

ecsa 2024

conference

vienna | 3-6 april

Book of Abstracts

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IMPRINT

Editor:



Date of publication: **20 March 2024**



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| **01 - Welcome**

WELCOME TO #ECSA2024: CHANGE, COLLABORATION, AND OUR COLLECTIVE FUTURE

Welcome to Vienna! It is with great enthusiasm that we introduce the 5th European Citizen Science conference (#ecsa2024), under the overarching theme of “Change.”

Change is all around us. Amidst conflicts, political evolutions, and environmental issues, there arises a call for citizens who are both knowledgeable and compassionate. Citizen science enables individuals and communities to comprehend, engage, and actively contribute to solving these complex challenges.

Over 500 participants – researchers, students, practitioners, and policymakers – gather in Vienna, joined by many others online, for four days of discussion, networking, learning, and celebration.

Let’s make the most of this opportunity, reaffirming our dedication to ECSA and the field of citizen science with resolve and optimism. Every action we undertake moves us a step closer to achieving a world that is both more sustainable and equitable.

A special thanks to the host team in Vienna, University of Natural Resources and Life Sciences and Naturhistorisches Museum Wien, for welcoming this record-breaking number of participants, both in-person and online. This success bodes well for the future and provides a wonderful opportunity to connect and celebrate the 10th anniversary of both ECSA and Österreich Forscht (Citizen Science Network Austria).

We are grateful for the support of our community and look forward to continuing to work together to build a brighter future through citizen science.

Enjoy the conference, the reading of this book of abstracts, and beautiful Vienna!

Dorte Riemenschneider, ECSA managing director

Berlin, 8 March 2024



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| 02 - Information



INFORMATION ON THE #ECSA2024 CONFERENCE

The ECSA Conference 2024 takes place from April 3 to 6 in Vienna, Austria. We invite researchers from all disciplines, scientists, practitioners, activists, funders, policymakers, non-governmental organisations, artists, and other interested citizens worldwide to reflect, discuss, and network on the topic of citizen science for change.

Conference topic: Change

The conference is focusing on the motto #Change, since we are in a time of rapid change on multiple levels. Change can be seen as positive by one group and negative by another. As a result, different perspectives on any given change can draw completely different conclusions.

Our aim

We want to address different approaches to change from all kinds of perspectives within the realm of citizen science and participatory research.

We want to discuss both active, transformative change, and the observation of change monitored by citizen science in all kinds of disciplines.

We want to highlight the potential of citizen science to be a change maker in research and society, and as a tool to manage the change happening around us.

ECSA2024 organising team



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- Chrysanthi Bairaktari
- Simona Cerrato
- Joe Jubb
- Paul Sorrell
- Franziska Žibert

BOKU team:

- Daniel Dörler
- Florian Heigl

NMH team:

- Katrin Vohland
- Helga Maria Auer
- Iris Ott
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- **Andrea Troncoso**
A mountain with wings
Germany

- **Katrin Vohland**
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Australia

- **Mendel Wong**
CitizenScience
Asia



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| 03 - Abstracts

PANEL DISCUSSION

Mainstreaming citizen science in Europe – Status quo and future perspectives

Barbara Weitgruber (Austrian Federal Ministry of Education, Science and Research), Susanne Hecker (Chair European Citizen Science Association), Maina Muniafu (Chair CitSciAfrica), Dejan Dvorsek (Deputy Head of DG Research & Innovation, EU Commission)

Chair: Christoph Rohrbacher

In this panel discussion, the panellists will reflect on the development of citizen science over the last ten years and discuss together how the future of the field could be shaped to promote the mainstreaming of citizen science in Europe and worldwide. How is the future of citizen science seen in Europe and the world? What role does citizen science play in the current changes taking place worldwide? How is the mainstreaming of citizen science, i.e. the integration of citizen science into existing funding programmes or the awarding of special citizen science funding, viewed? Are these positive or negative developments? What are the advantages and disadvantages? How does citizen science fit into new concepts of excellence? Does citizen science need its own criteria for excellence? How can the institutionalisation of citizen science (e.g. new infrastructures, new job profiles, long-term funding, embedding citizen science in strategies and institutional planning, etc.) succeed? And what added value can citizen science have for politics or for political action plans, e.g. SDG monitoring, European science for policy ecosystem? These questions will be discussed intensively.

KEYNOTE SPEECHES

The challenge of continuous adaptation: citizen science for a changing world

Shannon Dosemagen

We're at an unprecedented moment in human history. Technology is outpacing policy, transformations through open science have yet to become mainstream, climate change and the loss of biodiversity speed along faster than solutions. But the human ability to thrive in the face of adversity means there is hope. The fundamentals of citizen science can offer us ways forwards in this era of discontinuity – what is essential and what new approaches do we need to embrace?



Shannon Dosemagen directs the Open Environmental Data Project (OEDP). OEDP focuses on building spaces to grow the global conversation on environmental and climate data access and use. Previously, she co-founded and served for a decade as Executive Director of Public Lab, a community that uses open approaches to support people in addressing environmental issues. Dosemagen is a co-founder of the Gathering for Open Science Hardware, and serves on the boards of the Open Science Hardware Foundation, Code for Science and Society, and the USA National Parks Conservation Association. For her work, she has been awarded Fellowships with the Shuttleworth and Claneil Foundations, and at the Berkman Klein Center for Internet and Society, Harvard University. She previously chaired the USA National Advisory Council on Environmental Policy and Technology (NACEPT) and the Citizen Science Association.

Katja Mayer

The integration of societal participation into the production of scientific knowledge stands as a core principle within citizen science. Although participatory methods have a long tradition in the social sciences — exemplified by participatory action research in fields like sociology, education, and anthropology — a historical examination unveils the intricacies and obstacles tied to these methods' acceptance and application. Historically, participatory research often found recognition only on the fringes of academic discourse, encountering structural and power-related barriers. Moreover, the demarcation between political engagement and social science research was a recurring dilemma.

In my presentation, I will explore the intricate history of participatory research methodologies spanning various epistemic cultures and scholarly practices. I aim to shed light on the historical challenges these methods faced, including the power disparities disadvantaging participatory researchers and the hurdles in creating sustainable structures for such methodologies. Through specific examples, I will delve into the lessons that can be drawn for structuring and managing citizen science initiatives, particularly focusing on governing participation and acknowledging the contributions of all stakeholders in the collective knowledge production process. The aim is to delineate strategies through which participatory research can effectively navigate practical hurdles, thereby cultivating an inclusive, appreciative transdisciplinary research and development environment conducive to social change.



Katja Mayer is Elise Richter Fellow at the University of Vienna's Department of Science and Technology Studies exploring the interface of science, technology, and society, with a particular emphasis on the politics of open science and data infrastructures in the social sciences. She has been part of the Horizon Europe CoAct Project, studying how evaluation of citizen science projects could be done more participatory.

Her research spans from research and innovation policy to science diplomacy. With prior experience in the IT industry, as visiting fellow at Carnegie Mellon University, as a research advisor to the President of the European Research Council, and postdoc at the TU Munich's chair of Computational Social Sciences and Big Data, she's well-versed in the practical and theoretical aspects of her field. Furthermore, she is senior scientist at the Center for Social Innovation ZSI in Vienna and member of the Uni Vienna research platform Governance of Digital Practices.

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FOCUS SESSIONS

A focus session is a 4.5-hour format (divided by 2 breaks after 1.5 hours each) dedicated to one specific topic proposed by the focus session conveners. During the focus session, the chosen topic is addressed from multiple perspectives and with mixed formats, e.g., a series of presentations followed by interactive formats.

Rural citizen science: Fostering transformative change with rural communities

Claire Murray; Petra Benyei; Marco Barzman; Alexandra Czeglédi; Jessamyn Fairfield; Cathal Flood; Jacqui Goldin; Gerid Hager; Rick Hall; Peter Hoebe; Lucía Moreno; Stefan Thomas; Toos van Noordwijk; Anna Verones; Elise Werner

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The rural population is reported to be 43.1% of the world's population and is the custodian of most of the global biological and cultural diversity, simultaneously experiencing the most and the least changes in rural environments and societies. Rural communities are seeing some of the strongest impacts of the environmental and economic crises in their surroundings, with loss of habitats and species, increasingly extreme climate events, reduced employment opportunities and over-extraction of natural resources. However, they see frustratingly limited changes to an unsustainable agricultural system and in access to water/mobility/energy/digital infrastructure, in access to health care and education and are frequently excluded from policy decisions that directly impact them. This means they are communities that citizen science should be looking to engage and support, as they can both report the change (or lack of change) they are experiencing and bring change into their lives if they are empowered to be part of the processes and decisions that will impact them the most.

Participatory science is not new to rural areas, in fact it has a long and powerful history in fields like agricultural sciences, rural sociology or environmental monitoring. However, citizen science and open science have had limited reach in rural communities and bring new technical and ethical challenges. Many citizen science projects use digital platforms and tools that are often not appropriate in rural settings with low population density, formal education level and digital infrastructure. Indeed, several authors looking into the inclusiveness of citizen science highlight that there is an urban, industrialised and educated bias in citizen

science participant recruitment. This bias is also reflected at an institutional level, whereby universities and scientific institutions that run citizen science projects are mostly located in metropolitan areas. A small number of civil society organisations and a loose organisational structure make it difficult for rural communities to access the field of citizen science. Particularly when it comes to researching social phenomena, as in citizen social science, the creation of research forums where people come together in deliberative circles to discuss their perspectives on social developments, challenges and problems is of great importance. Rural areas therefore pose particular challenges for citizen science, requiring different forms of access, participation and involvement that still need to be developed and discussed.

This abstract is a combined submission bringing together interests and experiences of the ECSA-LKN Empowerment, Inclusiveness and Equity Working Group and the ECSA Agri-Food Working Group, with active engagement and contributions from both groups. We are collectively proposing this session as we want to unite the citizen science community's expertise to reflect on methodologies and approaches that empower rural communities and enable change. The session will include a broad range of interactive activities (from fishbowl to world cafe to other hands-on artistic exercises) that will help the group deliberate and expand on some pre-identified topics and generate ideas and a network for future collaborations (more details about the program will follow via email). Moreover, we aim to co-develop recommendations for the citizen science community to ensure we do meaningful, impactful and sustainable work with rural communities and actively identify institutional opportunities that can support rural community members to join us in this effort.

Taking citizen science in a new direction, one step at a time!

Chris Styles; Enrico Balli; Elena Buzan; Minja Krstić; Lea Podgorsek; Luciano d'Andrea; Claudia Colonnello; Elke Dall; Carmen Siller; Ilse Marschalek; Johannes Baumann; Rosa Arias; Vicente Aylwin; Evanthia K. Schmidt; Andrea Declich; Carla Montesano; Vittorio Colizzi Colizzi; Agnes Mirembe; Vasiliki Kiparoglou; Sarwar Shah; Jeremy Tomlinson; Raul Valdes Coteria; Francis Ogwal; Simona Cerrato

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Over these past 3 years, the Step Change project has been working together to demonstrate how citizen science can work in synergy across multiple fields of research to help tackle issues close to the hearts of society.

Through the collective efforts of our Step Change partners, we have been able to make significant strides in our understanding of how to adopt citizen science approaches in the fields of health, energy, and the environment, as well as its potential limitations, across EU and African perspectives.

From its inception, a key tenant of the Step Change project has been the idea that we can achieve so much more when we work together, as the saying goes: “if you want to go fast, walk alone, But if you want to walk far, walk together”, the same is true of citizen science. We are excited to use this opportunity to share what we have learned throughout the Step Change project, but to also hear from others, to map out the world that citizen science can create, and explore how these practices can help bridge the gap between research and society, by including society explicitly in your research.

This session will include contributions from two distinguished keynote speakers, sharing their thoughts on how citizen science will shape our future: Raul Valdes Coteria, from the UNESCO Institute of Lifelong Learning – will share their thoughts on how citizen science practices are being used to achieve the UN Sustainable Development Goals. The second keynote will be presented by Francis Ogwal, OEWG (open-ended working group of the UN environment programme) Co-Chair- who will speak about their experiences of biodiversity conservation from the perspective of the Convention on Biological Diversity and Nagoya Protocol, with a particular focus on Africa and the potential of citizen science on enhancing environmental protection. Each keynote speaker will be given an opportunity to answer questions from those in attendance.

However these are just two perspectives, and using these contributions as jumping-off points, we will open up our horizons with a series of open dialogue activities. Our audiences will be able to explore and share their experiences of how citizen science approaches could best be utilised, with some guidance from our Step Change project partners. These will include a world cafe activity and a fishbowl discussion.

We will also use this opportunity to showcase the new Citizen Science Navigator, an online repository of training resources and case studies from Step Change and other international citizen science projects, providing insights into how best to adopt citizen science in multiple fields of research and how to get the most from transdisciplinary partners and stakeholders. Following this introduction, we

will lead a discussion to determine what citizen science practitioners need from these resource databases, to ensure that the Citizen Science Navigator is truly fit for purpose.

The final part of this session will explore the power of mutual learning with our Step Change horizontal partners, as we ask our audience members to reflect on the future of citizen science, and how best we might use co-creation practices in order that the citizen science community can grow together, and determine how we might best provide the support needed to ensure that citizen science approaches can be adopted in all areas of research, so we can face future “wicked problems” in partnership with the communities researchers serve, rather than in opposition.

It is the hope of the Step Change project that we might use this rare opportunity, where so many of our friends and colleagues from the citizen science community are present together, to provide an experience that will enhance every participant’s experience of the ECSA conference, with a deep dive into the full potential of citizen science, and how we can learn from each other’s experiences to ensure that we embrace a collaborative research environment.

Together we have made Step Changes in the field of citizen science so that others might run!

Rethinking impact assessment of citizen science

Barbara Kieslinger; Stefanie Schuerz; Teresa Schaefer; Antonella Passani

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For many years we have been trying to show the many facets of citizen science and the impact it can have on individuals, communities, and society at large. There have been various attempts to model the process into frameworks, and provide guidelines and tools, such as the ones utilised by the European funded projects MICS, ACTION, IMPETUS and ECS. However, many initiatives still struggle with impact assessment due to a gap between what our models intend to measure and what we are able to actually implement in the context of our projects.

In this session we want to critically review how we are currently assessing the impact of citizen science and explore how we can move beyond collecting Key Performance Indicators (KPIs), telling stories and writing (mostly unread) policy briefs.

We propose to work with our participants in a highly collaborative way by combining design thinking and workshop methodologies. We will start by exploring the problem in more detail and develop a set of PoVs (point of views). In order to get a truly multi-stakeholder perspective, we will collect statements from the conference participants during the various breaks and networking opportunities. Next, we will bring our findings together to co-design new approaches and metrics to assess societal impact targeted at different stakeholder groups, each described as a persona. These first prototypes will be put to test by presenting them to critical friends in the conference and wrapped up in a final round of discussion. We will also discuss how to take the work from this session into next steps of creating e.g. an ECSA working group, preparing a manuscript or other tangible outcomes. In the end, participants will have collaboratively worked on new approaches for impact assessment. They will have gone through a design thinking process and learned a set of co-design methods along the way.

ORAL PRESENTATIONS

An oral presentation is a short talk (with or without slides) given by one or two persons in one of the auditoriums. Each talk is 10 minutes long, followed by 5 minutes of discussion. It will not be possible to present remotely.

Rethinking impact assessment of citizen science

Catherine Wilson

Citizen science has been growing in multiple sectors of society, including academia, policy, conservation and education. Approximately one-fifth of citizen science projects offer educational resources aimed at schools or children. Despite this, there has been a limited amount of research assessing teachers' perceptions of citizen science and the benefits gained by school students. To address this, two phases of research have been conducted. First, 149 teachers and school staff from the United Kingdom participated in an online survey. This showed that 47% of respondents had heard of citizen science, but only 22% had used citizen science. The respondents named barriers to using citizen science as an educational tool and identified which benefits they thought were most important for their students. The second phase of research was conducted in four primary schools in the English Midlands. The students engaged in a co-created citizen science project, which included seven different scientific activities (including asking questions, undertaking the experiment and disseminating their findings). The majority of citizen science projects are contributory (meaning that participants only collect data), and there is little published on the practice and outcomes of collaborative and co-created citizen science (projects where participants are involved in multiple aspects of the research). Changes in children's scientific and environmental attitudes were measured, and the children reported that some scientific activities had a greater impact on their attitudes compared to others. The paper will address three forms of change in citizen science. First, highlighting the potential for citizen science to be used as a change-maker in formal education. Second, the ability of citizen science to change students' attitudes and behaviours. Finally, discussing if changing citizen science to a more collaborative approach increases the benefits children gain from participation.

Changes in participants' online social interactions within a biodiversity citizen science project

Baptiste Bedessem; Ana-Cristina Torres; Colin Fontaine; Nicolas Deguines

Biodiversity citizen science projects are both valued for their contribution to scientific research and for their impact on participants' science learning and engagement towards the environment. In this paper, we assess the impact of participation in a biodiversity citizen science project (the *Spipoll*, dedicated to *pollinators' monitoring*) through the temporal analysis of online interactions within the program's data sharing platform. By drawing on a previous qualitative analysis of the comments exchanged by the participants within this platform, we focus on those comments which share items on aspects of biology and ecology related to the Spipoll program. This sample gathers 2009 comments from 2010 to 2018. We first classified the different constitutive elements from these comments into seven categories following the topics they deal with. We then studied the temporal change in occurrence of each of these topics from 2010 to 2018. We show that long-term participation is associated with the growing expression of scientific procedural skills: formulation of hypothesis and explanation, proposition of new research questions. To our knowledge, our study is the first one that detects the acquisition of such procedural skills in biodiversity citizen science. We also show that long-term participation is associated with the growing attention, on behalf of the participants, to natural seasonal cycles. Our study then illustrates the existence of transformative changes induced by long-term participation in citizen science. Reciprocally, our results highlight the value of the online traces of citizen scientists' activities to analyse these participants' outcomes of citizen science. Consequently, it should encourage the development of such online communication spaces within contributory projects, without restricting them to online citizen science.

Documenting a changing world: citizen science in biodiversity monitoring – lessons learned

Johannes Rüdissler; Friederike Barkmann; Peter Huemer

To counteract the ongoing biodiversity crisis, we need more and better long-term biodiversity data. This includes data on diversity and population trends. This information aids political decisions and environmental management strategies, and must therefore provide sound and reliable scientific assessments of the state and trends of biodiversity.

While official bodies often still underestimate the importance of biodiversity data, committed volunteers have been documenting aspects of biodiversity for a long time. The recent technical developments e.g. digitization, digital networking, mobile devices and successful application of artificial intelligence have led to an exponential increase in corresponding citizen science activities and collected data. While this data is very important, it cannot replace investment in professional and systematic biodiversity monitoring systems. To exploit the full potential of citizen science for biodiversity monitoring, a comprehensive approach combining citizen science with professional surveys is needed.

Based on more than ten years of experience with butterfly-monitoring in Austria (viel-falter.at) we reflect on strengths, challenges, and potentials of this approach: we aim to representatively monitor the development of butterfly populations by combining structured citizen science observations with regular expert assessments. The required transdisciplinary partnerships are demanding but enriching. To motivate volunteers to conduct reoccurring systematic hence, sometimes boring, observation, is challenging – but not impossible. For this, it is essential to find a balance between committed personal (and hence often time-consuming) contact with citizen scientists and efficiently addressing a large and diverse number of people. Finding a common language and understanding to merge citizen science with established research approaches promotes mutual enrichment, provides educational opportunities and supports scientific literacy.

Green roofs in a changing world – involvement of pupils to understand a complex system

Friederike Barkmann; Andrea Ganthaler; Stefan Mayr; Johannes Rüdissler

We live in times of increasing anthropogenic pressure on ecosystems and a consequential decline in biodiversity. Green infrastructure such as façade greening and green roofs are often promoted as valuable secondary habitats, able to compensate for the negative effects of urbanisation on biodiversity. At the same time, they are potentially vulnerable to climate change as they are limited in their capacity to retain water and are often located in urban heat islands.

In the Sparkling Science project “Green roof habitats” we investigate how green roofs support biodiversity and how they are affected by droughts and heat events. We work with pupils as Citizen Scientists to untangle the complex system of climate, soil conditions, vegetation, and insect biodiversity on the schools’ green roofs. New and innovative as well as state-of-the-art methods are used to assess the different components. This includes Malaise traps and metabarcoding for the assessment of insect biodiversity, as well as weather stations, soil sensors, and cameras that transmit real-time data about the roofs’ condition.

We share our experiences gained working with pupils aged between 12 and 17 years. Especially for young people, climate change and the biodiversity crisis are highly relevant topics that are often perceived emotionally and can yet stay abstract. By conducting research at their own school, the involved pupils deal with these topics in their daily environment and gain insights into scientific research. In direct exchange with scientists, they take part in several steps of the research process, including data collection, analysis and communication. Data collected in the project is freely available, and the pupils can conduct and present their own research. A meaningful integration of schools into a research process can be challenging, but it is highly rewarding to see the impact of the project on the attitude of involved pupils and how it sparks various initiatives in the schools.

Citizen science indicators in 2024 National Open Science and Research monitoring in Finland

Miki Kallio; Jonni Karlsson

The field of open science has developed strongly over the past decade. In Finland, the open science maturity level of research-performing organisations has been monitored since 2016. The National Open Science and Research Monitoring model was renewed in 2022 and it will be further supplemented again in 2024. One of the most significant changes is that the citizen science indicators will be included in the new model. In this presentation, we highlight what the citizen science indicators are like and what we want to achieve with them.

The monitoring indicators that are based on the Recommendation for Citizen Science (2022) and other recent developments highlight the establishment of citizen science as a vital element of the shared open science framework in Finland, particularly concerning implementation. In our presentation, we examine the various structures that support citizen science developments in Finland.

We also provide a brief overview of how open science is promoted in Finland through a national coordination model, in which the entire research community participates in developing national goals, co-creating policies and recommendations, and coordinating policy implementation.

One example of this cooperation and contribution to the shared framework is the Citizen Science Support and Services working group, operating within the expert panel Culture of Open Scholarship. Furthermore, citizen science is recognized as a crucial component of the Participatory Science service category within the upcoming Open Science and Research Reference Architecture that was open for public review in summer 2023.

Design impacts of citizen science. A comparative analysis of water monitoring projects

Sabrina Kirschke; Christy Bennett; Armin Bigham Ghazani; Dieter Kirschke; Yeongju Lee; Seyed Taha Loghmani Khouzani; Shuvojit Nath

Citizen science is often supposed to provoke change – from increasing data provision and knowledge product development, via behavioural change of citizens, to problem solving. Likewise, researchers increasingly emphasise the role of project design in initiating these changes through citizen science. However, respective claims are mostly based on single case studies and reviews, calling for a systematic comparative approach to understanding the effects of project design on change. Based on a survey amongst 85 water-related citizen science projects from 27 countries, we analyse the comparative effects of literature-based design principles on project impacts. Factor analysis first reveals three key impact factors which are data output, citizen outcome, and impact chain. Regression analysis then shows that these impact factors are significantly influenced by several design factors, amongst which motivational factors are most prominent. The analysis also shows that design factors are most important for impact chain, followed by citizen outcome, and data output. While design factors only partly explain the overall project effects, the regression results are rather stable and significant when including other potential influencing factors like project responsibility and funding. In sum, the results provide an empirically substantiated and differentiated understanding of citizen science impacts and how these are influenced by project design.

Kirschke, S., Bennett, C., Ghazani, A. B., Kirschke, D., Lee, Y., Loghmani Khouzani, S. T., & Nath, S. (2023). Design impacts of citizen science. A comparative analysis of water monitoring projects. *Frontiers in Environmental Science*.

Changing for the better: citizen science and the development of community resilience

Ana Daniel; Jorge Fernandes

In recent decades, the occurrence of natural disasters, with devastating impacts on local communities, has become increasingly frequent around the world. As a result, there is the urgency to make risk reduction and the promotion of resilience a core element in public policy, especially in the case of developing countries. A resilient community is one that takes intentional action to enhance the personal and collective capacity of its citizens and institutions to respond to, and influence the course of social and economic change. Nevertheless, the promotion of community resilience is a complex and understudied phenomenon. This article aims to contribute to this literature gap by assessing the role of citizen science approaches in the development of community resilience, since citizen science is considered a promising approach for generating new knowledge and promoting social capital. In this case, a systematic review of existing literature was performed and 12 case studies were analysed in-depth.

The results show that citizen science initiatives are relevant for developing resilience through i) the collection of data from novel sources or remote places where data is scarce, allowing for a better characterization of potential hazards, and the identification of community needs, perceptions and behaviours; ii) enhancing community awareness and knowledge about hazard protection; iii) increase human and social capital through specific training initiatives; and iv) promote the cooperation between community (citizens), academia (professional scientists) and government (policymakers), which is relevant for the development of public policies shaped to local context, and aligned with community's needs and expectations. Finally, the article proposes several contributions to both theory and practice, as it explores the broader effects of citizen science initiatives on communities, such as the ability to promote change in order to better face future challenges.

From local to national place-based citizen science – upscaling and upskilling

Claire Narraway; Sophie Cowling; Georgina Sturgeon; Divya Kumar; Daniel Hayhow

The effects of climate change are being felt ever more intensely, particularly across urban environments, requiring solutions that engender both environmental and social change at scale. Natural features, such as nature-based solutions, are increasingly implemented to adapt urban environments to the effects of climate change. Large-scale monitoring of natural features is required to ensure appropriate implementation, conservation, and management however this is often prohibitively costly. Citizen science programs could facilitate this and simultaneously, provide active learning opportunities, fostering connection to nature and driving ecological behaviour change.

Citizen science projects that monitor natural features are often place-based and bespoke to the communities that they serve, requiring staff and time-intensive on-the-ground community engagement to build reciprocal trust between the community and researchers. The approach can facilitate engagement of underserved communities, accurate data collection, and pro-environmental behaviours but upscaling is notoriously difficult.

Tiny Forest, led by Earthwatch Europe, is working to find solutions to this problem. The project aims to understand the potential of small Miyawaki forests as a nature-based solution and engage people around the benefits of urban green infrastructure. Today, over 200 Tiny Forests are planted across the UK meaning that regular in-person engagement across the network is prohibitively person, time and cost-intensive. Instead, Tiny Forest deploys online community engagement, collaboration with other community groups, in-person hub days, and a new way of working with university student-led societies to reach communities across the country. In this presentation, we explore the practicability and potential of these methods in engaging communities for environmental and social change.

Beekeeper participation in environmental monitoring in Europe

Robert Brodschneider; Kristina Gratzner

Beekeepers have actively participated in research by taking samples from their beehives to study the environment. Honey bees (*Apis mellifera*) closely interact with vegetation during their foraging activities, inevitably coming into close contact with plants and environmental pollutants. Worker bees also transport these pollutants to the beehive with their hairy body and the food they collect. There, beekeepers can collect samples to study the pollution levels in the vicinity of the hive. The first European-wide study C.S.I. Pollen (2014-2015) involved 750 beekeepers determining the number of different colours in pollen samples collected from their colonies. This number serves as a rough indicator for the botanical diversity available to honey bees, enabling conclusions about the floral diversity among different landscapes. In the EU-funded INSIGNIA study (2018-2021), pollen samples were collected and analysed using DNA-metabarcoding techniques. Additionally, non-invasive hive sampling methods for pesticides were introduced. For the latter, beekeepers were provided with Tenax-coated strips, which they placed in the hives. The most recent INSIGNIA-EU study (2021-2024) expanded the range of environmental pollutants under investigation in beehives to include polycyclic aromatic hydrocarbons (PAH), volatile organic compounds (VOC) and microplastics. While these projects can best be categorised as contributory projects, there is a growing desire for even stronger involvement of beekeepers. In this presentation, we share new findings derived from a large-scale survey conducted among the participants of the INSIGNIA-EU project. The findings include aspects such as beekeeper citizen scientists' demography, their level of involvement, motivations and their opinion on ethics and data protection.

Responsible Research and Innovation in citizen science: what changes does it make?

Loreta Tauginienė; Barbara Heinisch; Eglė Butkevičienė

Citizen science and Responsible Research and Innovation (RRI) are inextricably linked. We therefore discuss impediments and motives of practising principles of RRI in citizen science. Using constructivist grounded theory, we analysed semi-structured interviews conducted with 20 citizen science projects. Our findings show that there are a few impediments that restrict the interviewees from embedding RRI in citizen science projects. First, there are concerns related to public engagement, e.g. understanding of public engagement as the concept, consideration of the societal needs in general, building and maintaining relationships, particularly communication throughout the entire project, slowed down research process and increased paperwork. Sometimes both citizens and governments have unrealistic expectations towards science to provide solutions to all problems and, when these expectations are not met, this diminishes trust in science and in impact of science. In terms of gender equality, inequities, e.g. regarding gender, background or religion, were traced in citizen science projects. Scientists usually have no customised science education training, specifically how to apply RRI (not only in citizen science). In terms of ethics, research ethics procedures do not take account of the needs of citizen science projects and are not adapted to citizens as active participants (and not only as research participants). Ultimately, open access can be an obstacle if personal or sensitive information needs to be collected in citizen science projects. Due to all these obstacles the interviewed citizen science projects feel that they are acting in the grey zones of the permissible. Despite that, the interviewed citizen science projects shared a few motives that encouraged them to practise RRI in citizen science, e.g. the interest to follow an approach of good science (good research practice), to evidence data reuse by other stakeholders or in other formats and learning experiences. Given the previously mentioned, changes should be implemented to acknowledge the value of RRI in citizen science and to provide citizen science-relevant resources to scientists.

Outlining the landscape of citizen-powered data ecosystems for inclusive and green urban transitions

Gerid Hager; Laura Temmerman; Carina Veeckman; Katerina Karagiannopoulou; Vanessa Boas; Inian Moorthy

People living in cities are increasingly exposed to environmental stresses, such as air pollution and heat stress. Access to greenspace, which provides ecosystem services and health-related benefits, varies both between and within cities, creating and accentuating inequalities. The pledge to plant 3 Billion Trees in the EU by 2030, the European Green Deal, or the Green City Accord place utmost importance on urban greening. Yet, public authorities still face considerable data gaps and lack a circular Open Data Ecosystem, for enabling change towards more just and sustainable cities. The Urban ReLeaf project brings public authorities and local communities together to jointly create this change. Six pilot cities develop inclusive citizen observation campaigns to provide essential information for improving the quality of life for everyone. This presentation introduces the Urban ReLeaf process framework for the collection, uptake, and validation of citizen observations to complement authoritative information systems. We highlight first results and lessons learned for other cities and academics from two stepping stone activities to identify opportunities for citizen participation to urban planning and policy: (1) mapping existing data streams stewarded by city administrations and the best-practices related to the data asset quality, ethical content, and level of openness, capitalising on the Data Landscape Playbook methodology, and (2) capturing the urban policy landscape on urban greening, climate change adaptation, citizen science and inclusive citizen participation by reviewing policy texts and interviewing key stakeholders in city administrations. These activities helped understand the local planning context and city readiness level regarding citizen participation and the integration of citizen data in policy making. It also helped spot data gaps and identify opportunities for inclusive citizen observation campaigns that are both relevant to citizens and urban planning.

Leverage the impact of citizen science with innovative communication tools and methods – the NEWSERA legacy

Joana Magalhães; Paolo Giardullo; Maria Angela Citarella; Maite Pelacho; Cristina Luís; Inês Navalhas; Esther Marin-Gonzalez; Leire Leguina; Elisabetta Tola; Rosa Arias

Society is dealing with several challenges such as those related to climate or health, concomitantly affected by an exponential rise of fake news, misinformation and disinformation. NEWSERA project has shown that citizen science has an enormous potential as an inclusive, broad and powerful science communication mechanism to increase trust in science and reduce the chances of incurring in fake news. For this, NEWSERA engaged 39 citizen science projects from Portugal, Italy and Spain, as pilots, in the development of communication strategies specifically addressed to quadruple helix stakeholders and journalists, through a series of workshops, entitled the #CitSciComm Labs. As a result, we co-created a series of five blueprints of targeted communication strategies to involve academia, society at large, policymakers, industry and journalists, in ongoing or emerging CS. Each blueprint includes specific guidelines, recommendations and case studies. To support its implementation, an ad hoc and open access impact framework, complementary to other more established frameworks, to specifically allow the monitoring of communication actions. Moreover, a misinformation checklist can support citizen science projects to prepare and disseminate fact-based, reliable, verifiable and thus trustworthy information to different audiences. The learnings from NEWSERA are currently being applied both in the training of citizen science projects involved in the IMPETUS project accelerator and the COALESCE project that is establishing the EU Competence Centre for Science Communication in order to foster preparedness to respond quickly to crises that need science communication and citizens involvement.

Citizen science and its potential for aiding an energy transition.

Luke Gooding; Sarah West; Rachel Pateman

Citizen science has emerged as a powerful approach to engage the public in scientific research across various domains. This paper explores the intersection of citizen science with the Sustainable Development Goals (SDGs), highlighting its role in addressing environmental, social, and health challenges. While citizen science has made significant contributions to SDGs, there is an evident gap in addressing SDG 7, "Affordable and Clean Energy." The paper emphasises the potential for citizen science to provide data and insights towards achieving SDG 7, focusing on energy access and renewable energy.

The study reviews existing citizen science projects related to energy transitions, examining their goals, methodologies, outcomes, and challenges. It identifies successful case studies to showcase the diverse ways citizen science has been applied to address energy challenges. Additionally, the research aims to bridge the gap between citizen science and energy transition research by investigating the reasons behind their limited coupling, including disciplinary divides, institutional structures, funding mechanisms, and policy frameworks.

The findings reveal three primary pathways through which citizen science supports energy transitions: problem identification and research agenda setting, resource mobilisation, and co-evolution of socio-technical aspects. Citizen science empowers communities, fosters participatory approaches, and generates knowledge that informs decision-making processes, ultimately driving positive change towards sustainable and inclusive futures. However, challenges related to data quality, inclusivity, sustained involvement, privacy/data security, and managing expectations must be addressed for successful citizen science energy projects.

In conclusion, this research underscores the potential of citizen science in advancing energy transitions and underscores the need to expand its integration in energy-related research.

"Get on board with researchers": life CONCEPTU MARIS marine citizen science campaign

Loredana Mulas; Elena Santini; Lara Carosso; María Leonor García-Gutiérrez; Paola Agostini; Marta Azzolin; Mauro Bonocore; Giovanni Coppini; Matteo Costantino; Roberto Crosti; Lea David; Marianna Farina; Livio Favaro; Natalia Fraija; Marco Gamba; Cristina Giacoma; Martina Gregorietti; Rita Lecci; Giulia Luzi; Fulvio Maffucci; Paolo Mancuso; Valeria Masala; Érica Moura; Eugenia Pasanisi; Juan Antonio Raga; Selvaggia Santin; Gianluca Sarà; Antonella Servidio; Paola Tepsich; Francesco Tomasinelli; Gianluca Treglia; Roberta Teti; Elena Valsecchi; Morgana Vighi; Antonella Arcangeli

Could citizen science contribute to the conservation of CEtaceans and Pelagic sea TUrtles (CEPTU)? Life CONCEPTU MARIS (LIFE20 NAT/IT/001371) bets on this possibility implementing Marine Citizen Science activities. Indeed, the involvement of citizen scientists in the marine environment is still weak especially for the monitoring of CEPTUs species given the difficulties on reaching the offshore areas where they live. At present, the project involved around 263 citizens who embark with researchers for monitoring marine life from ferries along 16 routes in the Mediterranean, contributing to increase data collection. In this regard, our Citizen Science activities represent a driving force for change with a powerful scientific, policy and societal value.

Scientific value is enhanced by gathering data to generate a better understanding of CEPTUs conservation status. The quality of the data collected by citizens is guaranteed by the constant presence of researchers and by a specific training on monitoring according to standardised protocols. Trained citizens will be able to contribute autonomously providing data through the App "Marine Ranger" (Life DELFI, LIFE18 NAT/IT/000942) and be informed about the conservation action. They will also be acknowledged in scientific publications based on data collected during the monitoring session.

Policy value is given by the quality of data gathered by citizens, which allows assessing the conservation status of CEPTU species, supporting scientific-based decisions and public policies. In this context, Citizen Science can contribute to policy improvement.

Societal value is achieved by raising awareness of project environmental issues also through a Citizen Science Campaign (open call for volunteers in 4 languages, 18 events, dedicated website and newsletter, media). On board experience leads citizens to a clear understanding of the current challenges facing marine species and ecosystems, which will be critical for a behavioural change.

Can citizen science in water-related nature-based solutions deliver transformative participation in agri-food systems? A review

Seyed Taha Loghmani Khouzani; Victoria Dany; Nadine Seifert; Kaveh Madani; Edeltraud Günther

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Agri-food systems are increasingly impacted by external shocks, stressing the need to transform them towards increased sustainability and resilience. Various disciplines highlight the role of Nature-Based solutions (NBS) in addressing societal challenges while creating sustainable and resilient contexts.

In steering transformative processes, participation is vital as a governance variable. However, motivating stakeholders' engagement with NBS uptake in decision-making requires evidence proving NBS's potential to address their concerns effectively. This review systematically analysed the potential of Citizen Science (CS) to overcome the barriers to NBS adoption and to drive stakeholders' attitudes towards sustainability.

Focused on water as an essential element of the agri-food system, 46 articles were systematically analysed to examine utilised water-related NBSs, locate relevant drivers and barriers of NBS and participation, and the discourse on citizen science potential.

The results highlight the emphasis of scientific literature on exclusive methods of NBS adoption and the human-centric services of NBS. While NBSs related to climatic extremes are most applied, less attention is paid to irrigation and WASH capacities as the respective input and output of agri-food systems. Most critical to NBS uptake are participation and finances. This review justifies using CS-NBS as a methodological approach to increase stakeholder engagement with NBSs. Such

methods can track the effectiveness of harmonised human-nature cooperation in promoting sustainability and resilience-building.

CS-NBS can increase the harmony between human and natural systems. This approach values and amplifies notions of inclusiveness and the incorporation of local knowledge. CS-NBS can initiate interdisciplinarity, collaborative learning, knowledge sharing, and enhanced participation in decision-making while unlocking the transformative capacities of NBS and strengthening the science-policy-society interface.

From fragmentation to cooperation: the collaborative efforts for change within the Citizen Science Community in Switzerland

Nikola Stosic; Tizian Zumthurn

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Our contribution to the ECSA 2024 conference highlights the evolution of "Schweiz forscht - tous scientifiques" at Science et Cité and the associated establishment of the Citizen Science Network Switzerland as the national hub for Citizen Science in Switzerland. We summarise the current developments and changes in the Swiss Citizen Science landscape, which lead from fragmented approaches to increased collaboration and co-creation. Examples include the founding of the Swiss Parks Working Group, the formulation of the 10 Swiss Citizen Science Principles and other forward-thinking reports and initiatives. In this manner, we share exciting and exemplary observations from the field that have shaped the development of the Swiss Citizen Science movement.

Finally, we take a look into the future and discuss what change is still needed, based on the findings of the report "Citizen Science in Switzerland: Contextual Analysis, Recommendations and Roadmap". This report forms the basis for the formulation of recommendations for action and initiatives to strengthen Citizen Science in Switzerland, in which experts from various fields work together collaboratively.

Driving change: transformative power of citizen science on a university campus

Inês T. Rosário; Sergio Chozas; Patrícia Tiago; Ana I. Leal

Biodiversity is rapidly declining, yet public awareness remains low. Engaging people in conservation is a big challenge, especially in urban areas where contact with nature is limited. We launched +Biodiversity@CIÊNCIAS project, the 2020 Ideas for Sustainability Competition winner (Faculty of Sciences of the University of Lisbon), to promote biodiversity knowledge and empower Ciências community to observe and register species on the campus. The project monitored biodiversity over time, with the support of "Science community" (students, researchers, etc.) and with citizens who live and work in the area. We used traditional monitoring methods and data recorded in the citizen science platform BioDiversity4All/iNaturalist.

Over two years, the project significantly boosted the campus's citizen science activity, growing observers from 81 to 366. This surge directly impacted observations (that grew from 675 to 8018) and species (from 255 to 971). Plants and insects led with observations (4372 and 1481), while birds had the top species: the common blackbird (*Turdus merula*, 115 obs.) and the black redstart (*Phoenicurus ochruros*, 87 obs.), followed by the first plant, the oleander (*Nerium oleander*, 68 obs.). Four categories of users were defined regarding their relationship with science, the project, and the citizen science platform: Naturalists, Researchers, Students, and Others. Daily observations increased significantly for all categories during the project, particularly for Students and Researchers. Most of Student observations were recorded on campus, while Researchers, Others, and particularly Naturalists also registered beyond the +Biodiversity@CIÊNCIAS project area. These findings highlight citizen science's potential for increasing biodiversity interest among the university community and the public. Citizen science is thus a perfect tool for addressing societal engagement in biodiversity conservation in the face of an unprecedented biodiversity crisis.

A competency framework for digital inclusion in citizen science

Mohammad Gharesifard; Irene Vivas Lalinde; Brooke Flanagan

Public engagement with science through citizen science projects often includes knowledge co-creation processes that bring together multiple actors. A prerequisite for the success of such processes is understanding of competencies that each actor brings to the table, or those that they may need to develop to be able to better collaborate with each other. In this context, competencies are understood as skills, knowledge, and attitudes for inclusion of different actors in citizen science projects. Without a good understanding of typologies of skills, knowledge, and attitudes required by citizens to participate in citizen science initiatives, or those of project initiators to engage citizens in such initiatives, it is not possible to systematically measure and consequently improve those competencies.

Between 2021 and 2023, the Digital Inclusion working group of CitiMeasure, an EU-Funded project led by Eurocities, took on the challenge of developing a set of guidelines for understanding competencies for digital inclusion in citizen science projects. The guidelines provide a useful framework for understanding and enhancing such competencies and provides a basis for better promoting inclusion in citizen science projects.

The guidelines were developed through a co-creation process involving 24 working group members from seven European cities and nine organisations. The guidelines thus reflect the collective understanding and experiences of these stakeholders and are intended to be a useful resource for cities, the citizen science community, and those interested in competencies for public participation and stakeholder engagement. The framework is built on the critical review of 39 resources including peer-reviewed publications, project reports, policy documents, and other useful sources of information.

The aim of this talk is to familiarise the audience with the competency framework and its potential applications.

BioBlitz: bridging citizen science, education, and biodiversity research for conservation action

Frederic Griesbaum; Julia Rostin; Alexis Tinker-Tsavalas

Biodiversity loss, climate change, and pollution pose a triple crisis that threatens our global and local biodiversity. Paradoxically, science still lacks comprehensive knowledge about the systematics of organisms, the number and composition of species, and, most importantly, how to change human behaviour to prevent ecosystem collapse. BioBlitzes, a collaborative effort between scientists, naturalists, and the public, aim to comprehensively document the biodiversity of an area in a usually short, pre-defined, period. The involvement of citizen scientists in BioBlitz events has proven valuable, both in collecting robust data on local flora and fauna – and in engaging citizens as biodiversity ambassadors. In recent years, BioBlitz initiatives have expanded and become a significant method for environmental monitoring and protection worldwide, contributing to environmental education and awareness. However, challenges persist in reaching people and ensuring post-event data quality. Our presentation gives an overview of globally organised BioBlitz events, their development, and impact on conservation initiatives, but also about the importance of the methodology and the possible educational aspects of citizen scientists. In addition, we report on our own experiences and exemplary results of events such as the global “City Nature Challenge” or “Home River Bioblitz” in Berlin. We discuss how we increased the number of participants and observations in recent years.

We aim to promote the organisation of regular, small-scale BioBlitz events by schools, local administrations, and nature conservation associations, as well as discuss the wider usage of the BioBlitz method at natural history museums to educate various stakeholders in civil society, ecology, and conservation. Overall, our objective is to strengthen the interconnectedness of citizen science, education, and biodiversity research, to drive transformative change in these vital areas.

Changing knowledge and attitudes through citizen science at schools

Natalia Ghilardi-Lopes; Gustavo Bellini Monteiro; Jussara Almeida Bezerra; Janaína Dutra Gonzalez

We report the results of three ongoing master’s projects in the Postgraduate Program in Teaching and History of Sciences and Mathematics at the Federal University of ABC (Brazil), which highlight the learning outcomes facilitated by school-based citizen science.

The first project focuses on investigating the biodiversity of the school garden. It involved 96 elementary school students in a co-created approach to citizen science through a 13-step inquiry-based teaching sequence. Conceptual knowledge about biodiversity increased from 2.1% to 92.7%, while understanding of citizen science improved from 6.2% to 79.2%. The students generated 135 productive research questions, of which 21 were selected, and their results were published in an E-book and documented on the iNaturalist platform (<https://www.inaturalist.org/projects/biodiversidade-do-jardim-da-emef-dom-benedito>).

The second project utilised a collaborative protocol for observing the phenology of trees with three high school classes. The teaching sequence comprised 8 steps, including hypothesis formulation, lectures, tree observations, data submission on the Anecdata platform (<https://www.anecdata.org/projects/view/1061>), data analysis and interpretation, and text production. Most students understood the life cycle of angiosperms; 30% started observing plants frequently, while 23% increased their study of them. About 70% felt capable of contributing to scientific projects, and 28% expressed interest in pursuing a scientific career. The data collected by students exhibited an average accuracy and precision of approximately 70%.

The third project was based on a 6-step teaching sequence to 153 5th-grade students from 10 public schools, with the goal of developing knowledge about sustainable food education. The results showed a 70.4% reduction in food waste (from 127.3g to 33.2g per student) and an increased awareness of the environmental impact of food waste.

What change can quality criteria bring for Citizen Science portals and projects

Daniel Dörler; Barbara Kieslinger; Teresa Schäfer; Florian Heigl

In 2018, "Österreich forscht" (www.citizen-science.at), the Austrian Citizen Science portal, introduced binding quality criteria for all citizen science projects that want to be listed on the platform. All these projects have met the 20 quality criteria, which were developed in a co-creative process with project coordinators, citizen scientists and external experts and cover the areas of scientificity, collaboration, communication, open science and ethics. The criteria are based on relevant documented experiences from literature and embrace disciplinary diversity.

Since 2018, in total over 100 projects from a wide range of institutions and disciplines have gone through the quality assessment process. In this contribution, we would like to present preliminary results of an evaluation of the quality criteria carried out in 2023, based on qualitative and quantitative research methods using the records of all projects that applied for listing on "Österreich forscht" since the introduction of the quality criteria. The evaluation was driven by the following questions: (1) Can criteria be applied to the diverse backgrounds of the projects in "Österreich forscht" or are some criteria excluding certain research directions or institutions or citizen-led projects or represent a particular hurdle? (2) What conclusions do we draw from this evaluation for others to apply quality criteria? E.g. Do the criteria contribute to a change in quality of citizen science projects? (3) What are the advantages and disadvantages of the criteria for "Österreich forscht"? We will give detailed insights into these aspects and suggest a critical discussion on the intended and unintended changes that the selection process based on quality criteria brought forward.

Citizen science backstage: a rocky road towards unexpected outcomes

Laure Turcati; Alice Millour; Renaud Debailly; Anne Dozières; Asma Steinhausser; Karèn Fort; Coentin Biets

We propose here to share our thoughts as researchers and project leaders on the difficulties we have experienced in running our citizen science (CS) projects. We are doing this as part of the Science Ensemble institutional network. Our disciplines and participatory practices are very diverse, which enables us to conduct a cross-disciplinary reflection on participation.

Our approach is part of the "culture of error" in citizen science introduced by Westreicher et al. (2021): we propose to share our vision of the errors and difficulties that we have identified, what we learnt from them and what we would do differently today.

We have identified 3 types of errors or difficulties, which we will illustrate with examples drawn from our own experience.

The first type of error is the one you will not make again.

In contrast with this first type of "plain mistakes", the following two types of difficulties are an invitation to defend a more realistic vision of citizen science and also to change our judgement on our own errors or difficulties.

The second type of difficulties differs from the previous one in that it is not due to an absence or a weak experience of citizen science. It refers to the uncertainties that are inherent to the plasticity of citizen science projects.

At last, we present how the development of a citizen science project may lead to unexpected consequences, both in terms of scientific objectives and community-wise. If some of these consequences sometimes emerge from obstacles encountered through the project, they represent a deviation from the initial approach that can be a source of opportunities. These last two types lead us to reflect on the issue of uncertainty and the way it manifests itself in citizen science.

By sharing the difficulties we have experienced and by reflecting on them collectively, we are encouraging a change in the way we look at mistakes and difficulties. To see them as inherent elements of our professional lives that can also take us elsewhere or further away than we thought when we set out.

Effective engagement in citizen observatories: lessons learnt from “Spot the Challenge” strategy

María Vicioso; Macarena Marambio; Sandra Espeja; Paula López-Sendino; María García; Gemma Agell; Martí Vilanova; Óscar Chic; Joaquim Garrabou

Citizen science projects tend to struggle for long-term volunteers’ engagement, especially in natural sciences, where long-term monitoring is essential to be able to track environmental changes. To address this issue, Observadores del Mar is developing the strategy “Spot the Challenge” based on “challenges” campaigns. Each challenge is designed to provide observations to fill data gaps on specific topics related to ongoing processes (e.g. ocean warming) or the onset of new phenomena (e.g. outbreaks of species). These campaigns ensure data reliability by: i) diverse communication materials, ii) online and field training, and iii) expert validation, and moreover, they provide feedback on results and assessments on the conservation status obtained, targeted to participants and the broader public. In this communication we will share lessons learnt from the “Spot the Challenge” strategy with emphasis on the use of diverse communication tools. Overall, this strategy has shown to improve volunteers’ engagement in short and long term and achieve positive results from citizen participation.

Observadores del Mar (OdM) is a marine citizen science platform devoted to enhancing understanding on the conservation and health status of marine ecosystems. At present, the platform hosts 17 projects that gather information on biodiversity data (species distribution and abundance) and anthropogenic impacts over marine ecosystems (e.g. colonisation of invasive species, mass mortality events and marine litter impact). Currently OdM has over 5300 volunteers, 500 entities and 100 scientists from more than 50 research institutions and universities. Over 21.000 observations have been scientifically validated, resulting in more than 50 scientific communications

and presentations. OdM is providing reliable and relevant scientific information while allowing citizens to get involved in marine sciences, facilitating the interaction among different stakeholders aiming to work for a healthy ocean.

Changing the representation of speakers in and beyond academia

Gergely Szabó; Enikő Grécsi-Zsoldos; Zsuzsanna Kocsis; Fruzsina Sára Vargha

The scholarship on linguistic variation has long been advocating for research activities that potentially change the representation of less prestigious languages and dialects in order to reduce stigmatisation towards their speakers. However, this objective has been achieved in only a few contexts. For instance, previous research on the spatial variation of Hungarian celebrated linguistic diversity and, paradoxically, contributed to the marginalisation of speakers by still positioning dialects opposed to an imagined standard language. In this talk, we present two projects inspired by citizen science approaches in which we intended to change this representation. We aimed to achieve this goal by including the language expertise of speakers in the study of spatial variation in different ways. In the first project, titled Citizen Dialectology, we published a map visualising online material that displays local linguistic particularities irrespective of being created by academic figures or grassroots endeavours. By treating these bottom-up depictions of named local varieties equally valuable as other academic forms of data publication, we wished to contribute to the acknowledgement of “lay people’s” language-related knowledge as legitimate forms of knowledge for linguistic inquiry. In the other project, we delivered a longitudinal study on the change of acoustic characteristics of vowels in the Palóc (Northwestern) dialect. In this study, we compared 60 years old recordings with ones created in 2023. In these new recordings, high school students interacted with each other. In the second phase of data gathering, the same high school students were invited to conduct interviews with elderly relatives and become citizen scientists. Drawing on the experiences of these two projects, we argue that the representation of certain dialects and their speakers can only be changed if we also change conventional roles in research, such as researchers and informants.

Citizen Science Global Partnership – Changing the course of global citizen science activities

Rosy Mondardini; Mendel Wong; Francois Grey; Maina Muniafu

The Citizen Science Global Partnership (CSGP), formally established in Oct 2022, has the ambitious goal of changing the way citizen science communities interact globally. Specific objectives include supporting the exchange of resources and methodologies between the global north and south, leveraging existing know-how of practitioners across the world, and producing new knowledge that would support the global engagement for sustainable development.

Over the initial ramp-up period, the partnership has been (and still is) tackling key strategic issues such as its role vs the role of regional and national CSA, the criteria for membership and partnership, how and where to seek support, and more.

At the same time, on a more concrete level, CSGP has already started solidifying its reputation by engaging on the international scene. For instance, it has contributed to the implementation of the UNESCO Open Science Recommendations, and it's working with UNEP on including citizen science data in their World Environment Situation Room Portal. The partnership also launched a UNICEF project on 'learning to earning' using citizen science to tackle environmental challenges at the community level, a project that provides direct support to CitSciAfrica Association. Plans include participation in the SDG Olympiad, an initiative to introduce global youth to citizen science for environmental health.

This oral presentation is a chance for the community to hear an update about CSGP's recent achievements, ongoing discussions, and plans for the short and long term future.

Telraam: empowering citizens to count traffic in the EU project COMPAIR

Kris Vanherle

Together for better air! Using citizen sensors to improve urban air quality.

We help cities and regions improve air quality by raising the quality of citizen science data for decision making. Equipping citizens with easy to use sensors and data dashboards we supplement gaps in official data to help drive the necessary personal and policy changes needed for a sustainable future.

In this presentation, we'll share the findings of a few use cases of the Telraam citizen science sensor in the project. Citizens were involved in the installation of a schoolstreet. The engagement of citizens involved collection of pre-intervention baseline data, post-intervention data and data analysis to assess impacts.

This talk will elaborate on the technical findings of the experiment. Items we'll tackle will be:

1. Did the citizen science generated data make a difference?
2. Was the engagement of citizens in the data analysis of particular value?
3. What is the experience of the citizen scientists with the sensors used?
4. The concept of the "super volunteer"?

How citizen science has changed SDG monitoring of marine plastic pollution in Ghana

Linda See; Dilek Fraisl; Omar Seidu; Kwame Boakye Fredua; Sarah Kollar; Tyler Kobla-Amalgo; Dany Gafari; Ian McCallum

Marine plastic litter poses a significant threat to the environment, which has been recognized by the United Nations (UN) in the framework of the Sustainable Development Goals (SDGs) and in the resolution to combat plastic pollution adopted by the UN General Assembly in 2022. The country of Ghana generates

approximately 1.1 million tons of plastic waste annually, with only 5% collected and recycled. Recently, the Statistical Service and the Environmental Protection Agency in Ghana recognized the need to change the way they monitor and report on marine plastic pollution, in particular, by drawing upon citizen science and the involvement of local communities. Various community groups and organisations in Ghana have worked actively with the ocean conservation to implement a standardised approach to gather and categorise plastic pollution and marine litter data in numerous beach cleanup campaigns. These data are integrated into the ocean conservation publicly accessible Trash Information Data for Education and Solutions (TIDES) database, which has data from more than 150 countries. This presentation will outline how these existing citizen science data and international and national networks were leveraged to address the data gap on marine litter in Ghana, demonstrating how Ghana has become the first country to officially report on plastic debris density under SDG 14.1.1b using citizen science data. Moreover, government agencies in Ghana have become more familiar with citizen science methodologies and gained a greater understanding of citizen science activities related to marine litter in the country. This significant step change in embracing alternative data sources by the Ghanaian government has also resulted in their contribution to the development of the country's Integrated Coastal and Marine Management Policy. This example provides a pathway for how other countries could adapt their methods for marine plastic pollution monitoring and involve citizens more actively.

Then and now: citizen scientists help assess the changing biodiversity of minnows in Austria

Anja Palandačić; Min Chai; Susanne Reier; Rok Friedrich; Sabine Wanzenböck; Josef Wanzenböck; Hans Rund; Florian Glaser; Ernst Mikschi

The minnows of the *Phoxinus* species complex were long thought to be a single species, as even experts found it difficult to distinguish them by external features. In the last 10 years, however, their status has changed dramatically as molecular studies have revealed a high level of genetic diversity within this group of fish. Currently, more than 23 genetic lineages are known in Europe, of which 14 are recognised as valid species. In Austria, instead of one common minnow, studies have revealed at least four species, three of which are presumed native and one

introduced. The Citizen Science project "Biodiversity of minnows in Austria", funded by the Federal Ministry of Education, Science and Research as part of the "Sparkling Science 2.0" programme, aims to collect and analyse the missing data to determine the number of minnow species swimming in Austrian waters. With the help of pupils from five different schools across Austria, four fisheries associations and numerous independent fishermen, the minnows are being sampled extensively and their genetic lineages determined. Basic data on their habitat is also being collected using standardised forms. At the same time, the project team is analysing up to 200-year-old specimens from the fish collection of the National History Museum in Vienna to assess the rate of change in the minnow's biodiversity. Our initial results confirm the native distribution of three minnow species in Austria and show several mixing zones between them, which may not be natural. This is therefore a study of change: on the one hand, changes in genetic diversity over time are evaluated. On the other hand, it highlights the changes that new methods are bringing to our scientific and general knowledge about biodiversity. One of the most dramatic consequences of human impact on our planet is the continuing loss of global biodiversity. What better way to experience these changes than by actively participating in a study designed to assess them?

The potential of wildlife rehabilitation centres as venues for citizen science

Liselotte Rambonnet; Megan Hulscher; Anne Land-Zandstra; Ionica Smeets; Menno Schilthuizen

Human activities like urbanisation, agriculture, pollution, climate change, and deforestation rapidly alter our environment and impact wildlife. To help wildlife, dedicated volunteers are rescuing and rehabilitating injured, sick, and orphaned wildlife worldwide. What often began in the 1960s and 1970s as grassroots efforts in living rooms is now evolving into professional Wildlife Rehabilitation Centers (WRCs). Every day, these centres collect data like the finding location of an animal and the reason for admission. The scientific potential of this data is being uncovered as the number of publications increased in the last decade.

Volunteers collect WRC data that contributes to scientific knowledge about topics like invasive species, zoonotic viruses, cat predation, and plastic pollution. Although

WRC volunteers do not necessarily consider themselves citizen scientists, this practice potentially aligns with the Ten Principles of Citizen Science to a large extent. However, knowledge is lacking on the data collection practices within WRCs. To address this gap, we conducted semi-structured interviews with coordinators of 13 Dutch WRCs and surveyed 200 Dutch wildlife rehabilitation volunteers.

Our findings reveal that coordinators and volunteers' most important motivation is helping animals and an interest in and liking animals. Most volunteers are unfamiliar with citizen science but think the data can contribute to science. Coordinators and volunteers are interested in using the WRC data to study and improve rehabilitation success and monitor diseases. While they think the data is suitable, the quality can be improved. Both suggest that additional training could enhance the data quality as well as learning more about the significance of the data in research and wildlife conservation.

This study supports the potential for wildlife rescue centres as venues for citizen science where volunteers are willing to contribute to scientific research and wildlife conservation.

How citizen science ties the knot between pathogen evolution and public health prevention

Orsolya Bajer-Molnár; Christine Marizzi; Marina Knickel; Florian Krammer; Daniel R. Brooks; Andreas Bergthaler

The Emerging Infectious Disease (EID) crisis has been a global health security challenge for decades, with COVID-19 serving as only the latest example of our inability to prevent outbreaks. In lack of implementing novel evolutionary knowledge explaining the process of emergence, our main focus remains preparing for the inevitable. In line with this, fighting communicable diseases and preventing epidemics has been entered as part of the UN's Sustainable Development Goals (SDGs) concerning Health and Wellbeing. However, controlling and preventing infectious diseases, even those vaccine-preventable, has been facing key challenges, largely relating to feasibility. It will remain unachievable to prevent community-level epidemics from evolving into national-level epidemics without a unified framework that links community-based activities to scientific progress.

The DAMA (Document, Assess, Monitor, Act) protocol is the policy extension of an alternative evolutionary framework, the Stockholm paradigm (SP), which calls for enhancing bottom-up efforts to accurately track pathogen evolution and mitigate effects of outbreaks. The framework builds on transdisciplinary initiatives involving exposed communities in pathogen surveillance and disease prevention to incorporate local expertise in understanding transmission dynamics and increasing feasibility of public health measures.

In a recently published book, we show the importance of establishing participatory programs with various stakeholders affected by EIDs. We describe how methods such as Citizen Science and Living Labs are essential in monitoring and designing preventive interventions on global, regional and local scales, and provide guidelines for using such strategies in relevant policy environments of human, livestock and crop diseases. This talk will demonstrate the importance of applying transdisciplinary methods in pathogen surveillance from theory to action.

Young volunteers on Zooniverse: exploring the relationship between participation and background characteristics

Maria Aristeidou; Christothea Herodotou; Grant Miller; Heidi Ballard; Lucy Robinson

Participation in online citizen science can bring science learning benefits to young people, with some participants reporting evidence of agency with science and taking action to do science in another context (Herodotou et al., 2022). This study explores the relationship between participation and background characteristics of young citizen scientists on Zooniverse.

Log data from 242 Zooniverse young participants aged 5-19 were used to calculate metrics indicating their participation and contribution levels. A survey (n = 64) collected data on participants' demographics (gender, age) and information (sharing account, online science-related activities), as well as their confidence levels in using the platform. Ethical approval was obtained from the authors' university ethics committee, and young volunteers' participation was voluntary.

Statistical analyses were conducted to calculate the participation and contribution metrics and assess the degree of association among the metrics. The confidence levels in using the Zooniverse platform related to the time spent on the platform and individual project tasks. Additionally, the duration of project tasks was associated with sharing their account with others. Nevertheless, age, gender, and prior engagement in online science-related activities were not associated with increased participation in citizen science projects.

Our findings suggest design changes in citizen science projects to enhance accessibility and engagement for young volunteers, considering their diverse backgrounds and interests. Further, citizen science facilitators should focus on building confidence in using the platform and provide opportunities for skill-building and social interaction.

Herodotou, C., Ismail, N., Aristeidou, M., Miller, G., Lahnstein, A. I. B., Khanaposhtani, M. G., ... & Ballard, H. L. (2022). *Online Community and Citizen Science supports environmental science learning by young people*. *Computers & education*, 184, 104515.

InsectMobil: impacts of landscape on insect diversity and composition through the use of citizen science and DNA metabarcoding

Birte Peters; Diana E. Bowler; Cecilie S. Svenningsen; Robert R. Dunn; Susanne Hecker; Anders P. Tøttrup; Aletta Bonn

Urbanisation and agricultural practices account for some of the most drastic modifications to natural habitats as a result of anthropogenic land cover change. The relative importance of different land covers for shaping insect communities, however, remains unclear.

In this study, we combine large spatial scale sampling by using citizen scientists car net data collection (nets installed on vehicle roofs) and DNA metabarcoding to investigate the effect of landscape patterns of insect community composition and richness along with land cover heterogeneity. During June and July in 2018 & 2019 volunteers collected 334 car net samples on 67 roads in 7 federal states of Germany. To estimate taxonomic composition of insect bulk samples, DNA

metabarcoding protocols were used, and the results compared to known data on flying insect richness and occurrence. The richness and diversity of flying insects were examined across main land cover types.

Our results indicate a strong negative association of urban cover on insect populations, implying that urbanisation may contribute as a main driver to insect decreases. As a consequence, conserving and extending protected natural and semi-natural habitats should be the primary priority for temperate insect diversity conservation.

By conducting a simple, standardised citizen science initiative, we managed to sample flying insects at a broad geographical scale within one month, with a response rate of more than 86% of samples returned. Therefore, car net sampling with citizen scientists can serve as a promising approach for tracking flying insects at a landscape scale.

Mapping sports and recreation opportunities with refugee youth: challenges, lessons, and impacts

Ekaterina Egorova; Javier Martinez; Kateryna Miller

Place-based citizen science has a strong potential to provide space for fun, education, and restoration of basic needs – such as sociality – among the newly arrived refugee youth. Yet the active engagement of this vulnerable community is still largely absent from the citizen science landscape today.

In the “Mapping Informal Sports and Recreation Opportunities with Refugee Youth” (Map4Rec), 54 Ukrainian youth (aged between 8 and 15) actively explore and map local public places for sports and recreation in their new home environments, six cities located in Twente, the Netherlands. During their summer vacations (August 2023), they conducted fieldwork on bicycles, collecting data (through qualitative observations, as well as sensors) on local places for outdoor activities through EpiCollect. Currently, participants are diving into the world of geospatial data analysis and visualisation, and design thinking – this will help them summarise and represent their findings, and design an inclusive and sustainable recreation place as their final project

work. At the end of the project, they will provide recommendations to local municipalities based on their findings, supported by the project team.

In this presentation, we will first share the project design and key lessons (e.g., challenges and used strategies), focusing specifically on the elements brought into the project by participants through co-creation sessions (e.g., co-design of research journals and a GeoBike). Second, we will share the outputs of impact assessment studies in the domains of well-being and education, policy and society (e.g., a roadmap towards inclusive recreation places, created jointly with diverse local stakeholders). Finally, we will share our thoughts about citizen science with refugee youth through the prism of theory of change, conceptualising place-based citizen science as a therapeutic and place-making activity with transformative impacts that increase the resilience of communities.

The role of BioBlitzes in citizen science: insights from participants and experts

Patrícia Tiago; Inês Evaristo; Bruno Pinto

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BioBlitzes are collaborative events where experts and citizens work together to identify the maximum number of species within a specific area during a predefined time frame. These events offer a cost-effective means of swiftly amassing valuable data, aiding scientific investigations. Moreover, their periodic and seasonal nature enables ongoing location monitoring. Beyond their scientific benefits, BioBlitzes foster community engagement by facilitating dialogue between professionals and the public, supporting education, knowledge dissemination, and biodiversity preservation.

This study characterises participants in BioBlitzes conducted in the urban vicinity of Lisbon (Portugal), in the year of 2022, examining the perceptions of both 96 participants and 11 experts—individuals with specialised knowledge who guide participants in these activities—regarding BioBlitzes.

Participant analysis involved pre- and post-questionnaires across four domains: sociodemographic, emotional, cognitive, and behavioural. Findings reveal that participants gained knowledge during the event, with limited observable

behavioural changes. A prevalent motivation for attendance was “Spending time with family and/or friends,” often with the intent of involving children in environmental learning. Most participants resided within the hosting municipality, and none travelled more than 30km. Birds emerged as the taxonomic group with the highest participation, possibly due to convenient timing or inherent public interest and curiosity.

Evaluation of experts occurred through two online focus group sessions with an approximate duration of one hour each. Thematic analysis revealed a consensus that both citizens and experts acquire knowledge and heightened conservation awareness during BioBlitzes. Importantly, all experts have utilised BioBlitz-derived data in their work, demonstrating the data’s significance for their research endeavours. Partly supported by Gravity project 10.54499/2022.02093.PTDC, FCT, Portugal.

Showcasing citizen science to promote changes and engagement in your community

Diana Escobar Vicent; Bea Cordero; Nieves Lorenzo-Gotor; Rebeca Ribas

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Results dissemination in citizen science is a powerful tool to raise awareness about the challenges of our time. By seeing the fruits of their contribution, citizens become empowered as scientific agents and are motivated to change habits and attitudes in our society.

In this session, we will present dissemination experiences from the Citizen Science Office of Barcelona. From talks, workshops and exhibitions at community centres, libraries or city events, such as the “Barcelona’s Science Festival” or the “City and Science Biennial”, up to cultural proposals that combine citizen science and artistic languages.

Since 2016, the Office transversal programmes have engaged nearly 14,000 neighbours and schoolchildren who have collected more than 10,000 measurements. These actions have motivated participants and other citizens to tackle the environmental and social challenges. In the process, they develop critical thinking and, as a consequence, are able to propose changes and take actions.

Sharing results beyond the research project community reinforces the idea that citizen science is much more than a way to collect evidence and must be an essential condition in any of the projects. Finding new ways to encourage the interaction between research and society is key to increasing the impact of research and achieving changes in society.

Exploring user-centric participation models in citizen science engagement: a mosquito alert case study

Berj Dekramanjian

Increasing both the number and diversity of citizen science participants remains challenging. With the aim of broadening the audience, the study aims to rethink citizen engagement methods in public health and ecological monitoring. As the majority of projects involve data collection, analysis, and reporting aligned directly with the initiator's objectives, potential benefits for volunteers beyond learning and research support are often overlooked. This results in a participant pool mainly composed of research enthusiasts, excluding diverse demographics. The now extensive motivator research, which is often heavily reliant on participant surveys, limits supporting expansion efforts. This study analyses results from a field experiment in an established project, where volunteers were prompted to not only report incidents, occurrences, or sightings related to the subject matter of the project but also to share reports on their interactions with it. Mosquito Alert, a project focused on invasive mosquito surveillance with initial activities being limited to reporting any encountered mosquitoes or breeding sites, was augmented to include biting reports. Designed to deliver benefits and insights to both citizen scientists and researchers, the aim was to engage volunteers with a task tied to their own experiences and assess its impact on their overall participation patterns. Preliminary findings show an increase in the general number of reports and volunteers, higher average reports filled per citizen scientist, with biting reports constituting a significant portion, and reduced one-time participation. The shifts and heterogeneity in citizen scientist engagement provide valuable insights into the interests of diverse demographics in different tasks, prompt a reevaluation of the scope of citizen science initiatives in achieving their objectives, and open new research avenues for enhancing motivation in citizen science, particularly by leveraging concepts like personalised frequent feedback and socialisation.

A framework for navigating the perplexing journey of FAIR data

Tomer Gueta; Nirit Lavie Alon; Yaela Golumbic; Naama Arkin; Alon Sapan; Tamar Dayan

The generation of FAIR data is vital to advancing scientific knowledge and ensuring the quality and reliability of research. The process of generating FAIR data requires specialised skills and resources. As citizen science projects become more common, large amounts of heterogeneous and complex data are collected. It is imperative to facilitate the change from proprietary to FAIR data.

The Center for Citizen Science at the Steinhardt Museum of Natural History uses Living Atlas technology to aggregate, manage and display biodiversity data collected through citizen science initiatives in Israel. BioCollect is being adapted to manage and collect data from a variety of citizen science initiatives. Additionally, the iNaturalist platform and its accompanying applications – iNaturalist; Seek – are being adapted and localised for use in Israel. This technological ecosystem adheres to all FAIR principles. The centre's citizen science network includes initiatives that meet citizen science standards. When a bespoke app collects data instead of BioCollect, iNaturalist, or eBird, or when handling legacy data, a FAIR journey must be taken. It requires guidance at several stages, integrating expertise from different disciplines. For example, to correctly standardise the data and produce appropriate metadata, one must have a comprehensive understanding of both biodiversity informatics and all the scientific facets of the project. Also, future data transformations must be accommodated with maintainable, reproducible solutions.

In this talk, we will present a practical framework we have developed to assist and optimise the FAIR journey. Among the framework's elements are a FAIR principles first aid kit (rational, basic concepts and terminology); a template for managing and documenting tasks; a collection of decision trees, checklists, and questionnaires; a protocol to assess changes to sampling schemes; and checkpoints to track changes in standardisation best practices.

Reconnecting communities to urban nature: insights from the Siena BiodiverCity project

Debora Barbato; Andrea Benocci; Chiara Bratto; Giuseppe Manganelli

The Siena BiodiverCity (SBC) project (<https://www.fisiocritici.it/en/sienabiodivercity>) was created by the Museum of Natural History of Accademia dei Fisiocritici (Italy) in 2022, with a primary focus on observation, census, monitoring and promotion of urban biodiversity in the city of Siena through citizen science. It emphasises a scientific rather than an artistic interpretation of culture through the motto 'biodiversity is culture, and culture is biodiversity.' A key event of the project was an annual City Nature Challenge BioBlitz, aimed at discovering and surveying all wild organisms in the town through the collaborative efforts of citizens and trained naturalists. A series of community workshops followed, with theory lessons, hands-on practical classes and urban biodiversity field trips. Another two events highlighted active citizen participation in good practices fostering environmental requalification e.g. seed bombs and bee hotels. A Biodiversity Desk offered free identification of natural samples/specimens observed or collected around Siena. Over two years, the SBC project gathered more than 5000 biodiversity observations on the iNaturalist platform, covering nearly 1500 taxa within the Siena territory, including widespread, rare and alien entities. This effort engaged more than 300 citizens and fostered a robust network among participants, city associations and institutions. The impact of SBC has catalysed significant socio-cultural change at different scales: for instance, SBC was important in Siena's attainment of tourism certification as the first eco-sustainable city of art, prompting urban planners to actively incorporate biodiversity and nature into city development. SBC offers a replicable model, serving as a starting point for similar initiatives and collaborations throughout Italy and Europe: in 2023, BiodiverCity has merged into a European project under the URBACT IV financing thanks to the collaboration with the Municipality of Siena.

Empowering citizen science: Serbia's first open call for citizen science projects

Bojan Kenig; Danijela Vučićević; Dobrivoje Erić; Ivan Umeljčić; Marjana Brkić

Serbia is embarking on a novel initiative with its first Open Call for Citizen Science Projects, marking a significant step toward fostering collaborative research endeavours as the first in the Western Balkans region. Led by the Center for the Promotion of Science and operating under the auspices of the Ministry of Science, Technological Development, and Innovations, this transformative effort aims to provide structured support for citizen science initiatives. This concept has thus far thrived within individual research teams and by the dedication of individual researchers.

This Open Call brings a structured, organisational approach to Serbia's citizen science landscape. While it maintains a flexible thematic approach, it also encourages applicants to draw inspiration from the United Nations' Sustainable Development Goals (SDGs), fostering projects that align with these global imperatives.

To communicate the most important aspects of citizen science, the Center for Promotion of Science developed a 'Guide through Citizen Science.' It details ECSA's ten principles of citizen science, explores its advantages, and provides practical planning tools. Furthermore, the Guide emphasises the synergy between citizen science and Open Science principles, emphasising knowledge democratisation and the pivotal role of citizen science in advancing SDGs.

This Open Call represents an unprecedented opportunity for Serbia to harness the collective power of citizens and researchers alike, furthering its scientific capabilities and contributing to the global pursuit of sustainable development through citizen-driven inquiry. It echoes the call for responsive, anticipatory, and co-creational science in an evolving world, aligning with Europe's mission to address societal challenges framed by the SDGs while recognizing the added value of science, education, and sustainable solutions in daily life.

Citizen Science Hubs as a way to move towards a Fourth-Generation University

Sabine Wildevuur

Background: Little scholarly attention has been paid to if and how universities could play a role in dealing with urgent, large-scale societal challenges, such as the inevitable consequences of climate change, endemic change, migration, changes sparked by technical innovations and conflict between different worldviews and philosophies. Fourth-Generation Universities are socially engaged organisations that strive to address real-world problems through co-creation and transdisciplinary collaboration with actors from science, policy, industry and society, also known as the 'quadruple helix'. They could provide an organisational model that is more closely aligned to our day and age. These type of universities could play a more prominent role by co-shaping agents of change, as part of their task of generating, operationalising and expanding knowledge.

Objective: So far, limited research has been done on Fourth-Generation Universities on how they operate, who run them, and to what end. This study investigates Fourth-Generation Universities and the hidden challenges that underlie this change and transformation — from a systems, stakeholder and individual standpoint— by examining the case of the implementation of Citizen Science Hubs in (technical) universities. A Citizen Science Hub is a scientific organisation or organisational unit that initiates, conducts, promotes and coordinates participatory research and innovation with and for society. Citizen Science is a way to address societal changes and create impact in concert with different stakeholders of the quadruple helix. This study asked the question: How can a Citizen Science Hub support Fourth-Generation Universities to better tackle societal challenges?

Method: This study adopted a socioanalytic approach to study the (hidden) dynamics of the implementation of Citizen Science Hub within (technical) universities and to increase knowledge on the preconditions to implement citizen science within these settings.

What can be discovered from the most elaborate aquatic citizen science project inventory of Europe?

Line Debaveye; Charlotte Van den Auwelant; Shamwari Anseeuw; Cyrielle Delvenne; Nils Jacobsens; Nancy Fockedeij; Jan Seys

PREP4BLUE is a Horizon Europe initiative dedicated to supporting the EU Mission: Restore our Ocean and Waters by 2030. Under the wings of this project, the Flanders Marine Institute (VLIZ) has taken the lead in two tasks— (1) establishing a comprehensive public online database encompassing as many marine and freshwater citizen science projects as possible in Europe for the very first time, and (2) creating a roadmap with recommendations and best practices on aquatic citizen science.

To create the database, a web and social media search strategy was devised, covering a wide array of search terms in every European language, to uncover as many projects as possible. At the end, approximately 1,000 citizen science projects were identified, spanning a diverse spectrum of subjects and levels of engagement in aquatic citizen science. In autumn 2023, this database will be available on the P4B website to promote synergies and spark inspiration for future aquatic citizen science projects.

Next to the creation of the database, we set up an online survey and a series of in-depth interviews with a select group of the projects in our database. These interviews served as a platform for open conversations and knowledge sharing, aimed at identifying best practices within marine and freshwater citizen science. With the gained insights, a roadmap for marine and freshwater citizen science will be constructed to help starting or running projects on their journey towards restoring our ocean and waters, with active engagement of citizens at its core. This roadmap emphasises social inclusivity within citizen science, shedding light on the nuances and considerations inherent in working with citizen scientists in aquatic environments. Moreover, it also serves as a critical tool in unveiling the areas where aquatic citizen science still awaits its full potential, uncovering the missing links that will further enrich our understanding and stewardship of these vital aquatic ecosystems.

Israel's Backyard Bird Count project: 18 years of changes and insights

Nirit Lavie alon; Shlomit Lipchitz; Tomer Gueta; Amos Belmaker; Yaela Golumbic

Inspired by similar projects worldwide, the Backyard Bird Count (BBC) has been conducted in Israel since 2006. This project has three objectives: scientific – to create a multi-year database of wild bird species and characterise trends and changes in their frequency over the years; public - to increase involvement in nature conservation and educational - to raise awareness and interest in birds around us, deepening familiarity, knowledge and education for active citizenship. Over the years, BBC went through a number of changes including changes in leadership, data collection protocols, duration, data reporting system, and outreach efforts. Through research and evaluation BBC has also documented changes in the urban environment of birds biodiversity, increased public involvement and assessed the integration of the project into educational systems over time. BBC has also gained valuable insight on projects' life cycle and maintaining a dynamic project environment in light of cultural and technological developments.

In this talk we wish to describe the changes, adaptations and insight of 18 years of running the BBC citizen science project in Israel. We will discuss decision-making processes, design and modifications of the data collection protocols, technological adoption and the use and sharing of data. Our insights point to the importance of pre planning data collection and analysis methods according to detailed research questions and maintaining orderly records of steps taken and an evaluation of their effectiveness. Our experience and learnings are offered to leaders of citizen science with an aim to provide a deeper comprehension of projects' life cycles and enhance their preparation in a changing and dynamic environment.

Communication is key – best practises from seven years of engaging schoolchildren and students in plastic pollution research

Sinja Dittmann; Mandy Hinzmann; Janto Schönberg, Tim Kiessling; Linda Mederake; Doris Knoblauch; Katrin Knickmeier; Martin Thiel

Effective communication strategies are crucial for the success of citizen science initiatives. The "Plastic Pirates" investigated the plastic pollution of rivers and implemented a variety of communication strategies with participating schoolchildren and teachers. So far more than 24,000 participants have been involved since the start of the project in 2016. Without time-efficient communication and strategies to keep track of conversations, it would not have been possible to achieve the scientific and educational goals of the program, i.e., to help teachers increase the environmental awareness and scientific literacy of their schoolchildren, and to produce peer-reviewed articles based on the collected citizen science data. Some of the obstacles that had to be overcome to achieve successful communication were e.g., time constraints to obtaining scientific data from the participants, the time lag between the active involvement of the participants and the actual data analysis and publication of results, and limited personnel resources available for communication efforts. Our recommendations for other citizen science practitioners include the use of adequate and various communication channels, shifting the workload from the participants to the coordinating team of a citizen science initiative, as well as offering feedback on the research findings to the citizen scientists, thereby disseminating the results of the program. In this contribution we especially want to emphasise the value of regular and transparent communication with the teachers and students with the purpose to allow them to gain insights into scientific processes. These include concepts usually not taught in schools, such as having to explore different paths (and commit errors) in order to advance our knowledge, and to find creative solutions in interdisciplinary work environments (whereas schools commonly present topics very subject-specific).

Exploring digital and analog sociality together with 8-9 grade pupils in Finland and Sweden

Petteri Laihonen; Anna Öhman; Marie Nilsberth; Fritjof Sahlström

As part of our Nordic Challenges project, Nordic basic schools as past, present and future sites for solving the challenges of making diverse inclusive knowledge-based societies, we are doing research on student participation and sociality in hybrid school spaces. Our teams of professional researchers in Finland and Sweden have worked together with 14-15 year old citizen scientists in a school for one semester now, finding answers to following research questions: 1) How do school spaces at present provide opportunities for pupils to engage in social interaction with peers with diverse social backgrounds? and: 2) What are the roles of digital sociality for the relations that develop? In our Citizen Science venture, the pupils have documented their digital communication at school and beyond e.g. in the form of screenshots and screen recordings and (ana)logs. The pupils have then analysed these materials together with us researchers and with their peers in the other site through online and onsite meetings. The citizen scientists have reflected on the materials in groups together with researchers, in pairs and in individual sessions with researchers. In our presentation we show our research contexts, provide some examples of the research data as well as explain the challenges and benefits of our Citizen Science method. Finally, we give examples of our first results.

The role of citizen science in addressing scientific controversies

Rita Campos; Bianca Brito

Human societies face many challenges for which scientific knowledge is essential to gain a broader and in-depth understanding of the problems and possible solutions and alternatives. However, fake news, anti-science claims and misinformation unbalance much-needed public debates on socio-scientific issues. Conversely, failure to convey a clear and transparent message about science can also contribute to the emergence or growth of controversies. There is no

simple solution to such a complex problem, but the introduction of collaborative and participatory approaches to research, as a way of involving the public in the production of scientific knowledge, can be a powerful strategy for promoting trust in science, while integrating a critical view on research work. We recently proposed a new concept, engaged citizen social science, which aims to provide a theoretical framework for deeper engagement of citizens with science. This concept is being tested in a HE-funded project that integrates social sciences and humanities in the development of a new biosensor technology. Biotechnology is a hot topic in debates about scientific controversies, involving issues such as control, risks, access to data, democratisation of science or governance. By engaging in structured conversations with different publics, we are mapping these and other cultural and social perceptions, exploring dimensions such as the idea of representation (ideas about technology, cultural significance, perceptions) and questions of identity (who the public is considering knowledge, scientific literacy, proximity to technology, information consumption habits). The results of these social dialogues influence the project's research agenda and the production of the communication outputs, thus also having the potential to influence scientific policies in this area. Here we present the preliminary results of this mapping and discuss our findings in relation to our dialogical strategy and other controversial topics.

"Ganz Salzburg Bewegen" – Citizen science to change the tide of physical inactivity

Stefan Tino Kulnik; Sybille Salbrechter; Stefanie Radwanovsky; Ulrike Garstenauer; Kerstin Glachs; Michael Ebner; Till Fuhrmeister; Andreas Stainer-Hochgatterer; Daniela Wurhofer; Melanie Roth

Physical inactivity is a globally growing public health problem, contributing to significant disease burden (cardiovascular disease, type 2 diabetes, cancers, depression) and associated healthcare and societal costs. In Austria, several underserved groups (UGs) display lower than average physical activity (PA) levels, including people aged 30-45 and 60+ years, and those without employment, with minimal education level, or migration background. Changing the tide of physical inactivity requires an approach that answers to local circumstances and the specific needs of UGs, to develop tailored and contextualised strategies. Our

citizen science project “Ganz Salzburg Bewegen” (“All of Salzburg Moving”) aimed to develop such strategies for UGs in the city of Salzburg, Austria. In 2023, we conducted a large-scale participatory design process, involving citizens from UGs in needs assessment and ideation of strategies for PA. Over 400 citizens engaged in a 4-day community conversation event on the streets, 8 citizen co-researchers interviewed 53 peers, and 80 citizens participated in a 2-day ideas workshop, co-creating strategies for PA together with experts in design and PA promotion. The process resulted in over 100 ideas addressing issues of inclusivity, accessibility and affordability of opportunities for PA, and including aspects of community building and social participation to support engagement and motivation for PA. Ten ideas were selected, developed further in collaboration with design experts, and presented in a public exhibition at which citizens voted for their favourites. An evaluation of all activities showed that citizens were very satisfied with their engagement in the project and felt they could adequately express their personal opinions and comprehend the tasks and explanations for different activities well (90-95% satisfied). This citizen science project has successfully employed participatory design methods at large scale to catalyse change for PA.

Citizen science on bikes in museums and schools – Being part of mobility change research with the senseBox:bike

Thomas Bartoschek; Verena Witte; Eric Thieme-Garmann; David Weigend

Bikes and bike friendly cities are becoming the core theme of mobility change. In the presented project(s) we apply and investigate data-driven and participatory approaches to enable changes in bike-friendly policy and city infrastructure.

Together with Futurium – house of futures – and several fablabs we co-designed a participatory approach to empower citizens to be part of the mobility change in Berlin. 30 citizens participated in the senseBox:bike workshop, built mobile senseBoxes to measure environmental phenomena, distance of surpassing cars and road or bike-lane quality. Some of the citizens collected mobile data for over 2 years, which was published as open data on openSenseMap and visualised in an interactive “living exhibit” in the Futurium Lab. We organised an intermediate lab meeting with some of the participants to discuss feedback, usability and the software of the prototypical device and re-co-designed the senseBox:bike to

an open source product for mobile bike data collection. After two years we are meeting the citizen scientists again at Futurium and interviewing them about motivations, obstacles, experiences in the project.

We adapted the approach with an more educational focus and designed workshops for five schools in Essen, evolving the participatory approach: the students work in the local quarters of the city, they build, program and mount the devices to their bikes, they conduct data collection and analysis, and then get into dialogue with local politicians, following the spatial citizenship approach.

In the presentation we show the potential of participatory practices in museums and science centres and compare them to citizen science projects in formal education settings. A change in approaches following the same aim: citizen science for mobility change.

Students as fact-checkers: lessons from the ‘News-know-it-all’s’-initiative

Charlotte Hens; Jef Van Laer; Annelies Duerinckx

In a rapidly changing society, marked by an unprecedented digitization of information, the imperative to equip children and adolescents with the necessary tools to engage actively in this evolving landscape becomes increasingly apparent. The project ‘NieuwsWijsNeuzen’ (‘News-know-it-all’s’) (January 2023 - June 2024) wants to contribute to this by making children (8-12 years old) more resilient against disinformation by focusing on news literacy, both on the side of (youth) journalists and on the side of children.

The project includes designing a child policy and conversation guide for and in co-creation with journalists and developing innovative educational materials that introduce young children to journalism, debunking disinformation and learning to think critically about media. Scivil, the Flemish Knowledge Centre for Citizen Science, is involved in designing a checkpoint for disinformation on social media. This checkpoint, taking the form of a TikTok channel, facilitates children’s reporting of potentially dubious messages encountered on TikTok, fostering a fact-checking process that culminates in the dissemination of validated information through succinct video responses on the TikTok channel.

Due to the short duration of the project, instead of presenting a finalised model for this checkpoint, the initiative will conduct pilot programs in which students undertake the role of citizen fact-checkers. The project aspires to broaden the checkpoint's utility to encompass monitoring of fake news on TikTok, thereby generating a valuable dataset that could serve in the detection of evolving trends. This addition will further strengthen the citizen 'science' as an approach. In this presentation we'll focus on the lessons learned, highlighting the opportunities and challenges associated with adopting a citizen science approach for fact checking within the context of 'News-know-it-alls'.

Microscale urban heat mapping: building upon the neighbour's experiences and perceptions

Isabelle Bonhoure; Ferran Larroya; Rebekah Breeding; Josep Perelló; Helena Bernhardt; Christian Peer

Urban heat islands and extreme heat are of big concern in cities worldwide. Academics, urban planners, and public administrations are joining forces to characterise the phenomena and ideate innovative solutions. Despite these efforts, the experiences, knowledge and perceptions of the neighbours most heavily affected are seldom considered and technical criteria often prevail.

The research initiative Heat Chronicles (Cròniques de la Calor, in Catalan) is framed within the OPUSH (Open Urban Sustainability Hubs) Urban Europe and SENSE. (The New European Roadmap to STEAM Education) Horizon Europe projects. The current presentation is identifying key reasons to consider local communities' involvement and is describing how this involvement is implemented.

The perception of heat changes across people and neighbourhoods, which can also have different degrees of heat vulnerability, depending on socioeconomic and urbanistic factors. Therefore, we have selected specific locations in the Barcelona metropolitan area and involved different citizens' groups, civil society organisations, libraries, as well as primary and secondary schools.

As the temperature can experience drastic variations within a few blocks distance, high-resolution data collection becomes also necessary. Neighbours

and academic researchers have together identified most relevant outdoor public spaces and visited them during collective heat walks, where continuous geolocated sets of temperatures with adapted low-cost sensors have been collected. The neighbours also bring into play the mental component of heat comfort, that they both expressed on-site and off-site. Finally, the collective interpretation of the results, combining geolocated temperatures and neighbours' heat perception, is allowing to generate new scientific evidence on extreme heat. The process is serving to elaborate proposals for transformative changes of urban spaces, also in collaboration with a similar initiative taking place in Vienna.

Empowering citizens for changing AI innovation: a practical approach and toolkit

Karen Verstraelen; Annelies Duerinckx; Jef Van Laer; Charlotte Vandooren; Neena Singh; Michiel Vaes; Pieter Duysburgh

The project 'amai!' (Flemish for 'oh, my!') aims to change how artificial intelligence (AI) solutions are created and integrated into society, by giving citizens a voice in the development of AI in societal domains such as mobility, climate, health and work. The project has been running since 2021 and has greatly evolved through its three yearly cycles. The evolution and approach of amai! and the lessons learned are now documented in a hands-on toolkit. In this talk, we will share our most valuable lessons learned and inspire others to set up similar initiatives.

The amai!-project is a crucial component of the Flemish AI Plan, emphasising the importance of citizen involvement in complex issues. At its core, amai! is a mission-oriented participatory approach that aims to bridge the gap between AI research and the public. Its methodology is applicable across various domains and regions.

The annual amai! cycle consists of four phases. It starts by identifying relevant societal challenges and collecting citizen-generated ideas, resulting in over 950 contributions so far. In the second phase, citizens and experts co-define the scope of these issues and of potential AI-solutions to tackle them. Phase three encompasses an open call for consortia to develop these new AI solutions, selected through a rigorous process involving both expert and citizen panels.

In the fourth phase, the selected consortia then develop the new AI solutions, integrating citizen science methods throughout the process. To date, 14 innovative AI solutions have been funded.

The amai! toolkit provides a collection of tips & tricks and practical tools for project initiators and policymakers seeking to involve citizens in debating and tackling complex societal topics using our approach. By distilling the project's methods and lessons learned, this toolkit not only empowers others to replicate and adapt the amai! approach but also highlights the project's transformative evolution over three years.

The DOCK for change – Developing visions for the future in a co-creation climate laboratory

Martina Affenzeller; Cyril Dworsky

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In 2022, the Vienna University Children's Office opened the "DOCK", a new space for co-creative processes on the banks of the Vienna Danube Canal. The DOCK's focus is future and climate education: in the "DOCK for Change" project, children have the say on climate issues for three school years: together with experts, they get to the bottom of pressing questions and develop bold ideas for the future.

The process consists of several steps, starting with up to 100 change agents aged 8 to 15, who plan the topic of the year and co-design the research methods and formats. At the end of the year, they also present the results of a variety of activities – collecting the voices and experiences of around 1000 young people in Vienna.

The first child-determined annual theme for the school year 2022/23 focused on mobility and clean energy in the city. Three missions ("more muscular power", "more green", "more space") included elements of citizen science and active citizenship. Hundreds of children met with scientists and entrepreneurs to learn about scientific evidence as well as innovative business concepts. They shared their experiences, views and ideas of how to develop and implement solutions for their own immediate and future lives, and the lives of the generations to come.

In this talk we demonstrate the potential and benefits of a co-creation approach as a starting point for meaningful citizen science with children. The DOCK for Change concept includes fundamental aspects in the project design that are often neglected due to a shortage of resources, but also a lack of methodology. Especially when it comes to developing research questions, designing creative, participatory, child-friendly methods, collecting and analysing data, and communicating results together (see ECSA's 4th Principle of citizen science). We emphasise that this methodology gives children a positive perspective of their own involvement and real participation (see Hart's Ladder of Children's Participation 1992).

Piloting towards sustainability transitions – Reducing microplastic pollution from textiles

Lies Jacobs; Bernou Boven; Anna Bosshard; Cameron Brick; Emilia Pajor; Zeph van Berlo; Antonia Praetorius

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Microplastics are a major environmental concern as they have been found in marine-, freshwater- and terrestrial ecosystems. An important source of microplastics as a pollutant are synthetic fibres from textiles for which domestic washing acts as a major emission pathway. Reducing microplastic pollution from textiles is a complex challenge with scientific questions (1) (when, where and how are the microplastics emitted), behavioural aspects (2) (how can we motivate individuals to adopt sustainable washing/purchasing practices), and societal challenges (3) (how do we engage broad communities in such sustainability transitions through citizen science). These different dimensions of a sustainability transition require different perspectives. Here we present a transdisciplinary pilot project (META(+)) wherein we explore how citizen science can address (1) and (2) in addressing microplastic emission reduction from textiles. We present the methods we developed to engage citizens in collecting microplastic emitted from textiles and the results regarding the detected emission patterns (1). To monitor knowledge, attitudes, and behavioural intentions – and how citizen science participation might alter these, we present a pre-post survey method and resulting changes (2). Finally, we look forward to a follow-up project SISTEM-NL where we build upon good practices and lessons learned in META to engage a broad community (3) around microplastic reduction in the Netherlands.

Citizen science and climate risk: applying a post-normal science framework to uncover transformative initiatives

Nicolle Aspee

I aim to unravel how citizen science can contribute to climate risk reduction and adaptation from a transdisciplinary perspective in sustainability science. This approach acknowledges the overlooked role of society in the science-policy interface, which tends to underestimate the intricate and dynamic nature of climate risks and hinders its management on the ground.

My research takes a meta-perspective of citizen science, analysing projects worldwide and utilises the post-normal science framework to identify initiatives that hold transformative potential for co-producing scientific knowledge to support policy goals in complex and urgent challenges like climate change. In theory, selected citizen science projects could foster creative dialogue and provide contextually relevant knowledge, thus evading the limitations of disciplinary biases. This potentiality holds the promise of enhancing risk management by collaborating with the extended peer community or the affected segments of society.

However, citizen science projects are diverse, and participants can not always act as an extended peer community. In this context, the employed methodology aggregated projects centring around disaster risk reduction and adaptation. Following this review is a two-fold analysis. First, it identifies projects associated with climate risk management by pinpointing the specific aspects they intend to address. Second, it assesses their transformative potential within the science-policy interface by categorising projects into problem-solving zones based on factors such as uncertainty, urgency, stakes, and values observed in each project.

Within the theme of “Change,” this analysis acknowledges the uncertainties related to climate issues and the intricate interplay of socio-ecological dynamics in its management. It aims to explore the links between knowledge and action, emphasising society’s participation in the scientific process as a critical factor in addressing these dynamic challenges.

How to best do co-research with children and adolescents? A rapid qualitative evidence synthesis

Karolina Seidl; Anna Wahl; Daniela Rojatz; Lisa Affengruber; Isolde Sommer; Lisa Gugglberger; Lisa Stauch; Orkan Okan; Ursula Griebler

Background: In recent years, emphasis on involving children and adolescents in research has grown. Levels of meaningful involvement differ across participatory research approaches, with co-research often fostering higher levels of participation. Our rapid qualitative evidence synthesis (rQES) aims to prepare insights and reflections from past co-research endeavours with children and adolescents to define the characteristics of an ideal co-research process.

Methods: We carried out a rQES synthesising qualitative research on reflections and insights about co-research experiences. We searched electronic databases (Scopus, Social Science Citation Index, BASE) up to May 2023 and did supplementary searches. Two reviewers screened 698 abstracts and 156 full text articles to select studies that meet our eligibility criteria. From 46 eligible studies, we sampled 30 studies based on data richness for the qualitative content analysis to synthesise the data.

Results: Ethical concerns, such as consent, transparency, tokenism, and privacy emerged as prominent challenges in co-research approaches. Other challenges include time allocation issues, managing expectations and complex power dynamics within research teams, bureaucratic barriers, and sufficient financial resources. Respectful relationships between youth and adult researchers are key to genuine and sustainable participation. Empowering capacity-building sessions, focusing on young researchers’ understanding of their own rights, and building a collective identity facilitate co-research. Adult co-researchers require specific skills and attitudes, including training, reflexivity, commitment to the research process, and a deep respect for and engagement with co-researchers.

Conclusion: Our review provides practical insights and recommendations based on the experiences of young co-researchers. These insights can serve as guidance for individuals initiating co-research projects involving children and adolescents.

The ECHO Project: catalysing change in soil health through citizen science

Alba Peiro; Francisco Sanz; Tanja Mimmo

In the dynamic landscape of citizen science, the ECHO Project, a 4-year Horizon Europe initiative (Funded by the European Union under GA no. 101112869 – ECHO and co-funded by UK Research and Innovation), stands as a testament to transformative change. Aligned with the EU Mission “A Soil Deal for Europe”, our project underscores the pivotal role of citizen engagement in fostering soil health, a cornerstone for biodiversity, climate resilience, food systems, and human prosperity. ECHO embodies the spirit of co-creating knowledge and solutions, resonating with the objectives of reducing desertification, conserving soil organic carbon, and enhancing soil literacy.

ECHO’s objectives aspire to actively involve citizens in soil protection and restoration by enhancing their skills and knowledge, as well as empowering them to participate in decision-making processes. Citizens are the catalysts of change, echoing the EU’s vision of raising awareness and transitioning towards healthy soils.

We will outline the forthcoming milestones and outcomes of ECHO, focusing on a comprehensive analysis of the state-of-the-art of previous projects and initiatives centred on citizen science and soil health. Taking into account multiple factors (e.g. scientific, fieldwork, technological, and engagement factors), we will highlight the importance of depicting the current landscape, gleaning essential lessons and fine-tuning paths at the beginning of projects like ECHO, to ensure their maximal impact in the long term.

ECHO integrates citizens in the narrative of soil health; a dialogue where every voice will not just be heard but will lead to shape policies and practices for the collective improvement of this non-renewable resource. Beyond creating science, it nurtures a dynamic ecosystem where curated data and insights drive informed decisions, innovative solutions, and sustainable practices for tangible, impactful change.

Institutional changes for societal impact: lessons learnt from one year as a Citizen Science Hub

Floor Keersmaekers; Karel Verbrugge; Eline Livémont

Citizen science is an important way for universities to both identify and address societal challenges, involving expertise and knowledge from outside the institution’s walls. During our presentation, we want to focus on the steps taken at the Vrije Universiteit Brussel to raise the quality of citizen science projects and increase the university’s societal engagement. In this way, VUB aims to initiate and contribute to change.

More specifically, the university launched a Citizen Science Contact Point (CSCP) in October 2022, with an internally funded citizen science project call and a ‘Citizen Science Starter Kit’ as its first outcomes. Regarding the call, the CSCP was responsible for each step from start to finish: from writing the text of the call to advising applicants and composing a jury, summarising the jury reports for the research council, supporting non-awarded proposals in alternative trajectories, and finally to the guidance and follow-up of the awarded projects. To ensure the projects’ societal impact, this follow-up includes support in science outreach, given the CSCP’s embedding in VUB’s Outreach & Communication office of the vice-rectorate of Research. Additionally, for general project support of our research community, we developed a guide with information, case studies and tools: the Citizen Science Starter Kit. The past year has offered many opportunities to put the Starter Kit into practice.

These processes have brought along some pressing issues and valuable lessons that we’ll bring forward in this presentation to initiate reflection and discussion. We will address questions such as ‘In what (unexpected) ways have these outcomes contributed to reaching our goals as a CSCP?’ or ‘What challenges had we not anticipated?’ In the larger scheme of things, we will turn our experiences into recommendations for concrete actions within research-performing organisations that want to implement a changing attitude in favour of more support of citizen science.

How COVID-19 boosted citizen creativity – Lessons for citizen science in community health promotion

Lea Den Broeder; Annemarie Wagemakers

Summary:

What lessons can be learnt from citizen self-organisation in health promotion during COVID? This paper presents opportunities, barriers, do's and don'ts for innovative citizen science in community health promotion. Lessons and practical tips are based on experiences collected with the CS4Health community.

Background:

During the COVID crisis, citizens created a broad variety of health promoting activities in their communities. Examples include online music lessons, neighbourhood meals, Balcony Fit and online platforms for mutual help. These activities boosted change and growth, helping citizens, communities and organisations to build resilience and community power. Important features of community actions included increase in mutual aid and neighbourhood ties, the central role of community-based organisations, changing patterns of volunteering, digital media use and health promotion opportunities. These actions reveal untapped potential to feed into innovative collective research activity.

Methods:

We collected views and experiences, gained during COVID times, from the Citizen Science for Health community in a 'solution room' at the CS4Health conference in Enschede, 2023. In this session, we applied a democratic tool, 'talking with the feet', that encourages people to be active and visualise their positions. This method invites all persons in a room to participate and express their opinion. We discussed what lessons were learnt and how the participants' experiences could feed into new approaches for citizen science in community health promotion. The results of the solution room were analysed and enriched by theoretical insights and participants were invited to member check.

Results:

We present the resulting overview of opportunities, barriers, do's and don'ts for citizen science in community health promotion. We will share tips on how to engage communities in health promotion research, also not in times of crisis.

Investigating the spread of plug-in solar devices using a citizen social science approach

Katharina Rzepucha-Hlubek; Jonas Grauel; Marie Ufert; Felix Langer

The transition from fossil fuels to renewable energy is key to slowing down climate change. The Rhenish lignite mining district is one of three designated structural change regions due to Germany's coal phase-out until 2030. The aim is to transform the former lignite mining areas into model regions for sustainable energy, economy, and living. A change of the regions is necessary to avoid a structural break and to prevent the regions from becoming economically unbalanced. The transition is almost exclusively designed in a top-down fashion and little through participation by citizens. As part of the project 'MehrWertRevier' we conduct three Citizen Science projects to examine how citizens can be engaged to foster sustainable transitions in the fields of energy, mobility, and nutrition.

The first project 'Solar – Na klar!' aims to investigate the reasons as well as the obstacles influencing a consumer's purchase decision of plug-in solar devices and which role particularly peer-to-peer influence has in the spread of those devices. Plug-in solar is promising as it offers citizens a low-threshold way to contribute to the energy transition because of the price and ease for installation in contrast to traditional photovoltaic systems. Using a Citizen Social Science approach, the project will be carried out with Citizen Scientists from the region in participative workshops. The knowledge generated with and by the Citizen Scientists will be made usable for the region and aims to support the structural change. Furthermore, in a stakeholder dialogue the results are transferred to local initiatives, organisations, politicians, and administrations.

In our contribution, we will present the project and its results. We also want to reflect on the potential of Citizen Social Science to catalyse change on multiple levels from individual (energy usage patterns), communication (users/non-users), group (community building among solar pioneers) to regional (fostering energy transition).

Crowdsourcing object-based annotation for segmentation of volumetric bio-imaging data using deep learning

Avery Pennington; Michelle Darrow; Mark Basham

In this work, an image dataset of viral infection produced using cryo-electron tomography was analysed by citizen scientists using a crowdsourcing method combined with a deep learning-based segmentation method. The crowdsourcing dataset and the segmentation produced from it allowed the quantitative analysis of the changes of phase the virus went through while infecting a human cell.

Crowd-sourcing the annotation of the tomogram required involving the detailed inspection of volumetric data by citizen scientists through two workflows on the Zooniverse platform. In the first workflow, citizen scientists produced a database of viral object positions and the other a set of phases for those locations. Evaluating output of the crowdsourcing process against expert ground truth demonstrated that the crowdsourcing workflow was able to generate reasonably accurate annotation that could be used in the production of masks for segmentation. From these locations and classes mask annotation was generated by software process which allowed a deep learning-based segmentation model to be trained without requiring an expert to paint masks manually. Using this annotation an Attention U-net encoder-decoder model was trained and used to predict a segmentation which was post-processed into an instance segmentation. From the segmentation result class-wise image statistics and pair correlation functions were calculated to obtain the key quantitative results of the image analysis, the counts of the viruses by virus phase.

The object-based annotation workflow presented here demonstrates the application of crowd-sourced annotation to the generation of instance

segmentations of volume bio-images and represents an example of how a crowd-sourced annotation process can be integrated alongside deep learning-based AI approaches to enable data processing which otherwise would be time-consuming or impossible.

Human weather- and impact- reports in Austria – A crucial support to mitigate extreme weather- and climate- impacts?

Thomas Krennert

Governments and civil authorities struggle with mounting socio-economic challenges caused by extreme weather- and climate impacts. Consequently, optimal decision making requires robust data about weather- and climate related hazards and damages, during immediate warnings and alert coordination, as well as for long term threat assessment. Since 2020, Austria's national weather service, GeoSphere Austria (former ZAMG), has compiled a database of nearly 80,000 human weather and impact reports, facilitated through the web-app wettermelden.at. Weather stations are not able to detect hazards like flooding, wind damage or similar, hence, these observations provide a valuable data source about the „ground truth “. Thus, a real time feedback loop between disseminated weather warnings and impact reports from voluntary observers is established, an important capability for GeoSphere as a key advisor within the Austrian National Crisis and Disaster Management SKKM. Moreover, these reports contribute to forensic damage assessments following extreme weather events and climate impact research, respectively. With the Trusted Spotter Network Austria TSN, GeoSphere offers a comprehensive training program for voluntary weather enthusiasts. Through this program, fully trained “Trusted Spotters” enhance the accuracy and reliability of their reports. In collaboration with other European National Weather Services NMHSs within the framework of EUMETNET, GeoSphere is dedicated to exchange and standardise human impact reports during cross-border extreme weather events, to serve both, warning purposes and scientific research. Thus, realising a full collaboration between European NMHSs, given their obligations to advise civil protection, emergency response and disaster relief. The Austrian citizen science program wettermelden.at and the Trusted Spotter Network was recognized for its best practices from the European Meteorological Society EMS and the World Meteorological Organization WMO.

Citizens as hazard forecasters: the potential for citizen science to play a greater role in anticipatory action and disaster risk management

Tim Woods

Citizen science is increasingly realising its potential in terms of benefitting science and society (Benyei et al. 2023). One area in which these benefits are possibly under-realised is in forecasting hazards. This could play a significant role in disaster risk management approaches – especially anticipatory action. While there are ongoing efforts exploring citizen science for disaster risk management (e.g., the CSDRR project), anticipatory action is a relatively new approach.

Anticipatory action has three elements: (1) early actions, agreed in advance and implemented before a hazard occurs; (2) triggers, which are thresholds that indicate the likelihood of a hazard occurring; and (3) pre agreed financing, which is released once the trigger is reached and used to implement the early actions. The greatest potential for citizen science lies in the second: monitoring hazards to determine when and where they will strike.

There is a small but growing number of examples of citizens acting as hazard forecasters and triggering anticipatory action. For example, the Ecuadorian Red Cross trained a network of citizen observers and installed metres to measure volcanic ash. Citizens reported back ashfall measurements and other data to inform scientists of possible eruptions of the Sangay volcano (Clatworthy 2022).

Citizen science is an excellent way for citizens to contribute to forecasting hazards that impact them, and could be particularly helpful in low- and middle-income countries (Hicks et al. 2019). There is also scope for citizen-generated data to play a role in global initiatives that aim to reduce risk, such as the UN's Early Warnings for All initiative and SDG Target 13.1.

This presentation does not intend to provide an exhaustive overview of citizens' contributions to forecasting; rather, it aims to start a discussion about the potential role of citizen science in anticipatory action and gain audience recommendations on how to take this approach forward.

GeRoKi – Genetic detection and roadkill hotspot analysis of roadkilled vertebrate species on selected road sections in Austria

Janette Siebert; Fanny Rosa Kaiser; Cornelia Rieder; Kerstin Filzmoser; Lukas Schabernag; Brigitta Kanda; Alexandra Wanka; Elisabeth Haring; Kathrin Pascher; Johann Zaller; Daniel Dörler; Florian Heigl

Road networks negatively affect wildlife populations with few exceptions. Habitat fragmentation or roadkills due to vehicle collisions can lead to population declines. Roadkills (vertebrates killed in traffic collisions) seem to be one of the main causes of vertebrate mortality in cultural landscapes. Official statistics on roadkills in Austria only exist for game (e.g. brown hare *Lepus europaeus*). The highest numbers for roadkilled game in Austria have been recorded in Lower Austria for many years. Data on roadkills of non-huntable vertebrate species – including protected species – are mostly missing. The aim of the GeRoKi study is to determine hotspot locations and vertebrate species mainly affected by road traffic. Roadkill monitoring was conducted on five 10km road sections in Lower Austria, by bicycle three times per week. Furthermore, we investigate whether the non-invasive collection of blood from the road surface next to morphologically difficult to identify roadkilled vertebrate species is an effective method for DNA extraction and species identification using DNA barcoding. Additionally, the public in the immediate vicinity of the road sections has explicitly been asked to participate as citizen scientists in roadkill reporting in order to compare their random reports with reports from the roadkill monitoring. We expect the lower speed of the bicycle to reduce the number of undocumented roadkills, which could be overlooked when travelling by car. This study has a model character and is intended to show that DNA barcoding for species identification of roadkills, which has been underrepresented in scientific studies so far, has great potential for obtaining genetic evidence, especially of rare or hard-to-find species (e.g. European gopher *Citellus citellus*). This could be a game changer for how roadkills are documented in Austria.

Boosting biodiversity in school grounds: a theory of change

Victoria Burton, Lucy Robinson; Jade Gunnell; John Tweddle

Does participation in community and citizen science really lead to behaviour change and environmental action? What mechanisms can projects employ to connect participation in research with achieving real world change, and how can we build participants' sense of agency to take environmental action, through our programmes?

The National Education Nature Park aims to involve every nursery, school and college in England in enhancing the biodiversity on their site, whilst supporting young people's wellbeing, pro-environmental behaviours and green skills. The programme is supported by the UK Government's Department for Education, and focuses on building young people's sense of agency to act and supporting them to gather the data they need to make informed decisions about enhancing their learning spaces for nature, and for themselves.

In the National Education Nature Park programme, young people gather environmental data using citizen science research, then through collaboration and collective decision-making they design and implement their own nature recovery actions. Through ongoing habitat and biodiversity monitoring, young people will measure biodiversity change on their education site over a period of years. They will gather data to assess the relative successes of interventions they have designed and implemented themselves, with a goal of boosting biodiversity and enhancing climate resilience.

In this presentation, we share our theory of change and the design features of the programme that connect participation in citizen science with achieving two crucial types of change – environmental change in the form of biodiversity gain, and the behaviour change that underpins it.

Transforming realities: citizen science changing snail-borne diseases risk understanding

Noelia del Carmen Valderrama Bhraunxs; Julius Tumusiime; Maxson Kenneth Anyolitho; Mercy Gloria Ashepet; Casim Umba Tolo; Grace R. Kagoro; Tine Huyse; Lies Jacobs

Schistosomiasis is a significant global health challenge, impacting millions of individuals worldwide, with a substantial burden in Sub-Saharan Africa. The transmission of this snail-borne disease is influenced by a complex interplay of behavioural practices, such as risky human water activities, and ecological factors, including the presence of snail vectors and parasites. To address this public health issue, the Action Towards Reducing Aquatic snail-borne Parasitic diseases (ATRAP) project has established a network of 25 citizen scientists who monitor snail populations and risky water practices in rural areas around the highly disease-endemic region of Southern Lake Albert in Uganda.

While the presence of snail vectors is vital for understanding potential schistosomiasis transmission risk, a comprehensive assessment must also consider practices occurring within the area. In this study, we bridge this gap by constructing risk maps incorporating both ecological and behavioural data. Water-related practices have been categorised based on the level of risk, taking into account factors such as duration and skin exposure. To ensure the accuracy of these risk assessments, surveys were conducted with citizen scientists to collect data on the duration of activities and the extent of skin exposure. These findings were further validated by referencing relevant existing literature on the topic.

By comparing risk maps generated solely from ecological data (snail presence) with those incorporating information on risky water practices, we seek to provide a better understanding of schistosomiasis transmission risk. This multidimensional approach allows us to pinpoint high-potential transmission areas, offering valuable insights for policymakers and public health officials to design local control measures. Our study underscores the importance of citizen science to obtain local, contextualised information to better understand and thus control complex diseases like schistosomiasis.

Citizen science as a strategy for reconfiguring schools into collaborative ecosystems

Rita Campos

Climate change is threatening life on Earth in many ways, such as the emergence of zoonotic diseases (eg Covid-19), the increased occurrence of extreme weather events (e.g. heatwaves) or the rapid loss of biodiversity. Understanding global warming means understanding the science behind its causes and impacts and knowing how to identify reliable sources of information. Schools play a crucial role in this process, helping students to participate in contemporary societies. The reconfiguration of schools into collaborative ecosystems, a network linking curricular content, scientific research and local and global realities, allows teachers, students and scientists to work together, sharing responsibility for identifying problems, thinking about possible solutions, reflecting on existing knowledge, gathering new evidence and integrating different perspectives. This proposal is strongly linked to participatory citizen science. Allowing teachers and students to lead research has great potential for success in terms of engagement and learning outcomes, as well as understanding of the nature of science (key to combating misinformation). Here we present a project developed with children attending an urban primary school, aiming at promoting greater involvement with different biodiversity issues, namely the mapping and characterisation of biodiversity, the relation with human health and well-being, the importance of urban green spaces and the impacts of human actions on biodiversity. After an initial session led by the researcher about scientific research and citizen science, children were responsible to conduct the field research and the subsequent steps of the project. The teacher took the lead in articulating the project activities and school work. The results show that, in addition to a greater and better knowledge of biodiversity, this strategy increased the children's scientific literacy, as well as their understanding of the process of constructing scientific knowledge.

Observation.org – Biodiversity citizen science and monitoring

Dylan Verheul; Jolien Morren; Peter Kaufmann

Observation.org, an EU-based platform for biodiversity citizen science and monitoring, was founded in the Netherlands in 2004. Since its modest beginnings as a website, it has rapidly evolved into a global biodiversity data hub, amassing an impressive 230 million observations. Data quality is ensured by over 1,000 species experts working with smart technology to continuously validate the data. The platform is hosted in the Netherlands and adheres to European privacy regulations.

In its 20 years of existence, Observation.org has seen technology change from the website and database era to the current world of apps, artificial intelligence and image recognition. We've helped citizen scientists and professionals with access to new and sustainable technology. By using a single platform that can do it all, we've changed organisations from moving from one piece of software for each project to working with a single long-term solution for all projects, reducing costs and increasing data integrity. Observation.org also shares data in the Global Biodiversity Information Facility (GBIF), where we publish the third largest open biodiversity dataset in the world.

From entry-level apps to full-fledged monitoring projects for research institutes and governments, Observation.org is in active use by thousands of users. 32 million observations per year are being collected, validated and shared.

32 million observations per year, that is close to 88,000 per day. With these numbers, we can monitor changes in biodiversity. Observation.org data is actively being used for early warning for invasive alien species, monitoring disease vectors, and tracking species distribution and climate change.

We invite you to join Observation.org at <https://observation.org>. We also work closely with regional partners. In Austria, these are Haus der Natur in Salzburg and Museum inatura in Dornbirn.

Together we discover more!

Analysis of individual learning outcomes of students and teachers in the citizen science project TeaTime4Schools

Anna Wawra; Martin Scheuch; Bernhard Stürmer; Julia Miloczki; Mia Guggiari Dworatzek; Taru Sandén

Only a few of the increasing number of citizen science projects set out to determine the projects' impact on diverse learning outcomes of citizen scientists. However, besides pure completion of project activities and data collection, measurable benefits as individual learning outcomes (ILOs) (Phillips et al. 2014) should reward voluntary work.

Within the citizen science project „TeaTime4Schools“, Austrian students in the range of 13 to 18 years collected data as a group activity in a teacher guided school context; tea bags were buried into soil to investigate litter decomposition. In an online questionnaire a set of selected scales of ILOs (Phillips et al. 2014, Keleman-Finan et al. 2018, Wilde et al. 2009) were applied to test those ILOs of students who participated in TeaTime4Schools. Several indicators (scales for project-related response, interest in science, interest in soil, environmental activism, and self-efficacy) were specifically tailored from these evaluation frameworks to measure four main learning outcomes: interest, motivation, behaviour, self-efficacy. In total, 106 valid replies of students were analysed. In addition, 21 teachers who participated in TeaTime4Schools, answered a separate online questionnaire that directly asked about quality and liking of methods used in the project based on suggested scales about learning tasks of University College for Agricultural and Environmental Education (2015), which were modified for the purpose of this study.

A citizen science approach to transform aquatic ecosystem management in Armenia

Tigran Keryan; Verena Radinger-Peer

Aquatic ecosystems (AE) are vital for global well-being, offering essential services like water supply, food, and recreation. Yet, they face threats from climate change and human activities, resulting in a decline in their services. Armenian AE have a high vulnerability due to the high density of the population, lack of water treatment and demands from agriculture. These conditions along with climate change cause negative impacts on local communities and the environment. Therefore, there is an urgent need for sustainable AE management that both academics and policy-makers strive to achieve. A comprehensive understanding and assessment of ecosystem services (ES) requires the integration of knowledge from multiple disciplines, and social participation as different stakeholders have diverse perceptions about the benefits of AE. In the EcoServ project, we elaborate a citizen science (CS) approach, involving citizens in research design, implementation and evaluation to bridge this gap. Our paper addresses three key research questions: 1) What participatory approaches are evident in scholarly literature for valuing aquatic ES? 2) What are the challenges and benefits of engaging citizens in aquatic ES assessment? 3) How can citizen science approaches be applied to the Armenian context? Our study is based on a systematic literature review, based on which a conceptual framework and methodological approach to implementing citizen science in the ES assessment of Armenian AE is elaborated.

This research contributes to the broader discourse on ES assessment, emphasising the need for participatory and inclusive methodologies. At the same time, it critically examines varying stakeholder perspectives on participation in project implementation and decision-making processes for sustainable governance of AE. CS, as a tool for assessing and managing aquatic ES, is a novel approach in the context of Armenia, contributing to the broader discourse on aquatic ecosystems' sustainable management.

Understanding engagement styles to improve project design and promote success

Liz Dowthwaite; Corey Jackson; Eunmi (Ellie) Jeong; Nimisha Parashar; Laura Trouille; Cliff Johnson

In order for citizen science to be most effective in creating change, including producing new results, engaging volunteers in a call to action, and using results to change the world around us for the better, we need to understand the different ways of designing platforms and projects that are most successful. We present new results from a large-scale cross-project survey of Zooniverse volunteers, highlighting findings surrounding the different modalities through which volunteers take part, and the differing ways that volunteers choose to engage with the platform. We relate this to the different characteristics of volunteers, and their differing attitudes towards how they take part in online citizen science. This follows on from previous papers discussing the survey which focussed on psychological factors and moves forward by presenting suggestions for changes that projects could make to become more successful along a variety of axes, including better engagement, better results, and better outcomes, and how we can improve our approach to projects by considering 'motivational design'. We hope to build on the many successes of online citizen science to ensure that this important field can continue to flourish, along with the volunteers who make it possible. We also consider how our results might guide the use of new and emerging technologies such as communicating with volunteers about machine learning, and how what we know about online participation can guide the creation of successful hybrid projects (which combine in the field with online participation).

UrbamarBio: transforming citizen science collaboration through the quintuple helix of innovation

Sonia Liñán; Xavier Salvador; Berta Companys; Andrea Comaposada; Laura Sánchez; Jaume Piera

UrbamarBio, a citizen science initiative founded in 2016, aims to enhance our understanding of urban marine biodiversity by actively involving the public. With over 30,000 marine fauna and flora observations gathered through the MINKA citizen science observatory, its success is attributed to the adoption of the Janus engagement framework (Liñán et al., 2022). This framework harmonises short-term and long-term actions and rewards, recognising that citizen science projects involve various stakeholders and communities beyond volunteers. According to the Janus framework, volunteers engage at different levels, necessitating short-term incentives to sustain their motivation, while scientific outputs and evidence-based policies, arising over months or years, serve as long-term rewards. Effective engagement strategies must balance these temporal dynamics.

UrbamarBio leverages the Quintuple Helix of Innovation to implement the Janus Framework, fostering collaboration among academia, industry, government, citizens, and the environment. The academic community (ICM-CSIC) plays a vital role, providing data curation and technological support through MINKA. The business sector, represented by Anèlides, and the local government, embodied by the Barcelona City Council, act as enablers facilitating community engagement and offering field support. In this presentation, we want to present the advantages of using enablers to boost the success of a citizen science project.

A notable achievement is the integration of a dedicated fish layer into the Biodiversity Atlas of the Barcelona City Council. Before UrbamarBio's involvement, this atlas lacked any information about the marine biodiversity of Barcelona's beaches. This initiative exemplifies the transformative power of collaboration within the Quintuple Helix of Innovation, marking a significant milestone in advancing citizen science and sustainability in urban marine ecosystems.

When high school students change the way of working with environmental DNA

Maria Rytter; Marie Rathcke Lillemark; Anders Tøttrup

Citizen Science has traditionally been applied in biodiversity monitoring, as the approach holds the potential for conducting large-scale data collections. However, involving citizens in more than data collection is still in its infancy. The Danish citizen science project DNA & life has since 2014 invited high school students to help researchers at the Natural History Museum Denmark and University of Copenhagen to collect and analyse aquatic environmental DNA (eDNA) samples. Through the years, DNA & life has established a new model of working with citizen science and eDNA, and has been a collaborative partner in several research projects and national, governmental species monitoring programs. The project has changed the way of thinking and working with citizen scientists.

We present the framework for the current model of DNA & life and results from different eras of the project that expands the partnership between citizens and researchers by involving high school students in several parts of the scientific process - most remarkable the laboratory work of conducting real-time PCR analysis that is currently carried out by non-professional students. The presentation of results will among others include the first detection of the non-indigenous species, round goby, in the northern part of Denmark as well as the first detection of eDNA from toxic, marine algae.

We showcase both the challenges and benefits of letting high school students perform the crucial laboratory work in a complex research scheme.

Engaging and training citizen scientists in advanced laboratory analysis, such as the monitoring of eDNA in water samples, has promising applications for large-scale national monitoring of marine and freshwater species that can be used in governmental mapping and monitoring efforts. We will give an overview of the future prospect and potential for inviting citizen scientists to engage in more than the sole data collection.

Designing (for) change: a taxonomy-based approach to project design

Carolyn Stein; Moritz Müller; Jonas Fegert

For realising the transformative potential of citizen science, in science, society, and policy, effective project design is essential. The effectiveness hinges on dimensions such as the design of incentives, communication, or the implementation of participation. For evaluating and improving the effectiveness of citizen science projects and enabling structured comparisons between initiatives, entering a dialogue on the various design decisions citizen science practitioners face is indispensable. Nevertheless, to date, there is no guiding schema for assessing the project design of citizen science projects, although numerous classifications have been developed for the degrees and forms of citizen science participation.

In this talk, we present a design taxonomy for citizen science projects and examine its usefulness for citizen science practitioners. We highlight the development and evaluation of the taxonomy and report the findings of its application to 66 projects listed on the German citizen science platform Bürger schaffen Wissen. The talk introduces the fundamental theoretical principles of the taxonomy and discusses how the classification of citizen science projects could enable structured evaluation of projects, using examples from our survey on Bürger schaffen Wissen. Our findings indicate major differences across the design of citizen science projects that can be grouped into multiple design clusters, partially correlated with the projects' objectives and their type of participation.

The presentation seeks to demonstrate that a project design taxonomy is not merely an ontological instrument that pertains to the realm of theoretical discourse on citizen science. Through making design choices tangible, the taxonomy and the results of its application serve as a baseline to navigate the citizen science design sphere, while empowering a dialogue between practitioners that is necessary to identify needs for change and innovation. Thereby, the taxonomy is intended to encourage a change in project evaluation, promote community sharing of best design practices, and the creation of new citizen science initiatives.

The AGORA project: a gathering place to co-design and co-create adaptation

Marta Ellena; Marianna Adinolfi; Marina Mattera; Alfredo Reder; Arianna Acierno; Mauro Buonocore; Selvaggia Santin; Rosie Witton; Sukaina Bharwani; Andreas Hoy; Blaine Lowry; Massimo Milelli; Francois Jost; Paola Mercogliano; Jorge Barba

The European Union (EU) funded AGORA project aims to promote societal transformation changes in social, economic, and political contexts by engaging with citizens and stakeholders through co-design and co-creation processes. Bringing together 13 partners from eight EU countries and the UK, AGORA's ambition is to accelerate and enhance societal transformation by sharing innovative citizen-led and problem-oriented climate adaptation solutions, acknowledging that there is no one-size-fits-all solution. A series of pilot regions will provide the arena for co-designing, co-developing, and co-implementing adaptation solutions towards a climate-resilient Europe.

As part of the project, the Digital AGORA will be created as an integrated discussion and learning online space, co-designed with citizens and stakeholders to support innovative mechanisms and transdisciplinary approaches for inclusive climate governance and action. The Digital AGORA will connect two Digital Academies: one to 'assess and use climate data and monitor climate risks' and a second one 'against climate change disinformation'. The goals of these academies are the following: (i) to facilitate access and usage of high quality, open-source climate data as well as climate risks data; (ii) to promote information and initiatives fostering climate adaptation supported by citizen science activities; (iii) to strengthen citizen responses to climate disinformation by making available credible information, media literacy material, and other relevant resource. AGORA will also launch a gamified mobile app to enhance citizens' knowledge on climate change and combat disinformation through engaging trivia challenges.

The Euro-Mediterranean Centre on Climate Change (CMCC) – as project leader – leads the team on "capacity building for stakeholder engagement", aimed at strengthening the AGORA vision with activities, tools, and materials to accelerate the transformation towards climate resilience.

Bridging the building knowledge gap through citizen science: the Colouring Dresden platform

Tabea Danke; Robert Hecht; Theodor Rieche

The building sector worldwide causes massive CO2 emissions, 40% of the total according to the UN report. These come from existing and newly constructed buildings, for example the extraction and production of materials.

Ideas for solutions include the promotion of circular construction, smart investments and political push and pull measures. However, the necessary information on materials used, quantities and routes is often incomplete or difficult to access.

The project "Colouring Dresden" aims to collect, explore and communicate knowledge about buildings through the open platform "Colouring Dresden", which is operated within the framework of the international Colouring Cities Research Programme (CCRP). It is the first German citizen science project for data collection and disclosure of information on the built environment, especially on buildings.

In close cooperation with stakeholders, research questions were developed, the platform was adapted, relevant data collection features were prioritised and various citizen science actions and communication channels for knowledge transfer were established.

The citizen science actions and knowledge transfer proved to be key factors for the citizen science project. Different evaluation methods were used to assess their suitability for use in citizen science.

The evaluation provided insights into the motivation of the participants, their diverse interests as well as the benefits for science, society and the individual. Significant differences in response quantity and data quality during data collection were found. The results show that citizen science projects can be successful in the context of the built environment. They also offer insights into suitable action formats and evaluation methods. This contributes to the further development of citizen science in Germany and enables the targeted planning of actions in future urban citizen science projects to increase the motivation of participants and to collect information on reducing CO2 emissions in the building sector.

Structuration of an institutional network to share experiences on crowdsourcing

Sandra Denery; Anne Jambois; Mathilde Armandine-Les-Landes; Iñaki Garcia De Cortazar Atauri; Nicolas Dones; Jean-Claude Streito; Sylvie Rousset; Jean-Baptiste Merilhou-Goudard; Caroline Falize; Delphine Mézière; Grégory Lambert; Marie Bodeux; Marco Barzman; Dominique Desclaux; Catherine Tailleur; Eric Cahuzac; Wilfried Heintz

The term “crowdsourcing” covers a diversity of citizen science projects. At INRAE, the French Research Institute for agriculture, food, and the environment, crowdsourcing projects contribute to numerous research topics related to preservation of biodiversity, monitoring of plant diseases, food and health, including monitoring of changes in environment and society... The projects engage various communities (citizen volunteers, professionals, schools, etc.) to collect data or samples in large amount or as specific knowledge.

Whatever the scientific domain, the project coordinators face common issues: setting up data collection tools (particularly digital tools), observing FAIR principles in data management, fulfilling regulations (GDPR, etc.), recruiting, and motivating volunteers over a long time...

Our objective within the Sciences in Society unit of INRAE’s Open Science Division is to structure a network for sharing experiences and knowledge on crowdsourcing, beyond the scientific disciplines and the research support professions.

Our action involves:

- identification of topics and needs,
- mobilisation of internal or external skills and resources in IT, in the regulatory and legal fields or in scientific mediation and communication,
- adaptation of supports and tools to the specificities of crowdsourcing and training proposals.

At the institutional level, we expect to support the development of crowdsourcing projects, to save time and resources, to capitalise on experiences, to better comply with regulations and data management principles and to increase the visibility and recognition of this type of participatory research.

English citizen scientists as change-makers for ancient trees and woods

Kate Lewthwaite

In England, citizen scientists have a key role in the mapping, monitoring and active protection of two of our most precious land habitats.

The UK has one of the richest assemblages of ancient and veteran trees in Northern Europe. For example, oak trees with a girth of 10m or more are still being discovered. Such trees with their cracked trunks, rot holes and deadwood are valuable individual habitats in their own right.

The Ancient Tree Inventory is run by NGO the Woodland Trust. Since 2004 it has created a database of 190,000 ancient and veteran trees with records collected by citizen scientists and verified by trained volunteers.

Ancient woods are areas of woodland that have persisted since 1600, as determined by old maps. They are relatively undisturbed by human development. As a result, they are unique, irreplaceable and complex communities of plants, fungi, insects and microorganisms.

Until recently both ancient trees and ancient woodland in England lacked significant legal protection. Citizens lobbied for change and the wording of planning policy was subsequently strengthened so that loss due to development is now “wholly exceptional”.

A case study will be given of the 8m girth Caversham oak – discovered and verified by citizen scientists, citizens lobbying for its protection via a public campaign and the local council subsequently refusing its destruction.

Citizens also monitor planning applications to see if ancient woodland or ancient trees are under threat from development. A proposed bypass in the town of Hereford is an example where a volunteer found the threat and citizens were part of a successful campaign to shelve the planning application.

The Woodland Trust’s current Living Legends public campaign calls for stronger definitions, protection for ancient woodland and ancient and veteran trees from deterioration as well as loss plus more advice and funding for landowners.

Co-creation for change: engaging urban community gardeners in the development of insect conservation interventions

Susan Karlebowsky; Ulrike Sturm; Monika Egerer

The increasing densification of urban spaces can have a negative impact on biodiversity in the city, but the diversity of green spaces also offers new opportunities for mainstreaming biodiversity conservation interventions. Urban community gardens are social-ecological systems that support biodiversity, ecosystem services and multiple human-nature interactions. They can therefore be an ideal “living laboratory” for co-creating, testing and collectively implementing biodiversity conservation strategies with gardeners that can be transferred to other urban ecosystems. We conducted three years of ecological research on pollinators in community gardens as part of our research project in Munich and Berlin, Germany, to support the scientific evidence. The first step towards a common insect conservation strategy was then to discuss our results with the gardeners. In three focus groups in Berlin in autumn 2023, we discussed the challenges, chances and open questions of implementing the research findings on pollinator-friendly interventions, with the aim of identifying collaborative opportunities. We identified barriers to adoption as well as where acceptance was high in order to best co-create solutions for successful implementation. Our next step will be to activate and support further urban residents in biodiversity-based urban greening. To this end, we have formed a consortium with ecological initiatives that promote civic engagement in Munich. This consortium will introduce the concept of “BioDivHubs” as local multiplier centres to disseminate the strategies and interventions developed in the gardens to the neighbourhood. In our contribution, we would like to share our experiences from the focus group work and also critically reflect on what the engagement with the gardeners means for our own scientific work in terms of translating research into practice and supporting city residents in mainstreaming biodiversity interventions in their neighbourhoods.

Scientists’ attitudes and citizen science practices at Long-Term Ecological Research (ILTER) sites

Caterina Bergami; Alessandro Campanaro; Cathlyn Davis; Alba L’Astorina; Alessandro Oggioni; Alessandra Pugnetti

Ecological and environmental sciences are one of the most active in proposing citizen science initiatives, since they necessarily include the social and cultural dimensions to confront the complex local and global environmental challenges. This is particularly evident in the International Long-Term Ecological Research (ILTER) network, which offers a valuable landscape to explore citizen science features across a wide range of different cultural and socio-ecological contexts, as well as worldviews of science-society interactions. The ILTER Network consists of 44 national networks, managing more than 700 sites worldwide, with the primary goal to investigate ecosystem structure and function in response to a wide range of environmental forcings using long-term, place-based research.

In 2020, we surveyed scientists working at ILTER sites across the globe to identify key features of citizen science initiatives in which they are/were involved and the levels of participation of the volunteers. We also asked them about their willingness to participate in different types of public engagement, their reasons for participating in citizen science, the associated barriers, and any impacts of these efforts on them. Our results indicate that the ILTER community demonstrated a good predisposition toward environmentally-focused citizen science initiatives with diverse scientific questions and with different levels of participation of volunteers. Moreover, the emerging picture is of a community willing and actively involved in many citizen science projects for both traditional reasons, such as data gathering and public education, and expanded reasons that activate a real two-way cooperation with the public. In the ILTER community, citizen science may thus become an opportunity to promote and develop partnerships with citizens, helping to advance the science-society interface and to rediscover and enhance the human and social dimension of scientific work.

Sharing the experience of different citizen science training programs: main outcomes and remaining challenges

Josep Perelló; Isabelle Bonhoure; Rebekah Breeding

Training on citizen science is starting to become a demanding activity in a variety of contexts and by a variety of stakeholders. We want here to share our own experiences offering training programs.

First context was developed with public libraries and considering public libraries as community hubs and library professionals as facilitators. In a first level, it was oriented to introduce citizen science to professionals of 25 public libraries in the Barcelona region and to cocreate a list of meaningful citizen projects according to their perspectives and their particular contexts. On a deeper level, we also offered training to 4 public libraries and their professionals. As citizen science practitioners we were accompanying them and offering them support in the cocreation of a new citizen science experiment with their own library users.

Within the current efforts to transform research universities, we have also recently developed a certified training program of 4 hours and 10 hours within the Universitat de Barcelona. The joint effort of TORCH, SENSE and CitizenScience NOW European funded projects has led to a training that emphasises social dimensions and encourages citizen science practices in deep collaboration with civil society organisations. The citizen science approach was aiming to give the capacity to deliver evidence-based policy recommendations and empower communities.

Other exercises under the form of summer schools and workshops have also helped to construct a program that transversally focuses on 6 transversal aspects: communities, action, digital tools, data, ethics, and inclusion and co-creation. Following the same approach, we have also delivered a similar training in an innovative recent master program on Sustainability that involves 4 European universities and as part of the social innovation module.

We will analyse main outcomes of these variety of training programs and the remaining challenges in each of the settings and contexts. We hope that our learnings may help other related initiatives flourishing worldwide.

"Citizen Observatory for Apuan Waters" a citizen science project for environmental protection

Clara Masetti; Laura Grassi; Flaviano Bianchini

Through a short lecture accompanied by slides, Source International, an NGO working on environmental protection and community issues, wants to present its citizen science project "Citizen Observatory of Apuan Waters (COAW)". . The project takes place in the Apuan Alps in Italy, an area that is very famous for Carrara marble quarrying but less well known for all the environmental problems that come with it, particularly those associated with a poor management of marble cutting dust. Through surface runoff resulting from rainfall, large amounts of this dust often associated with heavy metals end up in water bodies increasing turbidity, worsening water quality and sealing riverbeds.

COAW focuses on assessing the quality of water resources and asking the authorities to protect this water-related ecosystem by involving 40 citizens in all phases of the project to raise awareness and generate a bottom-up change.

Once a month, from July to November, we monitored 14 points including rivers, spring waters, thermal waters and groundwaters in the Lucido and Frigido River basins using simple, inexpensive but effective tools such as a turbidity tube, heavy metal kits, a multi-parameter probe and a simplified version of the Extended Biotic Index. We created an interactive map on Source International website, where monthly reports and data were uploaded. The results are accessible to everyone and highlight the deterioration of water quality after rainfalls. Finally, we held a public event with citizens and local authorities, presenting project results and calling for measures to protect water resources.

The idea is to create a simple and replicable methodology to assess freshwater quality in contexts of marble dust pollution. Citizens became active citizen scientists, learning to develop proper scientific inquiry and becoming aware of the environmental, social and economic risks of pollution in their local area.

VifAdept project: a participatory research on grapevines to adapt wine production to climate change

Agnès Destrac Irvine; Nathalie Ollat; Cornelis Van Leeuwen

Under climate change, increased temperatures and drought events have a major impact on grape growing for wine production. Suitability for premium wine production is challenged in some historical production areas, while opportunities arise in regions where grape growing was previously not possible. In order to maintain high quality wine production in traditional grape growing areas, growers need to adapt to the new climate conditions. One major lever for adaptation is modifying the local grape variety mix and introducing varieties which were previously cultivated in warmer and dryer areas.

Because of the appellation system, the adoption by growers of new varieties for adaptation purposes in the Bordeaux wine-growing region requires an organisation to monitor new parcels and study the response of new grape varieties to local climate and soil conditions.

This organisation will lead to the production of information and knowledge on these varieties at the scale of a wine-growing region. It is based on the participation of winegrowers, supported by the expertise and the knowledge gathered in the VifAdept scientific project.

The participative approach implies the development and the dissemination of simple, harmonised and adapted monitoring protocols, the use of common data management tools, the collection of data and the management and finally to process very large datasets.

Here we describe how a scientific research program has opened up experiments to citizens and how data collected on farms contribute to improve the knowledge, support change and the necessary adaptations to climate change.

Citizen science shedding light on beef supply chain transparency

Andrea Sanos Garcia; Erasmus zu Ermgassen; Patrick Meyfroidt; Participants of the do Pasto ao Prato initiative Citizens

The supply chains for agricultural commodities bridge the gap between producers and consumers, involve a multitude of different players, and mediate the global sustainability impacts of agriculture. The lack of transparency currently prevents accountability for harmful practices – such as deforestation, forced labour, or carbon emissions embedded in the supply chains. Nowhere are these issues more pertinent than the Brazilian cattle supply chains. Brazil is one of the largest beef producers in the world, producing 9.71 million tons of beef in 2021. The sector also leads as the main driver of deforestation and is one of the sectors with the highest number of workers rescued from forced labour. Approximately 75% of Brazilian beef is consumed internally, for which traceability is generally not available. The initiative 'do Pasto ao Prato' (www.dopastoaoprato.com.br/) has been providing information on the origin of meat sold in the Brazilian internal market. Consumers can make an informed decision by using a mobile app while shopping. In doing so, they contribute to a citizen science effort to map the sourcing of retailers across Brazil. This is enabling us to answer questions such as 'how do products with large socio-environmental impacts propagate along supply chains?' and 'which companies commercialise products with large socio-environmental impacts?'. As of August 2023, 7,316 beef products had been registered in 1,251 different stores across 24 of 27 states in Brazil. The data shows an intense domestic market integration with beef products often flowing long distances to reach consumers. Although in a smaller proportion, even states with solid historical beef production receive an influx of products. States encompassing deforestation hotspots are also among the ones where shoppers find the highest proportion of beef products related to poor performance in deforestation, social and sanitary compliance. Still these products also frequently find their way onto the plates of consumers in all states.

Nurture in nature for nurture of nature: citizen science can change youth environmental values, knowledge and behaviour

Smriti Safaya

Environmental citizen science activities can lead to positive changes in how school students think and act towards the natural environment. While the changes were more pronounced when students co-created citizen science projects, even one-time contributory citizen science activities increased student knowledge, and the frequency and range of environmental behaviours. As a result of rewarding citizen science experiences, teachers at an international school transformed their secondary science programme to pioneer a long-term coastal ecology citizen science project, and students and teachers at a local school kickstarted an inter-school movement to shift wasteful consumer behaviour in wider society. Additionally, biodiversity and pollution citizen science activities changed which psychological factors most influenced student pro-environmental behaviours. The dominant factors include (i) spending time in natural environments, (ii) having strong values about preserving nature, (iii) practising environmental behaviours as a household, and (iv) being exposed to stories about positive environmental actions. These findings come from a mixed-methods quasi-experimental study with eight Hong Kong schools, which utilised an environmental behaviour psychology framework never before used to design and analyse research about environmental citizen science. This presentation provides practical implications for citizen science project designers and organisers, environmental scientists and educators who want to create impactful citizen science opportunities in formal and informal educational spaces.

Collaborating for change: shaping local citizen science networks through science and civil society

Gesine Heinrich; Florence Mühlenbein; Linn Jördens; Anna Soßdorf; Laura Ferschinger, Silke Voigt-Heucke

In the field of citizen science, increased collaboration between academia, civil society organisations and local governments hold the promise of innovative solutions to today's societal challenges. This collaborative approach fosters a shared responsibility for change towards a sustainable future. Establishing strong local partnerships can be seen as a prerequisite for building long-term, decentralised citizen science networks. Due to their local embedding and the wide range of actors, these networks can play an instrumental role in driving resilient transformations.

Adding to the field of science of citizen science, this presentation offers a deeper understanding of the characteristics of such local networks. It portrays the perspectives of diverse actors in collaborative citizen science projects within the scope of the national citizen science contest in Germany "Take it to the streets! Citizen science in your city", working together on issues of local social change. Based on the findings of semi-structured interviews, the strengths, challenges, and future of these local citizen science networks will be discussed. What is the added value of their collaboration for these actors? What forms of collaboration emerge?

Understanding the heterogeneity of interests, functional logics or expectations of actors in these partnerships and depicting their reciprocity, refines the concept of decentralised, local networks as pillars of a sustainable citizen science landscape. Research funders, policy makers and citizen science practitioners can use this insight to design and support thriving citizen science networks, strengthening the potential of citizen science to drive change.

The potential of participatory citizen science in observing change in plastics in soils

Mia Sol Guggiari Dworatzek; Julia Miloczki; Sophia Götzinger; Philipp Hummer; Agnes Milewski; Heide Spiegel; Taru Sandén

In Europe, about 50 million tons of plastic are produced per year out of which ca. 40 % is processed into packaging (Plastic Europe, 2022). Packaging often ends up in the trash or in the environment after only a short or single use. Unfortunately, recycling is often inadequate, contributing to only about 10% of the European demand for plastic being met by recycled plastics (Plastics Europe, 2022). Large amounts of plastic end up in the oceans, accumulating as “garbage patches” and washing up on shores. However, the amount of plastics that end up in soils is not precisely known. Scientific studies have concluded that 4 to 32 times as much plastic ends up in soils as in water bodies (Horton et al., 2017). In addition, little is known about what types of plastics enter the environment, and in what proportions.

The Soil Plastic App allows citizens to input observations of visible plastic and their characteristics, with a strong focus on agricultural plastics, on soils and enables them to monitor the change of plastics in soils. The App runs on the citizen science Spotteron Platform and is available for iOS, Android and as a web application. This way, observations can be entered anywhere on the globe and anytime. Since December 2022, citizens have already made over 22,000 plastic observations in the SoilPlastic App. The first set of validated Austrian citizen observations between the beginning of April 2023 and end of July 2023 resulted in ca 6000 observations. This presentation will present the first results and discuss the potential of SoilPlastic App in observing change of plastics in soils.

Digital twins of the environment: opportunities and barriers for citizen science

Luigi Ceccaroni; Stephen Parkinson; Dori Edelist; Claire Laudy; Todor Ganchev; Valentina Markova; Jay Pearlman; Pauline Simpson; Valentijn Venus; Patience Muchada; Garabet Kazanjian; Bente Lilja Bye; Marco Amaro Oliveira; Hugo Paredes; James Sprinks; Sasha Marie Woods

In recent years, there has been growing interest in digital twins (or virtual representations) of the environment. Programs in the European Union and the UN are investing in digital twins, particularly those of the ocean (DTOs). While citizen science has been mentioned as a potential data source for digital twins, the full potential of citizen science in this context has yet to be fully realised. The Iliad project [<https://ocean-twin.eu>], funded by the European Commission, is developing a comprehensive set of digital twins of the oceans which are interoperable, data-intensive, and cost-effective. The project (2022-2025) brings together over 50 partners to demonstrate the technologies and methodologies required to develop DTOs. Citizen science and engagement play a pivotal role in the project, with the following goals: (a) exploring the potential for citizen science to contribute to digital twins of the oceans; (b) demonstrating how citizen scientists (and society more broadly) can benefit from digital twins. The Iliad team is currently working on 15 separate digital twins of the oceans that fall into two primary categories: (i) environmental and ecological digital twins; (ii) engineering and industrial digital twins. Using the Iliad DTOs as case studies, this session will present lessons learned for citizen science from the development of each digital twin including: how to achieve interoperability with other data streams, how to manage open citizen-science data and citizen privacy in commercial applications, and which stages of development citizens can participate in (including how citizens can meaningfully engage with digital twins without contributing data). Common barriers to the adoption of citizen science will also be explored. The discussion will be of interest to anyone considering using citizen science in environmental digital twins or models.

Next Generation Lab: a game changing collaboration between the natural sciences and archaeology

Sarah Hagel Svendsen; Marie Rathcke Lillemark; Anders P. Tøttru; Luise Ørsted Brandt

The citizen science project Next Generation Lab converts unstudied urban archaeological leather and bone collections into a hands-on learning experience for high school students. The students identify the animal origins of the material and thereby enhance our understanding of mediaeval and renaissance livestock usage and artisan material choices.

Urban rescue excavations yield more material than can be fully stored, preserved, or analysed. Next Generation Lab employs a citizen-science approach, inviting students to the Natural History Museum Denmark for a day. During their visit they prepare samples for peptide mass fingerprinting via the method of Zooarchaeology by mass spectrometry (ZooMS) on non-diagnostic bone and leather fragments. The project achieves two objectives: identifying animal species and training high school students in laboratory techniques inspiring them to consider a career within STEM.

The data generated by the students is handled by archaeologists and researchers and gives new knowledge, both in a historical aspect and also in terms of developing a novel workflow and process of handling and analysing large sample collections via the ZooMS method. This data expands our knowledge of animal resource utilisation, shedding light on often overlooked materials in mediaeval assemblages that could provide further insights into urban animal resource use.

We will present data and results from the project and showcase how the interdisciplinary work between archeology and natural sciences can create new ways of investigating and understanding our history. We'll show that the students not only generated high quality data, but also contributed to current knowledge by identifying hitherto undescribed animal species for usage for leather production in mediaeval and renaissance Copenhagen.

Lastly we will give an overview of the project's prospects and potential in understanding and value our cultural heritage based on the student's engagement and participation.

Fostering change: the inspiring story of the Amazon Waters Alliance

Gina Leite; Mariana Varese

The Amazon Waters Alliance (former Citizen Science for the Amazon Network, CCA Network) involves 26 partners and aims to engage Indigenous peoples, local communities, civil society organisations and scientists to share knowledge and impact policy to maintain the ecosystem integrity of the Amazon Basin, with a focus on fisheries management and wetland conservation. The Alliance is an inspiring story of 7 years of collaboration among a thriving community built in this enormous region, interlinking mainstream science, community engagement, technology, conservation management, and policy influence. Different aspects took precedence in this dynamic flow where experimentation, learning, adaptation and transparency were core principles of collaboration.

The story starts in 2016, with the publication of key scientific foundations about the connectivity of aquatic systems at scale, and the Amazon Waters Declaration which outlined priority objectives. In 2017, the CCA project built on the Amazon Waters principles to create a community and co-design, test, and deploy a project at Amazon scale. The project engaged citizens and organisations to understand the large-scale migrations of fish in the Amazon using an open and collaborative science approach and low-cost technologies. We developed the Ictio platform to collect and share data on food and migratory food fishes. We also formalised the CCA Network. Ictio is an open-and-safe database with over 107k fish observations. Although technology and innovation is promoting a rapid change in society, the project revealed the gap of digital inclusion and poor connectivity in the Amazon non-urban areas. Among the lessons, we learn the urgency to act collectively to inform policies and decisions.

Thus, partners decided to move from a knowledge-sharing network and formalise an Alliance to impact policies at scale with a strong public participation approach, and principles of open and collaborative knowledge, and citizen science.

Participatory science for agroecological transition: changes are also observed on the research side

Didier Stilmant, Pénélope Lamarque; Daniel Jamar; Séverine Lagneaux

Today's environmental and societal challenges call for a transition towards a more sustainable and resilient food system. This transition induces urgent and profound changes through social innovations involving a diversity of stakeholders who perceive change and act differently. To grasp this diversity, scientists increasingly cross their disciplinary boundaries and connect with stakeholders to jointly deal with complex problems in socio-ecological systems such as agroecological transition. Moreover, participatory research benefits from increasing acknowledgment due to its positive outcomes such as higher legitimacy, inclusivity and relevance of research outcomes to practise.

Through different projects (AssoBIO, SPOt, Live or Die) in Wallonia (Belgium), we have developed participatory approaches in which researchers from different disciplines and various stakeholders (consumers, farmers, business actors in supply chain and/or public sector actors) have been involved along different stages of the process (from formulating questions to results dissemination) to co-construct innovative agroecological solutions at a regional scale. We have identified not only barriers and levers encountered by stakeholders to change their agricultural practices, but also the difficulties met by researchers emerging from the need of more transdisciplinary and participatory science. For example, participatory approaches induce a dual stance –researcher and facilitator– for which the development of new skills is necessary in order to: (i) foster participants' enrolment; (ii) develop the researcher's ability to objectivize the subjectivity of their implication; (iii) frame appropriate research questions and design to the participatory approach; (iv) question what makes sciences through transdisciplinary interactions. We will discuss these different aspects, which could for example give some insights for the design of a new training programme for participatory science researchers.

A bird sound identification app to facilitate faster data collection on environmental change

Ossi Nokelainen; Patrik Lauha; Ari Lehtiö; Otso Ovaskainen

Citizen science covers initiatives from crowdsourcing, distributed intelligence, participatory science, to so-called extreme citizen science. However, terminological overlap, different project aims and cultural differences with respect to the field of research have led to discord on how useful citizen science projects are and whether extreme citizen science may effectively be accomplished. Here, we demonstrate a case-study of an extreme citizen science project, an automated bird sound identification app of the Finnish birds. We report how people welcomed the app and present spatial and temporal distribution of observations collected over a single season. We discuss issues on reliability and validity of the user-based annotations of the identification results. The app showcases that extreme citizen science can potentially detect change in our environment in a timelier manner than previously and thus, guide faster conservation acts. Joint efforts of professional and citizen scientists are therefore called-for.

Positive deviance in livestock farming in East Africa: citizen scientists as agents of change

Birgit Habermann; Leah Gichuki; Tigist Worku; Todd A. Crane; Emmaculate Kiptoo; Elizabeth Getahun

Change is everyday life for East African livestock farmers. Nothing is static in dynamic food systems that are constantly confronted with the impact of climate change and erratic market dynamics. We believe that citizen science based on positive deviance is offering a more dynamic and sustainable response than traditional monodisciplinary and normative sciences: citizen science offers a response to how people want to live their lives, how they know and learn, in their own unique ways. Positive deviance helps us to find those farmers who are more successful than others in the same circumstances, not the wealthiest but those most invested in developing endogenous adaptation solutions, and

willing to share their knowledge with others. These farmers are not only more successful farmers, but also farmers who try their best to seek ways to improve their production and profitability by taking a risk to experiment and test ideas and knowledge on their farms.

We found that opening the space for livestock farmers to get actively involved in the research process and becoming independent agents of their own transformative process is not only empowering but also yields better insights for scientists into which interventions work and which do not work, and why. Livestock farmers as citizen scientists and livestock researchers together with extensionists develop their own processes of engagement, data collection and knowledge sharing through interactive research. Feedback loops on findings between farmers, researchers and extension helped to maintain the dialogue between the different groups. The citizen science approach is advancing local multidisciplinary collaborations in agricultural research which is critical in co-creating climate adaptation actions in livestock systems.

Scaling citizen science for a responsible and inclusive change: The MLE CSI-PP Toolkit

Antonella Radicchi; Muki Haklay; Alan Irwin; Marzia Mazzonetto; Florian Heigl; Daniel Dörler; Rosa Arias; Margaret Gold

With the conference motto “Change”, scholars and practitioners are invited to reflect on “the potential of citizen science to facilitate, initiate, observe, document and reflect on change” defined as “the act or result of something becoming different”. In order for successful citizen science (CS) pilot initiatives to unleash their potential for achieving change, they need to be scaled up, but how this scaling-for-impact can be measured, assessed and operationalized is still understudied in literature and practice in CS.

This talk will address the conference motto with a presentation of the MLE CSI-PP Responsible and Inclusive Scalability Toolkit produced during the “Mutual Learning Exercise on Citizen Science Initiatives - Policy and Practice” (MLE CSI-PP) run by the European Commission D-G Research and Innovation in collaboration with eleven EU Member States.

This Toolkit offers a novel theoretical and methodological framework to support the scaling of citizen science initiatives in a responsible and inclusive way in order to achieve greater impact and positive change.

The research underpinning this Toolkit followed a mixed methods approach of i) a literature review of theory and case studies, ii) interviews with experts in the field of citizen science and related disciplines, iii) a survey among the participants in the MLE CSI-PP and iv) three working sessions run during the Berlin meeting in 2022.

The talk will introduce three core components of the Toolkit:

1. A multidimensional qualitative definition of scalability, which addresses proof of value, the matter of concern and social/legal alignment;
2. An operational framework for the scalability of citizen science projects consisting of four models (up-out-deep-down scaling) and two approaches/strategies (top-down/deliberate and bottom-up/accidental)
3. Eight recommendations for policymakers willing to support the scalability of citizen science projects, by designing appropriate assessment criteria and ad hoc funding schemes.

A French citizen science program to monitor soil fauna diversity changes with land-use management and practices

Sandra Barantal; Camila Andrade; Apolline Auclerc; Robin Dagois; Anne Dozières; Angélique Daubercies; Laure Turcati; Alan Vergnes

Soil fauna represents an important reservoir of biodiversity and fulfils an essential role in soil ecosystem functions. However, we crucially lack of data to predict spatiotemporal dynamics of soil fauna diversity in the face of environmental changes and human activities. Additionally, the significance of soil biodiversity is relatively unknown to a wider audience, notably because these organisms are hidden and difficult to observe. Together, the lack of data and the lack of public awareness about soil diversity, limit our ability to design and implement effective conservation strategies. To meet these challenges, a new citizen science program namely QUBS has been launched in 2022 to monitor Soil Biological QUality in France. The QUBS program invites citizens to discover the diversity of fauna that

inhabits the soil of their garden or other green spaces through a range of fun and innovative protocols. The QUBS's observers share the results of their participation online, in the form of photographs of the species they have collected. Thanks to a system of collaborative validation of species identification and the possibility of commenting on other participants' observations, the participation platform becomes a space for exchange and collective learning, where the community itself exercises a quality control over the data. Here, we will present the various methods developed to stimulate a public interest in soil animals and those enabling participants to link their management practices with soil diversity. A "mission" system has been implemented to invite the participants to compare soil biological quality among different situations within their site, the participant's garden becoming a real site of experimentation. Besides an overall presentation of the program, we will present a critical assessment of the participation through an analysis of the quality of data acquisition as well as the level of commitment achieved by the participants.

Quantifying the evolution of citizen science: a bibliometric analysis

Moritz Müller; Ulrike Sturm; Silke Voigt-Heucke

Over the past decade, citizen science has experienced remarkable growth and diversifications, positioning itself as a changemaker in academia. This evolution has been marked by an increasingly diverse support structure, driven by the emergence of new funding programs. The infrastructure and community have expanded, and the term "citizen science" has become more prevalent in academic discourse. An increasing number of scientific articles on citizen science underlines the spread of citizen science as a research approach.

While previous analyses have explored the scientific output of citizen science, there are still knowledge gaps about the landscape of citizen science publications. A lack of studies on the evolution of citizen science in the past five years and new evidence on the low scientific output of citizen science projects call for a more up-to-date and in-depth analysis. Furthermore, the current research lacks temporal data on the quantitative development of citizen science publications in the different disciplines, so that it is not possible to assess whether citizen science has spread in the different scientific fields.

To address these knowledge gaps, our presentation will discuss the results of a bibliometric analysis of citizen science publications. Leveraging a dataset of citizen science publications obtained by querying the Web of Science database for citizen science articles, we analysed the quantitative development of citizen science publications and their distribution across disciplines over time. Our analysis distinguishes between research that uses citizen science data and accompanying research on citizen science, e.g. on participants' learning outcomes. With this approach, we bring a new perspective to bibliometric research on citizen science that allows for a more informed assessment of the current state of the citizen science research landscape and its changes over time. In doing so, our research aims to provide the citizen science community with valuable insights that can inform strategic decisions, funding gaps, and collaborative efforts, ultimately fostering the continued growth and impact of citizen science in academia and beyond.

Tiny Forests: three years of citizen science data and insights on urban environmental change

Sophie Cowling; Claire Narraway; Daniel Hayhow

The climate and biodiversity crises are heightened in cities, causing detrimental effects to human and environmental health. Nature interventions, such as Green Infrastructure (GI) and Nature based Solutions (NbS), are increasingly being leveraged to address these challenges and implement long-term positive change. However, the factors affecting the efficacy of GI and NbS are poorly understood. Large-scale monitoring is required to fully explore the functional processes within urban interventions, which is simply not achievable by individual researchers. Citizen science is ideally placed to fill critical research gaps, while simultaneously providing opportunities for education and social change.

Earthwatch Europe, and partners, have planted more than 200 tiny forests in the UK since 2020, contributing towards environmental change through place-based community action. Tiny Forests are 200m² sites, containing 600 trees and shrubs, planted within urban areas. The sites are planted using the unique Miyawaki tree planting methodology, which comprises of a densely planted (~3 trees per m²) mix of native species in well-prepared soil. Tiny forest seeks to

re-connect people with nature and provide vital ecosystem services to deprived urban areas; achieved through community engagement, social empowerment and citizen science. Through in-person and remote support, citizen scientists monitor four key research areas (ground carbon, biodiversity, thermal comfort and flood mitigation) that explore ecosystem service provision, and how these change over time.

Here, we will present the initial findings from the first three years of data collected within Tiny Forests by citizen scientists, across our four research strands. The presentation will discuss the initial results and how these sites contribute towards environmental change in urban areas. We will also share the successes, difficulties, and how citizen science data acquisition will need to adapt as the Tiny Forests grow.

The element of change across the “From Sea to Street” initiative

Baiba Prūse; Marta Dieviņa; Sophia Kochalski; Ignacio Gianelli; Katina Roumbedakis; Marien Helmus; Embla Ekström; Ludovica Montecchio; Tanja Straka; Svea Rogge; Arne Kinds; Natali Lazzari; Milena Arias Schreiber; Sebastian Villasante

The Earth’s vital oceans are constantly changing and are at risk from pollution, overfishing and climate change. Research highlights the importance of early and direct contact with the sea in fostering responsible stewardship. However, in urban areas, these interactions are limited, making mediated experiences crucial. Murals, a special form of street art, have recently gained importance in European cities and shape emotions, memories and relationships between people and the environment.

The “From Sea to Street” project, running from June 15 to December 14, 2023, is a citizen science initiative among Spain, Latvia and the Netherlands on the intersection of art, citizen science and nature conservation. With the help of the citizens, the project maps and analyses murals, decoding the stories and emotions they evoke. Our methodology includes interviews and collaboration with artists, street art tours with students, community workshops and a multilingual survey. These different approaches provide a rich data set which brings the space to analyse citizens’ diverse connections to the sea and ocean.

The goal of this presentation is to look at the project’s various methodologies for collaborating, engaging and communicating with citizens across the participating countries. We present lessons learned and how the practices applied as the initiative have changed our thinking when it comes to embedding citizen science in the day-to-day research and university curriculum.

Does using AI in citizen science support volunteer’s learning process and outcomes, and how?

Khrystyna Pankiv; Laure Kloetzer

The goal of this research is to investigate the influence of using ML classification model on the volunteer’s learning process and outcomes. One of the oldest and largest biodiversity-related citizen science projects - eBird (<https://ebird.org/home>), developed by the Cornell Lab of Ornithology in the Information Science and Macaulay Library, collects data from birdwatchers from all over the world to record the checklists of when, where and how they have seen or heard birds. This project has a mobile application for birdwatchers to record the checklists of when, where and how they have seen or heard birds. Using this application, bird’s species should be identified by volunteers, based on their knowledge of bird’s species. The Cornell Lab also developed a mobile application Merlin that uses classification of deep convolution neural networks to help users automatically identify bird’s species by photo, sound or description.

The participants (students of Information Technology Institute of Ivano-Frankivsk National Technical University of Oil and Gas) were randomly divided into two groups: one was using eBird application and the other one was using Merlin application. The volunteers were interviewed and tested for bird’s knowledge before and after participating in the project to find out how using the ML classification model influence the volunteer’s learning. Also the test results will be compared with a control group that will not volunteer in the citizen science project.

The main finding is that knowledge improvement using eBird was better than using Merlin.

Also the knowledge improvement will be compared to students' university scores, to investigate possible correlation. We are interviewing 5 participants with the highest and the lowest knowledge improvement from both groups to investigate what influenced most the learning process.

Citizens as changemakers: exploring playful participation through citizen science

Mugdha Chandratreya; Catherine Jones

When citizen science as a methodology places participation as central and important to any scientific enquiry; it becomes imperative to explore the contours of what then means to participate. What are the levels of engagement? As citizens involved in science to what extent can your participation go. If participation is central to citizen science, then these actively involved citizens are they the drivers of change within their community? The question of positionality of the citizen also then becomes a point of enquiry. We consider it essential to also discuss how citizen science as a process does not always lead to behavioural or societal changes but the space that it provides for active participation by members of the public can provide impetus for collective community action in future. That means, citizen scientists are the key to kickstart the process of change.

We critically examine these concepts with the help of our review of literature and secondary sources of data. We also discuss the myriad of techniques available that push for increased participation in general in citizen science and specifically by reviewing the role of playful participation with the help of a board game designed to support reflections on health in place. The methodology involves qualitative analysis of the secondary sources of data that includes reports of past and ongoing projects.

Keywords: Participation, Levels of engagement, Citizens, Changemakers

How participants care for data in biodiversity citizen science, in a context of rapid technological changes

Deborah Gonzalez Canada

Citizen science participants care for the data they generate as an affective state, as a material doing, and as an ethico-political responsibility (De la Bellacasa 2011, 2017). These caring practices 1) are fundamental to citizen science, yet often invisible, and 2) take place in rapidly changing digital environments. Citizen science apps, social media, and other technologies used for data collection, analysis, and communication are constantly shifting, which in turn impacts caring practices. This has implications for citizen science programs.

Since 2019, I have investigated volunteers' practices in biodiversity monitoring and how digital technologies shape those practices. My Ph.D. project focuses on a frog and a bird monitoring program with over 20 years of trajectory and multiple technological changes, from analogue to digital technologies.

For some of the interviewed participants, their biodiversity records are not just data they collect, submit, and forget about. Different types of data, from an audio record of a frog to a graph showing the impact of citizen science on endangered birds, have emotional value. Participants affect and are affected by these files. The files are sometimes attached to fond memories or might be a meaningful reason to continue monitoring, while losing access to the files because of technological changes in apps and platforms might discourage participants to continue volunteering. Because of the fear of losing records, or the desire to use data in alternative ways, some of the volunteers make digital copies of their records. A frog call record, for example, then lives amphibian lives; it exists in the citizen science app and migrates to biodiversity atlases, but it is also hosted in Soundcloud and shared on social media groups.

If records are so meaningful, how can ongoing access to files be provided to volunteers? How do citizen science programs prepare for and manage ongoing digital changes while continuing to encourage and recognize participants' care practices for data?

High-quality citizen science data to inform and complement official monitoring on sustainable development and climate change

Elena Proden

Citizen science offers significant opportunities in helping produce much required evidence to develop or adapt policies and actions required to promote sustainable development and address climate change. Data gaps are huge when it comes to monitoring progress on Sustainable Development Goals adopted by UN Member States in 2015 or on regionally or nationally relevant indicators across all dimensions of sustainability: people, planet, prosperity, peace and governance, and partnerships. Beyond making data on indicators available, other critical issues are related to the need to improve the timeliness of data, as well as its granularity to be able to track progress for different geographic locations and population groups in a useful manner. Finally, many new indicators or measurements related to vulnerability, governance and human rights are about the experience or perceptions of people with so far multiple data gaps not fully addressed. For public authorities, however, to fully benefit from these opportunities offered by citizen science, it is important that National Statistical Offices (NSOs) and NSSs (National Statistical Systems) embrace change and engage with citizen science data. Engagement means that NSSs use citizen science data either as input into the production of official statistics or validate the quality of citizen science data and promote it through official monitoring platforms. A much more transformative change would be about moving beyond the traditional paradigm under which NSOs were functioning with the main focus on data production, and increasingly assuming the role of data stewards supporting citizens and various stakeholders in producing quality data meeting specific local needs or objectives. The research undertaken under the Crowd4SDG project offers findings and recommendations for both NSOs and citizen science community on how to nurture a more vibrant data ecosystem needed to ensure timely and quality data and evidence availability and use.

Lichens and air quality: a new citizen science approach

Stefano Martellos; Sebastiano Andreatta; Stefano Loppi; Tania Contardo

Since a first experience in the United Kingdom during the '70 of the past century, citizen science approaches have been adopted also in the field of air quality monitoring, on the basis of indices of epiphytic lichen diversity. Since the identification of lichens in the field may often be quite difficult, especially to laypersons, in the framework of citizen science approaches volunteers were often involved adopting simplified sampling protocols, which usually require taxon identification at higher level than the species, or even the use of morpho-types, or thallus colours. Even with these simplifications, several studies demonstrated that the data produced with citizen science approaches were highly reliable and could be useful at least to define general patterns of lichen diversity, with the aim of addressing further finer investigation. A very simple citizen science approach has been developed for monitoring air quality through a streamlined index of epiphytic lichen diversity by involving school children. The protocol foresees the identification of monitoring stations of a 50 metre radius, in which the trunks of 3 isolated trees, selected among a list of common species, are sampled, checking whether there are only crustose lichens or no lichens at all (score = 0), narrow-lobed lichens (score = 1), broad-lobed lichens (score = 2), or fruticose lichens (score = 3). The Municipality of Verona, which this year hosts the National Conference of the Italian Lichen Society, was selected as the test site. The outcome of this activity, as well as the major constraints faced in the involvement phase and during fieldwork, will be presented and discussed.

The activity is supported by The Municipality of Verona and its Natural History Museum, the National Biodiversity Future Center, The Italian Botanical Society, The Italian Lichen Society, the Cariverona Foundation, the Italian WWF and the Italian Association.

Citizen science and gender perspective: promoting equity and change in scientific research

Mabel Segú Odriozola; Alba Anton

In our rapidly changing world, citizen science is emerging as a transformative force by democratising scientific exploration from diverse perspectives. The urgent need for a critical shift in knowledge generation is recognized, ensuring that scientific projects are inclusive, equitable, and drivers of social change. We present an innovative tool developed under the SOCIO-BEE project, based on intersectional and gender theory to assess inclusion and equity in research.

SOCIO-BEE understands that inclusion and equity are not just fundamental principles, but essential commitments. The gender perspective is not optional; it is a commitment to social justice and scientific democratisation. The goal is to benefit all, recognizing the intersectional complexity of gender, origin, and diversity. This is particularly relevant in environmental projects, where an equitable distribution of benefits is crucial for sustainability.

SOCIO-BEE goes beyond declarations; it implements an integrated strategy with scalability. It recognizes diverse roles for citizen scientists, avoiding the marginalisation of vulnerable individuals, and identifies key factors: diverse participation, data representation and accuracy, accessibility, and safe environments.

SOCIO-BEE has created an innovative tool that offers space for qualitative responses, rubrics, item explanations, and guidelines. It provides personalised scores and recommendations, considering intersectional and gender identities.

This tool is adaptable, versatile across all phases and disciplines of citizen science. Feedback is adjusted according to responses, improving practicality and relevance. With tools like this, we can unlock the full potential of science.

Measuring nightly changes in artificial light emissions with the Nachtlichter app

Christopher Kyba; Nachtlichter Analysis and Co-design teams

Within the project "Nachtlicht-BühNE" (Citizen-Helmholtz network for research on nighttime light phenomena), two teams of citizen scientists co-designed two data collection apps, together with researchers from the Ruhr-Universität Bochum (RUB), the German space agency (DLR), and the German Research Center for Geosciences (GFZ). We present results derived from data taken with the "Nachtlichter" (Night Lights) app during our "Time for the Night" campaign in Sept-Oct, 2023. The app allows citizen scientists to conduct lighting inventories, by recording the light sources present and their characteristics (e.g. colour) while walking from one street corner to another. As of 30 September 2023, participants had recorded observations of 27,000 lights in 500 surveys.

The aim of this year's campaign was to examine how different types of lighting change over the course of the night. Among the questions that we will discuss in our presentation are the following: What fraction of advertising lighting (signs and shop windows) are turned off late at night, and at what time are they typically turned off? How does this change in lighting relate to changes in the number of pedestrians our participants observed on the street? Does the practice of change in nighttime lighting vary depending on the land use context within Germany? Finally, does lighting practice (particularly with regard to nightly changes in advertising and private lighting) differ between Germany and peer countries?

The present campaign was developed during Research Year 2023 – Our Universe, funded by the German Ministry of Education and Research. Programs to analyse lighting changes were prepared in advance of the campaign, based on data from earlier Nachtlichter campaigns in 2021 and 2022. The early campaign data is consistent with the hypothesis that temporal lighting practice in Germany changed following the Russian invasion of Ukraine, and the resulting changes in German energy prices and policy.

FLOW: citizen science detects freshwater streams failing the Water Framework Directive

Julia von Gönner; Jonas Gröning; Matthias Liess; Aletta Bonn

Our freshwater streams suffer greatly from the input of pesticides and fertilisers, as well as the straightening of watercourses and destruction of riparian vegetation. The goal of the European Water Framework Directive to put all surface waters in a “good ecological status” by 2015 has been missed in a large part of German waters.

In the BMBF-funded citizen science project FLOW, over 900 volunteers have been studying small streams from 2021 to 2023. More than 90 BUND, angler and student groups examined the ecological status of 137 streams across Germany in accordance with the requirements of the European Water Framework Directive. Learning materials, videos and training units were created for this purpose. A biological indicator (SPEARpesticides) is used to assess the pesticide contamination of the sample sites based on aquatic invertebrates and insects (macrozoobenthos).

Preliminary data from citizen researchers shows that over 50% of sampling sites in agricultural catchment areas had excessive pesticide contamination in relation to the macrozoobenthos community and do not achieve good ecological status as required by the EU. These streams were rated as “moderate”, “unsatisfactory” or “poor” using the SPEARpesticides index. With regard to hydromorphology, over 60% of the agricultural streams examined did not achieve good ecological status.

Rigorous testing shows that the citizen science data quality is comparable to the professional monitoring of small water bodies (KgM). We were also able to show that the ecological knowledge and collective action to protect streams of those involved in citizen science stream monitoring increased through learning-by-doing. By creating shared knowledge, collective empowerment can arise. As a next step, the volunteers would like to work on restoring aquatic ecosystems and further monitor their success.

Citizen science as part of cultural heritage change detection and management in conflict areas

Bente Lilja Bye; Katerina Zourou; Stefania Oikonomou; Charalampos (Babis) Chatzidiakos; Thanasis Koukoulis; Kateryna Boichenko

With the onset of the Russian attacks on Ukraine and the following war, Ukraine is experiencing unprecedented and unpredicted changes in its cultural heritage landscape. Specifically, cultural heritage is being destroyed, exposed to new stress factors detrimental to cultural heritage in various ways. These changes have multilayered impacts, both material and non-material. This context brings to the fore the following question: “How can cultural heritage be managed in the case of direct and indirect impacts during a conflict?”

During war, it is both dangerous (bombs, pollution, floods etc) and hard (infrastructure damaged, not accessible) to monitor cultural heritage sites and monuments, to check if they are impacted by the conflict. Through a series of hackathons (EUSpace4Ukraine 2022, MyEUSpace competition, Social Hackathon 2023; Hatathon Ukraine 2023), a decision support tool has been created that harmonises space data, Earth Observations, both space-based and in-situ, including data provided by citizens, to monitor and document threats and damages to cultural heritage in conflict zones.

The authors are experts in citizen science, environmental sciences, software development, Earth Observations, data management standards, and digital education and will offer a demonstration of the Space4CC decision support tool. The tool provides cultural heritage managers in conflict areas with updated data and information on the status of cultural heritage sites and monuments. The tool can be used by decision makers and citizens alike. This presentation shows the overall concept of the cultural heritage management tool, showcasing citizen science and how citizens are included in the solution in an interoperable fashion.

The challenges related to citizen science in conflict areas are described along with strategies and solutions to overcome them. By facilitating citizens’ involvement in the value chain, from creation to decision-making, a redundancy strategy is applied for cultural heritage safeguarding. Finally, an outline of the strategy to continue the integrated engagement of citizens, including education for uptake of knowledge in institutions and civil society organisations alike, is presented.

Geonity: empowering change through enhanced citizen science engagement

Francisco Sanz; Jorge Barba

In a world where change is constant and inevitable, the role of citizen science in driving innovation and fostering community engagement is paramount. Ibercivis presents “Geonity,” an open-source application designed to amplify the impact of citizen science by simplifying the creation and participation in projects centred around the geolocation of observations. This application is a testament to our commitment to adaptability, inclusivity, and change.

Geonity is an evolution of Citmapp, inheriting its legacy of hosting over 50 citizen science projects, and enhancing it with intuitive, user-friendly interfaces and features. Available on both Android and iOS platforms, Geonity democratizes science, allowing every user to effortlessly create and participate in a myriad of citizen science projects. Every project created is instantly accessible to all users, fostering a global community of citizen scientists united by their passion for discovery and change.

The application’s design is rooted in simplicity and accessibility, ensuring that users, regardless of their technical expertise, can contribute to the global knowledge base. Users can initiate their own projects in just a few steps, making science an inclusive and collective endeavour. Each observation, each data point, contributes to a tapestry of information, weaving together insights that drive change.

Developed by Ibercivis, Geonity is not just an application but a movement towards a world where science is open, collaborative, and instrumental in navigating change. It embodies the spirit of adaptability, transforming every smartphone into a tool of discovery, and every user into a citizen scientist.

Join us in this journey of discovery, where every observation is a catalyst for change, and every citizen scientist is a beacon of innovation. Together through Geonity, we will navigate the terrains of change, armed with knowledge, community, and the unyielding spirit of discovery.

Pflanze KlimaKultur!

Aletta Bonn; Birgit Nordt; Hannah Prawitz; Wayne Schmitt; Gerald Parolly

Urban areas are perfect test beds to assess the effect of urban heat islands on plant phenology. The citizen science project Pflanze KlimaKultur! (www.pflanzeklimakultur.de), coordinated by Botanical Gardens in the four cities Berlin, Halle, Jena, and Leipzig, and iDiv studies these effects on the phenology of herbaceous species together with almost 200 citizen participant sites located across the urban gradient (private gardens, allotments, and parks). Participants planted a ‘climate garden’ with a set of eleven model species and monitored weekly phenological developments over two years. Paired with local data for soil, surface, and air temperature monitored with climate loggers as well as satellite-based Sentinel-2 imagery land cover data, we assess the indicator potential of plant phenology to identify influences of the urban heat island effect using a citizen science approach. Overall, results demonstrate a negative correlation between the onset of flowering in some species with air temperature, i.e., earlier flowering at warmer temperatures. No association was found, however, with the surrounding land cover (green space, built-up area, or water) in a 500m radius and flowering data, despite present correlations between land cover and temperature.

In parallel, Botanical Gardens served as dialogue platforms to discuss with citizens ideas and visions for biodiverse, healthy, and climate-resilient cities using participatory mapping approaches. With this integrative socio-ecological approach, we hope to strengthen citizen science as a community capacity building approach for civic empowerment. Botanical Gardens as public spaces can enhance their science-society interface and offer opportunities for creating joint knowledge and understanding through citizen science.

Bridging the gap: harnessing citizen science for biodiversity monitoring in Germany's conservation efforts

Silke Voigt-Heucke; Moritz Müller; Julia Rostin; Frederic Griesbaum; Sophie Ewert

The rapid decline of biodiversity is one of the greatest challenges of our time, requiring the establishment of robust biodiversity monitoring schemes. In Germany, a lack of monitoring data hinders the production of comprehensive conservation reports. Engaging volunteers in large-scale data collection through citizen science could be an invaluable tool and data source to fill reporting gaps. However, the reliability of citizen science data remains controversial, highlighting the need for wider acceptance for its full integration. To explore attitudes towards citizen science within federal nature conservation agencies, we conducted a comprehensive nationwide online survey in Germany. Over 200 respondents from a wide range of conservation agencies participated, allowing us to assess their attitudes and the challenges associated with using citizen science data. Encouragingly, over 80% of respondents demonstrated a good understanding of the concept of citizen science and recognized its central role in conservation efforts. Notably, half of the respondents expressed a strong interest in becoming more involved in citizen science projects. However, respondents also identified significant barriers, mainly related to information sharing and lack of access to and knowledge of how to use citizen science data. To accelerate the use of citizen science in biodiversity monitoring, we propose several solutions. First and foremost is the need to strengthen information sharing mechanisms and initiate capacity building initiatives between citizen science practitioners and conservation authorities. We highlight the importance of refining interfaces between authorities, data platforms and citizen science projects to facilitate effective collaboration. Our findings highlight the potential for effectively integrating citizen science into biodiversity monitoring schemes. However, it is essential to prioritise the reduction of barriers and misconceptions, and to bridge existing gaps between the different stakeholders involved in this endeavour.

Can citizen science-generated data induce policy changes? Insights from policy actors in Uganda

Mercy Gloria Ashepet; Tine Huyse; Liesbet Jacobs; Maxson Kenneth Anyolitho; Viola Nyakato; Bente Wigerinck; Grace Kagoro Rugunda; Liesbet Vranken; Caroline Michiellier

Citizen science has received recognition as an appropriate tool to address global challenges, shape policy and foster sustainable change. While examples of how citizen science has induced policy changes are present in the Global North where the approach is well established, scaling the uptake of citizen science-generated evidence demands insights into the perceptions of key actors influencing policy, be they government or not. However, in the Global South, where citizen science is largely untapped, much remains unknown about how citizen science is conceived by policy stakeholders. This study addresses this gap by examining perceptions of policy actors towards citizen science in Uganda, focusing on the factors that either facilitate or hinder their trust in citizen science-generated data.

To achieve this, the study targeted three citizen science initiatives implemented in southwest Uganda to monitor natural hazard disasters and freshwater snails transmitting schistosomiasis. Purposive sampling was employed to select both elected and technical leaders relevant to the objectives of these citizen science initiatives. Eighty semi-structured interviews and nine focus group discussions were conducted with leaders at the district, sub-county, and community levels, followed by a thematic analysis of the data.

Preliminary results indicate that there is moderate trust in citizen science-generated data amongst the leaders. Trust is attributed to factors such as the presence of supporting evidence for the data and participant selection procedures. Distrust seems to stem from concerns about the data quality reported by the community members as well as the 'quality' of participants. To foster trust in citizens' science-generated data and facilitate impactful citizen science, respondents suggest constant supervision by local stakeholders particularly to verify the data. This underscores the importance of actively involving local community members right from the inception of the project.

Promoting citizen science observatories as a blended learning environment for the Blue Schools: the case of MINKA platform in Catalonia

Elisabet Bonfill; Berta Companyns; Xavier Salvador; Carlos Roderó; Ivan Roderó; Jaume Piera

Improving ocean and water literacy among school communities is one of the objectives of the European Commission for the following years. To achieve this, they are supporting projects that promote the expansion of the Network of European Blue Schools as ProBleu EU Project. This idea contributes to the main goals of the EU Mission “Restore our Ocean and Waters by 2030”. One of these objectives is to bridge the knowledge and emotional gap, and part of it could be filled by involving schools under the umbrella of blended learning environments that combine face-to-face learning with technology-mediated instruction. This hybrid method allows us to use the methodologies of Open Schooling, where interaction with scientists and with the places where they live, especially with their local waters, fits perfectly.

In this context, citizen science platforms such as the citizen observatory MINKA (<https://minka-sdg.org/>), can be an excellent tool for developing Blended Learning Environments, as discussed by Mominó et al. in 2016. These observatories are technological platforms that offer a range of tools. Schools can participate by engaging their students and school community in collecting and analysing data on biodiversity or environmental parameters, such as water temperature, from their surroundings. This concept has a great potential for education. The flexibility of these platforms to adapt to different educational contexts and the ability for teachers and students to create and manage their local projects (alone or involving local partners as associations or companies), enhance the learning experience and empower students to take an active role in environmental stewardship.

In conclusion, this kind of citizen observatories can be promoted and implemented in several European schools as in the Catalonia region case. As a result, we get a large amount of local data as we increase the sense of belonging to a global community within the schools.

spotFIRE: a citizen science app to support the prevention of forest fires

The Trung Hoang; Mortimer Müller; Agnes Milewski; Philipp Hummer; Quang Bao Tran; Florian Heigl; Harald Vacik

Forest fires are becoming an increasing danger worldwide, and citizen science approaches can help to manage and reduce the forest fire danger by engaging the public in data collection and analysis for better prevention and suppression.

The spotFIRE mobile app allows users to report forest fires and document information about the fuel load as a potential source for fire ignition. The data collected by the users can help to inform forest managers about the hotspots of current and past fire events, support fire managers in the planning of fuel treatments to reduce the fire danger and increase the awareness of citizens about the factors influencing the fire danger. The App was developed jointly by the forest fire research team at BOKU, the Citizen Science Spotteron platform and with the end users. We conducted several workshops with stakeholder groups to define a set of questions to be investigated in the App. The discussions with the citizens helped to co-create the design and structure of the App for collecting information on combustible material. The development team used the feedback from meetings to design the core elements and functionalities and launch the first version in September 2023 in three languages (German, English, Vietnamese). The research team then continued collecting feedback from testers to evaluate the user experience and improve and update the app for the 2nd version.

In this contribution, we present the findings that we made, when the first version of the app was launched. It has been well-received by users and used to collect data on forest fires and fuel loads in several regions. From the initial results, we have identified some critical lessons, which include the time needed for the collaboration between researchers and potential users in the design phase, the challenges in ensuring a user-friendly interface with support for multiple languages, and the difficulties in gathering feedback for a structured and harmonised improvement of the App.

WORKSHOPS

Joining forces to meet the needs of (environmental) citizen science in conflict zones

Anna Berti Suman; Katerina Zourou; Stefania Oikonomou; Margaret Gold; Uta Wehn; Núria Castell; Ida Theilade

The ongoing Russo-Ukrainian war has triggered the development of numerous citizen science actions that gather data on environmental and health issues (Zourou & Oikonomou, ECSA 2022), and on associated human rights violations. In the post-war era, data collected by these initiatives could become evidence in judicial fora, for example in international criminal and human rights tribunals. Already at present, this evidence is being showcased in the 'court' of social media and in the news.

Citizen-generated data in conflict zones, however, should be treated with a critical eye, bringing along considerations and questions on responsible management as well as on potential misuse of such data. Furthermore, a careful analysis of the legal potential and challenges that this data may encounter should be performed. Advice should be provided to citizen science communities engaged in this data gathering, both to those located in conflict zones and those belonging to the diaspora. We posit that universities, through their students, staff and networks, like the ECSA platform, could provide such advice in multiple forms.

In the workshop, we will: 1) present to participants selected citizen science cases and projects deployed during the Russo-Ukrainian war (GROMADA project, CitiObs project); 2) ask participants to reflect in a proactive manner on the needs and knowledge/resources gaps these communities may face; 3) elaborate strategies to respond to these needs as representatives of different fields and sectors (e.g., participants from academia; from ECSA; from a citizen science initiative) and present these strategies in a final debriefing session.

Making lasting change: fostering long-term collaboration and funding with local institutions for climate action

Marit Bogert; Tanya Yankelevich

The Dutch citizen science project Delft Measures (<https://bit.ly/DelftMeasures>) focusses on the collaboration between citizens, local institutions, and NGO's to map weather and changing climate in the city of Delft. It has been running for 4 years, during which citizens measure long-term changes in temperature, rainfall patterns, and soil moisture.

The project is supported by the municipality, Delft University of Technology, and NGO's to reach a diverse array of goals that assist and enrich the project from many angles. It addresses a variety of interests and goals from all stakeholders, from improving climate adaptation to implementing open science practices. At the ECSA conference we would like to host a workshop showing how we secured this support, collaboration and funding, and how we support all these different goals through one project. We will help participants develop a plan on how our lessons learned can be applied to their specific projects. Our diverse social and scientific methodologies make this project an interesting and inspiring case study that can be duplicated for maximum impact in other contexts.

The workshop will show how DM has developed and how it managed to reach a consistent base of enthusiastic citizens, engaging them in making changes in the city for climate change adaptation. For Delft, as a city below sea-level, this means a better drainage network to deal with the larger showers of summer rain, while retaining water during longer periods of drought. By setting up secure collaborations with the municipality and university, the data citizens collect is used as direct input for the (future) efficiency of the city-wide sewer and drainage network. For the university, the results are valuable to understand the influence of cities on local climate patterns. Additionally, the project is a case study for the university's Open Science program, aiming to evaluate the implementation of open science practices in local citizen science projects.

CROPS: creating transnational communities to support the upscaling of citizen science

James Sprinks; Dilek Fraisl; Steffen Fritz; Ana Solange Leal; Giovanni Maccani; Agueda Gras-Velazquez; Arianna Liconti; Sasha Woods; Stephen Parkinson; Luigi Ceccaroni

When considering change within the citizen science discipline, scale is a key aspect to consider in order to maximise the impact of actions, and the scientific knowledge gained from them. The Horizon Europe project CROPS will achieve change by enabling citizen science at scale. It will leverage citizen science data and approaches to address societal issues that our world is facing today. Transnational citizen science communities will be developed, building on existing networks, and established to create a knowledge-sharing space to support the upscaling of citizen science actions.

This workshop session will begin with an introduction to the CROPS project, its goals and objectives, followed by a collaborative, co-design session, where all attendees will share their ideas, experiences and opinions regarding the upscaling of citizen science. Through interactive discussion, and idea creation using a range of media (pens, paper, online boards and messaging), attendees will contribute towards the design of transnational communities, the spaces provided for them, and the resources and support available.

The session is important as it will be the first major co-design event when considering the creation of CROPS communities to support the upscaling of citizen science. An important goal of the co-design approach is to ensure a range of citizen science activities and stakeholders are represented as part of the design process, with their ideas and feedback informing the CROPS approach in building such communities and the spaces for them to share knowledge and support each other.

The outcome of the session will be a better-informed community about the issues surrounding the upscaling of citizen science actions, and a better-informed community support structure, taking a user-centred approach towards its design and implementation. Attendees will benefit by being founding members of the first CROPS transnational communities, and will have access to their resources.

A common way of monitoring near real-time change of environmental data with the OGC's STAplus

Joan Maso; Andreas Matheus; Oscar Gonzalez-Fernandez; Nuria Julia

Many citizen science projects regularly collect data about the environment. However, monitoring the change by combining different data citizen science projects is still extremely difficult. When the data is shared on the Internet, there are often technical interoperability issues and shortcomings of operational web APIs as they are commonly custom-designed to serve their own application(s). For continuous monitoring of the overall change, it is necessary to arrange some API interoperability, a common data model, and agreed semantics. In addition, a mechanism to be able to receive change notifications is rarely implemented. Notifications allow for implementing alerts, which are useful in cases such as reaching dangerous air quality conditions, forest fire detection, endangered species tracking, etc. STAplus is an API that supports pushing notifications to previously subscribed applications to notify users.

Inspired by the CitiObs, AD4GD and More4Nature projects application of STAplus for dealing with aspects necessary for citizen science (citizen attribution, licensing, semantic definition, campaigns, etc), the workshop will: a) Illustrate near real time capture of air quality data using the Smart Citizen Kit. b) Explore how to apply the STAplus data model in existing citizen science initiatives. c) Show the potential of rich data queries including geo-fencing illustrating performance and interoperable reuse across projects. d) Showcase how tools can produce rich queries in an intuitive fashion. e) Generating alerts when unacceptable thresholds have been surpassed. f) Demonstrating attribution and recognition of citizen scientists contributions. g) Protecting private and sensitive information.

The outcome of the workshop will serve as an input for next sessions of the "Projects, data, tools and technology" ECSA working group.

(This work has received funding from the European Union.)

Citizen science for policy: is the citizen science community ready for change?

Dilek Fraisl; Steve MacFeely; Haoyi Chen; Linda See

Citizen science is growing and so is its influence on policy. More and more governments and international organisations are interested in, and actively harnessing, the potential of citizen science data for monitoring and reporting of the UN Sustainable Development Goals (SDGs), as well as other multilateral agreements and frameworks such as the post-2020 Global Biodiversity Framework. For example, the UN Statistics Division (UNSD) is mandated by the 54th Session of the UN Statistical Commission to establish a collaborative and conceptual framework on data produced by citizens (referred to as the UNSD Citizen Data Collaborative). The World Health Organization (WHO) has been very active in exploring the potential of citizen science data for addressing the data and policy gaps for the health and well-being related SDGs and WHO's Triple Billion Targets. Change is undoubtedly happening, and citizen science is being widely acknowledged among the scientific and policy communities, but the question is: Is the citizen science community prepared for this?

This workshop session will build on a joint paper (<https://www.frontiersin.org/articles/10.3389/fpubh.2023.1202188/full>) recently published by IIASA and WHO experts highlighting that 83% of the health and well-being SDGs and the WHO's Triple Billion Targets can benefit from citizen science data. It will also explore how this potential can be leveraged to address the relevant data and policy gaps for input to the UNSD Citizen Data Collaborative. The session will facilitate interactive methods starting with a set of lightning talks (15 minutes) followed by a world café format, where participants will divide into groups to discuss the aforementioned question of citizen science preparedness from various angles.

The results will be shared with the UNSD Citizen Data Collaborative as input to its conceptual framework. The outcome will be a better-informed citizen science community regarding the next concrete steps to realise the potential of citizen science for official monitoring and policy development.

Workshop on citizen engagement methodologies for climate adaptation: insights from the AGORA Project

Francois Jost; Anna Verones; Rosie Witton; Sukaina Bharwani; Eulàlia Baulenas; Samuel Pickard; Alicia Moreno; Marta Ellena

The AGORA project is committed to fostering citizen and stakeholder engagement in climate change adaptation through a transdisciplinary approach. It seeks to co-design innovative soft climate adaptation solutions while promoting climate justice, gender equality, equity, adaptive capacity, and citizens' empowerment to support decision-making processes. In this context, this workshop seeks to co-explore the diverse range of citizen engagement methodologies such as citizen science, among others, identified and applied within the AGORA project and their potential to advance climate adaptation, resilience, and social justice. Following the highlighted lessons learned from both AGORA and previous citizen engagement initiatives, workshop participants will engage in a discussion drawing insights from various perspectives. This discussion will encompass topics such as the factors that enable and hinder citizen engagement, indicators for evaluating engagement processes, and an exploration of the role played by digital platforms and tools, including the Digital AGORA, in elevating citizen engagement and facilitating knowledge co-production.

Participants will be invited to co-explore innovative approaches to engage citizens and stakeholders in climate adaptation. This includes, for example, citizen science and the design of effective communication strategies for engaging the public by framing messages that resonate with people's values and motivations, especially for working families, hard-to-reach individuals and vulnerable groups at higher risk from climate impacts. The workshop will be highly interactive, facilitating the exchange of practices, lessons learned, and insights among participants.

Tools to meaningfully involve citizen scientists and professionals

Mellany van Bommel; Samantha Elkhuisen; Annemarie Wagemakers; Kris Bevelander

Many (research) projects aim to include citizen scientists for reasons such as taking citizen's perspectives into account, developing tailored projects, having more data collected (among underrepresented groups), showing the contribution of citizen science and/or increasing citizens' knowledge, sense of ownership, and empowerment. For professional scientists, it is a challenge to engage citizens in research activities as there are several issues that come with citizen science, for example: are the right citizens represented, is the capacity of citizens and professionals sufficient and is the topic feasible. To deal with these issues, tools can be used to stimulate interaction, guide processes, and provide (actionable) knowledge.

In this workshop, participants will learn how to meaningfully involve citizens and professionals in (research) projects. Topics addressed in the workshop will be based on issues identified by participants. Participants learn about the topics they are interested in and simultaneously learn to work with citizen science tools.

The workshop starts by making a dynamic learning agenda about what participants want to gain from this workshop. Next, we will integrate these learning points into different tools to facilitate a mutual learning process, such as 'a rich picture' and 'cross the line'. A rich picture is a way to explore, define and discuss a situation and express it through diagrams to create a preliminary mental model. Next, participants are invited to formulate thought-provoking statements to further explore and discuss important topics. To stimulate people to move and think, we use the cross the line tool. At the end of the workshop, participants will reflect on the initial learning agenda to see what insights are gained and whether these tools actually promote inclusivity for all participants. Finally, participants are invited to formulate personal actions for everyone's own context.

Citizen science in climate assemblies: policy recommendation based on citizen-generated knowledge

Julian Vicens; David Laniado; Florida Di Ciommo; María Alonso Raposo

Citizen science can be experienced as a tool for generating policy recommendations, there are plenty of examples in topics such as air quality, mental health or climate change. The emergence of Climate Citizen's Assemblies as a form of deliberative democracy for climate change action creates a perfect framework for experimenting with citizen science, to explore its potential to bring the voice of citizens in the development of climate policies. This is the context in which the CLIMAS project takes place, with the ambition to support a transformation to climate resilience by offering a problem-oriented climate adoption Toolbox, co-designed in Living Labs and validated in Climate Citizen's Assemblies.

In this workshop, participants are invited to jointly explore the role of citizen science in Climate Citizen's Assemblies. We will begin with an introduction to the structure of a Climate Citizen's Assembly, complemented by examples from CLIMAS. Furthermore, we will provide a comprehensive introduction to how Living Labs can serve as effective facilitators for the co-creation and testing process. Following the same participatory approach used in the co-creation sessions conducted within CLIMAS Living Labs, we will hold a session to discuss the potential of integrating citizen science into Climate Citizen's Assemblies. Finally, we will have a high-level debate on this topic with an invited speaker to wrap up the session.

This session will combine learnings and practical insights into how citizen science can be effectively used in Living Labs and Climate Citizen's Assemblies. It aims to generate fresh perspectives from citizen science practitioners regarding the integration of citizen science into Climate Citizen's Assemblies to foster the creation of actionable climate recommendations.

The agenda for the workshop is organised as follows: we will provide the CLIMAS framework, followed by an introduction to Climate Citizen's Assemblies and Living Labs and the methodology for testing citizen science in both Climate Citizen's Assemblies and Living Labs. Collaboratively, we will discuss synergies among

citizen science, Climate Citizen's Assemblies, and Living Labs. Finally, we will have a high-level discussion with an invited speaker, concluding with a wrap-up and key takeaways. The outcomes of the workshop are expected to be incorporated into the toolkit developed in the CLIMAS project and, subsequently, into future Climate Citizen's Assemblies.

Citizen science with schools – Developing best practises for diverse educational contexts

Tim Kiessling; Wiebke Brink; Julia Lorke; Elisabeth Schauermann; Petra Siegele; Katrin Kruse; Fabienne Wehrle

Conducting citizen science projects with schools offers special benefits for students, teachers and researchers, which go beyond the creation of novel scientific insights. Researchers can reflect on new perspectives raised by young people on their research topics. School students may profit from gaining topic-specific knowledge and enhance their scientific literacy. For teachers it can be motivating to receive access to new teaching material and offer their students an engaging learning opportunity. However, a range of potential obstacles might stand in the way of a successful implementation of citizen science projects in schools, e.g. a missing fit between the project's topic and the school curriculum, the fact that school students are not volunteers (unlike in most other citizen science projects), or the challenge of aligning the project's schedule with a busy and fast paced school environment. Further, educational contexts vary widely between and even within countries. In this workshop we present results from two publications of the German and Austrian working groups on "Citizen science in schools": We will offer tips, best practises and insights on how to best cooperate with schools in citizen science, discuss our suggested recommendations for involving school students and teachers with the workshop participants, and will reflect upon factors enabling and hindering the implementation of citizen science projects with schools in different countries with different educational contexts. With this contribution we aim to reflect on the main role of citizen science projects as producing new scientific knowledge, and suggest a change towards considering the scientific and educational components of citizen science projects as interlinked and equivalent goals.

Shared learnings for measuring the various impacts of citizen science

Maite Pelacho; Francisco Sanz-García; Lucía Moreno; Olga Varela

Analysis of the impacts - i.e. changes and consequences, being direct or indirect, of our activities in citizen science - is essential to consolidate theoretical approaches and good practices, as well as to learn from misconceptions and failed outcomes and/or processes.

In Spain, we have been working on this since at least 2016, through the Citizen Science Observatory, a collaborative project launched by the Ibercivis Foundation with co-funding from the Spanish Foundation for Science and Technology (FECYT). Since long before, Ibercivis and many different social agents have been working together to consolidate citizen science in and from the diverse territories in Spain.

The objectives of 'ImpactosCC' – a one-year project (at least), with co-funding from FECYT-Ministry of Science and Innovation – are, on the one hand, to facilitate self-awareness of all the impacts of each project, and on the other hand, to obtain a broad and detailed landscape of the impacts of citizen science in Spain. We will analyse the following impacts: (1) scientific-technological, (2) environmental, (3) socio-cultural, equality and equity, (4) economic, political and governance. The project aims to be useful for people/communities/entities either working in citizen science or benefiting from its impacts. We seek to contribute to "making profitable" all the efforts made by and among all of us, as well as those yet to come, strengthening each other, reinforcing and creating cooperation networks, thus, achieving an increasingly transformative, open, inclusive and sustainable citizen science.

In this workshop, we will share our objectives and methodology, exchanging views, experiences, criticism and mutual support. This can also be useful for other countries and regions. We will build on the work already done in Spain and on that developed by other European agents, in particular in the MICS project, which in turn is widely based on the knowledge of the European community of citizen science.

European Citizen Science Academy (ECS Academy): what is in it for you? A call to collaboration

Cléa Montanari; Pooja Khurana; Muki Haklay; Claudia Fabó Cartas; Mostafa Moonir Shawrav

Within the different activities that are supported by the European Citizen Science (ECS) project, the ECS Academy is tasked with increasing the capacity to teach and train people in citizen science. The session introduces the ECS Academy, its roadmap and framework for dialogue, and explores the training needs and opportunities for joint efforts over the coming years, as the academy starts operating.

The session has three objectives. The first is to introduce the ECS Academy by providing a short introduction about the establishment of the academy from the EU-Citizen.Science effort, the development of a roadmap, framework for dialogue, and a business plan. Secondly it is to identify training needs and gaps by discussing gaps in citizen science training in relation to the identified needs and provisions by activities carried out in the scope of ECS, namely 1) surveys for trainers and educators in citizen science and early career researchers, 2) analysis of training material repository in relation to various criteria (e.g. topic, language, audience), 3) regroupment of training needs from various workshops conducted by ECS. Thirdly, this session would like to engage participants in the co-production of the first year plan of the ECS Academy. With participants in-person (and if possible online), we will identify and prioritise the training activities that are required, how the training repository can be leveraged, create links with ongoing training activities, the material that needs to be created, and plan training activities that participants are interested in (e.g. a course that they are preparing). This information will shape the development of the ECS Academy for 2024-2025.

The session will have 3 parts: 1) an introductory presentation on ECSA, 2) a presentation on results and understanding of the citizen science community (explaining to what extent our results resonate with their perceived needs in citizen science training), and 3) an interactive discussion and prioritisation exercise.

Increasing the diversity and visibility of the citizen science community's contributions to the UN Sustainable Development Goals (SDGs)

David Ziegler; Marius Oesterheld; Silke Voigt-Heucke

Recent research highlights the untapped potential of citizen science activities in advancing the United Nations Sustainable Development Goals (SDGs). While many studies emphasise the integration of citizen science-generated data into the monitoring of specific SDG indicators, experts have pointed out that citizen science projects can contribute in many other ways, e.g. by raising awareness or promoting behavioural change. This underexplored facet remains largely uncommunicated for the following three reasons: 1) Many members of the citizen science community are still not really familiar with the SDGs. 2) The SDG framework is, by design, data-focused and geared towards National Statistics Offices (NSOs). 3) Citizen science outcomes that do not take the form of monitoring data are often more challenging to document and evaluate. This workshop aims to change the described situation by charting a more comprehensive way forward for citizen science contributions to the SDGs. Drawing on recent literature, best-practice examples and mutual-learning opportunities, we will use this workshop to co-develop strategies for both fostering and giving greater visibility to citizen science-based contributions beyond the provision of statistical data relating to specific SDG indicators. Furthermore, we will discuss concrete further steps for supporting the citizen science community in making its diverse contributions to the SDGs comprehensible. The results of the workshop will be fed into an updated version of the citizen science SDG declaration "Our word - our goals: Citizen Science for the Sustainable Development Goals", which is currently being developed by the EU-funded project European Citizen Science (ECS).

The challenges of citizen-science-informed policy uptake – The case of air quality monitoring

Danaja Fabcic Povse; Carolina Doran; Nuria Castell; Eduardo Illueca

Air pollution is a major public health problem in Europe, and despite the EU air quality legislation, air quality levels exceed the threshold for human health protection in many cities. SOCIO-BEE and CitiObs, two EU funded projects, invite Citizen Scientists to gather air pollution data using novel technologies such as wearables, low-cost sensors and mobile applications, allowing them to collect data in locations that traditional methods do not allow. In different pilot locations, data is currently being collected through several processes of standardisation and quality checks, yet the data uptake by decision makers is still low. In this workshop, we'll explore the barriers that hinder the uptake of citizen-generated data in science and policy. We will look at the technical barriers, (data quality, data formats, interoperability, etc..) as well as the legal barriers (frameworks such as Data Governance Act, Ambient Air Quality Directive and the General Data Protection Regulation).

Our workshop aims to gather know-how from citizen science practitioners on the challenges and solutions they encounter in the uptake of citizen generated data in policy. In groups, the participants will discuss two questions:

1. How do you experience these barriers?
2. In your opinion, what would a solution look like?

The ultimate aim of our workshop is to contribute to environmental, health friendly policies. Through a final brainstorming session, the participants and speakers will propose solutions and ways forward.

Empowerment in schools: reflecting the roles of students, teachers & scientists in citizen science projects

Elisabeth Schaueremann; Walburg Steurer; Julia Lauss; Martin Scheuch; Peter Pany

The cooperation of scientists, teachers and students in citizen science projects is very enriching for all participants and initiates a multi-layered learning process for all three stakeholder groups. For many of the participants, this kind of cooperation is completely new and there are a number of hurdles to overcome in terms of communication, coordination or traditional areas of responsibility. In addition, with the start of the project, all participants find themselves in a new group constellation, in which roles suddenly change and shift. All of a sudden everyone becomes a learner: scientists become facilitators, teachers become motivators and multipliers and students themselves become experts through their research activities. This requires a rethinking of usual roles and hierarchies, which in turn can lead to intense communication in order to restructure responsibilities on all sides. The question then arises as to how researchers can support the transformation process in such a way that a smooth takeover of new roles can take place. How can all participants be strengthened in their roles on the one hand and mobilised on the other?

The topic of changing roles in citizen science projects has not been addressed much by the citizen science community. Therefore, we would like to inspire and start a discourse during the ECSA conference. The workshop facilitators have a strong background in citizen science with schools, as they either lead projects themselves with school students, or manage funding programs.

In this workshop, participants will take on different roles in order to explore the perspectives of students, teachers and researchers. The aim is to initiate a process of awareness-building of different roles and their relationships. At the end of the workshop, participants will elaborate aspects and factors that support scientists to easily change their roles in their projects and help participants to be flexible in their roles as well.

Adapting to change: transforming research libraries into catalysts for citizen science in a rapidly evolving world

Kristian Hvidtfelt Nielsen; Thomas Kaarsted; Anne Kathrine Overgaard; Anna Louise Okholm; Alisa Martek

In a world experiencing swift changes due to technological advancements, environmental challenges, and societal shifts, the conventional roles of research libraries and researchers are in flux. Kaarsted et al. (2023) delved into European research libraries' understanding and application of open and citizen science, unveiling profound awareness but scant enactment in services and infrastructure. Key barriers are resource, funding, and policy constraints.

To counter these, strategic enhancements in partnerships, institutionalisation, and policy frameworks are vital. This 90-minute workshop empowers attendees with insights into the challenges and prospects in integrating research libraries into citizen science and the capability to devise concrete, operational solutions.

Objectives are to underscore the urgent evolution required by research libraries to champion citizen science; to identify unique services and resources that research libraries can furnish to propel citizen science forward; and to collaboratively formulate innovative strategies, ensuring research libraries' pivotal role in the citizen science ecosystem.

Agenda:

- Welcoming remarks (10 mins): Briefing on the topic's relevance in our dynamic world.
- Panel Discussion: Navigating Change (20 mins): A dialogue on the necessity and benefits of adaptation involving academics, librarians, and citizen science advocates.
- Breakout groups (25 mins): Small teams delve into the challenges and opportunities stemming from rapid change, focusing on practical solutions.
- Ideation session (20 mins): Brainstorming on innovative strategies transforming Concluding remarks (15 mins): Summary of insights and a look at the pathway forward in effectuating transformative strategies.

By joining, attendees will grasp the pivotal role of research libraries in shaping citizen science and gain the tools to craft impactful, operational strategies.

Kaarsted et al. 2023. *Open Inf. Sci.* 7(1).

Science for Change tools: the new methodological toolbox to create zero-waste collaborative workshops

Rosa Arias, Blanca Guasch

SFC Tools is the new methodological toolbox created by Science for Change that includes an online platform and a physical toolkit to perform zero-waste workshops. It has been created based on the experience in designing and facilitating more than 300 collaborative sessions in more than 20 European, national, regional and local projects.

The online platform includes methods for all phases of the creative process: research, definition, ideation, prototyping, evaluation and communication. It also offers a physical toolkit to carry out all the methods described. And finally, it displays resources in different formats (articles, videos, interviews, tutorials, etc.) for designing, conducting and facilitating co-design sessions.

In the workshop, we are going to present the toolbox and work with it in an interactive session. Based on the participants' concerns about Citizen Science and its potential to bring change to both science and society, we are first going to define a clear objective and scope. Secondly, participants will be asked to ideate ways in which Citizen Science can contribute to change in different levels of society. Then, we are going to choose the most relevant contributions and rapid-prototype them. Finally, they will be asked to communicate their contributions to the rest of the group in short pitches and evaluate the other groups' proposals.

To conclude the session, we are going to discuss the toolbox. We will ask participants if they found it useful and friendly, how was their experience in each part of the workshop, if they would use it in their daily lives, and other relevant questions that will serve us to keep improving it. We will also have a moment of reflection to see if they realised that all materials were reusable and none of

them had plastic. For this final reflection, we are going to share indicators on how much plastic, glue, and other polluting materials are usually used in collaborative workshops.

Exploring the marriage of citizen science & Living Labs in support of green, social and digital transitions

Sven Schade; Rosa Arias; Fernando Vilariño; Paula Rodriguez Müller; Nora Salas

The accelerating changes in our daily lives request a holistic approach to public governance that accounts for green, social and digital transitions. It is imperative that citizens are not left out of the equation, and Citizen Science approaches can contribute greatly to possible solutions. However, there are also other ways of engaging citizens, academia, the public sector and industry, such as Living Labs, Fab Labs and Maker Spaces - just to name a few.

It remains challenging to understand how existing methods and tools could be used in combination to address the grand challenges of our turbulent times (a goal that is shared by all the initiatives mentioned above). While Living Labs struggle to engage citizens in their innovation process but succeed to involve key stakeholders to address local societal issues, Citizen Science can provide the missing piece while generating new knowledge aligned with societal needs to foster social innovation. Backed by the memorandum of understanding between ECSA and the European Network of Living Labs (ENoLL) signed in 2023, this workshop seeks to bridge these two worlds for mutual benefit and increased societal impact.

We will (1) introduce the features of Living Labs; (2) co-create practical examples how Citizen Science and Living Labs can provide joint contributions in support of green, social and digital transitions; and (3) start outlining a roadmap where the ECSA and ENoLL communities join forces to empower citizens to become true change makers.

Participants are expected to bring their experiences, questions, and individual perspectives. They will leave the event with a deeper understanding of Living Labs and their role in societal transformation; insights into practical applications

of Citizen Science and Living Labs; opportunities for knowledge exchange; and a chance to contribute to a roadmap for future collaboration.

Insights gathered will inform a position paper exploring the integration of Citizen Science and Living Labs.

Co-designing the future of European citizen science: a participatory workshop for eu-citizen.science

Jorge Barba; Claudia Fabó Cartas; Florence Gignac; Miguel Hernández; Cléa Montanari

In the age of digitisation and global connectivity, citizen science platforms play a pivotal role in facilitating collaboration, exchange, and engagement in scientific research. However, for a platform to be effective, it must be designed not just for the community but with the community. Within the framework of the European ECS project, we're embarked on a journey to bolster and widen the European citizen science community. As an integral part of this mission, we present a participatory workshop centred on the eu-citizen.science platform. This workshop seeks to actively involve the community in the service co-design and feature selection process, ensuring that the platform is responsive to genuine needs and evolves in line with user expectations and aspirations. Addressing the conference theme, "Change", we aim to catalyse positive and sustainable change in the way citizen science is practised and perceived in Europe.

Format:

Introduction and Contextualisation (15 minutes): Brief presentation on the ECS project and the relevance of eu-citizen.science in the European citizen science landscape.

Brainstorming Session (25 minutes): Participants will be split into small groups and provided with a set of potential features and services. They will be asked to discuss and prioritise based on what they consider most relevant and necessary.

Service Co-design (35 minutes): Using interactive tools and materials, groups will work on designing and conceptualising how they'd like their chosen features or services to be implemented.

Presentation and Feedback (10 minutes): Each group will briefly present their ideas, with feedback from fellow participants.

Conclusion and Next Steps (5 minutes)

This workshop represents a unique opportunity to actively shape the direction of one of the most promising projects in the field of citizen science in Europe. We invite all stakeholders, from researchers and activists to policymakers and educators, to join us in this exciting journey.

Citizen science beyond science: a collaborative approach for increased incentives and capacities

Kathy Berger; Maya Pasgaard; Christina (Ida) Breed; Michelle Greve; Kristine Engemann Jensen

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In this workshop, we lean on experiences from South Africa as a point of departure for discussing the unrealized potentials and complications of practising more collaborative, transformative citizen science. To set the stage, we first outline the Global South context of our work and share our previous research activities that have taken us on a journey towards citizen science. Building on these contextual and empirical insights, we invite participants to co-develop ideas for the integration of citizen science into our upcoming research activities rooted in a transdisciplinary partnership across Aarhus, Denmark, & Tshwane (Pretoria), South Africa.

Our research focuses on the potential of community-driven nature-based solutions for waste management and water security. This involves assessing local ecological potentials and together with local community members, implementing small-scale interventions within our designated study areas. Our approach engages both the community and city officials to co-develop incentives and capacities while anchoring research results within the City of Tshwane. As

part of our research, we will conduct a survey in November 2023 to explore the incentives for local communities to engage in nature restoration.

In our workshop, we will explore holistic and transformative methods designed to encourage collaboration among citizens and city officials, fostering trust and advocating for the socio-ecological benefits of community-based nature restoration and monitoring. Together, we will facilitate a guided brainstorming session where participants will engage in dynamic interactions, utilising pens, post-it notes, visual aids, and their imagination.

We hypothesise that integrating more collaborative citizen science into our research not only provides additional data but embraces mutual learning as a means to strengthen incentives and capacities among city officials, citizens, and citizen scientists across disciplines and societal sectors.

Exploring ways to enhance diversity and inclusivity in citizen science

Nuria Castell; Uta Wehn; Margaret Gold; Carina Veeckman; Jan Peters-Anders; Inian Moorthy; Vanessa Boas; Gerid Hager; Anna Kozłowska; Milena Vuckovic; Karin Ekman; Julia Costa Carneiro; Oscar Gonzalez; Jessica Guy

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Change thrives when individuals from diverse backgrounds collaborate, each bringing their unique perspectives and opinions. However, the challenge lies in how to foster such diversity among participants within Citizen Science initiatives.

A recurring issue in citizen science projects is the lack of diversity among participants. Citizen Observatories (COs) and citizen science projects often experience relatively little involvement from vulnerable and marginalised groups. Recent research shows that people with less formal education, people of colour and women are underrepresented in citizen science. This can perpetuate and reinforce inequities, inequalities, and epistemic monocultures. The causes for this may stem from resource constraints, such as limited time for participation and financial barriers. However, the underlying factors are often more intricate, resulting from a combination of variables intersecting with historical, social and cultural factors.

This workshop will be organised by the EU funded projects CitiObs, Urban ReLeaf and GREENGAGE. It will provide a platform for practitioners to examine successful approaches as well as areas for improvement for diversity, equity, and inclusion in citizen participation within Citizen Observatories and citizen science projects. The workshop will be structured around 4 thematic tables and will apply a participatory research approach to brainstorming and collecting pathways for inclusive citizen science:

1. Fostering inclusivity and diversity in technology utilisation
2. Leaving no one behind when co-creating sustainable change
3. Inclusive communication guidelines for citizen science
4. Citizen science and the new European Bauhaus principles of inclusion, aesthetics and sustainability.

The outcomes of the workshop will be integrated into the projects' toolkits and will be the basis for best practices for stakeholder engagement in their citizen observatories. All the documentation will be made publicly available.

Co-creating an inclusive European Science Service for Biodiversity

Karmen Czett; Kata Fodor; Eszter Kelemen, Nikita Sharma

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A critical challenge of biodiversity conservation lies in ensuring that the voices of diverse social groups are integrated into the policy-making process. The BioAgora project is developing a new science-policy Interface, the European Science Service for Biodiversity (SSBD). One of the goals of the European Science Service for Biodiversity is to establish a methodological tool for a multi-layered, deliberative process to incorporate societal value choices and knowledge into biodiversity decision-making.

This workshop invites participants to consider the role of citizens and participatory research in the functioning of the European Science Service for Biodiversity and in creating transformative change in biodiversity governance. Participants will be encouraged to identify barriers to inclusivity and brainstorm about effective governing principles that could foster the inclusion of social groups across different cultural and geographical contexts.

Questions to be considered: Whose participation is relevant for biodiversity policy? What are the main barriers of inclusive policy-making? What governing principles are needed for an inclusive European Science Service for Biodiversity?

Workshop plan:

Expected no. of participants: 20-30

1. Initial results of BioAgora (15 min)
 - a. Presentation on the purpose of BioAgora and its initial results
 - b. Highlighting the significance of including diverse voices and perspectives in biodiversity policy-making
2. Understanding Stakeholders (15 min)
 - a. Discussing the role of various social groups in the functioning of the European Science Service for Biodiversity
 - b. Emphasising the diversity of perspectives and interests in their involvement of the European Science Service for Biodiversity
3. Identifying barriers to inclusivity (15 min)
 - a. Identifying common barriers to inclusivity in biodiversity policy-making
4. Overcoming barriers (20 min)
 - a. Discussing strategies for overcoming barriers
 - b. Identifying what governing principles are needed in the European Science Service for Biodiversity to overcome barriers
5. Action planning (10 min)
 - a. Writing down one specific action participants could take to promote inclusivity in biodiversity policy-making
6. Wrap-up and Q&A (15 min)

Changing perspectives on environmental noise and annoyance. Lessons for your own local setting

Jeroen Devilee; Nick Mabjaia; Kirsten Vegt; Hester Volten

Unlike the improvement of air, soil and water quality, the amount of environmental noise has steadily increased in European countries. Specifically, citizens that live nearby roads, railways or under flight paths of aeroplanes can be severely annoyed.

To get an idea whether the number of severely annoyed citizens is acceptable, governmental agencies often rely on responses to questionnaires in which respondents indicate their long term annoyance and on the calculation of the noise exposure. This methodology has been scrutinised by citizens as they think the results do not express the annoyance they experience.

Two recent citizen science projects in The Netherlands studied whether it is possible to complement the existing methodology for long term annoyance. Together with citizens we experimented with a methodology in which environmental noise by trains and aircrafts is measured with small and cheap noise sensors. Moreover, we registered annoyance four times a day with a questionnaire in an app. Two groups of 14 citizens delivered large numbers of questionnaires (approximately 3000). Strong statistical models could be made. Moreover, we tested several cheap environmental noise sensors to benchmark their performance with expensive class-1 noise sensors.

In this workshop we share our experiences and teach other European Citizens about this approach.

Program:

- Presentation (Nick, 15 min) The performance of small cheap noise sensors
- Presentation (Jeroen, 15 min) Citizen Science and annoyance by Schiphol aircraft noise
- Presentation (Kirsten, 15 min) Citizen Science and annoyance by Railway noise
- New interactive case study (Hester and others, 45 min):

- Selecting a case with participants
- Recruiting and selecting citizens
- Measuring environmental noise with small, cheap noise sensors
- Measuring short-term annoyance with an app
- Matching noise events with aircraft passages
- Deriving indicators
- Statistical analyses
- Reporting
- Evaluation of the process.

Standardising citizen science methods to monitor and care for our water ecosystems

Franziska Stressmann; Georgios Sylaios; Joe Jubb; Garabet Kazanjian; Bruna Gumiero; Steven Loiselle

Citizen science has emerged as a powerful tool for collecting data to improve monitoring and management of aquatic ecosystems. In recent years, citizen scientists have contributed a wealth of data on water quality, aquatic biodiversity and hydrological dynamics. These contributions hold immense promise for enhancing our understanding of water ecosystems and informing conservation and mitigation efforts. However, the inherent diversity in data collection protocols, methodologies and data formats poses significant challenges to data interoperability and integration with other data sources, in particular regulatory and research data. This lack of standardisation is stopping citizen science and its generated data from reaching its full potential.

The EU funded OTTERS project aims to accelerate this creation of technical, legal and ethical standards for water-associated citizen science, as a way to create societal transformation for marine and freshwater stewardship.

OTTERS will organise a workshop divided into two sessions, focusing on marine and freshwater CS, with each bringing together researchers, citizen scientists, policymakers, and other stakeholders to explore and co-create opportunities for standardising citizen science approaches and data. The workshop will provide a platform for participants to share best practices, discuss potential frameworks

for data standardisation, promote collaboration between citizen scientists, professional researchers and policymakers, and suggest how best to integrate citizen science data into regulatory frameworks and policies.

Case studies for best practice in citizen science will be presented, such as Ocean Citizen for marine, and the RiuNet Project (Spain), Riverfly Partnership (UK) and Flow (Germany), focusing on macroinvertebrates in freshwater. The workshop's outcomes are expected to include the development of guidelines for standardising citizen science data, fostering cross-collaborations, and creating a roadmap for the future standardisation of citizen science.

Co-designing guidelines for policy-makers for mainstreaming and upscaling citizen science across the European Research Area

Vicente Aylwin; Rosa Arias; Gemma Rodriguez; Claudia Fabó Cartas; Marius Oesterheld; David Ziegler

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Policymakers wield immense influence, not just in setting the course of governance but also in driving transformative change. In this context, citizen science has the potential to inform policy-making through an evidence-based approach; to stand as a valuable resource for data collection, knowledge generation, and problem-solving; for detecting citizens' needs and perspectives; and for democratising science and increasing legitimacy and trust in government. This co-design workshop seeks to explore how policymakers and funders can promote the mainstreaming and upscaling of citizen science practices across the ERA at EU, national and local levels, through existing or new funding programs and other support mechanisms, such as national observatories, networks, or common research infrastructures. Building on the results from the mutual and learning exercises on citizen science initiatives- policy and practice, and the policy priorities identified within the EU-funded project ECS, this co-design workshop proposes a role-playing strategy as an active learning pedagogical approach to encourage participants to assume different positions, including that of policymakers, funders, citizen scientists, and researchers. On the basis of lighthouse cases, participants are expected to engage in a critical reflection from the different perspectives assumed. Later, they are encouraged to translate their conclusions into a co-designed policy brief to refine the recommendations for policymakers

developed within the ECS project. This policy brief will aim toward embedding citizen science in mainstream research practices and funding. In a 90-minute workshop, we introduce ECS project objectives, MLE findings on CS, and initiate a co-creation exercise to produce policy recommendations for citizen science based on lighthouse societal challenges and role-playing. Participants will shape the roadmap collaboratively, gaining a deeper understanding of policy challenges and stakeholder dynamics. The outcome: updated policy recommendations for increased citizen science support within the ERA.

How to include schools in citizen science health studies: practical experiences and lessons learned

Teresa Schaefer; Claudia Magdalena Fabian; Barbara Kieslinger; Elisabeth Unterfrauner

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The EU-funded project InChildHealth (www.inchildhealth.eu) aims to involve schools and children from 6 to 12 years in citizen science health study activities. In the cities of Vienna, Lisbon, Athens, Colchester, Barcelona, Copenhagen, and Helsinki citizen science interventions are planned to identify determinants for indoor air quality (IAQ) and evaluate the impact on children's health in school environments.

The development of evaluation indicators and instruments to measure the impact of these citizen science activities, like learning and behavioural change, is not the only challenge. Many school teachers are already overstrained with meeting their teaching responsibilities and find it difficult to invest additional time for citizen science activities. Thus, the InChildHealth research team developed different citizen science modules, to allow teachers choosing between different degrees of involvement and adapting activities and IAQ teaching material to school curricula. The citizen science module 1 the "Air Quality Checker" for instance takes only 2 hours and provides basic information and hands-on activities on why indoor air quality is important and how children can positively influence it. While module 2 the "Air Quality Researcher" lasts around 8 hours, where students can explore the air particles in their classroom, define a research question, collect data on bacteria and fungi, and analyse them together with the researchers. Some teachers in Austria even took the opportunity to include the InChildHealth citizen science

activities in their educational programme of their schools “project week” and chose module 3 the “Air Quality Project Leader”, where students conduct their own experiments on indoor air quality with the support of the research team.

In our session, we will share first insights from our modular approach in engaging with teachers, students, and the related school activities and invite participants to share their experiences from work with schools for mutual learning.

Northern exposures: shifting paths and future challenges for Arctic citizen science

Thora Herrmann; Anna Heumann; Anna Krzywoszynska; Marko Mutanen; Roger Norum

In the Arctic, community and citizen science have emerged as effective means, fostering collaborative knowledge production through active engagement between scientists and communities in research. Yet citizen science’s potential in the region has yet to be fully explored. This interactive workshop brings together northern and Arctic representatives, as well as interested participants to explore the range of opportunities and challenges of citizen science in the North. The workshop kicks off with a curated series of snapshots (live, online and recorded) that will feature “best practice” benchmarking citizen science projects from across the circumpolar North. These focused, pecha-kucha style presentations will showcase ongoing work in the North on critical topics, i.e., and climate change monitoring; species surveying; health and food security-related citizen science; identity and cultural heritage; and the development of relations and trust with Arctic communities. This will establish for the workshop an ethos of diligence, pertinence and urgency which characterises northern interventions. Following these overviews, participants will join in an interactive World Café to discuss perceived, imagined and anticipated pitfalls and potentials of citizen science in the North. This will identify needs for (and possible courses of) action towards a future respectful and engaged citizen science in this demanding and critical region. Topics will include, i.e., local and Indigenous perspectives on research; data collection and analysis methodologies; and the role of collaborative science in addressing complex societal challenges. Workshop participants will be invited to collaborate on

a joint publication. We also aim to collaboratively draft a joint statement summarising key findings and action points arising from the discussions as a connective input from the Vienna conversations towards the planning of the 6th ECSA conference, thereby creating new ECSA synergies and directly linking themes, topics and initiatives across ECSA events.

Criteria for citizen science – A source of community empowerment or a barrier?

Gitte Kragh; Daniel Dörler; Darlene Cavalier; Annelies Duerinckx; Liesbeth Gijssels; Patricia Tiago; Jaqui Goldin; Cristina Luis; Andrea Sforzi; Florian Heigl

Citizen science comes in many shapes and forms, and we use a variety of different terms to describe what we do. This sometimes causes confusion, both among researchers, but also when we interact with other citizen science stakeholders, e.g., funders, evaluators or collaboration partners. This confusion needs to change to a shared understanding, and there are opportunities to more clearly delineate what citizen science is, e.g., through use of vignettes or criteria. The ECSA Working Group on citizen science Networks has, over the last 3 years, co-created transparent, impartial criteria with citizen science researchers, practitioners and citizen scientists that can help decide if a project should be listed as citizen science on online platforms. If implemented, criteria could facilitate a system change in how citizen science networks collaborate, enabling citizen science project listings across platforms. The criteria could also be useful for funding bodies, researchers and other citizen science stakeholders.

The goal of this workshop is to familiarise participants with the criteria and discuss how and where citizen science criteria might be useful in their work, where criteria might be barriers and how to overcome such challenges.

In this workshop, we invite researchers, practitioners and other citizen science stakeholders to share their experiences with and reflections on criteria for citizen science and discuss how criteria can be most beneficial for all involved, especially when applied to create shared understandings between researchers and other stakeholders in citizen science projects.

After a brief introduction to the developed criteria, participants are invited to join discussions in several ways:

- First through a fishbowl approach, where they share their own experiences, case studies, and reflections on where and how criteria can most usefully be applied (20 min.)
- Secondly, through a mind mapping exercise of important topics, raised in the fishbowl or through new reflections (15 min.)
- And finally, through World Café discussions based on chosen most important topics from the mindmapping (35 min.)

The promises of citizen science – Fact or fake?

Barbara Heinisch

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Despite its increasing popularity, not everybody is supportive of citizen science. Authors are critical of the promises that citizen science practitioners claim and challenge the role citizen science can play in the democratisation of science or in tackling societal challenges. They put the promises of citizen science under scrutiny and question that citizen science can increase trust in science among the public by participating in actual research. Some critics do not only deny the promises of citizen science, but even see a threat in it as it may jeopardise academic freedom, support platform capitalism or cement existing power relations. This workshop is dedicated to the question of whether citizen science can keep its promises, and for which promises it might be destined to fail.

In the beginning of the workshop, a sociometric positioning exercise breaks the ice to get to know each other. After a short introductory lecture giving an introduction to the topic and framing the field, the participants note the promises that citizen science can(not) hold. Then, the participants engage in role plays where different opinions and the pros and cons of citizen science are represented (according to a code of conduct). The observations made and insights gained during the role plays are then discussed as a group and jointly summarised in an infographic.

POSTERS

Every step along the way – Step Change journey into citizen science

Enrico Balli; Simona Cerrato; Dorte Riemenschneider; Annette Klinkert; Chris Styles; Elena Buzan; Minja Krstić; Lea Podgorsek; Luciano d’Andrea; Claudia Colonnello; Elke Dall; Carmen Siller; Ilse Marschalek; Johannes Baumann; Katharina Habersbrunner; Rosa Arias; Carla Perucca Iannitelli; Evanthia K. Schmidt; Ebbe Krogh Graversen; François Jost; Carla Montesano; Andrea Declich; Marina Potestà; Vittorio Colizzi Colizzi; Elisabetta Russo; Agnes Mirembe

Step Change is a project under the Horizon 2020 framework, focusing on the domain of citizen science in the three fields of paramount societal interest energy sustainability, healthcare and biodiversity conservation the last decades, citizen science has gained pronounced prominence, as evidenced by its widespread integration across diverse research disciplines, the adoption of specialised database platforms and applications, and the initiation of European and national funding schemes specifically tailored to bolster citizen science projects.

However, the potential of citizen science is still to be discovered, both as a specific research approach and as a policy tool to strengthen the conflicting relations between science and society. Challenges such as data quality/validation, scientific recognition, demonstrated impacts and sustainability seem to hold back the whole potential of citizen science. Step Change has been precisely conceived to provide a great contribution by generating new knowledge useful to explore the potential, but also the critical issues, limitations and recurrent obstacles of citizen science as a research approach and evidence-informed-policy tool, in the fields of health, energy, and the environment.

A key aspect of the Step Change project has been the idea of mutual learning between scientists, stakeholders and citizens, and we feel this should extend much further, and that citizen science projects should be a community where we learn from one another to drive positive change in the field of citizen science.

As the Step Change project reaches the end of its journey, we would like to take this opportunity to share some of the key findings and lessons learnt throughout

the project, from the perspectives of each of our citizen science implementing partners, but also from our horizontal partners, such as the synergies between research practices and citizen science, and evaluating the impact on those taking part in citizen science across the quadruple helix.

A permanent advisory group with low-income citizens to increase inclusivity in university research

Gera Nagelhout; Julia van Koevinge; Hanneke Volbeda; Latifa Abidi

Background: Two years ago, we started a permanent advisory group with low-income citizens to increase inclusivity in the research of our university department.

Change: We will describe experiences with two ongoing changes during our presentation:

1. The change within our advisory group from giving advice to becoming more involved in research.
2. The change within our university department of working more with citizens in research.

Methods: Our advisory group meets five times per year and advises on all stages of research: from idea generation for grant applications, to testing materials, and interpretation of results. Advisory group members are regularly interviewed about their experiences, and we make changes based on their feedback.

Results: We will describe the development of our advisory group in the past two years. We will describe who and what helped us recruit this low-income group that is often underrepresented in research (through local media, trusted professionals, snowball sampling, a simple and clear flyer, and a fitting incentive). Also, we will talk about what helped us establish a good working relationship (getting to know each other personally, deciding ground rules together, and showing vulnerability). Although it started as a group that merely gives advice to researchers, the group is now ready to become involved as co-researchers. When we started off, we did not invest much time in getting our university colleagues to work more with citizens in research. They could ask questions to our advisory

group and we reminded them of this possibility, but this did not trigger much questions. Later on, we realised we needed to make it easier for our colleagues to engage with our advisory group.

Conclusion: A permanent advisory group with low-income citizens can help to make university research more inclusive. However, change does not happen overnight or by itself and working more with citizens needs to be actively stimulated among university researchers.

CitSci ID: exploring citizen science as opportunity for identity work for students and teachers

Maria Peter; Julia Lorke

Participating in citizen science can have profound effects on the participating citizen scientists. Participation might change, e.g., people's knowledge, skills, or behaviour. Changes can also occur on a deeper level: getting involved in research as a citizen scientist can change the way we position ourselves towards the world of science. This so-called "science identity" describes whether and to what extent we see ourselves and are seen by others as individuals who know about science, use science, and contribute to science. Science identity can influence our career choices and our engagement in science-related societal issues such as environmental conservation, climate change, or health issues.

In our research project CitSci ID we explore the connection between citizen science and science identity in the specific context of formal school education. We want to find out whether participation in three citizen science projects affects the science identity of teachers and their students. Previous research often focused on a change of students' knowledge or scientific literacy. In those studies, students usually participated in a citizen science project only once or they participated in one specific citizen science project only.

In contrast to previous studies, CitSci ID encourages teachers and their students to participate in three different citizen science projects during three consecutive school terms. Teachers can individually choose three different citizen science projects as they fit into their curriculum. We survey the students and teachers

before and after participation in the various citizen science projects using questionnaires as well as individual and focus group interviews.

At the ECSA Conference 2024 we present and discuss our research design and first results. We are specifically interested in the perspective of citizen scientists and how they perceive their own science identities as well as in other approaches to integrate citizen science into schools.

A balanced environment: proposal for a shared governance model for citizen science

Julie Cacheiro

The living lab approach brings together citizens, government authorities, researchers and businesses around a unifying project. It dismantles barriers between stakeholders by allowing them to share knowledge and co-create new research practises. However, citizen science projects often involve top-down research, where researchers are the main actors and citizen participation is limited to data donation. The whole value chain remains under the control of professional scientists, and no opportunities are given to citizens to set research priorities or have a voice in the process. This leads to a question: how can the relationships among all stakeholders be balanced?

In this presentation, a shared governance model adapted to citizen science is suggested. This framework takes several factors into account: the research object, stakeholders and communication processes. The concept of a bifacial object is mobilised and adapted, which makes possible the bringing together of people with separate interests and concerns to exchange practises and knowledge. It aims to balance relationships among all stakeholders with the goal of sharing an interpretative space.

Following the explanation of this framework, a case study is presented with a focus on the "Citizen Transition Living Lab". This living lab is a transdisciplinary platform for applied research dedicated to ecological transition. This bottom-up and democratic initiative is an interface between the world of science and civil society, aimed at facilitating approaches that combine scientific and non-scientific knowledge. The

purpose is to promote ecological transition through participatory research in the service of citizens. This lab enables citizens to propose a research idea and realise it in collaboration with all stakeholders. Citizens can propose new research orientations and address unmet research needs as part of a process of empowerment.

Citizen science activities in Croatia: an external evaluation

Dolores Mumelaš; Alisa Martek

In recent years, there has been a growing interest in conducting Citizen Science projects and activities in the Republic of Croatia. Scientific institutes, nonprofit organisations, universities, schools, and libraries are involved in organising these activities within the country. However, the role of organisers in shaping and implementing Citizen Science activities, as well as the impact of these activities on business development, participants, and the broader community, has not been investigated. Additionally, these activities have never been collected and compared in terms of their purpose, target groups, scientific areas they encompass, scientific outcomes, and so on.

This presentation aims to introduce research on Citizen Science activities conducted thus far at the national level in the Republic of Croatia. For the purposes of this research, the “An Open Framework for Evaluating Citizen Science Activities” proposed by Kieslinger et al. in 2017 will be utilised. The mentioned framework will be adapted for the research needs, and qualitative research methods will be applied. The research will focus on the segments of the framework related to three dimensions: scientific, participant, and socio-ecological and economic. It will explore questions such as the relevance of scientific problems, ethics, openness standards, collaboration, scientific knowledge, target groups, individual development, economic potential, and more.

The primary purpose of this research is to provide a comprehensive evaluation of Citizen Science activities in Croatia and to highlight their role in scientific advancement, community engagement, and economic development. The research aims to inform policymakers and organisers to enhance the effectiveness and impact of Citizen Science initiatives globally, contributing to the broader promotion of Citizen Science worldwide.

AutSPACEs: co-designing citizen science for sensory processing in autism

Bastian Greshake Tzovaras; Georgia Aitkenhead; Helen Duncan Little; Martin Stoffel; David Llewellyn-Jones; James Scott; Susanna Fantoni; Kirstie Whitaker; AutSPACEs community

Around 90% of autistic people process sensory information differently to non-autistic people, leading to many public spaces not being designed for autistic people and for example can be too bright, busy or loud. Prior research on sensory processing has frequently overlooked the lived experience of autistic people, thus failing to generalise to real world environments. With AutSPACEs – short for Autism research into Sensory Processing for Accessible Community Environments – we are running a community-led, online citizen science project that aims to fill this data gap in order to make environments more accessible for autistic people.

At the heart of the project is a co-created, open-source web platform for collecting qualitative data on sensory processing experiences that was designed with the input of autistic people, software developers and researchers. Thanks to the key input by autistic people – AutSPACEs expanded its scope from purely collecting sensory processing experiences to also including recommendations. These recommendations could be either personal coping strategies that could help other autistic people, or suggested improvements for spaces targeted at policy makers or space designers, to improve accessibility and inclusion. Through this, the project has become a repository of qualitative data on both sensory processing experiences and strategies for how to improve them.

Jointly, our team of autistic participants, researchers and software engineers has adapted a co-leadership model for the development of its citizen science platform, including sensitive issues such as the content moderation strategies, data protection guidelines and user testing approaches. In our presentation we will highlight how our open and collaborative design process facilitates an inclusive citizen science project that supports a diverse range of participants, and share goals and ideas about how other research projects can profit from these lessons.

INSIGNIA-EU: monitoring of environmental pollution with honey bees and citizen scientist beekeepers

Kristina Gratzler; Robert Brodschneider; Consortium INSIGNIA-EU

Beekeepers with their hives and tools to manage honey bees (*Apis mellifera*) are valuable citizen scientists. INSIGNIA-EU (2021-2024) is a European Union-funded project aimed at environmental monitoring by a pan-European network of beekeeper citizen scientists. This project provides insights into environmental pollution, including pesticides, microplastics, heavy metals, the air pollutants polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs), and the pollen diversity available to honey bees. The data analysis focuses on investigating spatial and temporal variations among apiaries located in diverse land-use and land-use-diversity settings, and variation between countries. The modelling concerns spatial and temporal exposure of honey bee colonies to pollutants and the availability of pollen throughout the year. In order to enhance beekeeper participation in citizen science initiatives, the project has introduced innovative non-invasive and non-destructive sampling methods. Building on the predecessor project INSIGNIA (2018-2021), the project in 2023 involved 315 beekeepers from all 27 EU member states. These beekeeper citizen scientists conducted synchronised and regular samplings from April to August, utilising various methods including the APIStrip for non-polar pesticides, honey for polar pesticides, silicone bands for air pollutants (VOCs and PAHs), the APITrap for microplastics and propolis for heavy metal detection. The INSIGNIA approach has proven to be an effective model in which the special knowledge of beekeepers is used to carry out extensive environmental monitoring across Europe. This approach enables the collection of large sample sizes and facilitates comparisons of environmental pollution in diverse landscapes.

What's in the water? Citizens as field reporters of cyanobacterial blooms

Maša Jablonska; Tina Eleršek

The citizen science project Ciano SLO (cyanobacteria in Slovenia) has been active since January 2022. We aim to (i) track changes in the environment with the help of citizens, and (ii) promote change in people's attitude towards nature by encouraging them to observe and react to these changes. Cyanobacteria are prokaryotic organisms that can form blooms in water bodies under favourable conditions (high nutrient concentration and temperature, low water flow). Some species can produce cyanotoxins that pose a threat to human and animal health, and excessive growth of cyanobacteria can negatively impact ecosystems by reducing oxygen levels and blocking sunlight. We launched the Ciano SLO platform to improve our knowledge of toxic cyanobacteria occurrence and minimise the risk to people. Citizens can upload photos of blooms or other phenomena in water bodies, and we take samples and analyse their potential toxicity. Citizens gain information on cyanotoxin risk (interactive map), guidelines for protecting their health, information on cyanobacteria and water-related issues, and personal satisfaction from participating in research. Researchers gain information on the distribution of cyanobacterial blooms, which provides a basis for future research projects, while also building trust in science. In the first 19 months of the platform's operation, we have built an online network of almost 900 citizens, and received 40 contributions that have helped us identify seven new sites with potentially toxic cyanobacteria, as well as many other phenomena (e.g. algal blooms, iron bacteria). Moreover, our followers show great interest in the results, share information and help us raise awareness. This engagement resulted in high media coverage, so we believe the project has helped change public awareness of cyanobacterial blooms. The results show that citizens are interested in environmental issues when they are communicated to them in understandable language and by a credible source.

Game on: exploring game-based tools for citizen engagement in climate research and policy

Katharina Koller; Barbara Kieslinger

The climate crisis requires far-reaching changes which need to be supported by civil society and policymakers alike. New methods of public engagement are necessary to capture needs voiced by citizens, understand the social acceptability of climate change measures, and transform this information into actionable knowledge. Games can offer great potential for democratic participation through their central role in contemporary culture, allowing citizens to experience the policy process and voice their concerns. By involving citizens and policy stakeholders as players and co-researchers throughout the research cycle, we explore new formats of political participation and citizen empowerment. In the EU-funded collaborative research project GREAT, we implemented a participatory game-based method for public engagement to develop, implement, and interpret games on climate change. Citizens and policymakers were involved in a series of workshops covering different phases of the research process: the exploration of current and controversial climate issues at local level and the definition of research questions, the transfer of these issues into a collaborative serious game, and the analysis and interpretation of the data collected during the execution of the game. This contribution will report on experiences and conclusions from implementing the game-based participatory approach. We will review the different methodical approaches we implemented with policymakers and citizens and discuss limitations and challenges encountered in the engagement process. In addition to presenting the game-based tools we developed with our stakeholders, we will reflect on their potential for citizen participation and engagement with climate change and its transferability to other social issues. With this contribution, we hope to demonstrate how the ever-growing cultural role of games could be leveraged in supporting and managing the changes necessary to address societal challenges.

Towards long-term citizen-based plastic monitoring in Ghana

Lea Schmidtke; Sabrina Kirschke; Rose Pinto; Christian Schmidt; Louise Schreyers; Katrin Wendt-Potthoff; Tim van Emmerik

Citizen science projects globally succeed in collecting and analysing environmental data. At the same time, however, these projects are often project-based and therefore of short duration. This presents a challenge as such activities may not effectively influence the use of citizen science data in political decision-making processes. This presentation aims to explore the prerequisites for establishing a long-term citizen science-based plastic monitoring strategy in freshwaters, by using a case study with focus on plastic monitoring in freshwater in Accra, Ghana. This case study is particularly relevant due to the significant issue of plastic pollution in the region. Also, official monitoring data to effectively address the problem are lacking and existing citizen science activities potentially make an important contribution to addressing this data gap and problem area. Our methodology involves three key approaches of data collection and analysis: (i) Eight interviews with experts from Ghana and internationally to discuss long-term monitoring barriers and solutions; (ii) a survey among 17 stakeholders before a plastic monitoring workshop to gather insights on citizen science challenges; and (iii), roundtable discussions with 24 workshop participants in Accra to explore these issues further. Qualitative data have been transcribed and coded, and further complemented and cross-checked with the insights from the survey and workshop discussions. As a result, we identified 22 barriers and 36 solutions to implement citizen science in the long-term. Our findings relate to different fields of actions (social, economic, environmental, technical, and management & governance) and specific stakeholder groups (public sector, private sector, civil society, academia). Based on our results, we make suggestions as to how citizen science can be implemented in the long-term in different fields of actions and from various institutional perspectives.

'A Healthier Southern Denmark': health science researcher's engagement in citizen science

Thomas Kaarsted; Anne Kathrine Overgaard

Citizen science within health sciences appears to be a growing area. Medical and health-related researchers have traditionally seen citizens as patients and to a lesser degree individuals, and at the same time hospitals have coined strategies mentioning a human-centred approach.

A Healthier Southern Denmark explores this approach as well as citizens' willingness to take part in a prioritisation of health-related research projects with an emphasis on researcher's dialogue with citizens. Five research projects with CS-elements are chosen by a scientific committee and presented to the public by media, and then it is up to the citizens to vote by SMS and thereby prioritise and decide which projects are funded (2 million DKK from the regional government).

Based on a survey with 20 research groups who participated in A Healthier Southern Denmark, this poster presents the project model and results as well as the researchers experience with engaging the public, and their motivation to do so in the future.

The researchers reported a high emphasis on citizen's access to health-related research and also placed a high degree of importance that citizens engage in their research (and not only the perhaps more traditional patients and relatives-approach) as participation can improve health literacy.

This poster presents these findings along with a couple of perspectives to enhance the human-centred approach in the Health Sciences including the connection between the UN charter on human rights (Mann et. al. 2018) as well as the potential of growing a sense of community and policy relevance (Marks et a. 2023).

While not a traditional citizen science project, A Healthier Southern Denmark includes the citizen science elements of inclusion, contribution and reciprocity (Golumbic et al., 2017). During the five year run the project had 52,674 votes and a total reach with +2 million interactions in a region with 1.5 million citizens.

Does crowdsourced transcription data increase accessibility for print-disabled users?

Victoria Van Hyning; Mason Jones

Crowdsourced Data: Accuracy, Accessibility, and Authority (CDAAA) is a 3-year grant project funded by the Institute of Museum and Library Services (USA) to investigate socio technical barriers that Libraries, Archives, and Museums (LAMs) face in making crowdsourced transcriptions open and accessible to sighted users, and people who are Blind or otherwise print-disabled and use screen reader software to hear digital text. Crowdsourced transcriptions are the most common data solicited by LAMs because, theoretically, when integrated into discovery systems, they broaden access to non-machine readable images of documents. Many LAMs explicitly invite volunteers to help make their collections accessible for screen-reader users, and volunteers are passionate about this mission, but LAMs experience significant challenges in integrating crowdsourced data into content management systems.

We work with 9 US-based partners across private, public, university, and federal LAMs, and community-led groups using platforms like Zooniverse, FromThePage, and/or bespoke software to run transcription projects in citizen science and humanities domains. We seek to understand their challenges and successes in ingesting crowdsourced transcriptions into their repositories and the experiences of people who use screen readers to access LAM content. This poster presents mid-stage findings from the CDAAA mixed-methods project based on our analysis of semi-structured interviews and transcription integration system demonstration sessions with our 9 LAM partners; and results from our usability testing of LAM discovery systems and transcriptions, by 12 people with print-disabilities who use screen-readers.

CDAAA, and this proposal, strongly align with principles 7 and 9 of the 'Ten Principles of Citizen Science,' and the ECSA2024 'Change' theme by seeking to promote changes to LAM crowdsourced data management and accessibility, and identify good practices that can be implemented more widely.

Inspire change in public libraries with citizen science

Anja Pedersen; Anne-Mette Kjærbye Jakobsen

“The roles of both librarians and users in the ‘next generation public library’ remain underdeveloped. Cigarini et al. (2021)

Citizen science is a new powerful tool for democratising science and society. Libraries are at the forefront of many paradigm shifts, adapting their services to promote access to knowledge through experimentation and creative methodologies. As society evolves, libraries evolve with it! Public libraries are already through the sustainability agenda transforming their scope to engage communities.

The University Library in Southern Denmark and The Odense Public Libraries are leading the way with the “Scientific and sustainable communities in public libraries” project in 2023/2024. Partnering with public libraries in Kolding, and Helsingør, they explore the vast potential of Citizen Science to benefit society and try to develop new roles for both librarians and users.

Citizen Science isn’t just about data; it’s about community-driven initiatives and collaboration. Public library users are often motivated by personal reasons, social networks, advocacy, and a high level of trust in their libraries. Especially in times of change, where facts and agendas are often challenged. Many citizens experience a personal desire to actively contribute to needed change and to meet peers and scientists around a shared topic. This is where the free and neutral public library space is crucial along with a high level of trust in the public libraries.

To facilitate knowledge-based change public libraries offer room for all to exchange viewpoints, and along with universities and researchers, substantiate facts and findings. Citizen Science offers a valuable foundation to involve citizens directly in the scientific process and be part of change.

Or as Josep Perelló, a professor at the University of Barcelona, aptly states, “If libraries can lend out books, why not a citizen science project?”

Join the movement. Embrace citizen science. Inspire change.

Shaping the circular bioeconomy through citizen science: outcomes and lessons learned in the HOOP trainers program

Diana Reinoso

Nearly 88 million tons (173 kg per person) of food is wasted every year in the EU member States along the food value chain (Brusselaers, J. and Van Der Linden, A., 2020). In parallel, EUROSTAT indicates that the majority of municipal waste generated in Europe is still disposed of through landfilling (24%) or incineration (27%). In response to this pressing issue, the H2020 circular bioeconomy project HOOP implemented 4 citizen science interventions in 2023 to optimise the separate collection of the organic fraction of municipal solid waste and prevent food waste through co-creation and gamification methodologies. During the programme 164 people collaboratively co-produced improvement proposals to tackle specific local challenges in the HOOP Lighthouses (LH) of Murcia (Spain), Western Macedonia (Greece), Regione Lazio (Italy) and Münster (Germany) based on the analysis of the data collected by 1296 users through the App “HOOP Trainers”.

The citizen science research question was defined during co-creation sessions with various LH stakeholders. Gamification was applied during the data collection process, where HOOP Trainers users trained an avatar to convert bio waste into useful bioproducts. The data analysis process was done in the Biowaste Clubs, which serve as collaborative spaces where citizens and other stakeholders regularly exchange ideas for advancing towards circularity. By analysing the HOOP Trainers outcomes, a deeper understanding of citizens’ perspectives on bio waste separation, acceptance of bioproducts, and perspectives for a circular city were attained. This knowledge enabled Biowaste Club participants to co-produce a myriad of innovative ad hoc solutions grouped in three main areas: resource and waste management, sustainable production and consumption and education, awareness, and policy. The poster will show the program outcomes and the lessons learned while combining both digital and physical participatory scenarios designed through gamification and co-creation methodologies.

Change of view: towards airborne citizen observatories. A PoC from the Waste Watchers project

Klaas Pauly; Hanne Collette; Thomas de Groot

Smartphones have become ubiquitous in society, enabling many popular citizen observatories for environmental monitoring. However, they typically provide ground-based point measurements, lacking the capability to give full coverage over an extensive area and providing insights on hard-to-reach places. Currently, we are seeing promising developments in the availability of consumer COTS drones, which we like to call “flying smartphones” for their similar size, weight, price, ease of use and sensor quality. These drones have the potential of providing citizens with a uniquely informative bird’s eye perspective and becoming powerful tools in a portable, decentralised remote sensing system. The European drone legislation has been unified since 2021, allowing relatively easy deployment of (very capable) sub-250 g drones for recreational and professional use alike. Here, we present the Flemish citizen science and AI-focused amai!-project Waste Watchers which ran in 2023, engaging citizens to acquire drone imagery of the Scheldt river banks in a world first effort to collaboratively map the distribution and prevalence of litter from above, as input to prioritising clean-up efforts. Halfway through the 6-month public phase of the project, 100 datasets had been submitted to the cloud processing servers by over 20 participants, reaching a coverage of 40 km. Meanwhile, close to 200 people, with a wide variety in age and background, had carried out successful drone flights through 5 workshops organised to inform non-drone owners of the project, the legislation, and the drone technology. Deep learning object detection algorithms continue to be updated based on new project data as it comes in. Next to the project set-up and results, we discuss how it fits within a wider strategy of raising awareness about environmental issues as well as the potential of technological developments that are often seen as threatening, and enhancing collaboration between policy makers and citizens.

UrTrees: a mobile app to involve citizens in measuring urban trees

Joris Ravaglia; Pierre-Alexis Herrault; Franck Hétroy Wheeler; Anne Puissant; Philip Wheeler

Trees provide essential ecosystemic services (e.g. stocking carbon or locally regulating temperatures) and play an important role in the resilience to climate change, especially in urban areas. Quantifying these services in cities is difficult because little information is known about each tree, and no allometric model yet exists for urban trees.

The UrTrees project calls the citizens to the rescue to help collect measurements and increase our knowledge of urban tree features. Using the mobile app that we have designed, only a short video around the tree is necessary to approximate three key measurements: the tree height, its diameter at breast height (1m30 above ground) and the crown volume. No expertise in trees is required to use UrTrees, which has even been tested on children from 6 years old.

A 3-dimensional point cloud of the scanned tree is first derived from the video using Structure-from-Motion algorithms. Surface geometric models for the trunk and the crown are then fitted to the point cloud in order to estimate the essential measurements. Additionally, Pl@ntNet can be used to identify tree species. All measurements are stored in a database providing data for urban tree studies and feedback to the mobile app user. Efforts have been put into the mobile app user experience, with a scoring system, daily quests and point cloud interactive visualisation. Individual tree information collected through the app will be freely available to the general public.

3 years of BioMARathons: the marine bioblitz

Xavier Salvador; Berta Companys Oliva; Ana Álvarez Sánchez; Jaume Piera Fernández; Sonia Liñán Moyano; Karen Soacha Godoy; Carlos Rodero García

Citizen science is a tool that will contribute, increasingly, to improve the knowledge of the natural environment and face the Sustainable Development Goals with the involvement of the citizens, acquiring new information and data that will be used in scientific studies or in governance (Soacha et al, 2022).

In these terms, it is important to energise activities that allow the citizens in scientific projects and be part of the entire decision-making process, with data endorsed by the academy.

The EMBIMOS group aims to create tools that facilitate citizen contribution with science in all entire decision-making processes. For that, we created the initiative BioMARathon (BioMARatón in Spanish and BioMARató in Catalan), a marine Bioblitz (citizen census of biodiversity during concrete dates and locations) to acquire the maximum number of marine species in the Catalan coast. Since a Bioblitz is constrained in time, and the marine weather may not be favourable when you are organising those events, we have extended those BioBlitzes over a long period of time (from April to September).

To improve the engagement of the activity, we use the Quintuple helix model of innovation (Liñan et al, submitted) that includes the participation of enabled entities to promote the participation of citizens and the involvement of local administrations, to recognize the work and results of the initiative. We identified the best trigger was a friendly competition, "championship", between the 3 marine provinces of Catalonia to see which one has a higher richness of species.

For the past 3 years we have been holding this BioMARató and we have achieved great results that we want to expose on a poster. More than 80.000 observations of biodiversity with over 1700 species and more of 300 participants along 3 years of this long term marine bioblitz and the change of perception of the participants about the knowledge of marine biodiversity.

Participation and citizen science with young people – discussed using u3Green as an example

Sabine Hennig; Tim Schötz; Robert Vogler

Discussions about the quality of life in cities emphasise the importance of urban green. This is further underlined by increasing urbanisation and climate change impacts and requires appropriate implementation of urban green. Of central importance is a fundamental understanding of how citizens use urban green and what needs they place on them. However, use and needs typically vary between individual people and groups. For instance and for various reasons, urban green usually plays a more important role for the youth than for adults. To shape and design urban green areas suitable for young people, the use of participatory methods, i.e. citizen science, is a promising approach. Even though participation of young people offers numerous advantages, they are considered a difficult target group in terms of participation. Accordingly, appropriate participatory methods, including modifications and adaptations, to truly engage youth are required. There are several open questions about this: Which forms of citizen science and participation are particularly helpful for addressing the youth and how should they be combined and implemented? What youth-specific results can be achieved through the approaches and methods used? These questions are being investigated in the Sparkling Science project u3Green (www.sparklingscience.at/u3Green.html; <https://u3green-zgis.hub.arcgis.com/>), to which the youth not only contributes data on urban green, but also participates in the creation of the according data contribution app, data analysis and interpretation as well as dissemination. Thus, in u3Green an appropriate participation model has been developed, which includes a variety of participation formats (workshops, focus groups, internships etc.) and methods (questionnaires, Q-Method, meta-plan method etc.). This led to new insights into the design and use of urban green, e.g. the relevance of activities such as walking, as well as requirements for safety and cleanliness and an understanding of prohibitions and restrictions.

PROBLEU: fostering generational change through citizen science and ocean- and freshwater-related education in schools

Agnese Galeazzi; Romita Trehan; Luigi Ceccaroni; Eli Bonfill; Jaume Piera; Gennadi Lessin; Stephen Parkinson; Berta Companys; Sasha Woods; James Sprinks; Egle Butkeviciene; ProBleu Consortium

The talk will highlight the citizen-science aspects of ProBleu, a European-Commission--funded project that is promoting citizen science to mobilise and engage children, youth, teachers, and school communities in implementing the EU's Mission Starfish, and restoring oceans and waters across 40 countries. By encouraging open schooling, which combines online and place-based activities to make education more accessible and inclusive, ProBleu seeks to engage schoolchildren, their parents and carers, and the wider society to increase ocean and water literacy through citizen science and environmental education projects, and encourage environmentally-friendly behaviours. ProBleu supports schools in developing and implementing innovative projects involving shared teaching and learning methods, such as citizen science, challenge-based learning, design thinking, system dynamics, science shops, and virtual ocean journeys, to improve understanding of oceans and waters. ProBleu considers impact, education, inclusivity, responsible research and innovation, policy, interoperability, and societal measures. It learns from existing methodologies, including EU-Citizen. Science, citizen-science project results, citizen observatories, communities of practice, bio-blitzes and bio-marathons, and Sustainable Development Goals monitoring. ProBleu provides tools and resources in various formats, including school policy briefs, training and educational resources, videos and interviews, open-source software, and equipment repositories. ProBleu is also establishing relationships with the Network of European Blue Schools. ProBleu empowers children and youth to take action on ocean and water conservation through citizen science. And empowering young people is essential for generational change, as they are the ones who will be most impacted by environmental challenges.

How can we engage the community in pandemic preparedness and response?

Christine Marizzi; Philip Meade; Rita McMahon; Randy Albrech; Andreas Bergthaler; Florian Krammer; Orsolya Bajer-Molnár

The COVID-19 pandemic has stressed the need to partner with the community in pandemic readiness and prevention. Aside from large scale preparatory measures, anticipatory studies are needed, such as high resolution surveillance of human-animal interfaces. The DAMA (Document, Assess, Monitor, Act) protocol is a framework embedded within pathogen evolution, describing the importance of grass-roots initiatives and bottom-up processes in monitoring emerging pathogens with at-risk communities. Not only does this enable high resolution data collection, but it also helps build trust among stakeholders, a critical component of pandemic management. In the past decade, citizen science has played an important role in increasing public engagement in applied research. Citizen science can identify threats to environmental health and can help support surveillance of emerging infections (EIDs) as a complement to conventional sentinel surveillance. Incorporating citizen science reporting of EIDs in humans and wildlife allows for earlier detection by collecting data to create a baseline and to study transmission dynamics.

Here we will present two innovative citizen science programs that actively involve high school students in every step of the research process. 1) BioBus's New York City Virus Hunters program is the first large-scale surveillance study of avian influenza and avian paramyxovirus in urban wild birds in the United States with community involvement. Results are shared with the public through talks at research symposia, press features and scientific, peer-reviewed publications. 2) Medical University of Vienna's Air FilterProject is the first pathogen surveillance program investigating respiratory viruses circulating in high school environments through student involvement. Experiments are designed with students, results are used by students to conduct their mandatory research project within the Austrian curriculum as well as to advise preventive measures in peak respiratory disease seasons.

The citizen science project “AmphiBiom”: a quest to mitigate habitat loss for the European green toad

Stefan Burgstaller; Janette Siebert; Magdalena Spießberger; Thomas Ofenböck; Johann Zaller, Wolfgang Graf; Silke Schweiger; Daniel Dörler, Florian Heigl1; Lukas Landler

Amphibians are among the most threatened taxa in the animal kingdom. Global change, including habitat loss and degradation, is one of the major factors driving the ongoing diversity decline. In many cases, human-made secondary habitats can mitigate some of the negative effects. One such example is our main study species: the European green toad (*Bufo viridis*). Their primary habitats (steppes and wild river floodplains) are scarce in contemporary Europe, however, they often can be found in cities and suburban areas. The aims of our project are 1) to better understand the green toad distribution in Austria, 2) to identify factors contributing to their occurrences and 3) to provide new potential breeding habitats. To tackle these aims, we 1) rely on the help of citizen scientists which can use our phone application (“AmphiApp”) to record the conspicuous green toad breeding calls; 2) conduct amphibian and environmental surveys at known green toad breeding sites; and 3) provide citizen scientist with small ponds (1 x 1.20 m surface area, 300 in total) which they place on their property and monitor for two years (“pond initiative”). The recorded calls together with professional surveys will provide us with new distributional information, potentially expanding the known range of the green toad. The “pond initiative” will not only allow us to study the succession of small artificial ponds over the course of two years; it is also intended to change the perception of garden ponds as a conservation tool rather than ornamental. Understanding the biodiversity such a small pond can create might affect many more people than ‘just’ the citizen scientists working with us on this project. Private ponds which are treated as possible habitats for threatened species could mitigate the biodiversity decline of amphibians and their associated animal community. A community under threat due to longer dry periods, ongoing land degradation, and declining groundwater levels.

Citizen science toolkit for deliberative processes in climate action

Ferran Bertomeu; Julian Vicens; Nil Alvarez; David Laniado

Citizens assemblies are bodies formed by citizens to be informed for deliberate on collective issues. In this case, climate change and its causes, consequences and challenges. They follow participatory mechanisms intending to generate policy recommendations. Citizen science emerges as a potent tool for bridging scientific evidence with policy recommendations.

In this presentation, we introduce a novel toolkit designed to incorporate citizen science into various phases of citizen climate assemblies. These phases encompass framing climate change issues, providing knowledge to citizens, and formulating policy recommendations. More specifically, we unveil the initial version of our toolkit, tailored to facilitate the integration of citizen science projects into citizen climate assemblies. Through citizen science, participants in these assemblies can gain hands-on experience in real environments, enhancing their understanding of conservation issues and contributing to policy recommendations.

Thus, the primary goal of the toolkit is to empower participants to gain knowledge from citizen science projects while ensuring inclusivity and accessibility in the participatory process. It also aims to create an immersive experience for participants, fostering value and behavioural changes. Development of this toolkit is underway at the Ebre Bioterritori Living Lab, serving as a central hub for co-creating and testing citizen science tools for climate assemblies.

The co-creation community, which encompasses stakeholders such as policy-makers, citizen assembly facilitators, professional scientists, and citizens, has meticulously selected projects and identified relevant activities to catalyse climate change actions. In summary, we will present our research on creating an inclusive, accessible, and practical citizen science toolkit that aims to empower citizens to collectively address climate change through participatory processes in citizen climate assemblies.

The potential for environmental change: a network analysis case study in Romania

Lucrina Ștefănescu; Monika Meltzer; Filip Alexandrescu

Environmental social change involves shifts in community and individual behaviours, societal attitudes, and, subsequently, changes in national policies to respond to environmental challenges. Citizen engagement plays a pivotal role in bringing about these transformations. The presentation explores the role of social networks in fostering citizen engagement in citizen science projects, drawing on a case from the Apuseni Mountains, Romania. The area under investigation shows great promise for tourism development, but it also faces numerous environmental challenges: mining pollution from closed and ongoing mining operations, surface water pollution by untreated domestic wastewater and waste accumulation on riverbanks and in the forest. In this context, there are some timid initiatives from individuals and one local NGO to address these issues. The aim of our study is to identify the networks of local participants involved in dealing with pressing environmental issues and analyse their relationships to get a glimpse of the collaborative potential needed for social environmental change in the region. The “not-in-my-backyard” attitude urges some individual people to act against localised accumulations of waste or episodic water pollution, among others. Joining a collective action though, such as Ecomarathons or environmental protests or petitions, is much more challenging but also more efficient in grappling with complex environmental problems. In this regard, the actors with the best social skills were identified and their closest network nodes were analysed to see whether they can create a coalition for environmental causes, capable of generating change in the local community. The findings from the social network analysis are corroborated by results from a citizen science mobile app (EcoVoce) which allows citizens to report the environmental issues by means of Volunteered Geographic Information.

Utilising citizen science to assess the impact of green roofs and walls on urban biodiversity

Patrícia Tiago; Ana I. Leal; Cristina Matos Silva

Today, it is generally accepted that nature-based solutions can play an important role in cities' regeneration, since they address urban challenges in a multifunctional way. In fact, green spaces provide multiple benefits for people and nature. Green roofs and walls are some of the most promising alternatives as urban space is scarce and they can green the grey infrastructure. Yet, their merit is not generally known and accepted, mainly due to difficulties in valuing intangible benefits as biodiversity.

Biodiversity guarantees an important amount of ecosystem services, such as food supply, soil composition, air quality or climate regulation. Therefore, public policies have pursued answers to protect biodiversity, namely based on international agreements, as the United Nations Sustainable Development Goals. However, despite the growing concern, the loss of biodiversity has continued, particularly in urban areas.

The purpose of project GRAVITY is to enhance the knowledge on green roofs/walls contribution to the biodiversity of cities following a transdisciplinary approach where citizen science takes on a central and crucial role interconnecting with areas such as green roofs/walls technology, associated costs and benefits (environmental and social dimensions), model development, geographic information system and biodiversity measuring.

The strategy of the project is to: i) define a city case study and catalogue of existing green roofs/walls that are already installed; ii) collect a comprehensive and systematic data basis of green roofs/walls contributions to the biodiversity of the city using citizen participation; iii) develop a model to assess the contribution of green roofs/walls to urban biodiversity and to understand the effect of various explanatory variables (e.g., how does proximity to other green spaces or type of green roof/wall influence its contribution to urban biodiversity?); and iv) understand how this project can be up-scaled in other cities. Supported by Gravity project 10.54499/2022.02093.PTDC, FCT, Portugal.

Restore4Life: development of wetland assessment indicators with citizen scientists

Gabriele Weigelhofer; Martin Tschikof; Eva Feldbacher

Over 80% of the Danube floodplains and wetlands have been converted to agricultural and industrial areas. As a consequence, we are facing severe changes across the Danube basin, such as biodiversity loss, water quality deterioration, and reduced water retention and flood attenuation, which affect both wetlands and the society. The Horizon Europe project Restore4Life (restore4life.eu) aims at developing an online Wetland Restoration Support System that will allow large-scale holistic wetland restoration activities across Europe. To encourage and stimulate transformative change towards an ecologically more sustainable society, we will demonstrate the multitude of socio-ecological and economic synergies that arise from wetland restoration.

As one part of the project, we strive to empower citizens and stakeholders to actively participate in the project co-design through the establishment of local communities of practice. Together with Citizen Scientists, we will test, adapt, and optimise assessment indicators for the status of ecosystems' functions and services at selected restored wetlands across the Danube basin. These indicators will include, amongst others, estimation of above- and below-ground carbon stocks of different soil and vegetation types; evaluation of wetland habitats via remote sensing using Copernicus and drone data; occurrence of selected wetland species (e.g. birds, amphibians, etc.); and local climate and water chemistry data. Our aim is to develop methods together with Citizen Scientists, which are easily applicable by non-scientists and transferable to other European regions that lack infrastructure, knowledge, or staff. The aim of the poster presentation is to exchange experience and knowledge about the transformation of different assessment indicators developed by scientists into easily applicable, citizen science suitable methods.

Panorama of citizen science in Brazil and recent changes: web platforms and local networks

Gustavo Sigal Macedo

Citizen science in Brazil has consolidated itself as an emerging approach, informally disseminated by groups of enthusiasts, articulated mainly through Instagram, Facebook and WhatsApp, and more conceptually, by some academic departments or environmental organisations, such as ICMBio, ECOA, INEA, IBICT, Fundação Boticário, SOS Mata Atlântica, Labbor, Instituto Butantan and SAVE. In the academic area, this approach takes place in areas such as: Ecology, Biology, Astronomy and Environmental Education. As a promising trend, science clubs and maker spaces can be found, which have the potential for the development of tropicalized practices, adapted to the realities of cities. It is worth highlighting the intersection of citizen science with other approaches such as: Open Science and Social Innovation Laboratories. Several groups include participatory logic in their investigations, mappings and interventions. Such initiatives tend to adapt the steps of the scientific method, or just some of its elements, with a more open format, involving volunteers interested in the themes or the dynamics of contribution. Global platforms such as iNaturalist and GoogleMaps are adopted by the groups, but the dynamics of brazilian networks and platforms such as Civis and Rede Brasileira de Ciência Cidadã can be seen. Other portals can be highlighted, such as: Wikiaves, Biofaces, Observando os Rios, Where are the Whales and Dolphins, on ecology, and Exoss and Bramon, on astronomy. It is also notable to observe startups and creative initiatives such as: Olabi, DataLabe, GypsyLab, ConectorCiência, BlueChange, ComuRede, QuebradasMaps and BlueBirdsBR. And events, such as: Vêm Passarinhar, Tropixel, Avistar, Arraial do Céu, Great Southern Bioblitz and City Nature Challenge. Some of the initiatives are volatile, which is why the most perennial associations and portals gain importance for knowledge management, continuity of actions and popularisation of this democratic science approach in Brazil.

Empowering public engagement: citizen science initiatives in project LIFE NarcIS

Anja Kržič; Anja Pekolj; Grega Makovec; Vit Kukulja; Klavdija Šuen; Maja Zagmajster

In Slovenia, data, and documents vital for nature conservation are scattered across diverse sources, managed by various institutions. This poses a challenge when seeking comprehensive information on the country's natural treasures. However, a unified platform emerged in the form of the Nature Conservation Information System, NarcIS, a centrepiece of Project LIFE NarcIS (LIFE19 GIE/SI/000161).

Within the project, the Institute of the Republic of Slovenia for Nature Conservation (IRSNC) and University of Ljubljana (UL) are guiding the power of Citizen Science. While developing distinct approaches, both share the mission to enlighten the public about the importance of collecting data on species and habitats. We aim to engage individuals in actively contributing to nature conservation in our ever-evolving digital society.

At the IRSNC, we have upgraded SporociVrsto.si web portal, optimising the process of reporting species sightings, particularly those of conservation concern. The platform can be easily accessed during outside activities, offering a simple system for entering the essential information on species. Collected data undergoes peer-review, thus enriching our understanding of species distribution. Monthly articles on species interesting facts and conservation status are published to ensure the public remains well-informed.

Meanwhile, at the UL we have introduced the "Živo podzemlje" website dedicated to collecting data on subterranean species and habitats. Different target groups such as cavers, fishermen, local residents and schools, are approached in different ways to participate in the data collection. Collecting data on subterranean habitats is far from trivial, so Citizen Science engagement requires a different, more targeted approach.

The overall objectives of Citizen Science activities in the LIFE NarcIS project go beyond mere data collection. The purpose is to encourage people to be actively present in improving knowledge in this rapidly changing era.

What is the scientific evidence between citizen science engagement levels and protected areas' governance? A systematic map and qualitative synthesis

Monika Suškevičs; Joanna Tamar Storie; Carmen Kilvits; Mart Külvik

Citizen science entails different citizen engagement levels in research. It is not well-known how these levels affect protected area governance. This review systematically maps and analyses how the empirical scientific literature has constructed the links between three citizen science engagement levels (contributory, collaborative, co-created citizen science) and their outcomes for protected areas' governance. From our search results (5486 records), 63 articles dealt with the topic in-depth. The most common engagement level was contributory citizen science. Almost all collaborative and co-created citizen science was conducted outside Europe or North America. All citizen science levels support the strategy-formation phase of the governance cycle, whereas collaborative citizen science supports the monitoring and evaluation phase, and co-created citizen science the practical implementation. The collaborative/co-created citizen science supports legislative, cooperation-based, and information instruments, whereas economic instruments are not well-recognised by any citizen science level. Collaborative and co-created citizen science target a more diverse set of actors and governance levels. Collaborative and co-created citizen science often mention project funding and collaboration as factors to achieve the outcomes, whereas contributory citizen science frequently mentions the cost-effectiveness of citizen science. In our total sample, citizen science is mainly conducted in national parks and marine protected areas and targets simple monitoring objects. It shows a knowledge gap for other protected area types and points to the need to diversify monitoring indicators. We suggest protected area managers explore the potential of collaborative and co-created citizen science, especially in the European and North-American context, as these citizen science levels support a more complex set of practice-oriented governance outcomes needed for the strategic adaptive management of protected areas.

Empowering change: the role of citizen science in biodiversity conservation

Julia Lanner; Jovana Bila Dubaić

The ongoing biodiversity crisis is only one symptom of a changing world. Let's contemplate a scenario in which individuals are empowered with the knowledge to reverse this unsettling trend and enrich their understanding of the natural world that surrounds them. Ecologically oriented citizen science projects have the potential to accomplish this by addressing the issue of a diminishing and steadily homogeneous biota and by encouraging participants to experience nature.

With 'BeeRadar' and 'Belgrade.Bees.Ecology', we search for invasive wild bees in Europe. We address the important role of local pollinators and aim to create awareness of the potential threat of changing biodiversity through a target-group focused science communication strategy. Further, we aim to build trust in research and educate about ecological misconceptions through open discussions. The project's communication strategy includes classic and digital media channels, social media and person-to-person knowledge exchange.

We developed a survey in a co-creative process with participants to evaluate our science communication strategy and assess A) the effectiveness of various science communication channels used, B) their perspective regarding current biodiversity challenges following their participation in the citizen science project, and C) the motivation for their participation in citizen science.

Around 800 surveys have been filled spanning from Austria to Serbia, where citizen science remains an emerging field. Digital media, particularly social media platforms, played a major role transporting information from the citizen science projects to participants. The knowledge acquired after participation exceeded the societal average, as noted by the participants themselves. The sentiment towards the undertaken research was positive, with the main motivating factor to participate was to contribute to biodiversity research.

A citizen science approach to govern demand patterns of ecosystem services and their influencing factors – lessons learned from Austria

Katrin Kerner; Florian Danzinger; Thomas Wrška; Martin Schönhart

Nature provides many valued services to people including provisioning (e.g. food), regulating (e.g. filtration of pathogens which improves water quality) and cultural services (e.g. areas for recreation). These services contributing to human well-being are referred to as ecosystem services (ESS) in academic literature. Past research proved the importance of land use (e.g. how farmers manage their agricultural land) for ESS supply. Most academic ESS assessments focused on the supply. However, the lack of information on the demand for ESS risks that areas are prioritised for the supply of ESS where the demand of society is small. In the citizen science project ServeToPe, we aim to (i) test methods for ESS demand assessments by citizens in the Austrian Biosphere Reserve Wienerwald (BRWW), (ii) identify the congruence of ESS supply and demand in the BRWW, and (iii) inform citizens and regional decision-makers about ESS and sustainable landscape governance. We engaged with different citizen groups, applying different methods: we held workshops at schools, analysed social media data, surveyed citizens in the region and developed two online surveys. One survey is designed for a one-time reporting of regularly undertaken and observed uses of ESS by people in the BRWW. The second survey was conceived for an ongoing reporting of observed uses of ESS, for which we currently look for 50 volunteers for one week of monitoring activities. We also addressed pupils who took part in school workshops for the same task. The results will be presented to selected citizens in a workshop to discuss required changes and sustainable landscape governance in the BRWW. The preliminary results show that cultural services have the highest demand. Our lessons learned so far show that (i) engaging different citizen groups leads to complementary results on ESS demand, (ii) effective and tailored communication to each citizen group is of key relevance and (iii) online tools proved particularly useful.

Innovating together for green urban transitions: stories from Urban ReLeaf cities

Inian Moorthy; Gerid Hager; Vanessa Boas; Ilia Christantoni; Naomi Clarke; Bárbara Coelho; João Dinis; Johanna Doerre; Nora Gāgane; Gitty Korsuize; Viola Marx; Georg Pins; Sabīne Skudra; Dimitra Tsakanika; Stephen van Aken; Liesbeth van Holten; Mariëlle Versteeg

Nature-based solutions in urban environments can provide cooling effects, decrease air pollution, and improve mental health, amongst others important ecosystem services and health-related benefits. Ambitious plans, such as the pledge to plant 3 billion trees in the EU, the European Green Deal, or the Green City Accord support such approaches. Their implementation, however, requires transformative changes on the ground to overcome business as usual approaches. The Urban ReLeaf project delivers change by bringing public authorities and citizen groups together to shape green infrastructure actions in their cities. Six pilot cities co-create citizen-centric innovations for the democratisation of urban greenspace monitoring and the wider policy making process in pursuit of urban climate resilience. This poster showcases the stories of the six cities and their approaches to participatory, and data-driven decision making. Athens is undergoing a greening transformation with a new, citizen-powered tree registry providing critical data for better management of greenspaces. Cascais engages citizens in sharing perceptions and thermal comfort levels while using greenspaces to validate the effectiveness of its parks. Meanwhile in Dundee, a city facing increasing grey infrastructure in deprived areas, actions to enhance the accessibility of greenspaces are co-developed with citizens and stakeholders. Mannheim has a heat action plan to safeguard its most vulnerable residents but has identified critical data gaps. Citizen observations of trees and thermal comfort, when integrated with official data streams, will aid the delivery of climate adaptation measures. Riga engages diverse audiences to address concerns about air pollution and greenspace usage, to ensure better informed policies. Finally, in Utrecht, data on temperature, humidity and heat stress, collected by and for citizens, will help them reduce the urban heat island effect and shape effective mitigation strategies.

Let's get physical! Bridging a citizen science digital platform into physical space

Ines Méhu-Blantar; Iris Ott; Daniel Doerler; Florian Heigl

The Natural History Museum Vienna (NHM Wien) has historically embodied citizen Science, engaging citizens in scientific endeavours, research, and collections for centuries. With a collection spanning 30 million objects, encompassing nature's diversity, Earth's evolution, life, and humanity's cultural development, the museum represents unyielding scientific exploration. Transformational change unfolded with the implementation of Deck50, a multidimensional space for science communication, birthing a novel format "Vielfalt Kennenlernen" since September 2021. In a pivotal transformation, "Vielfalt Kennenlernen" partners with Österreich forscht, Austria's citizen science platform. This synergy reshapes citizen science in terms of expanded participation: Citizens across Austria gain access to diverse citizen science projects, forging an embodied connection between "Vielfalt Kennenlernen" and Österreich forscht, broadening citizen science horizons. With this presentation we want to share first experiences of this collaboration between the Natural History Museum Vienna and Österreich forscht. The collaboration enhances dissemination as Österreich forscht projects find a diverse, engaged audience at Natural History Museum Vienna, leveraging Deck50's versatile infrastructure and immersive environment to spotlight citizen science. The partnership fosters community engagement since Deck50, renowned for its intergenerational appeal, nurtures a vibrant citizen scientist community, fostering belonging and fortifying the citizen science spirit.

What makes this collaboration special is its fusion of the physical and digital realms to offer a transformative citizen science experience. By establishing Deck50 as a central hub within the Österreich forscht network, more people are encouraged to participate, share, and actively engage in citizen science. At its core, this partnership aims to bridge the digital platform into physical space and, conversely, take the museum into the very tangible world of Citizen Science.

The D-A-CH AG: shaping and empowering change together

Olivia Höhener; Nina Nolte; Tiina Stämpfli; Florian Heigl; Daniel Dörler; Moritz Müller; Wiebke Brink; Tizian Zumthum; Elena Schoppa-Briele; Petra Siegele

Since 2019, the D-A-CH AG unites stakeholders in the context of Citizen Science, such as platform providers and representatives of universities and research institutions. As D-A-CH AG, it is our concern to intensify the cooperation in German-speaking Europe, to use synergies, to exchange best practices and to establish short ways of informal exchange. Our goals are:

- The expansion of personal contacts and the establishment of closer cooperations
- Setting common priorities such as conferences, training etc.
- Learning and profiting from each other
- Enabling and initiating projects/ project consortia
- The further development of Citizen Science in terms of content and quality

First results of the cooperation are:

- The inclusion of members of the D-A-CH AG in the committees of the respective national conferences in 2023
- Cross-nationally planned and conducted trainings on "Open Data in Citizen Science" and "Digital Ethics" in 2023

With our poster, we intend to show how we work together in the D-A-CH AG, which goals we have set and which activities we carry out together. In addition to what has been achieved so far, the poster will also present challenges in cross-border cooperation, as well as tips on how to overcome them.

Central questions are:

- In which areas is the need for exchange and networking particularly great?
- What goals can be achieved within the framework of an international network?
- Where are the limits? (e.g. different political frameworks, different national network structures etc.)
- How must the cooperation be organised in order to sustainably keep a transnational working group alive?

- What impulses can a transnational approach give to all three countries?
- What kind of change can it bring about?

The poster is aimed at leaders and members of other networks and working groups concerned with how networks can bring about a framework for shared learning and concrete change, as well as at Citizen Science actors in German-speaking countries.

StreetMind: a modular citizen science platform bridging health and environmental research

Sebastian Siehl; Stephan J Lehmler; Philipp Hummer; Frauke Nees

Ecological changes, such as urbanicity or climate change, play a significant role in mental disorders ranking globally among the leading causes of years lived with disability. To gain a better understanding on how citizens deal with such challenges and navigate a constantly changing environment, the individual context in which citizens reside and move, including its individual perception, is a crucial source of information. We introduce the digital citizen science platform StreetMind, developed for individual and environmental assessments with high sensitivity and specificity along a modular pipeline. The StreetMind app can capture regularly visited spots, taken routes, and daily experiences, including emotions and behaviours in the respective environment. The platform is enriched with communicative features (e.g., chat), motivational elements (e.g., badges), and interactive components (e.g., map types) related to citizen science. The StreetMind website includes a survey tool for collecting standard trait-like questionnaires and contains other citizen science aspects, such as a blogs and newsletter. We demonstrate its feasibility, applicability, and usability in the mental health research context using data from a community-based sample and population cohorts. We present models that consider individual variations in urban mobility patterns, along with evaluations of social factors and environmental stressors (e.g., noise), and consider their relevance for understanding environmental-driven risk and resilience patterns concerning stress, anxiety, and depression. The StreetMind platform leverages citizen science to explore how dynamically shifting contexts affect mental health. Streetmind can be utilised in research, urban planning, community building, and policy making.

Testing citizen science as an intervention for curriculum extension in secondary schooling in Poland

Katarzyna Molek-Kozakowska; Marcin Deutschmann

Citizen Science facilitators often complain about the difficulties in recruiting motivated citizens from various sociodemographic groups to participate in long-term co-creative research aimed at tackling wicked issues that need end-users to contribute. But what if this shortage was at least partly alleviated as a result of educational interventions that bring citizen science to public schools and allow teenagers to do research in a supportive environment? And what if this solution was tested not in one of the established democracies in Western Europe, but in a country still grappling with its post-communist legacy, polarised populist public sphere and a relatively inflexible school system with conservative, knowledge-laden curricula?

In this poster we show a pathway to building social capital for global citizenship, which we tested through a voluntary citizen science initiative with 10 secondary schools in a Polish region for over three years. We focus on attested (not assumed) gains (and challenges) of initiating and monitoring “extreme” citizen science projects conducted by pupils in the humanities and social sciences. We advocate for adding another facet to citizen science implementation, namely its civic “educational intervention” potential, by showing how we aligned our citizen science agendas with Poland’s national curriculum requirements regarding transversal skills and social competences rather than only knowledge co-creation. We illustrate how working in teams on the issues of communication, linguistic diversity, multiculturalism and language learning has enabled schools to train pupils’ IT and communication skills, self-management, outreach and critical thinking in authentic contexts. We map how such projects can be potentially conducive to a better understanding of processes of doing social sciences, a reflectivity about the scientific method, and an inclination towards future citizen engagement. More on the project itself can be found in multilingual videos we shared via FORTHEM Alliance YouTube channel, available here:

<https://www.youtube.com/playlist?list=PLXxIBiZ0KpQdXc1rhtKA0YyYegMTMvEIs>.

Changing the scale of citizen science towards the transnational level

Giovanni Maccani; James Sprinks; Ana Solange Leal; Dilek Fraisl; Steffen Fritz; Agueda Gras-Velazquez; Arianna Liconti; Sasha Woods; Stephen Parkinson; Luigi Ceccaroni

Citizen science has become a proven method across a range of scientific disciplines, able to collect new and complementary data which enhances and adds context to existing scientific methods. By upscaling to a transnational level, citizen science could collect, analyse and exploit a vast amount of data across Europe and beyond, achieving a higher impact through creating a multinational community of citizen scientists. However, many citizen science initiatives start at a small-scale, facing technical and practical challenges when attempting to upscale to a wider level, with current EU mechanisms not providing the support or resources required to assist their effort.

The CROPS project will evolve the EU Research & Innovation system so that it can support the transition of citizen science from small-scale to a Europe-wide level, changing it towards a modern, open-science approach. CROPS consists of four activities: (i) appraisal of existing citizen science, their activities and their suitability for upscaling; (ii) creation of protocols and guidance for the upscaling of citizen science, replicating and building on best practice that exists; (iii) providing guidance regarding practical considerations such as open data sharing, sustainability, RRI and diverse funding opportunities; and (iv) development of transnational citizen science communities, including establishing societal coalitions and potential citizen science champions to raise awareness of the potential of citizen science when addressing Horizon Europe EU Mission goals. CROPS is tailored to all types of citizen science, stakeholders (children, adults, researchers and non-researchers), and participation approaches, and contributes to the citizen science discipline by proposing an embedded method to facilitate citizen science-driven change at scale. CROPS addresses two key citizen science challenges: (i) sustainability of citizens’ interventions over time; and (ii) generalisability of outputs and outcomes across socio-cultural-political contexts.

Stop and listen. The citizen science and arts project Dawn Chorus

Lisa Gill; Michael John Gorman; Auguste von Bayern

In early 2020, our species witnessed an unprecedented disruption to public life. In a worldwide effort to slow down the Corona pandemic, human activities almost came to a halt, resulting in a profound quietness in cities, airports and industrial areas – clearing the stage for the sounds of nature.

This brief moment of silence was the perfect time to kick off the citizen science and arts project Dawn Chorus in which people collect and share bird songs from all over the world. Its aim is to draw public awareness to biodiversity, and to provide a basis for documenting and exploring soundscapes, biodiversity and anthropogenic noise, through early-morning sound recordings. These acoustic snapshots, collected mostly via smartphones, allow insights into biodiversity that go far beyond the naked eye.

Now, just before the start of its 5th recording season in May 2024, the Dawn Chorus collection counts more than 39.000 sound recordings, enriched with scientific metadata, photographs and creative comments from participants across around 60 countries. The Dawn Chorus app makes it easy for experts and lay people alike to objectively document bird biodiversity, and to make a scientifically valuable contribution.

Identifying the individual sound sources during the dawn chorus phenomenon is important for pinpointing which species was present where and when, and for understanding changes in biodiversity. Given the size of the dataset, manual annotation by a handful of experts is no longer feasible. However, automated acoustic recognition of dawn chorus recordings remains a difficult task, even for today's algorithms.

To tackle this challenge, some of the Dawn Chorus citizen scientists became involved beyond data collection: with their help, we are building a database of human-annotated "ground-truth" recordings, and are co-creating an annotation platform tailored to the Dawn Chorus dataset, to the specific needs of annotating users, and to the requirements for AI development.

The project VisibLL: changing language awareness in Viennese high school citizen scientists

Barbara Soukup; Elissa Pustka; Lisa Krammer; Sophia Seereiner

This poster presents the citizen science project 'VisibLL – High school students explore the (in)visible multilingualism of the Viennese linguistic landscape' (2022-25). Under VisibLL, Viennese high schoolers-as-citizen scientists (HCSs) document and critically reflect on public signage that contains, per the HCSs' perception, written text in a language other than German. The central research question is: What non-German languages can be found, with what frequencies, in what contexts? A goal in science didactics is to raise the HCSs' critical awareness of multilingualism in public space, as a ubiquitous phenomenon mirroring and (re) negotiating social group dynamics, representation and power. A goal in science of language is to study the HCSs' language categorizations in a context of written language contact, i.a. to explore whether common loan words (e.g. 'shop', 'café', 'döner') are assigned to German or their language of origin (English, French, Turkish), thus tracing dynamics of language change.

In addition to providing basic information about the project (participants, goals, activities), we address the conference theme of 'change' by presenting results from a pre-/post-intervention protocol set to gauge the effectiveness of project activities regarding the didactic goals. To capture change in awareness and attitudes, the HCSs completed questionnaires at the beginning and end of a three-day workshop in 2023 which comprised collection and analysis of photographic data from their school districts. Results show that awareness and appreciation of multilingualism increased over the interval. Further, the HCSs later successfully created two public museum exhibitions based on project output, which suggests a heightened understanding of and engagement with project themes. A central goal of our poster presentation is also to exchange designs of and experiences with citizen science pre-/post-intervention protocols with other conference participants in view of possible improvements.

The Citizen Science Starter Kit

Karel Verbrugge; Carina Veeckman; Floor Keersmaekers; Eline Livémont

Although citizen science is no longer a novelty, initiators are still facing challenges while implementing it. A recent survey in Flanders (Belgium) shows that the willingness to start with citizen science has not significantly increased between 2005 and 2020, with respondents indicating a large need for information (1). In addition to the expected difficulty of broaching an unfamiliar research approach, it may also be hard to decide whether citizen science is the right fit for your research.

To alleviate these issues and promote continued change towards a participatory research culture at universities, the Vrije Universiteit Brussel (VUB) developed the Citizen Science Starter Kit within the Horizon 2020 EUTOPIA TRAIN project. Published in 2022, and with ongoing updates in fall 2023, the starter kit is a how-to guide for beginners with the most essential information to get started. The starter kit introduces and defines citizen science, and provides a decision-making framework for evaluating its fit. There is also a specific training module with a step-by-step plan and templates, tools, and checklists to get started with citizen science.

This poster session highlights the value of the starter kit and involves the audience in capturing their information needs through post-its. We would like to hear from the audience what kind of challenges they experience(d) and which support they might need. The collected results will be analysed by VUB and will serve as input for the future development of the starter kit. Eventually, we hope that the starter kit supports researchers in informed decision-making and stimulates critical debate on citizen science. In doing so, we wish to foster a change towards a more participatory research culture and increase the uptake of citizen science.

(1) Duerinckx, A. et al. (2021) Citizen science and Flemish scientists: evolutions in knowledge, opinions and attitudes. Scivil, Leuven, Belgium. DOI: 10.5281/zenodo.5825397.

Fostering sustainable mobility in the Rhenish region using a citizen social science approach

Jonas Grauel; Katharina Rzepucha-Hlubek; Marie Ufert; Felix Langer

The transition from fossil fuels to renewable energy is key to slowing down climate change. The Rhenish lignite mining district is one of three designated structural change regions due to Germany's coal phase-out until 2030. The aim is to transform the former lignite mining areas into model regions for sustainable energy, economy, and living. A change of the regions is necessary to avoid a structural break and to prevent the region from becoming economically unbalanced. The transition is almost exclusively designed in a top-down fashion and little through participation by citizens. As part of the project 'MehrWertRevier' we conduct three Citizen Science projects to examine how citizens can be engaged to foster sustainable transitions in the fields of energy, mobility, and nutrition.

Using a Citizen Social Science approach, the second project focuses on the field of sustainable mobility in the region. The Rhenish region is characterised by its different structural and geographical conditions. Some parts of the region are rural, others are more urban, and beyond that the region is marked by the huge lignite mining areas. This poses major challenges for mobility in this region. Because of these conditions the region is characterised by a high commuter traffic – incoming as well as outgoing commuters. Together with Citizen Scientists we will investigate – in a collaborative approach – the possibilities to promote a more sustainable mobility in terms of a multimodal solution in this region and find innovative alternatives for reducing car commuter traffic, for example, as well as testing the acceptance of those alternatives and new concepts.

The project will start in February 2024 and includes five participative workshops. Within the scope of a poster session, we would like to present the specific chosen research topic, approach, status of the project and the latest results.

WILDLIFE CRIME – From discovering and uncovering: detective work in the name of species protection

Marietta Hengl; Karin Ernst; Peter Sziemer; Stefan Agnezy; Martin Kapun; Silke Schweiger

Illegal trade in protected animal and plant species is expanding worldwide. According to a report by the United Nations Office on Drugs and Crime in 2020, wildlife crime is an extremely lucrative global business with an annual turnover of at least \$23 billion, and is one of the largest organised crimes in the world. Violation of the Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is part of criminal daily business. In Austria, poaching due to a conflict of interest, like conflicts of resources (e.g. land use), poses an existential threat to the populations of many species. WILDLIFE CRIME – From Discovering and Uncovering: Detective work in the name of species protection is an innovative Sparkling Science 2.0 project, managed by the Herpetological staff of the Natural History Museum Vienna, where students from four partner schools in Austria (BRG XVI Vienna, BG/BRG Perchtoldsdorf, Sacré Coeur Graz and the American International School Vienna) are actively involved in research processes on wildlife crime. Participating students are aiming to create CHANGE by raising people's awareness on the topic of wildlife crime and its crucial negative effects on our global biodiversity. In the course of this project, the students learn about wildlife crime in workshops held by cooperation partners (UNODC, FMF, WWF Austria, BirdLife Austria, IUCN-SSC-CSG, QSMI) and gather scientific data by conducting interviews on people's knowledge and opinion on wildlife crime and by searching for wildlife crime cases in the world wide web, on social media platforms and in their immediate surroundings. Subsequently, the students actively disseminate their acquired knowledge and raise people's awareness on wildlife crime by sharing self-designed information folders and posts on social media. At the ECSA conference, the results of the student surveys will be presented, outlining wildlife crime cases and people's awareness on wildlife crime.

A journey to self-management in people with rheumatic conditions

Ria Wolkorte; Rita Schriemer; Patient Representatives; Christiane Grünloh

About 2 million people in the Netherlands live with some form of rheumatism. A lot of research is done on drug-based care for people with rheumatism. In recent years there is a shift in thinking, where people are given more agency and there is more emphasis on self-management.

Self-management are actions and skills aimed at dealing with symptoms and consequences of the condition on well-being and societal participation. Self-management is not just about 'doing it yourself'. It is also about 'determining for yourself'. Out of necessity, many people start figuring out for themselves what can help them against symptoms.

There is no systematic or current picture of the experiences with their deployed self-management strategies. With our study, we wanted to give an overview of strategies, people's positive and negative experiences with them and what are promoting and hindering factors to take up these strategies. The resulting overview could change treatment and disease management for people with rheumatism by supporting them in their self-management.

The project took a participatory citizen science approach. The research group consists of about 5 researchers and 12 people with different types of rheumatism. The group decided on the relevance of the topic. Afterwards, they formulated the research question, and designed a survey that was distributed digitally to all people with rheumatism in the Netherlands. They drafted the data management plan together. In the analysis phase, the group discussed different frameworks that could be used for coding the data, and worked together in reporting and disseminating the results.

The project applied a strong collaboration between people with rheumatism and researchers, adding to the standard research process. By giving people agency in the decision-making process in the research, including what would be done with the collected data, people are taken seriously and knowledge of both researchers and people with rheumatism is utilised.

Coordinating local citizen science at the global level: the Citizen Science Global Partnership

Katya Perez Guzman; Steffen Fritz; Mariana Varese

Citizen science initiatives promise to strengthen and legitimise the monitoring and governance of natural resources, with the active participation of citizens, specialists, and institutions at various levels. Some of these initiatives are already integrated through national and regional networks such as Citizen Science Associations (CSAs). Many sustainability challenges, such as access to health or environmental degradation, can only be addressed through local-level actions that are coordinated at the global level. Before the establishment of the Citizen Science Global Partnership (CSGP), there has not been a global institution that serves as a hub of coordinated actions toward sustainability, where the citizen science projects remain local or regional, but adhere to overarching plans orchestrated by multinational or global citizen science-minded groups, as well as benefit from shared resources where citizen science data becomes far more valuable as it is harmonised and made globally FAIR. The CSGP aims to fulfil this role and has already demonstrated its value by coordinating the 2017 Global Mosquito Alert Consortium. In the near future, we aim to expand through new members, to cover the most important SDGs, and gain financing to carry out orchestrated citizen science campaigns anywhere in the world. This contribution aims to specify the change that the CSGP brings to the citizen science community so that we can find synergies with other actors, and explore how our activities complement each other, toward a more integrated local-to-global future citizen science.

Motivating and engaging high school students in citizen science projects

Berit Elisabeth Alving; Line Laursen Corydon; Mette Fentz Haastrup

Citizen science in education programs at high schools has the aim to engage youth in research with a hands-on, active learning process. Therefore, the SDU Citizen Science Center has participated as a practitioner in several citizen science projects within social sciences, natural science and humanities that engage Danish high school students as citizen scientists as part of their education.

In Climate Future Fiction the students contribute to research on young people's concerns regarding climate change in the far-future by writing and analysing Cli-fi stories in their English classes. In Our History the students participate as citizen scientists by interviewing elderly people about their experiences of the societal changes in Denmark in the 1960s and 1970s, thereby creating data for the researchers as part of their history lessons. A Healthier Southern Denmark is a project and competition with five researchers from the region's hospitals, in parallel a High School Panel is established. As part of their social science lessons, the students are in dialogue with the researchers on how to disseminate research to citizens.

Some 74 Danish high school classes have participated in these projects since 2019. Experiences from these citizen science projects are the focus of this poster:

- A model on how to engage high school students in citizen science.
- The perspective of engaging the students in citizen science.

In co-creation with high school teachers and researchers, we have developed a semi-generic model for implementing citizen science in high school education. The model includes a masterclass for the teachers, co-creation of curriculum-based learning materials, dialogue between the researchers and the high school students and a competition element for the students with feedback from the researchers. Evaluations and follow-up research shows that the participating students increase their scientific knowledge, hopefully, this will change their attitudes towards science in the long run.

Unlocking the potential of environmental citizen science: insights from the NordicPATH project

Karin Ekman; Núria Castell; Marc Peñalver Grau; Amirhossein Hassani; Philipp Schneider; Ágot Watne; Marta Segura; Håkan Fridén; Jenny Lindén; Marisa Ponti; Anna Broberg; Asta Hiippala; Enza Lissandrello; Rasmus Steffansen; Maria Vitaller del Olmo; Lasse Schytt Nørgaard

Environmental citizen science can help citizens move from a reactive approach to a more proactive and holistic perspective on environmental issues. The potential of citizen science is high, but for policy and decision-makers, the potential value seems to remain largely untapped in the Nordic countries. To mitigate the use of citizen science in policy and decision-making, the NordicPATH project has established a model for citizens' participation and collaborative planning for a collective and shared response to environmental challenges for smart sustainable cities in the Nordic countries.

The NordicPATH project has promoted citizen science through involving residents and municipalities in Norway, Sweden, Finland, and Denmark. By using the same overall approach in different countries, we explored different approaches to citizen participation and engagement in urban air quality governance by basing co-monitoring, co-design, and co-creation on the specific needs of each municipality.

We found that citizen science holds the potential to change the way citizens look at their living environments and facilitate data creation as a purposeful and meaningful social activity. This is seen when agency, responsibilities, and relationships between stakeholders are different from what is 'pre-defined' in policy documents and the practice of official monitoring.

We propose the following pathways for engaging citizens in air quality monitoring and urban planning.

- Position citizen science as a value-adding, responsible, and impactful mechanism to address critical issues.
- Sensitize local policymakers on the benefits of building relationships with citizens and integrating citizen generated data into decision-making.

- Use citizen-generated data to show aspects that are otherwise not readily apparent, such as the local effects of woodburning on air quality.
- Improve the use of citizen science data in policymaking and promote trust in the data by recommending requirements and methodologies necessary to ensure transparency and data quality.

Expanding and engaging the citizen science community in Europe

Simona Cerrato; Claudia Fabó Cartas; Dorte Riemenschneider

Expanding and engaging the citizen science community in Europe is the main goal of the European Citizen Science (ECS) project.

ECS envisions a connected, inclusive and strong citizen science community able to tackle societal change in Europe. Creating and sharing data, resources, training and services with communities involved in citizen science and underrepresented publics, building capacity, and uniting diverse European actors under a common platform mark the stages of the journey that we will travel together as we continue building a strong and active community.

After almost two years since the start of the project, in April 2024, we are able to present the main achievements so far, the benefits created for the community and further engage those interested in more project activities. In particular, the eu-citizen.science platform and the ECS Academy offer real growth opportunities and are an asset that can guarantee the sustainability of the project in the long-term. The ECS 28 citizen science ambassadors represent the network that works to locally spread citizen science as a research approach in all EU member states and the UK. The potential of the project can actually become true with the active contribution of the community, and this is why ECS focuses on diversity, inclusion and co-creative processes. The ECSA2024 conference is the right opportunity to boost all this, gather ideas and create new perspectives.

Treasures for change in a citizen science project on linguistic diversity

Janin Roessel; Christine Möhrs; Elena Schoppa-Briele; Rahaf Farag

As modern societies are becoming more diverse due to mobility and immigration, so do linguistic landscapes. However, the voices of people contributing to linguistic diversity are seldom heard. They may rather encounter negative stereotypes and a focus on language deficits. Given the central importance of language to people's identity and as a crucial social bond, we need transformation in the way linguistic diversity is viewed, met, and harnessed.

How can we track linguistic diversity and people's experiences to capture and inspire change? The citizen science project "The Language Checkers: This is how we speak in Neckarstadt" (transl.) tackled these challenges in Mannheim, Germany. Children and adolescents living in the highly diverse district Neckarstadt-West explored their own and the other language/s in their environment together with linguists. In a book project, e.g., elementary students created a story highlighting their languages. Older children were trained to implement the scientific methods of linguistic landscaping and language biographical interviews, thereby capturing over 100 linguistic traces in the district as well as manifold linguistic realities of its residents. Our guiding principle was to consider participants as co-scientists while co-generating research questions and jointly conducting research.

This project emerged as a door-opener for change on various levels: Our citizen scientists expressed surprise for and acknowledgement of their own language treasures. These experiences shall foster positive identities and empowerment. By extension, (social) media campaigns carried project insights and appreciation for multilingualism to broader audiences—a stepping stone for transforming deficit-oriented (self-)views and making citizen science more visible. The basis for these achievements has been trust, which we established not only with citizens, but also with stakeholders, thereby laying the foundation for transfer of knowledge and sustainability.

Best practices in citizen science infrastructures

Amalia Cardenas; Karen Soacha; Ana Álvarez

The number of citizen science projects and volunteers contributing to scientific research has sharply increased over the past decade. Determining the factors that drive the success of such initiatives has become a pressing issue in the literature. As part of the European Citizen Science Horizon Europe project, a systematic review of 65 documents was conducted and a synthesis of best practices and lessons learned for the collaborative design and development of citizen science data infrastructures was compiled into a report as part of Work Package 3. The report offers technical and ethical frameworks that provide a core set of values and guiding principles that citizen science initiatives can take into consideration. The classification of practices was organised under seven thematic sections that correspond to the Science Data Lifecycle Model. Each section includes a selected compilation of proven practices, lessons learned, and key resources—offering citizen science researchers and practitioners a comprehensive overview that aligns with the steps of the data lifecycle. Key findings include the need for developing and documenting detailed and context-specific proven practices as a way to transfer knowledge among practitioners facing similar challenges. The importance of capturing, documenting, and sharing failed experiences was also highlighted as an important contribution that can help the extended citizen science community gain a deeper understanding of the complexities involved with developing and managing data infrastructures. A concerning lack of documentation and limited references regarding co-design, co-development, and security in the context of citizen science was detected, suggesting a need for increased efforts to document and share experiences in these areas. Overall, this report provides a practical guide when planning the development of technological services within the context of citizen science.

The EU funded projects **Probleu** and **SHORE** open up a dialogue toward the ambitious target of **UNESCO: ocean literacy in the school curricula**

Vanessa Sarah Salvo; Elisabet Bonfill Molina; Luigi Ceccaroni; Berta Company's Oliva; Carlos Rodero Garcia; Afsin Yusuf Çetinkaya; Elifnaz Unay; Sonia Liñan Moyano; Jaume Piera

Ocean literacy is a key factor of the Ocean Decade of Ocean Science for Sustainable Development Goals to transform the citizen relation with the blue planet toward its protection. The enhancement of the citizens' engagement and of the blue curricula implementation in formal education (Santoro et al. 2022) are considered strategic actions to reach the 7 outcomes of the Ocean Decade (UNESCO-IOC, 2021). As a matter of fact, the UNESCO during the One Ocean Summit (Brest, 2022) launched an open call to the Member States to all together reach the ambitious objective of ocean education in school curricula by 2025. On the other hand, the EU Mission Restore our Ocean and Waters by 2030 accepted this challenge supporting proposals about blue schools and ocean literacy. Citizen engagement is one of the crucial points of this EU Mission. In particular the ProBleu and SHORE EU funded projects have forged a collaboration about the European dialogue about the blue curricula implementation in formal education in which citizen science has to be an important tool for the students participation. These projects are focused on digital tools and the empowerment of youngsters, respectively, towards the Network of European Blue Schools (NEBS) improvement. ProBleu focuses on innovative resources based on the Open Schooling approach and citizen science projects. While SHORE will engage & mobilise students and schools promoting country hubs and guidance for the educators and schools on blue curricula. Both projects are collaborating to increase the NEBS supporting small grants for schools actions all over Europe and associated countries encouraging engagement and collaboration between the scientific and the educational communities. The project aims to promote an international dialogue about the blue curricula in Europe to build up a roadmap supporting the ocean education in school curricula UNESCO's goal in the framework of the UN Ocean Decade Conference in Barcelona in April 2024.

Enhancing citizen observatories for sustainable change: the **CitiObs** project

Georgia Simadi; Vasiliki Papageorgiou; Núria Castell; Uta Wehn; Joan Maso

Cities face immense pressure to accelerate emissions reduction and combat climate change. Solutions lie not only in technology but also in social transformation. CitiObs, an EU co-funded initiative launched in January 2023, addresses this challenge. It empowers Citizen Observatories (COs) in diverse cities to actively engage citizens in monitoring the urban environment through low-cost sensor technologies and wearables, with a focus on air quality.

CitiObs reimagines citizens' role in governance, promoting participation, deliberation, and influence. It builds open infrastructure, strengthening capacity for COs' inclusion in multilevel governance, and the uptake of citizen gathered data as complementary to other environmental in-situ data. The project aims to drive societal transformation towards sustainability, fostering awareness and citizen-led actions to combat climate change and environmental degradation.

Working across 85 cities with diverse stakeholders, CitiObs embraces diversity and inclusivity, and aims to:

1. Broaden citizen and community involvement in urban environmental monitoring.
2. Augment the availability of citizen observations for policy and research.
3. Elevate the status of Citizen Observatories in research and policymaking.
4. Demonstrate CitiObs tools for enhancing COs on a large scale.

CitiObs seeks to participate in ECSA 2024 with a poster presentation. We are committed to advancing citizen science as a catalyst for transformative change, underpinned by robust data and inclusive engagement.

Are we in the dark about citizen science technologies? A deep conceptual dive

Karen Soacha; Pranesh Prakash; Jaume Piera

Amidst the constant evolution of citizen science, technology plays a crucial role. This presentation delves into the ongoing conceptual transformation of citizen science technologies. In various contexts, these technologies are referred to as citizen science platforms, citizen observatories, or citizen science hubs, yet consensus on terminology remains elusive. Regardless of nomenclature, these encompass a set of tools that support engagement, community building, knowledge sharing, and data management in the realm of citizen science. These tools facilitate entry for newcomers, project discovery, the provision of training resources, and the handling of diverse data types, ranging from biodiversity observations to personal health records.

This presentation offers an overview of our current knowledge about citizen science platforms. It explores how these platforms are defined, the challenges they present, and the research areas they highlight. Additionally, it suggests a way to categorise these platforms and analyses their roles within the citizen science community. Just as the concept of citizen science has evolved through collaborative efforts, influenced by a spectrum of perspectives and ongoing dialogues, our comprehension of citizen science technologies and their significance in the citizen science landscape must also be formed through a collaborative exploration with multiple perspectives.

By analysing the conceptual development and proposing a functional ontology of these technologies, we aim to catalyse discussions about the relationship between citizen science and technology. As citizen science transforms how the public engages with and contributes to scientific knowledge, it's essential to consider how these technologies are reshaping the very foundations of knowledge construction within citizen science.

Lessons learned on the way to a Citizen Science Center at the Museum für Naturkunde Berlin

Sophie P. Ewert; Moritz Müller; Susanne Hecker; Silke Voigt-Heucke

Citizen Science holds great potential as a change agent in nature conservation, substantially strengthening biodiversity research and influencing nature protection policy. The renowned Krefeld study in Germany has underscored its pivotal role. Beyond its scientific and political impact, Citizen Science can be a catalyst for behavioural changes within the public. However, the full potential as a change maker for nature conservation remains untapped, largely due to fragmented connections between key stakeholder groups and a lack of practical support.

In Germany, knowledge and experiences exist at different levels and within different stakeholder groups, including experienced volunteers, technology developers, policymakers, and researchers. Yet, bridging the gaps between these stakeholders while fostering innovation and exchange to address today's socio-environmental challenges, often proves to be difficult. Recognizing this need, the Museum für Naturkunde Berlin (MfN) aspires to establish a Citizen Science Center – an agile and collaborative space and networking hub. Its overarching goal will be to foster partnerships, facilitate capacity building and drive innovation in Citizen Science, particularly in the context of conservation, sustainability, and digitalization.

Our poster presentation offers insights into an ongoing feasibility study dedicated to realising the vision of a Citizen Science Center at the Museum für Naturkunde Berlin. We outline the roadmap for engaging the German citizen science community in the development, shedding light on a nationwide survey designed to identify the unique needs and expectations of the citizen science community. We also present the results of the feasibility study, highlighting the challenges, opportunities, and next steps in establishing a Citizen Science Center – a critical milestone in harnessing the transformative potential of citizen science for conservation.

Change in research assessment in the light of CoARA: bridging citizen science and the broader academic landscape

Mathilde Bessert-Nettelbeck; Moritz Müller; Leonie Malchow; Wiebke Brink; Silke Voigt-Heucke

In the diverse field of citizen science, the criteria for assessing quality and impact of research have been intensely discussed. Publications such as the ECSA Principles have outlined goals and values of citizen science and serve as important tools for gaining recognition and fostering innovative funding schemes that champion participatory research methods. However, the reality remains that scholars in the field rely on the same funding bodies as more traditional forms of research. As a result, they are assessed using standards that may not account for the field's unique characteristics. Hence, changing research assessment methods exclusively within citizen science is insufficient – broader recognition within the scientific community is needed.

Beyond the citizen science bubble, change in research assessment is underway: The Coalition for Advancing Research Assessment (CoARA), led by institutions of the EU, is a major effort to reform the way science quality and impact are currently assessed. Endorsed by over 500 research organisations worldwide, the agreement aims to recognize “the diverse outputs, practices, and activities that maximise the quality and impact of research”.

To bridge this gap between citizen science and the broader academic landscape, we propose to find common ground between the assessment of citizen science and other research areas by rethinking criteria for excellent research in CS. We introduce a framework of criteria that emerged from the development of a German citizen science research award: the “Wissen der Vielen – Forschungspreis für Citizen Science”. This framework was developed to highlight research that excels in knowledge production using citizen science techniques—focussing on quality and impact criteria valued by a broad spectrum of academic disciplines. Especially, we discuss our criteria in the light of the CoARA reform agreement. We argue that citizen science has an important role to play in changing research assessment to take account of the different ways in which knowledge is produced, in line with the mission of CoARA.

Monitoring riparian vegetation in citizen science

Bruna Gumiero; Marco Cossu; Francesco Di Grazia

There is extensive literature confirming that native riparian vegetation plays a crucial role in maintaining a healthy and functional ecosystem. Riparian areas provide crucial ecological services, such as habitat provision, food for freshwater organisms, water quality improvement, and affects flood hydrology by attenuating the flood wave, enhancing deposition, reducing bank erosion among others.

Drawing from previous experiences it is evident from citizens' observations that the absence of riparian vegetation and the diminished naturalness of riverbanks are not perceived as problems by citizens who are unaware of the importance of riparian vegetation. Additionally, citizens often view natural vegetation near rivers as hazardous and unsightly. With the goal of advancing scientific knowledge regarding the functions of riparian vegetation in society, we have developed a specific methodology, referred to as “RiVe”, for citizen science activities. RiVe is designed to assess riparian wood quality and is user-friendly for individuals of all backgrounds. The riparian vegetation monitoring methodology is intended to empower citizen scientists to monitor riparian habitat mosaics and assess human impacts through the analysis of vegetation community structures and the observation of composition and coverage of twelve target species, which are easily identifiable and valuable as indicators. Considering both environmental monitoring, which involves creating a straightforward database, and the social dimensions of knowledge, awareness, and education, three distinct stages are crucial: i) training citizen scientists, providing them with basic knowledge about riparian vegetation and species identification; ii) data collection, where citizen scientists collect information on riparian vegetation and iii) conjunction analysis, which likely involves analysing the collected data. Ultimately, the findings from the analysis of the data collected thus far will be presented.

Virus Factory in schools: building science capital with online citizen science in the classroom

Patricia Smith; Kathryn O'Brien Skerry; Helena Cotterill; Avery Pennington; Oliver N. F. King; Win M. Tun; Chris Lintott; Mark Basham; Sian Tedaldi; Michele C. Darrow

Citizen science projects provide diverse and promising opportunities for teachers to work in collaboration with students to build science capital by exploring relevant, real, and accessible science. Here we present a case study detailing the development and deployment of a school curriculum using Science Scribbler: Virus Factory, an online citizen science project on the Zooniverse platform.

Science Scribbler: Virus Factory asked contributors to locate and classify the life cycle stage of viruses within a cryo-electron tomography data volume of a virus infected cell. After completion, the project was minimally modified, and used as a basis for a multi-workshop series targeted at school children aged 9-11, finishing with a 25-minute Q&A with researchers who worked on Science Scribbler: Virus Factory.

The workshop series was delivered by a public engagement officer to four schools within Oxford in late 2020. The experience of participating students, teachers, and researchers was gathered by a series of questionnaires. Following this, further delivery took place across the UK between 2020 and 2023, with further surveys conducted.

Initial evaluation indicated that online citizen science projects could be successfully employed as a basis for education to students as young as 9 years old. Survey responses showed that the 3-part workshop series increased students' positive perceptions of science, and their consideration of STEM careers. Students and teachers reported an increased understanding of citizen science, and teachers were reportedly more likely to engage with citizen science projects in the future. Students reported an increased awareness of the importance of computers in scientific research.

All materials needed to deliver this multi-workshop series will soon be available in an open access format, with a limited number of physical teacher resource packs available by application.

Measuring the impact of citizen science in education: ProBleu as a case study for MICS

Sasha Woods; Stephen Parkinson; James Sprinks; Egle Butkeviciene; Gennadi Lessin; Jaume Piera; Uta Wehn; Luigi Ceccaroni

The MICS project has developed a platform, tools and resources for assessing the impact of citizen-science projects. Using both rule-based systems and neural networks, the MICS platform scores planned, current or past citizen-science projects on their anticipated or achieved impact across five "domains": society, science, governance, the economy and the environment. The platform also provides recommendations so that citizen science projects may generate more positive change.

ProBleu, funded by the European Commission, will promote ocean and freshwater literacy in school communities and grow the Network of European Blue Schools; part of the EU4Ocean Coalition of Ocean Literacy that aims to drive a wave of change towards ocean sustainability. ProBleu will release funding calls to sustain and enrich current school activities, as well as kick-start and support new activities; and will adapt existing educational methods as well as develop new resources – including those related to citizen science – to support Blue School projects.

Here we use the MICS platform to assess the anticipated impacts of ProBleu, in addition to the surveys and interviews that will be conducted with school children and school communities. The project is projected to have a high impact on society, engaging school communities and improving the understanding of – and enhancing the sense of responsibility towards – the value and challenges of oceans and waters among children, youth and teachers. This, in turn, is anticipated to have a high impact on the environment, through improved environmental awareness, attitudes and behaviours. Although MICS has assessed ProBleu as likely to have a lower impact on governance, this could be improved by collaboration with education-related policymakers.

By using the MICS platform to assess impact throughout its lifetime, the ProBleu project will be able to exert a more positive change on ocean and freshwater literacy, and better contribute to Mission Starfish 2030.

Shifting perspectives: collecting stories of Post-extractive F*utures in a mining town

Karin Reisinger

The shrinking town of Eisenerz lies at the foot of the Erzberg mountain, Austria's largest and best-known site of extraction of iron ore. The post-industrial town is experiencing a rural exodus, which affects women in particular. Mining is predominantly narrated in male, heroic narratives, while counter-narratives of repair, care, reproduction and maintenance are mostly overlooked.

Within this complex field, the citizen science project Post-extractive F*utures focuses on intersectional feminist perspectives on an area of mineral extraction; it collects stories of care to broaden the perception of mining areas and strengthen the focus on feminist narrations for future perspectives. We ask: Which practices contribute to the continuance of the community? The collected material shows, discusses and negotiates the spatial practices of repair amid extraction of multiple actors. Therefore, we work with local associations and different age groups to reach diverse groups and profit from a lively environment of local associations.

Thinking and knowing with the diverse actors and their – often surprising – practices, the citizen scientists shape the project on several levels: they collect and locate stories of practices, they research private archives, and they report and sometimes even organise. Mutual learning takes place in meetings and shared activities, and through the process of transformation into drawings by East Styrian artist Roswitha Weingrill. The collected knowledge will contribute to creating imaginations of future stories of a liveable community. With the help of artistic methods, these stories are illustrated and made accessible in public discussions. Following an exhibition in the town of Eisenerz, the contributors will receive the original project drawings. This is a crucial step in the process of giving back to the community and those who co-shaped the knowledge.

Role of gamification and behaviour change in transforming citizen science engagement

Nimisha Parashar; Liz Dowthwaite; James Sprinks

Citizen Science projects demand sustained participation from volunteers, the continuous recruitment of new contributors, and the instigation of behavioural changes that lead to real-world impacts. As digital platforms increasingly become important in involving citizens in these projects, a significant challenge arises in the form of high dropout rates, impeding their overall effectiveness. Therefore, it becomes necessary to explore innovative mechanisms that can promote effective engagement and subsequently drive behavioural change within these digital platforms. Here we present the findings of a study focused on gamification - a promising mechanism that has the potential to change the way we design and think about the digital modes of engaging volunteers.

Whilst there are some high-profile examples (EyeWire, FoldIt) of successful citizen science games, there are also examples where methods have failed to be engaging and have shown to instead put off motivated volunteers. We address such substantial gaps in existing understanding by investigating the impact that specific, novel, gamification features have on participation, highlighting the connection between game elements and engagement. Additionally, we adopt a behaviour change perspective, diving into the identification of specific behaviour change factors that gamification has the potential to influence, i.e., the opportunity, the capability and motivation for behavioural transformation in the user. This research area holds immense promise for the development of projects aimed at fostering behavioural change and engaging citizens across diverse contexts, such as promoting environmentally conscious behaviours, enhancing waste management practices, refining shopping habits, and overall advancing the field of citizen science. Furthermore, we explore how these findings can improve the use of innovative technologies that can bring radical change in the field.

Ciência + Cidadã – An active citizenship programme in scientific research

Maria João Leão; António Gomes da Costa; Renata Ramalho; Maria José Amândio; Elisabete Brigadeiro

The Active Citizenship Programme - Ciência + Cidadã (C+C) - is an innovative project in Portugal, launched in a close partnership between ITQB NOVA, Instituto Gulbenkian de Ciência (IGC) and Municipality.

C+C has three main pillars as mission:

1. Citizen science projects, developing scientific research projects with the involvement and the active participation of citizens
2. Co-creation, thinking about science with people combining education, art and sport
3. Public consultation in decision-making for science in an open dialogue between citizens, scientists and political representatives.

We will present citizen science projects that are being developed within the scope of C+C, namely:

- Oeiras Experimenta Living Lab_ Mitigating climate change impacts with citizens via sustainable rehabilitation of an agroecosystem in Oeiras
- MicrobiomaPTComunidade_Citizen Science in a pioneering study of Intestinal Microbial Dynamics in Portugal
- Micromundo@Oeiras_Citizen science to discover new antibiotics and map antibiotic resistance with high school, university and master students using soil samples

Around 1000 citizens of different ages and social backgrounds have been involved, to date, in the activities mentioned above, including around 100 students, 20 teachers and 9 artists.

In summary, C+C aims to create an identity and community values, based on knowledge and science, with impact and return for both the scientific community and citizens, in a multidisciplinary and intergenerational way.

Changes in research and society and in our cities – The case of Vila Nova de Gaia, Portugal

Katarzyna Pydzińska Azevedo; Margarida Rocha

In line with the motto of the ECSA 2024 conference “Change” the poster presents the case of the Vila Nova de Gaia city (Portugal) and some specific changes that have occurred there with active participation of citizens. One of the most significant initiatives promoted by the city authorities, together with other institutions and researchers, is called *Meu Bairro, Minha Rua* (“My neighbourhood, my street”), from which result further projects, and local actions (leading to changes), either directly initiated by citizens or with their strong engagement (e.g. implementation of «Kiss&Go» zones in school-areas and changes towards more sustainable behaviour of local population). Overall, the initiative *Meu Bairro, Minha Rua* is not purely a citizen science project, but making and celebrating change is its major focus, and it certainly involves participatory research. The poster will however address not only concrete society changes based on the examples from Vila Nova de Gaia, but also changes in research and research methods practised in that region of Portugal, especially in social sciences area. The above-mentioned local authorities collaborate closely with the Department of Sociology at the University of Porto, forming a so-called “social observatory”. There is an ongoing doctoral research project in that Department focused on studying the topic of Citizen Science and its potential to support better evidence-based policy making and to enhance social inclusion, as well as its added value to achieving and monitoring SDGs. The poster intends to present also some aspects of that study – how the perception of participatory approaches is changing and how the potential of citizen science is seen in Portugal – both from the perspective of researchers, but also from the perspective of local authorities. The latter, based on an example from Vila Nova de Gaia, already strive for positive changes in their territory – do they believe citizen science and citizen engagement can help them towards that goal?

Promoting change from field to plates: the case of nine european living labs working collectively

Dominique Desclaux; Luca Colombo; Allison-Marie Loconto; Francesca Galli; Tara Dourian; Yuna Chiffolleau

Gathering citizens, research organisations, companies, policymakers, shapers, and practitioners is often considered sufficient for creating a living lab aimed at change towards food system sustainability.

However, sustainability remains a social construct calling for a deliberation about the values that must be prioritised. These values need to be debated at each level of the food chain, from the choice of crops (neglected vs. main crops) and seeds (commons vs. intellectual property) through production (organic vs. weak agroecology) and processing (small-scale vs. industrial) to food supply and retail (local vs. global).

The Divinfood project's living labs create favourable conditions for the emergence of such debates. They all aim to engage, around neglected and underutilised agrobiodiversity, groups of stakeholders that are still too rarely represented in participatory research approaches, such as teachers and students of agricultural schools, chefs, marginalised people and citizen-led organisations.

All actors are regularly invited into:

- farmer's fields to observe, evaluate and comment on cultivated biodiversity,
- chefs' kitchens to taste, co-create recipes,
- laboratories to analyse, raise research questions, discuss results,
- micro-enterprises to co-conduct diagnosis,
- neighbourhood associations to increase awareness about sustainable food systems,
- meetings with policy-makers to co-develop short food chains and territorial networks.

Each of the 9 Living labs acts in its own territory. Bringing them together allows to shape a meta-Living Lab in which changes are studied, debated, observed, documented, initiated, and reflected.

Connecting Living Labs enables to think locally these changes and to act globally for their implementation. By making collective choices to give voice to very small-scale structures within each region, this meta living lab contributes to profound changes for global food system sustainability and diversity.

Urban Heat Stories: a chatbot for micro-stories on urban heat in Vienna

Helena Bernhardt; Isabelle Bonhoure; Christian Peer; Sebastian Harnacker; Josep Perelló

Urban Heat Stories discusses the individual effects of Urban-Heat-Islands by the example of neighbourhoods in Vienna. The average temperature and the amount of extreme heat days and heat waves are expected to rise also in Vienna. Additionally in urban environments, dense building structures and strongly-sealed surfaces enhance the Urban-Heat-Island effect.

Existing systematic data illustrates on a large scale the socio-spatial effects of extreme heat on Viennese districts. But the vulnerability against heat strongly varies within micro-spaces depending on multiple socio-spatial and socio-economic factors. A phenomena which most of the current data lacks to inform. Thus, Urban Heat Stories investigates individual experiences regarding heat with vulnerable groups as Citizen Scientists and seeks to develop a Chatbot-Pilot as an innovative methodology for systematic elevation of individual heat experiences.

In the frame of the European research project OPUSH (Open Urban Sustainability Hubs) and in cooperation with the partner project Heat Chronicles (Cròniques de la Calor) at Universitat de Barcelona a common strategy was developed to approach heat experiences. In workshops with citizens, public spaces of the direct neighbourhood were mapped and discussed. The temperatures of the so located spaces were measured and compared with the mental heat-sensitivity. The discussed Heat-Stories of the citizens can be later used for the Chatbot-Pilot. The poster presentation at ECSA 2024 conference will reflect and visualise the mixed-method approach used – especially citizen science as a strategy in city planning – and give a first outlook on the chatbot-pilot.

Community-based monitoring in the Arctic

Finn Danielsen; Noor Johnson; Olivia Lee; Maryann Fidel; Lisbeth Iversen; Michael K. Poulsen; Hajo Eicken; Ania Albin; Simone G. Hansen; Peter L. Pulsifer; Martin Enghoff

The polar environment is rapidly changing. Arctic people live in and observe the Arctic environment year-round. Intimate knowledge of the environment is fundamental to their survival. This poster presents a review of the capabilities, good practices, opportunities, and barriers of community-based environmental monitoring (CBM) programs in the Arctic. The review is based on discussions with community-based environmental monitoring organisers and community participants at workshops and on an analysis of 30 out of 170 community-based environmental monitoring programs in the region. The workshops were held in Nuuk, Fairbanks, Québec, Longyearbyen, and the Russian districts of Komi Izhma, Zhigansk, and Olenek. The Arctic community-based environmental monitoring programs complement scientist-executed monitoring by using different methodologies and engaging the experience of Indigenous knowledge holders and other long-term residents who have significant knowledge of the environment. The programs often provide insight into processes and changes not captured in government agency or research-driven monitoring programs. New technologies enable the programs to collect data and communicate findings with greater certainty than before. Some programs have made their data publicly available, but few have links to data discovery portals or global repositories. Most programs have helped communities advance their own social and political goals. The programs have the potential to contribute to achieving 16 of the 17 United Nations Sustainable Development Goals. One barrier is that management authorities are sometimes slow at operationalizing or acting upon community observations in their decision-making. Lack of recognition and trust remains a substantial barrier for successful collaboration. Regardless of the barriers, involving people who face the daily consequences of environmental change in the Arctic is important for providing relevant information that can be used for adapting natural resource management to the local realities in a rapidly changing Arctic.

Impacts of citizen science on jellyfish-human interactions: a case study of Israel and Malta

Emily Robertson

Engrained cultural values and behaviours affect how individuals interact with the sea and the animals within it. Citizen science as a form of environmental education provides an avenue to alter these environmental-based biases and attitudes. Jellyfish in the Mediterranean region are viewed from a number of cultural perspectives, depending on the species, geographical area, coastal impact, and severity of swarms. This research focused on understanding the social values and perceptions of Israeli and Maltese societies towards their gelatinous neighbours, and the degrees of change due to the local citizen science initiative. The primary hypothesis, and current analysis, affirms that participation in regional citizen science positively impacts the human perception of jellyfish. Theoretical frameworks from human-animal studies, animal studies, and anthro-zoological research were used to analyse the results. Ethnographic methods of participant observation and interviews were employed to obtain data on social perspectives and ecological understanding. Both countries are impacted by jellyfish presence throughout the year, but the increased reliance on the sea for recreation and marine resources has altered the types of human-animal interactions. Social media and news agencies, ecological regulations, and maritime practices influence modern interactions with local species, and in turn, the effect the citizen science program has on its members. Physical encounters with jellyfish in connection zones (i.e., beaches, aquaria, and the open sea) shape the attitudes towards these animals, the jellyfish are also reacting to these encounters through their unique behaviours and perception of their marine environment. The outcomes of this study bear importance to the management of public health and well-being, decision-making processes in industries such as coastal tourism and nature protection, as well as raising awareness to the varying impacts of citizen science projects.

MoRe4nature: empowering citizens in collaborative environmental compliance assurance

Uta Wehn; Joan Maso; Stephen Parkinson; Sven Teurlincx; Laurence Carvalho; Ida Theilade; Karin Dubsky; Gitte Kragh; Hester Volten; Nuria Castel; Stijn Vranckx; David Gonzalez; Oscar Gonzalez; Oleg Bond; Stephen Boucher; Jens Noe Hansen; Nikita Sharma; Pablo Vega Ezquieta; Cristina Luis; Anna Dworakowska; Neil Burgess

The MoRe4nature project aims to trigger transformative change in conservation efforts regarding zero pollution, biodiversity protection and deforestation prevention by including citizens and communities as key actors in collaborative environmental compliance assurance (ECA).

A key element in reversing the trend in environmental degradation is a change in environmental compliance assurance interventions. Citizen science initiatives present innovative ways of joint data and knowledge production and of empowering citizens in sustainable natural resource management. However, barriers to the uptake of Citizen Generated Data (CGD) and citizen actions in environmental compliance assurance have not been effectively tackled.

MoRe4nature will use a socio-technical approach to address these challenges and deepen the role of citizens and communities in environmental compliance assurance by i) strengthening the capacity of existing citizen science initiatives to provide relevant and valid data and understanding the importance of environmental compliance assurance, ii) fostering and supporting collaboration and partnerships among citizen science initiatives and authorities to cover data gaps and shape policy monitoring frameworks, iii) developing and testing tools to validate data obtained from citizen science initiatives, thus contributing to the integration of such data sources in environmental governance and in European Open Science Cloud, iv) making citizen generated data available as a node in the Green Deal Data Space and v) channelling the urgency for concrete and immediate action of many citizens and communities by creating synergies between citizen science initiatives and LivingLabs for EU Missions, partnerships and other initiatives such as Fab Labs which share the values of sustainability transitions and which can help co-design actions as part of green and digital transformations.

We will ensure uptake and impact beyond the project duration by engaging 162 existing citizen science initiatives and 98 authorities and national agencies in 40 cases in Europe, Latin America, Asia and Africa as well as selected LivingLabs and Fab Labs in Europe.

JoinUs4Health: the challenging path of multiple interdependencies of institutional change

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JoinUs4Health, funded through Horizon 2020 EU Framework Programme, unites renowned population-based cohort studies – the Rotterdam Study (the Netherlands), Study of Health in Pomerania (Germany), and Bialystok PLUS (Poland) – with partners specialising in Responsible Research and Innovation (RRI), ethics, marketing and communication. Its mission is to harness the power of cohort study findings to empower local communities, relying on the concepts of citizen science and crowdsourcing. Along this journey, significant institutional changes have emerged.

At its core is an online platform, serving as a dynamic hub for interaction, idea exchange, and collaboration among stakeholders – science enthusiasts.

JoinUs4Health's primary objective is to enact a minimum of 6 institutional changes, each tailored to local contexts, encompassing RRI, Science Literacy, Public Engagement, Open Access, Governance, and Communication & Dissemination. The roadmap for achieving these institutional changes underscores their multifaceted nature, closely tied to the capabilities and decisions of partner institutions as the project evolves. Many of these transformative shifts will unfold gradually, in sync with the platform's evolving role as a nucleus of collaborative endeavours.

Therefore, institutional change emerges as a dynamic process, driven by specific actions, their observable impact, and adaptation to evolving circumstances, rather than being solely defined by achievement metrics.

JoinUs4Health offers invaluable lessons and transparent guidance in constructing societies adept at harnessing and co-creating knowledge. This poster aims to disseminate these experiences and bolster future projects focused on engaging citizen science in the realm of medical and health sciences. JoinUs4Health vividly exemplifies how collaboration and adaptability hold the potential to reshape institutions in alignment with the principles of RRI, providing a compelling testament to its transformative capacity.

Collective intelligence for adapting to climate change: monitoring the Arctic by expedition cruises

Michael K. Poulsen; Gitte Kragh; Lisbeth Iversen; Ted Cheeseman; Finn Danielsen

Our knowledge of the status and trends in natural resources and the environment in the Arctic is limited, making natural resource management decisions difficult. One challenge is how to reach remote, uninhabited wilderness areas in order to obtain much-needed data. This is where expedition cruises can play a crucial role. Through the collective intelligence of resident communities and visitors, citizen science enables valuable data and information to be generated from local and outside sources of knowledge. This poster outlines the findings from a citizen science pilot program of environmental monitoring by Arctic expedition cruises in Svalbard and Greenland conducted to understand the potential this kind of environmental monitoring may have and to identify suitable approaches for enhancing data collection, management, and knowledge sharing. Observations are more likely to be used by decision-makers in the Arctic if records are analysed and interpreted with a view to informing decision-making processes and if the findings are communicated to decision-makers in appropriate formats. An intermediary organisation that can facilitate the dialogue and knowledge transfer between citizen science programs, scientists, and decision-makers is essential to ensuring that data actually enter the decision-making processes.

Empowering change: capacity building for participatory research with insights from the German citizen science platform Bürger schaffen Wissen

Philipp Greiner; Moritz Müller; Wiebke Brink; Silke Voigt-Heucke

How does successful volunteer management function in citizen science projects? What is the key to effective project communication? Which methods are suitable for measuring the impact of citizen science? These are questions that researchers often face for the first time when they choose to co-create knowledge with citizens.

In the dynamic realm of participatory research, we recognize the ongoing challenge of adequate preparation for citizen science projects. Traditional academic training tends to focus on discipline-specific content, overlooking vital competences such as social and communicative skills. Additionally, citizen science is still establishing its reputation within the scientific system. As a result, researchers frequently need to independently acquire expertise, often learning through hands-on experience. While they tend to view the process of collaborative knowledge generation positively, they often admit feeling ill-prepared for the additional demands. The sustainable establishment of citizen science, therefore, depends on the empowerment of researchers to implement participatory approaches and citizen science into their own research setting in spite of these challenges.

In this context, capacity building is a crucial term. Our poster aims to highlight its transformative potential, exemplified by the insights and contributions of the German Citizen Science platform Bürger schaffen Wissen. The platform has been actively involved in citizen science for years through workshops and various initiatives including information, education and networking formats. The poster provides an overview of current capacity building opportunities at Bürger schaffen Wissen and invites participants from all disciplines to discuss their further development.

Join us in exploring how capacity building not only responds to change but also drives positive change in the citizen science community!

The opportunities and limitations of citizen science-driven interventions planned by a municipality

Rina Vijayasundaram

This presentation explores what challenges, limitations and opportunities can be found within the complex ecosystem of a city when the public plans citizen science projects. This will be done by looking at how the City of Aarhus creates citizen science-driven interventions in Aarhus, Denmark.

To do this, the presentation will explain the findings from the study of the City of Aarhus' contributions in the Horizon 2020 EU project DivAirCity (DivAirCity, 2022). Poor air quality is an urban challenge most European cities face, but the people already experiencing social inequality are even further impacted. DivAirCity wants to change this by improving environmental, health, and social conditions in cities by prioritising the participation of the groups most at risk.

First, I will cover how DivAirCity wishes to change the city through citizen-science driven interventions, and how their citizen science may be defined according to literature (The Ten Principles" ECSA 2015; Bonney et al., 2009). I will then delve into the ethnographic methods used for my case study, such as semi-structured interviews, participant observation and grounded theory (Tracy, 2013; Charmaz, 2007). I am also making use of Actor-Network Theory as it works with a relational definition of actors (Law, 1992; Callon, 1986), which fits well when trying to analyse relations in a complex ecosystem. The study is still in progress and so, if a paper is not yet published at the time of the conference, preliminary results will be discussed instead: I expect to be able to discuss how the City of Aarhus may struggle with creating citizen science-driven interventions, especially when they are involving several different groups of marginalised people, as these will each have their own agenda. I also expect to discuss how the City of Aarhus must work internally with other departments and what challenges might be found here. And lastly, I hope to discuss the opportunities that such a big-scale project might have.

OPEN FORMAT

Achieving change through global citizen science

Austin Mast; Dilek Fraisl; Libby Hepburn; Martin Brocklehurst; Katya Perez Guzman; Steffen Fritz; Francois Grey; Rosy Mondardini; Maina Muniafu, Mendel Wong, Mariana Varese

Change can only be achieved if we work together. The Citizen Science Global Partnership (CSGP) is a network of networks that aims to achieve change for a sustainable world by advancing citizen science at a global level. The CSGP aims to build trusted partnerships around citizen science data and action and create an enabling environment for citizen science to grow at scale and globally, while at the same time honouring all the actors involved in citizen science including individuals and local communities. CSGP is formally established about a year ago and working toward identifying a strategy to bridge local to global; science and research to policy and society; and demand for change to action far and near by leaving no one behind.

This open format session is a combination of short introductory talks covering different aspects and work related to the foundational goals of the CSGP, followed by a fishbowl conversation, where all attendees will share their ideas and experiences interactively to achieve global citizen science together.

The session is important as it will be the first progress update of CSGP to the ECSA and wider citizen science community since its incorporation as a legal entity and introduction last year. An important goal is to gather ideas and feedback from the community for inclusion into the strategies and work plan of the CSGP and establish a true Partnership to achieve change and impact within and outside the citizen science community.

The outcome of the session is a better informed community about the priorities, strategies, and goals of the CSGP and a more inclusive CSGP as the feedback and the results from discussions will be integrated into the workstream of the CSGP. The session seeks to engage with a broad audience from different disciplines, roles, and experience levels as each and every view and perspective counts for shaping the global citizen science.

Co-creating the future: exploring practices of co-created citizen science research across Europe

Rhys Archer; Sarah West

Co-created projects involve participants at all stages of the scientific process, from setting research objectives to dissemination of findings. Co-created citizen science projects, by nature, originate in direct response to the needs of the community. These projects are typically driven by a firm commitment to deliver tangible benefits to the residents within these communities. In co-creation projects, the active engagement of citizens at every stage of the scientific process ensures that the outcomes are deeply entrenched within the community's reality and context (Gunnel et al., 2021). This approach fosters the creation of practical knowledge and community empowerment and also aims to promote a more democratic production of scientific knowledge (Skarlatidou et al., 2019), furthermore, relationships with policymakers and stakeholders can benefit from co-created initiatives, fostering knowledge exchange among actors from different spheres who may not typically interact.

At SEI, we are actively involved in a range of co-created citizen science projects that have been executed in recent years. During the first part of this 1.5-hour session, we will share insights and findings from some of our co-created work. This presentation will lay the foundation for World Cafe style discussions centred around thought-provoking prompts to gather insights on co-creation practices across Europe, such as best practices when collaborating with underrepresented groups, identifying and surmounting barriers in the co-creation process within your specific country, and how to ensure a lasting legacy from co-created projects. Discussions from the latter part of the session will be used to inform a collaborative guide on co-created citizen science to ensure it is relevant cross topic and geography.

This open format session would be relevant to both those already engaged in the practice of co-creation, and those who utilise other engagement methods in their research.

The dynamics and perspectives of change of Citizen Science for Health

Gaston Remmers; Rhoda Schuling; Ria Wolkorte; Annemarie Wagemakers; Joana Magalhaes

The ECSA Working Group Citizen Science for Health is developing a number of activities to strengthen the field of Citizen Science for Health. It has developed a global survey on the challenges and dynamics of Citizen Science for Health (accepted for publication), and is organising the first global conference on CS4H in October 2023, at the University of Twente, The Netherlands.

Though the engagement of patients in health research has a long tradition, their impact on e.g. decision making on research questions, methodology, ethics, analysis and data management remain limited so far. However, more intensive Citizen Science and the involvement of patients in health research have a huge potential to contribute to innovative health research, as well as to society. This input is crucial to tackle current challenges in the health domain and transition from cure to care and prevention.

The activities of the ECSA working group CS4H provide a detailed and very up-to-date insight in the recent developments in the field. At the ECSA 2024 Vienna conference, the WG aims to generate an overview of the most challenging developments. We will touch upon the encounter and possible convergence of traditional patient involvement in research and citizen science for health approaches. Amongst the prominent topics, a few stand out: Ethics, Balanced return on investment, Implementation and Impact. The session will be interactive, with a mix of short presentations, debate provoking statements and synergizing exercises to tease into the direction for change in the field.

We are also not alone: we are supported by various organisations and initiatives, amongst which European Union's Horizon 2020 research and innovation programme INCENTIVE, SPRONG Bridge2Health, University of Twente, RadboudUMC, Mijn Data Onze Gezondheid, and the LBG OIS Center.

IMPETUS Demo Day

Diana Reinoso; Joana Magalhães; Christopher Styles

Our society is experiencing rapid and profound processes of change that will completely transform people's way of life. However, change needs to be co-led by a diversity of actors, whose focus reflects the UN Sustainable Development Goals and the Green Deal targets. For this purpose, the IMPETUS project (GA number 101058677) is experimenting with a new funding, training and mentoring scheme for European citizen science initiatives, to maximise their scientific, social and political impact. The IMPETUS Accelerator supports selected citizen science initiatives, working in areas such as biodiversity, health and accessibility, to develop a six-month project. Demo Days are a format that traditionally allows startups to pitch their product and attract future investors. For ECSA 2024, IMPETUS will transform this concept into an activity that leverages citizen science results. To celebrate the success of the first IMPETUS Accelerator, representatives from the first cohort of citizen science initiatives will present their projects, sharing the impact of the program in their projects and how they intend to maintain this momentum beyond IMPETUS and expand it to a wider EU community. At the IMPETUS Demo Day, the citizen science initiatives will pitch their project to the audience, who will be invited for a role-play of different stakeholders (scientists, policy-makers, science journalists...). After pitches, the audience will be encouraged to ask questions and provide constructive criticism. This will be a great opportunity for citizen science initiatives to test the power of their speech to connect with the needs of different stakeholders, which will be necessary for their communication strategy. The audience will then vote for the project they believe has better demonstrated the benefits and long-term sustainability of their work. Through this Demo Day, IMPETUS aims to inspire and foster collaboration for citizen science projects. Witness the achievements of citizen science initiatives in the IMPETUS Accelerator and reflect on our commitment to amplifying citizen-driven solutions.

Urban Innovation Rally: the green & just transition quest

Marcelo Lampkowski; Sophie Callahan; Karen Naciph Mora; Inian Moorthy; Gerid Hager; Vanessa Boas; Mel Woods; Husam Al Waer; Kevin Frediani

Transforming cities to combat climate change and improve quality of life is one of the most pressing issues of our time. Integrating Earth Observation (EO) technologies with community-based environmental monitoring can foster cross-sectoral innovation critical to addressing this challenge.

This gamified interactive session will highlight how citizen-powered data can bridge information gaps, promote community engagement and lead to more equitable urban planning processes, inspired by the Urban ReLeaf project (urbanreleaf.eu). The project catalyses positive and inclusive urban transformations by actively engaging citizens in data collection and decision-making processes in 6 pilot cities (Athens, Cascais, Dundee, Mannheim, Riga & Utrecht) and beyond through its Community of Practice.

Players will form 3 parties, each embarking on a unique quest with assignments to solve a variety of challenges drawn from real-life scenarios encountered in the Urban ReLeaf pilot cities. The parties compete, but the game also cultivates a spirit of collaboration to ensure that shared objectives are achieved.

Game sequence:

- Part 1: 15-minute rules and quest introduction
- Part 2: 45-minute gameplay phase marked by participant interaction
- Part 3: 30-minute results presentation and discussion on the insights derived from the experience

Players will:

- better understand how place-based approaches can support long-term and strategic changes to make cities more resilient, liveable and accessible.
- brainstorm solutions that harness the potential of inclusive citizen science to drive urban climate resilience and greenspace monitoring.

- gain inspiration and knowledge to implement similar initiatives in their own communities.
- network and open the door for further collaboration to scale impact.

Participants from a wide range of sectors and backgrounds are welcome; municipalities, CSOs, researchers, urban planners and data agencies may especially benefit.

Novel models for transferring taxonomic knowledge, for the future of biodiversity

Joe Jubb; Franziska Stressmann; Ana Casino; Marko Lovric; Alessandro Marchi; Michael Magee; Anders P. Tøttrup

Taxonomic knowledge forms the foundation of biodiversity research, and without taxonomy there would be no meaningful conservation efforts. However, the current shortage of taxonomic experts and resources is a major obstacle to global biodiversity and achievement by 2030 of the targets set under the Kunming-Montreal Global Biodiversity Framework (GBF). To counteract this scarcity, the EU funded project TETTRIs (2022-2026) aims to create transformative and long-lasting change in taxonomic capacity and knowledge transfer. In this workshop we will explore, and co-design, innovative strategies to boost transfer of fundamental scientific knowledge and create strong and sustainable collaborative channels between key actors including experts, citizens, academia, and organisations.

The workshop will be divided into 3 sections, each discussing a specific knowledge transfer mechanism in development by TETTRIs. An interactive part will then involve feedback and joint learning.

1. Taxonomic Knowledge Transfer Forum:

Once launched, the TKT Forum will unite diverse stakeholders for collaborative discussions and exchanges for the purpose of transferring taxonomic knowledge. The Forum aims to facilitate dialogue between researchers and the wider society (especially citizen scientists, conservationists and policymakers), foster

collaboration and address shared interests through round-table events and topic-driven activities.

2. Taxonomy Recognition Day:

Establishing an annual recurring event to highlight the importance of taxonomic experts and promote new opportunities through cross-sector cooperation. Planned for 23 May, marking the birthday of Linnaeus, this day will highlight the importance of taxonomy and nurture partnerships through advocacy activities with academia, decision and policy makers, workshops, and more.

3. Citizen Science Engagement Models:

TETTRIs is creating novel engagement models, aiming to empower citizen scientists to contribute to biodiversity research, co-create resources, and enhance public engagement in taxonomy. Different pilot and pop-up initiatives will be introduced.

Lessons learned from the citizen science mutual learning exercise and current status of national citizen science policies across Europe

Margaret Gold; Muki Haklay; Rosa Arias; Antonella Radicchi; Marzia Mazzonetto

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Citizen science practices are becoming increasingly recognised by the European Commission and are woven throughout the funding instruments and programmes of Horizon Europe. Citizen science is also being embedded by the EU Member States in their national science policies to involve stakeholders across the quadruple helix in Research & Innovation. However, citizen science is still unevenly integrated and supported within Science, Research, and Funding policies at the national level.

In this hybrid session, we will open with a presentation of the outcomes of the year-long Mutual Learning Exercise (MLE) on Citizen Science Initiatives, Policy and Practice by the Topic Experts who facilitated the exchange of information, experience and lessons learned regarding good practices, policies and

programmes to support and scale up citizen science at the national level. The first part of the session will focus on the following MLE Themes:

Topic 2: Ensuring good practices and impacts

Topic 3: Maximising the relevance and excellence of citizen science

Topic 4: Enabling environments and sustaining citizen science, and

Topic 5: Scaling up citizen science

Eleven participating countries (Austria, Belgium, France, Germany, Hungary, Italy, Norway, Portugal, Romania, Slovenia and Sweden) shared best practice examples and new measures to support and sustain citizen science in their countries. In the second part of this session, we will invite all participating countries who are in attendance at ECSA2024 to provide a brief presentation of their progress during and since the MLE, following the 'Enabling Factors' framework.

In keeping with the MLE aim to motivate, inform and exchange good practices, the final part of this session will close with a Fishbowl discussion amongst all present of their own national 'Enabling Factors' and how to continue to implement these in practice. New 'Status Reports' will be captured digitally from all attendees of this session.

HYBRID Session:

30 min: Lessons Learned

30 min: Status Reports

30 min: Fishbowl

The role of intermediaries in supporting diverse participation in citizen science

Darlene Cavalier; Caren Cooper; Tara Cox

Organisations like schools, libraries, museums, and youth groups (Girls Scouts, 4H) are critical intermediaries in changing the historical makeup of citizen scientists[a]. These organisations can help connect citizen science opportunities to people historically underrepresented in STEM, such as women and girls, persons of colour, persons with disabilities, and other marginalised communities. (Cooper, 2023).

SciStarter, a global hub for citizen science, Arizona State University, and North Carolina State University have developed and studied models for building the capacity of intermediary organisations to introduce and facilitate citizen science with their audiences.

This open-format session will present research-based initiatives for broadening participation in citizen science through intermediaries, including, 1) the Citizen and Community Science Library Network, 2) Crowd the Tap 3) Girls Scouts' Think Like a Citizen Scientist. Session participants will engage in a facilitated discussion to learn about the opportunities, barriers, and lessons learned when working with these critical partners. Then, participants will break out into smaller discussion groups to develop an action plan for engaging with intermediaries in their community using a partnership planning tool developed by the session presenters.

Leveraging data science for change: navigating perspectives in a world of rapid transformation

Liubov Tupikina; Muki Haklay; Josep Perello; Karen Soacha; Pietro Michelucci; Janet Rafner; Francois Grey

In a world undergoing rapid change across various dimensions, it is important to involve data driven methods to be able to assess and to follow and assist citizens in their sustainable actions and projects. These methods help assess, support,

and motivate citizens in actions and projects, addressing complex issues like biodiversity loss, urban liveability, and local activism. Our session is dedicated to exploring the potentiality of citizen science actions for collection of structured data as well as how data science can be a pivotal force for positive change, emphasising inclusivity and adaptability in the age of data-driven solutions and human-centred AI. The session objectives:

Data-Driven Methods: Explore how data science enhances transformative change through data analytics. Highlight innovative methods that integrate citizen science, data science, and human-computer interaction (HCI) while considering diverse perspectives.

Ethics and Fairness: Examine the ethical dimensions of data science and AI in societal and environmental contexts, emphasising fairness and equity in data-driven decision-making. Showcase real-world examples of data science's impact across domains and the complexities of interpretation.

Underlying Interdisciplinarity: Facilitate open and constructive dialogue to foster cross-disciplinary collaborations in the fields of data science and citizen science. Encourage cooperation between data scientists, citizen scientists, researchers, practitioners, and diverse citizen science projects (e.g., Stellar Catchers, iNaturalist community, Extreme Citizen Science group).

This open-format session consists of short presentations followed by interactive discussions to expand community knowledge about new approaches with participants.

We aim to bring together interdisciplinary groups of researchers, citizen communities, citizen scientists, data scientists, hybrid AI and HCI researchers, policy makers and experts in responsible AI and data usage.

This open format of our session is a combination of short talks by speakers covering different aspects and work related to citizen science and data science (speakers: Muki Haklay, Marc Santolini, Francois Grey and others).

SHORT TRAININGS

A short training is an interactive format where participants learn something new. The trainers use interactive methods to teach new methods or techniques to the participants. A combination of interactive and non-interactive methods is possible if the interactive methods prevail.

Planning and evaluating the impact of collaborative research: the OIS Impact Model

Mathieu Mahve-Beydokhti

Open, collaborative, and participative practices in research trigger complex change processes that lead to societal impact. Together with representatives of research, practice, civil society, policy, funding and media, we set out to make these different pathways to impact visible, explicit, and tangible. The co-creatively developed OIS Impact Model shows what effects Open Innovation in Science (OIS) initiatives for citizen involvement can have on personal awareness and competencies, behaviour and life circumstances of all those involved.

The OIS Impact Model is a tool which can be used to plan, communicate and assess the outcomes of citizen involvement in research. It is presented as an interactive map or as a downloadable toolkit with detailed guidelines. The OIS Impact Model includes both quantitative and qualitative evaluation methods which can be used throughout, at the end or after the research project. It follows a modular approach to either build or enhance impact planning and evaluation.

The OIS Impact Model does not claim to be complete, but provides a comprehensive foundation that can be easily and flexibly adapted to the project's needs complementing existing instruments or providing a basis for individual approaches. During this short training, participants will get a glimpse into how to use the OIS Impact Model. Using example citizen science projects, participants will draw their pathways to impact and learn how to further implement the model into their own work.

Boosting inclusion in citizen science research processes: why diversity matters

Gemma Rodríguez Fabià; Florence Gignac; Stefanie Schuerz; Lucía Moreno; Rosa Arias

Inclusion in citizen science has been defined in terms of social participation, sense of belonging and equal opportunities for participation at different research steps. Ensuring citizen science practices are inclusive and equitable allows for profound benefits to unfold which positively impact science, citizens and society. These include social good through a more comprehensive and less biased collection and generation of data; increased tolerance and understanding among societal groups and towards other individuals, higher levels of scientific and environmental education throughout society; and a stronger sense of belonging to a community. However, citizen science in its current makeup largely reproduces exclusionary mechanisms embedded in wider society. Prior examination of the demographic make-up of citizen scientists shows significant bias towards certain societal groups which often skew white, highly educated, academically skilled, and above median income.

We propose a 90-minute training that involves participants to take on an intersectionality perspective, where diversity is key and reflect on various potential axes of social exclusion, including gender, ethnicity, socio-economic and sociocultural status and educational level. Participants will be enabled to integrate inclusionary principles, and consider under-represented groups of population into their everyday practice. The training will start off by engaging participants in an interactive debate on their views on this topic through "The Card Exchange" game, which has proven to be very effective in initiating reflection and awakening interest on a specific subject by stimulating discussions on different cards statements. After, there will be a short presentation related to the topics discussed in the previous game, followed by a guided case study analysis in small groups. All participants will be provided with resources on how to ensure inclusion in citizen science (e.g. guide to prepare inclusive participatory events).

Citizen science and schools – uncovering the fingerprints of the past

Marie Rathcke Lillemark; Maria Rytter; Frederik Leerhøj; Anders P. Tøttrup

How can citizen science in educational, interdisciplinary programs connect students to their local biodiversity and cultural heritage? And what value does the authenticity of materials and place give to the insight and understanding of scientific work?

In this training session we invite participants to try some of our didactic approaches, and give an insight into how our leading citizen science and educational programs build on a pedagogical framework of training. By working with motivation, responsibility and role models, we have managed to make students become aware of their own role and impact of the exploratory work and thus increased the quality and scientific value of data.

The Citizen Science group at the Natural History Museum Denmark has for many years been successful in inviting high school students to conduct advanced laboratory analysis. Most recently in the project Next Generation Lab where students conduct various analyses, including morphological species identification and peptide mass fingerprinting from archeological leather samples.

During the session the participants will, as a practical example of our educational approach, work with methods to identify 400 years old archeological leather samples from the underground of Copenhagen. We will use a classic, archeological approach of morphological species identification based on the grain pattern of the leather investigated with a microlens connected to the camera phone. Based on this exercise we wish to involve the participants in discussing the value and potential of working with authentic materials and research questions in a citizen science and school setting.

We will discuss the value and obstacles when combining citizen science and educational programs and showcase the change in different points of view when connecting school curriculum with research topics and the students' own engagement, motivation and interest.

CITIZEN SCIENCE DAY

ECSA 2024 offers the possibility to be part of the Citizen Science Festival to be held at the Natural History Museum Vienna on April 6, 2024, from 10 am (10:00) to 5 pm (17:00). The event is open to the public who visit the museum.

“Soil Expedition” - Explore the soil in your veggie garden

Maria Peter; Christoph Koch

Have you ever wondered what's underneath the lawn in front of your house, or underneath the veggie garden in your backyard? Have you ever asked yourself whether there are enough of the right nutrients in your soil, or whether your soil might possibly be contaminated with toxic substances that you would rather not find in the strawberries, pumpkins, or herbs growing in your garden? Then we have just the thing for you!

Our research project “Soil Expedition” (“Expedition Boden”) started in May 2023 in Jena, a university town in Thuringia in the central eastern part of Germany. This is a community and citizen science project which gives the citizens of Thuringia the opportunity to learn more about nutrients and heavy metals in their soil.

Participants of the “Soil Expedition” take a soil sample in their garden and determine the soil type following detailed scientific instructions (www.expedition-boden.de). Using a test kit provided by us, participants can analyse the pH value as well as the nitrogen content of their soil. The rest of the soil sample is then analysed by a professional laboratory for the contents of copper, lead, potassium, etc. In addition, participants provide us with information about their garden and how it is used (plants grown, fertilisers used, etc.).

We combine the data gathered from the soil analyses with the information provided by the participants in order to 1.) better understand patterns of soil quality in the gardens of Thuringia, 2.) allow gardeners to adjust the use of e.g. fertilisers, and 3.) raise public awareness for the importance of soils, their components, and functions.

At the conference we will present our project and first results. At the interactive information booth, we will have test kits ready for anyone who wants to bring a soil sample and analyse the pH value, nitrogen content and soil type. Our marketplace info booth will be bilingual: information and instructions will be available in both German and English.

Virus Factory in schools: building science capital with online citizen science in the classroom

Patricia Smith; Kathryn O'Brien Skerry; Helena Cotterill; Avery Pennington; Oliver N. F. King; Win M. Tun; Chris Lintott; Mark Basham; Sian Tedaldi; Michele C. Darrow

Citizen science projects provide diverse and promising opportunities for teachers to work in collaboration with students to build science capital by exploring relevant, real, and accessible science. We have developed an open access school curriculum using Science Scribbler: Virus Factory, an online citizen science project on the Zooniverse platform.

The original project asked contributors to locate and classify the life cycle stage of viruses within a cryo-electron tomography data volume of a virus infected cell. After completion, the project was minimally modified, and used as a basis for a multi-workshop series targeted at school children aged 9-11, finishing with a 25-minute Q&A with researchers associated with the original Science Scribbler: Virus Factory project. Following a positive reception of the initial curriculum, an extension workshop was developed to straddle the science and ICT/maths national curricula.

Initial evaluation showed that the 3-part workshop series increased students' positive perceptions of science, and their consideration of STEM careers. Students and teachers reported an increased understanding of citizen science, and teachers were reportedly more likely to engage with citizen science projects in the future. Students reported an increased awareness of the importance of computers in scientific research.

We have previously delivered this project in non-classroom settings to a diverse audience at public outreach events such as Christmas lectures, open days,

conferences and educational sessions for students aged 14-16. We plan to showcase this resource at the ECSA science festival, where the public can learn about the science behind the original project, classify viruses with the school project, and learn how to access the online workshop resources to take this research back to their own classrooms.

EODOPEN: Pick your public engagement fruit

Maritta Horwath; Katharina Krones; Elena Sipria-Mironov; Liisi Lembinen

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As digitisation has brought wide-ranging changes to daily life, libraries, as facilitators to get access to knowledge resources, take an active part in that process of change. By making European digitally hidden collections of the 20th and 21st centuries accessible to the public, the EODOPEN project engages with communities in the selection, digitization, and dissemination processes while also dealing with rights clearance questions. Doing so, EODOPEN has brought significant changes to the library community and beyond.

Within the Marketplace we ask: How far does EODOPEN engage with the European public in order to address issues of accessibility to digital knowledge resources? Which methods has EODOPEN chosen to attract citizens to participate? What kind of methods are still to be developed? What can other projects learn from EODOPEN and where can EODOPEN members still improve their public engagement offers?

“Personality Test”: What kind of public engagement personality are you? Short questions on a card to determine which public engagement method works best for you. Booth visitors draw a card and can see which method suits them on the back:

- A.** You are rather shy and try to avoid public events: choose Social Media activity
- B.** You are very outgoing and like to party: choose 24-hour marathon reading of digitized books
- C.** You are intellectually interested and want to widen your horizon: chose to go towards citizen science
- D.** You like nice and handy everyday objects: choose printing of QR code with a link to your activities on paper coffee cup

Visitors are encouraged to do the test for themselves and to write their own cards for further visitors to come. Result: public engagement methods are collected and visitors get interactively involved with questions of participatory offers. Visualising the ideas: “Pick your Public Engagement Fruit” (each fruit is a public engagement method placed on different spots on the European map).

Wildlife crime – From discovering and uncovering: detective work in the name of species protection

Marietta Hengl; Karin Ernst; Peter Sziemer; Stefan Agnezy; Silke Schweiger

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Wildlife crime includes poaching, smuggling and illegal trade in endangered animals and plants which threatens global biodiversity. Wildlife crime also occurs in various forms in Austria, such as poisoning, trapping and illegally shooting of strictly protected species. The social acceptance of wildlife is ambivalent. Myths, misinformation and different interests often lead to conflicts and illegal persecution of wild animals. In the Sparkling Science 2.0 project, led by the Natural History Museum Vienna, we collect data on citizen’s knowledge on wildlife crime and raise awareness of this diverse issue, together with the students of our four partner schools and our cooperation partners. On the ECSA Citizen Science Festival Day, we would like to present our project core theme on a marketplace info booth to inform interested visitors about wildlife crime’s mostly affected species and species groups and how people can avoid any support of wildlife crime. At the ECSA citizen science Festival Day, we would bring preserved specimens and confiscated material representing examples of wildlife crime in fashion and traditional medicine as well as cases of wildlife crime in Austria. Visitors are invited to participate in the survey and interactively learn about the topic. Additionally, they can test their knowledge by solving a short quiz. The project team wants to contribute to the main driver of CHANGE – education!

Co-create the Public Lab at BOKU together with us!

Sandra de Vries; Gabriela Costea; Helmut Habersack; Allison O'Reilly; Angelika Riegler

During the Citizen Science Festival on the 6th of April 2024 in Vienna, we would like to involve and gather input from the participants and citizens of Vienna regarding the BOKU Public Lab. In what way do you want to learn about the ecology and floodplain of the Danube? Come and co-create this Public lab with us!

The project DANUBE4all (<https://www.danube4allproject.eu/>) has started to develop a strategic Danube Basin Restoration Action Plan. This plan will be scientifically based, practically orientated, and will be the result of a unique scientific, social and economic based collaboration. It seeks to integrate action on environmental concerns with social and economic wellbeing; embracing a science-to-people approach that actively integrates public interests and empowers all Danube stakeholders. The success is strongly dependent on the involvement of citizens and local communities.

Part of the project is therefore also to develop a Public Lab concept that offers interactive learning elements on the usages, ecology and human interactions with the Danube and its floodplain. The idea is to pilot such a public lab concept in the newly built and opened River Lab at the University of Natural Resources and Life Sciences – BOKU – in Vienna (<https://www.danube4allproject.eu/post/boku-sets-new-standards-with-launch-of-its-hydraulic-engineering-river-lab>).

The River Lab already had an Open Door Day on June 13th 2023, to give the public the opportunity to come visit the building, learn about the concept and science behind it, and discover what possibilities the new facility offers. Researchers and staff were on hand to provide details of DANUBE4all and other projects currently being conducted. Now join us during the ECSA 2024 Citizen Science festival and tell us what you would like to see, learn, try, experience or do in a Public Lab, and we will learn from you instead.

Citizen science in higher education: exploring the opportunities, challenges and synergies

Maria Aristeidou; Katerina Zourou; Yaela Golumbic; Sebastian Harnacker; Margaret Gold

The Citizen Science and Universities working group proposes an interactive 'live action' poster. The poster will highlight the benefits and challenges of deploying citizen science (CS) in higher education (HE) and will invite participants to contribute their insights (e.g., via post-it notes) from their institutional experiences.

The introduction to the poster's main aspects will draw from projects that have explored citizen science in HE across different locations and topics: citizen science in pre-service teacher (CitSci Edu) and science (ICCS) education, universities' social mission and impact (INOS), and citizen science hubs at research libraries (OPUSH).

These projects have found that employing citizen science in HE offers numerous benefits, including enhanced learning, nurtured scientific curiosity, and valuable student research experiences. Citizen science also supports universities in fulfilling their social mission, fostering collaboration, bridging science and society, and promoting early career awareness.

However, the integration presents challenges, such as adapting projects for university-level learning, addressing data limitations, ensuring equity, and enhancing students' data analysis and communication skills. Overcoming these hurdles requires aligning projects with course objectives, emphasising skill development, recognising civic engagement, and providing ongoing support.

Challenges also involve adopting collaborative citizen science, integrating it into curricula, training staff, establishing ethics and funding frameworks, and addressing participation biases. HE can be pivotal in supporting citizen science initiatives through knowledge and infrastructure. To further enhance engagement, interdisciplinary training activities with experts from various fields and civil society organisations are vital, as citizen science remains relatively unfamiliar to many researchers.

The interactive poster will enable us to learn from one another's experiences and collectively improve the integration of citizen science in HE.

Winter bird count across borders

Angelika Nelson; Eliška Konopáčová

The “Stunde der Wintervögel”, a Winter Bird Watch in Bavaria, has been organised by the Landesbund für Vogel- und Naturschutz (LBV, the Bavarian Society for the Protection of Birds) since 2005. Each year in early January people across the country count birds in the urban environment, their backyard or balcony, or in a city park. Numbers of participants have increased over the years, from 5000 in 2005 to over 20.000 in 2023, reflecting a worldwide interest in watching birds. Participants report numbers of each bird species seen to the LBV. To better capture the occurrence of residential and particularly wintering birds which migrate across Europe, this campaign has over the years been extended to several neighbouring countries: since 2010 birds are also counted in Austria, since 2011 in all of Germany, since 2019 in Czechia and since 2020 in Switzerland. We present materials and results from the campaign in Bavaria and Czechia focusing on how a project across borders can give us insights into highly mobile species such as birds. We will present learning tools for recognizing local bird species so that visitors can test their knowledge of European birds in a game-setting. Species knowledge is fundamental for this citizen science project.

As urban environments are becoming increasingly important for species diversity, an eventually European-wide count of organisms, such as birds, will give us invaluable insights into change of species distributions and compositions and allow us to correlate sightings with changes in habitat, particularly in gardens and urban parks.

The power of citizen science

Simona Cerrato; Claudia Fabó Cartas; Dorte Riemenschneider; Cyril Dworsky; Karoline Iber; Chris Gary

The European Citizen Science (ECS) project (funded by the EU in the Horizon Europe programme) has the main goal of widening and strengthening the European citizen science community through capacity-building and awareness-

raising activities. This will be done by reaching out to different audiences and stakeholders. In addition to being present in the scientific programme, ECS offers a series of activities for the people participating in the public Citizen Science Festival.

The activities will be organised as an interactive Speed Geeking session with 4 islands, each dedicated to a distinct audience and theme.

For researchers

Main topic: how citizen science can be a powerful way of producing high quality research.

For citizens and civil society

Main topic: how citizen science becomes available to large portions of European society, helping everyone to participate in the production of scientific knowledge.

For formal educators (teachers and students)

Main topics: a) how citizen science can make science education more relevant, b) how citizen science can provide young people the opportunity to create authentic connections with science and scientists.

For museums, science communicators, public engagement organisations

Main topic: how citizen science, science communication and public engagement have the potential to make science and research open, accessible and valuable for everyone.

In addition, the main resources of the ECS project, which are open to everyone, will also be presented: the eu-citizen.science platform with its variety of resources and tools, and the ECS Academy with its series of training and free educational resources.

The programme is co-organised by a leading organisation in public engagement in Vienna, the Vienna University Children’s Office, which will co-facilitate the dialogue and engage the local community of schools, families and other interested parties.

Measuring air quality with students on their way to school

Thomas Ogrisegg; Silvio Heinze

We present our new project where classes of students use portable air quality measuring devices and a smartphone app to measure the quality of the air (Particulate Matter, Temperature and Humidity, VOC) that they are exposed to on their way to school.

At the info booth it will be possible to live test our measuring devices and our smartphone app and check the air quality of the surroundings.

We will present our findings of the project so far and explain how to reproduce our equipment and how to set up similar projects in other locations.

Empowering urban transformation in an era of rapid change: CitiObs, GREENGAGE, and Urban ReLeaf

Georgia Simadi; Vasiliki Papageorgiou; Núria Castell; Uta Wehn; Joan Maso; Jan Peters-Anders; Francisco Sanz; Milena Vuckovic; Inian Moorthy; Gerid Hager

Three EU funded projects, CitiObs, GREENGAGE, and Urban ReLeaf come together to showcase pioneering solutions for citizen-powered sustainable urban development, in a time of rapid change.

During the marketplace, we will demonstrate how these projects are driving urban sustainability and inclusive citizen engagement. We will host activities such as a community board, an interactive digital map to locate Citizen Science projects and a dynamic word cloud, where participants will be able to collaborate and contribute. In addition, we aim to showcase technologies from the projects, such as air quality monitors and wearable sensors, promoting hands-on learning about participatory environmental sensing, and also provide an Interactive quiz station to see if participants understood the co-creation methodologies on display.

CitiObs aims to expand the deployment and uptake of Citizen Observatories as an integral part of inclusive multi-stakeholder governance, generating validated data for policy and research. CitiObs is enhancing Citizen Observatories and empowering citizens to participate in monitoring and protecting their urban environment, collaborating with 85 Citizen Observatories across Europe.

GREENGAGE strives for innovative governance, involving citizens in co-creating green initiatives and Citizen Observatories to address climate issues. Focusing on mobility, air quality, and health, it supports carbon-neutral neighbourhoods, using digital solutions to engage citizens, as well as innovative governance models.

Urban ReLeaf collaborates with local communities and public authorities across six cities to address climate issues related to urban greenspace planning, heat stress, and air pollution. The project nurtures citizen-powered environmental monitoring to bring the benefits of nature to everyone. The mission focuses on inclusive community placemaking, public sector innovation, and tailored strategies to create greener, more just, and resilient cities for all.

Art or AI? Engaging audiences with artificial intelligence using interactive games

Laura Grehan; Emma Clarke; Cara Greene; Faye Murphy

Artificial intelligence (AI) has seen dramatic progress in recent years. Most recently, rapid improvements in the capabilities of generative AI have prompted a mix of excitement and concern among the public about the potential applications of AI systems and their impact on society.

AI-generated art tools like DALL-E, Midjourney and Stable Diffusion are changing how we view art and creativity. But as humans, how good are we at distinguishing a classic artwork from one generated by a machine?

The 'Art or AI?' Museum of Very Modern Art leverages interactive games to engage audiences in reflection and discussion on the role of AI in our lives. It challenges visitors to spot if its artworks have been created by a human hand or generated by AI. Visitors participate in a short interactive quiz in which they are graded

on their ability to decipher their Dalís from their DALL-Es. This quiz stimulates reflection on how we view the outputs and potential impact of generative AI. Is the use of such systems ethical and desirable?

Created by the Science Foundation Ireland ADAPT Research Centre, 'Art or AI?' has featured at European Researchers' Night in Dublin and at regional science and technology festivals around Ireland. It forms part of ADAPT's '#DiscussAI' campaign, which has engaged more than 60,000 members of the Irish public in a national conversation on AI.

Visitors to the Art or AI? museum have scored an average of six out of ten to date, which demonstrates that people aren't fully equipped to discern AI images from those created by human artists. Can ECSA 2024 participants beat them?

The exhibition and its interactive quiz have proved to be excellent primers to engage public audiences of all ages and backgrounds with AI, opening up follow-on conversations and deeper reflection on the capabilities and ethical implications of emerging AI systems.

The following activities, selected by the Natural History Museum Vienna, will be also available to the visitors.

The impact of a citizen science project on the interest in lake ecology

Anna Okholm; Christina Greve; Sara Egemose

Less than 1,5% of Denmark's area consists of lakes, but they are visible in all parts of the country as Denmark has more than 200,000 lakes in different sizes and with different catchment areas. Many of the lakes suffer from discharge of nutrients and xenobiotics causing e.g., eutrophication and low biodiversity. National and European legislation such as the Water Framework Directive have for decades worked on achieving good ecological conditions in the lakes, but many lakes still do not fulfil the goals and

for many their actual status are unknown. Under 1% of the Danish lakes above 100 square metres are monitored regularly. It's the authorities that initiate and implement lake initiatives, but often without involvement of the local communities and often lakes are not prioritised in the municipality's agendas. Often with knowledge comes interest and engagement and we need to create a change in how people see and value all the lake ecosystem services. Citizen science projects can be an accelerator in this process and create bottom-up approaches to improve lake water quality.

In the Citizen Science activity, Find a lake citizens have since 2020 been collecting water samples from lakes during 10 weeks in August-October. It increases the available knowledge about lake quality both for citizens, managers and researchers as all data is open data, it provides knowledge exchange, and it encourages the citizens to engage in improving the quality of the Danish lakes.

Citizens can have different reasons for engaging. It can be an overall nature interest, an interest to improve lake quality in the local lake or an interest in communicating knowledge about lakes and biodiversity to children, grandchildren or school kids working with actual data. By sharing our knowledge and engaging the citizens in lakes and communicating how their involvement matters towards a sustainable use of our freshwater resources, you can create a bigger involvement, understanding and engagement by the citizens.

OPUSH urban heat stories

Helena Bernhardt

It will get hotter and hotter in the city over the next few years. The impact of heat can vary greatly from neighbourhood to neighbourhood. It depends not only on the building density or the degree of sealing in the city, but also on social and environmental aspects like the age and the state of health of the people and their immediate living environment.

The Urban Heat Stories research project therefore collects individual heat experiences of vulnerable groups in Barcelona and Vienna. The aim is to make the diverse concerns and demands of city dwellers visible and to develop a chatbot pilot. The project provides insights into the social dimension of heat at city level.

Hands-on activities are equipment use testing (heat sensors) on site and guided heat-tracking-tours in public space, testing of chatbot prototype, discussion sessions to collect feedback on pilots and its applications.

OPUSH Energy transition

Phoebus Panigyraakis

The city of Delft is home to more than 1500 municipal and state monuments that pose a challenge for energy transition and use of sustainable sources of energy. The Energy Transition OPUSH Citizen Science pilot is working with citizens of Delft residing in monument-listed buildings to face the challenges ahead, the municipality of Delft, and Duurzaam 015, a volunteers' network of energy coaches who have been doing energy-use-related surveys in Delft residences for the past six years, including more than sixty monument houses.

The exhibit will provide context for the state of monument houses in Delft, and the energy transition challenges and limitations that they are facing, mainly using maps, photographs, diagrams, and statistics. Secondly, the methodological process of the Citizen Science pilot will be presented including the database of Duurzaam 015 on monument houses and the tools available for its analysis, workshop sessions with energy coaches, and workshop sessions with citizens residing in Delft monument houses. In addition, survey equipment for the energy-use of monument houses will be exhibited including infra-red cameras, and the hoomdossier survey method.

Hands-on activities are equipment use testing (thermal cameras), processing the hoomdossier questionnaire, discussion sessions to collect feedback on pilots and its applications.

Helping hands for a taxonomic transformation

Giulia Micai; Heimo Rainer

The TETTRIs (Transforming European Taxonomy through Training, Research and Innovations <https://tettris.eu/>) project aims to involve natural history museums and other taxonomic facilities from all around Europe with the goal of building taxonomic research capacity by transferring fundamental knowledge to scientists and citizens operating in the field. It is composed of several tasks, among which task 6.4 (lead by the Natural History Museum Vienna) deals with crowdsourcing specimen annotation, building upon existing digital platforms for extracting new data from specimen images and increasing the engagement of the general public with scientific collections.

Using these platforms, volunteers can help transcribing and extracting information from specimen labels, images or written texts, making it available to both research facilities and the general public regardless of their physical location.

In the context of the ECSA Conference Marketplace we launch two campaigns based on two collections: the correspondence of Eduard Hackel, and herbarium specimens from the Lindberg Hepatics type collection. Work stations are available to do transcription of the materials and will be supervised by project staff.

After the marketplace day, the projects will move from physical to digital, remaining available online for interested people to keep contributing with the annotation.

"Jeanne", the marine restoration e-bike, an interactive workshop on wheels

Pedro R. Frade

Marine ecosystems are threatened around the world. The marine restoration e-bike "Jeanne", an interactive outdoor workshop for children and also available for citizen science initiatives, is our new tool for transformative change towards conservation and restoration of marine ecosystems.



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VORTRÄGE

Social Media partizipativ erforschen. Das Citizen-Science-Projekt SocialMediaHistory

Kristin Oswald

Die Regierungszeit Donald Trumps oder die #metoo-Bewegung können nicht verstanden werden ohne die Social-Media-Inhalte zu diesen Themen. Social-Media-Plattformen verändern nicht nur die Kommunikation, sondern auch gesellschaftliche Diskurs- und Deutungshoheiten rapide. Dies verändert Politik und Zeitgeschehen sowie das tägliche Leben von Milliarden von Menschen. Am Beispiel von Geschichtsdarstellungen untersucht das Projekt „SocialMediaHistory“ Diskurse, Akteur*innen und Darstellungsformen speziell auf Instagram und TikTok sowie den Einfluss der Medienspezifika und Algorithmen beider Plattformen auf die Rezeption der Inhalte.

Das hauptamtliche Team des Citizen-Science-Projekts arbeitet dabei gemeinsam mit einem Bürger*innen-Beirat, der die konkreten Forschungsfragen und -methoden mitgestaltet. Zugleich ist der „DabeiRat“ auch deshalb ein elementarer Teil des Projekts, weil er lebensnahe Perspektiven auf die Nutzung der beiden Plattformen einbringt und anhand dessen gemeinsam mit dem hauptamtlichen Team die Funktions- und Darstellungsweisen von Instagram und TikTok erforscht und reflektiert. Dies erweitert die Blickwinkel innerhalb des Projekts, sodass nicht nur die Forschungsbrille der beteiligten Historiker*innen auf die Inhalte selbst im Mittelpunkt steht, sondern auch die diversen Nutzungsweisen von und Erwartungen an soziale Plattformen.

Diese Zusammenarbeit wird dadurch ergänzt, dass sich alle Projektmitglieder gemeinsam der Frage annähern, wie Social Media in ihrer gesamten Bandbreite erforscht werden können, also auch die Funktionen und Algorithmen sowie der Content jenseits der bereits gut erforschten Textinhalte. Nur mit einem solch umfassenden Blick, der über die Korrektheit der Inhalte hinausgeht, lassen sich die Veränderungen durch soziale Medien wissenschaftlich erfassen und zugleich Ansätze entwickeln, um diese zu archivieren und damit auch dann noch der Forschung noch zugänglich zu machen, wenn die Inhalte selbst vielleicht nicht mehr verfügbar sind.

Wie können Citizen Scientists zur Erforschung von Gewässerbakterien beitragen?

Alexandra Pitt; Stefan Lienbacher; Johanna Schmidt; Martin W. Hahn

Die Ansprüche an Citizen Science Projekte haben sich im Laufe der letzten Jahre gewandelt. Eine große Herausforderung besteht darin, Citizen Scientists konsequent in wissenschaftliches Arbeiten einzubeziehen. Wie kann es gelingen, dass diese einen wirklichen Beitrag leisten, der in Publikationen sichtbar wird? Im Rahmen eines Sparkling Science Projektes erforschen Wissenschaftler/innen gemeinsam mit Schulklassen und weiteren Citizen Scientists die Biodiversität und Ökologie von Bakterien in heimischen Gewässern. Im Fokus steht dabei Aquirufa, eine mit Schüler/innen entdeckte und wissenschaftlich beschriebene Bakteriengattung. Die Junior- und Bürgerforscher sammeln Wasserproben aus selbst gewählten Gewässern, ermitteln Messwerte, arbeiten mikrobiologisch im Klassenzimmer und im Labor und sind an der Datenauswertung beteiligt. Insbesondere an der wissenschaftlichen Beschreibung neuer Arten und deren Publikation in internationalen Zeitschriften lässt sich der Erfolg und konkrete Beitrag der Citizen Scientists ablesen.

Ein Perspektivenwechsel – Wissenschaftskommunikation aus der Sicht von Schüler:innen

Alina Majcen

Unsere Gesellschaft befindet sich in einem rasanten digitalen Wandel, welcher sich auch auf die globale Kommunikation und die Nutzung von sozialen Medien auswirkt. Das Potential diese Kanäle auch zur Kommunikation von Wissenschaft zu nutzen haben bereits zahlreiche Wissenschaftler:innen, Wissenschaftsjournalist:innen und weitere Akteur:innen entdeckt. Obwohl Jugendliche viel Zeit im Internet und in den sozialen Medien verbringen (Postbank, 2023), ist ihr Konsum von solchen wissenschaftskommunikativen Produkten noch gering. Während über die allgemeine Mediennutzung von Jugendlichen bereits einiges bekannt ist, gibt es bisher nur wenig Forschung über die Wahrnehmung und Bewertung solcher Produkte. Erkenntnisse darüber sind jedoch relevant um herauszufinden, wann Wissenschaftskommunikation erfolgreich ist (Ziegler, 2022). Das Projekt „We talk about Science“ verfolgt daher einen Citizen-Science-Ansatz mit dem Fokus auf Jugendliche als Expert:innen ihrer Zielgruppe. In einer ersten Phase beforschen Schüler:innen in einem unterstützten und reflexiven Prozess ihren eigenen Konsum von Wissenschaftskommunikation. Danach verlassen sie die konsumierende Rolle und erstellen selbst wissenschaftskommunikative Produkte zum wissenschaftlich und gesellschaftlich relevanten Themenbereich „Kohlenstoffdioxid“. Im Entstehungsprozess der Produkte entscheiden die Jugendlichen nicht nur, welche Inhalte für sie interessant und relevant sind, sondern auch auf welche Weise sie diese kommunizieren möchten. Begleitend wird das Projekt mit einem Mixed-Methods Forschungsansatz untersucht, um Kriterien für eine in den Augen der Jugendlichen gelungene Wissenschaftskommunikation abzuleiten. Einblicke in das Projekt sowie erste Ergebnisse werden im Rahmen des Vortrages präsentiert.

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Schüler:innen als Citizen Scientists auf Social Media: Wie bewerten Lernende Wissenschaftskommunikation auf TikTok, Instagram und YouTube?

Philipp Spitzer

Wissenschaftskommunikation, also die Kommunikation von wissenschaftlichen Inhalten an Laien, ist ein wichtiger Aspekt wissenschaftlichen Handelns geworden. Das Verständnis von Wissenschaft trägt zu einer Teilhabe an der Gesellschaft bei und ist Voraussetzung dafür, fundierte Entscheidungen zu treffen, sowie aktiv an der Gesellschaft teilhaben zu können (Davies & Horst, 2016). Das letzte Eurobarometer zeigt jedoch ein nachlassendes Vertrauen in die Wissenschaft und ein nachlassendes Interesse (European Commission. Directorate General for Communication., 2021).

Ein Review von Publikationen zur Wissenschaftskommunikation im Kontext Schule im englisch- sowie deutschsprachigen Raum zeigt, dass Wissenschaftskommunikation hier eher nur selten stattfindet.

Das Sparkling-Science-Projekt „We Talk About Science“ möchte Schüler:innen als Zielgruppe von Wissenschaftskommunikation untersuchen, indem wir sie dazu befähigen, selbst Wissen zu kommunizieren. Auf diese Weise möchten wir zu einer zielgruppenadäquateren Kommunikation von Wissenschaft beitragen.

Zusätzlich recherchierten Schüler:innen von 21 Klassen an 13 Schulen im Rahmen des österreichischen Citizen Science Awards 2023 Produkte der Wissenschaftskommunikation auf Social Media und bewerteten diese hinsichtlich Attraktivität, fachlicher Richtigkeit und Wissenschaftlichkeit. Zusammengetragen wurden 3654 Protokolle, die Einblick in den Konsum von Produkten der Wissenschaftskommunikation und deren Bewertung geben. Der Vortrag gibt Einblick in diese Ergebnisse.

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Naturschutzbund und Citizen Science: Eine 111-jährige Erfolgsgeschichte

Gernot Neuwirth; Sarah Haslinger; Norbert Hirneisen

Bereits 1914 erschien in den „Blättern für Naturkunde und Naturschutz“ (dem Vorgängermedium der Naturschutzbund-Zeitschrift *natur&land*) ein Meldeaufruf: Das NÖ. Landesmuseum bat die Leserschaft, Vorkommen von Bilchen zu melden, um mehr über deren Verbreitung zu erfahren. Mit solchen und ähnlichen Aufrufen wurden seither vom Naturschutzbund nicht nur Verbreitungsdaten für die Wissenschaft erhoben, sondern auch zeitgleich Bewusstseinsbildung betrieben und die Artenkenntnis gestärkt. Mit der Phänologie-Kampagne „Erlebter Frühling“ in den 1970er/80er Jahren sowie der Wespenspinnen-Erhebung 1998 im Bundesland Salzburg bewies die Jugendorganisation des Naturschutzbundes (önj), dass auch Schüler*innen unter Anleitung wissenschaftlich relevante Daten erheben können. Zeitgleich mit der Etablierung des Begriffs „Citizen Science“ (CS) ging schließlich 2006 die Meldeplattform naturbeobachtung.at online.

Ziele und Zielgruppen im Betreiben von Bürgerwissenschaften blieben beim Naturschutzbund in den letzten 111 Jahren im Wesentlichen unverändert. Sehr wohl geändert haben sich aber die Ansprüche der beteiligten Akteur*innen an CS: Funktionalitäten und Methodik in der Erhebung und Verwaltung der Daten, die Bedeutung und Akzeptanz von citizen science in unserer Gesellschaft oder Finanzierungsmöglichkeiten, um Bürgerwissenschaften professionell betreiben zu können. Auch die Klimaänderung hat zu Veränderungen im Anspruch an citizen science geführt: Standen in den letzten Jahrzehnten vor allem Verbreitungsdaten und Nachweise seltener Arten bzw. deren Rückgang im Fokus, geht es nun darum, Bestandstrends auch häufiger Arten schnell(er) sichtbar zu machen. Diese Veränderungen vom ersten Meldeaufruf bis heute sollen durchleuchtet und diskutiert werden, mit Schwerpunkt auf Aktivitäten der Meldeplattform naturbeobachtung.at. Als Ausblick werden zudem notwendige Veränderungen aufgezeigt, um citizen science künftig noch stärker in unserer Gesellschaft zu verankern und ihre Bedeutung für den Naturschutz hervorzuheben.

Open Data in Citizen Science: Ergebnisse der D-A-CH AG Workshopreihe

Tizian Zumthurm; Moritz Müller; Wiebke Brink; Daniel Dörler; Florian Heigl; Olivia Höhener; Nina Nolte; Elena Schoppa; Petra Siegele; Tiina Stämpfli

Citizen Science (CS) beteiligt die breite Öffentlichkeit aktiv an der Wissenschaft. Die Transparenz, Auffindbarkeit und freie Zugänglichkeit von bürgerwissenschaftlich erhobenen Daten ist daher eine Frage der Forschungsethik: Generieren Freiwillige aus der Zivilgesellschaft umfangreiche Datensätze, so sollten diese auch offen zur Verfügung stehen. Die European Citizen Science Association (ECSA) nennt Open Data dementsprechend auch ein essentielles Prinzip von CS.

Gute Argumente für Open Data gibt es nicht ausschließlich aus forschungsethischer Perspektive. Offene Daten unterstützen in allen Forschungsbereichen die Replizierbarkeit und Nachvollziehbarkeit von Forschung. Eine Kultur offener Forschungsdaten fördert damit zentrale Qualitätskriterien guter wissenschaftlicher Praxis. Insbesondere in Zeiten, in denen aufgrund der unzureichenden Transparenz von Daten in den empirischen Wissenschaften von einer Replikationskrise gesprochen wird, ist Open Data daher ein wichtiges Instrument, um einen Wandel der Forschungspraxis und der Forschungsevaluation einzuleiten. Da die CS-Community Open Data als Grundprinzip des bürgerwissenschaftlichen Forschens definiert, ist citizen science Vorreiter für einen nachhaltigen Wandel hin zu einer offeneren Forschungskultur.

Trotz dieses Bekenntnisses zu Open Data ist der Output offener Daten von citizen science noch steigerungsfähig. Vor diesem Hintergrund hat die citizen science D-A-CH AG eine Workshopreihe zum Thema Open Data in Citizen Science konzipiert. Im Rahmen der Veranstaltungsevaluation wurden die Teilnehmenden zu ihrer Einstellung, ihrem Erkenntnisgewinn sowie ihrem Einstellungswandel gegenüber Open Data befragt. Der Vortrag gibt einen Einblick in die thematischen Schwerpunkte sowie die Teilnehmendenstruktur der Workshopreihe. Auf Basis der Ergebnisse der Befragung, reflektiert die Präsentation darüber, wie citizen science Praktiker*innen zukünftig zu einem offeneren Umgang mit ihren Forschungsdaten motiviert werden können.

Biodiversität mitgestalten: Ein Club-Format für die nächste Generation von Citizen Scientists

Ines Méhu-Blantar; Agnes Mair; Jessica Österreicher

Das Verständnis für den Wandel ist entscheidend für den Schutz und die Erhaltung der Biodiversität unserer Welt. Bei einem neuen Citizen-Science-Format, das sich an Kinder von 8 bis 12 Jahren richtet, dreht sich alles um die Selbstermächtigung der Jüngsten hinsichtlich Biodiversität und Artenschutz. Nach dem Motto "Nur was man kennt, kann man auch aktiv schützen", widmet sich die vom BMBWF finanzierte Workshop-Reihe der Vielfalt in der Natur und der Vielfalt im Museum. Die nächste Generation von Citizen Scientists wird im Rahmen von "Club Vielfalt" forschend lernend an die Methoden der Wissenschaft herangeführt. Verschiedene Stationen bieten unterschiedliche Zugänge – ganz bewusst werden auch kreative Methoden eingesetzt, um einen emotionalen Bezug zum Thema zu ermöglichen. Ob Wildbienen- und Schmetterlings-Monitoring oder Amphibien- und Reptilienforschung in der Großstadt – aktuelle Citizen-Science-Projekte des NHM Wien werden eingebunden und sollen die Kinder und deren Familien zum Mitmachen anregen. Das Format zeichnet sich dafür aus, dass bereits in jungen Jahren das Bewusstsein für Biodiversität und auch eine persönliche Handhabe aktiv gefördert wird. Jeder "Club Vielfalt" widmet sich einem der vielen Themen des Museums und wird von der Abteilung Wissenschaftskommunikation in enger Zusammenarbeit mit den Wissenschaftlerinnen entwickelt. Diese stellen nicht nur ihre Forschungsarbeit vor, sondern interagieren auch auf Augenhöhe mit den Kindern und bieten Raum für einen intensiven Austausch. Die erfahrenen Vermittlerinnen des Museums unterstützen die Teilnehmer*innen dabei, ihren eigenen Zugang zu den wissenschaftlichen Themen zu finden und fördern den intergenerationellen Dialog.

Alte Dialektwörter im Wandel der Zeit: das ABC der Dialekte

Amelie Dorn; Rebecca Stocker; Philipp Stöckle

Unsere Sprache ist ständigem Wandel unterworfen. So kann sich die Verwendung bestehender Wörter mit den Generationen verändern, aber genau so kann

sich die Bedeutung von Wörtern mit den Jahren ändern. Ein Beispiel wäre das Lexem Ampel, das aus lat. ampulla entlehnt wurde und ursprünglich ein kleines Gefäß für Öl bezeichnete, bevor es dann die Bedeutung 'Lampe' und schließlich 'Verkehrssampel' annahm. Das Wort Hornung hingegen ist vielleicht einigen noch bekannt, seine Verwendung wurde aber größtenteils zugunsten des Lexems Februar (oder auch Feber) aufgegeben. Das TOP Citizen Science Projekt „Das ABC der Dialekte“ (FWF TCS134) (<https://abc-mitmachen.acdh.oeaw.ac.at>) zielt darauf ab, alte Handschriften und Dialektwörter, die auf den über 100 Jahre alten Papierzetteln des WBÖ (Wörterbuch der Bairischen Mundarten in Österreich) enthalten sind, zu transkribieren und reflektieren. Einerseits werden so historische Daten digital aufbereitet, analysierbar und über die Plattform Zooniverse zugänglich gemacht; andererseits sollen interessierte Bürger*innen für ihr sprachliches und regionales Erbe begeistert werden. Durch einen Crowdsourcing-Ansatz wird eine umfangreichere Bearbeitung und Transkription der Materialien ermöglicht, während in einem speziellen Reflexionsteil Bürger*innen gleichzeitig die Verwendung und Bedeutung der klassifizierten Wörter reflektieren und diskutieren. Dieser kombinierte Ansatz aus digitalen Citizen Science Methoden und Reflexionen zum individuellen Sprachgebrauch ermöglicht es Sprachwandel anhand von alten Dialektwörtern aufzuzeigen und zu analysieren. In diesem Beitrag stellen wir die interaktive Projektplattform vor und präsentieren erste Ergebnisse aus dem integrierten Reflexionsteil, der Einblicke in den Wandel von Wortkenntnissen, -nutzung und -gebrauch gibt.

Unterstützung bei der Waldbrand-Dokumentation in Österreich

Mortimer Müller; The Trung Hoang; Georg Kaiser; Harald Vacik

International wurden in den letzten Jahren außergewöhnlich intensive Waldbrandsaisonen beobachtet. Auch in Mitteleuropa häufen sich Anomalien beim Auftreten von Waldbränden. Es ist davon auszugehen, dass im Zuge des Klimawandels und sozioökonomischer Veränderungen auch in Österreich mehr und intensivere Waldbrände auftreten werden. Dabei kommt dem Faktor Mensch eine große Bedeutung zu, da 85% alle Brände durch menschliche Aktivitäten ausgelöst werden und ein gesteigertes Bewusstsein über das Gefahrenpotential präventiv wirken kann.

Die österreichische Waldbrand-Datenbank unter <https://fire.boku.ac.at> stellt die umfangreichste Erfassung von Waldbrandereignissen in Österreich dar. Neben räumlichen und zeitlichen Informationen zum Auftreten von Bränden werden auch Daten zur Brandursache, der Vegetation, der Brandintensität u. a. erhoben. Der Umfang der vor Ort zu erhebenden Daten für die mehr als 200 jährlichen Waldbrände, stellen die Wissenschaft vor zeitliche und personelle Herausforderungen, da aufgrund der geringen Größe und Intensität der Brandereignisse keine Fernerkundungsdaten eingesetzt werden können.

Seit einigen Jahren engagieren sich Citizen Scientists bei der Erhebung von Waldbranddaten und dokumentieren Brandereignisse auf unterschiedliche Arten. Im Frühjahr 2023 wurde ein Training für Citizen Scientists zur Datenerhebung auf Waldbrandflächen durchgeführt. Im Herbst 2023 erfolgte die Fertigstellung der mobilen App „spotFIRE“, mit dessen Hilfe interessierte Citizen Scientists Waldbrandereignisse rasch und unkompliziert über ein Smartphone melden sowie Informationen zu vorhandenen Brennstoffmengen in Wäldern dokumentieren können.

Im Rahmen des Beitrags werden die Anforderungen an eine standardisierte Erfassung von Waldbränden in der österreichischen Waldbrand-Datenbank beschrieben, sowie die Einbindung von Citizen Scientists, die Anwendung der spotFIRE-App und die Herausforderungen bei der Qualitätssicherung vorgestellt.

„Wenn Bälle nur sprechen könnten“ – Digitale Assistenzsysteme für den Bewegungs- und Sportunterricht

Stefan Meier; Brigitta Höger

Mit der Forderung nach gleichberechtigter Chance auf gesellschaftliche Teilhabe (UN-BRK, 2006) gehen äußerst virulente Veränderungen einher. Dabei kann Schule als ein „Motor des Wandels“ begriffen werden, da hier Generationen für die Zukunft vorbereitet werden sollen. Diesbezüglich wird dem Unterrichtsfach Bewegung und Sport (BuS) gemeinhin ein hohes Potenzial attestiert. Gleichzeitig wird BuS-Unterricht nicht selten als Feld mit besonders vielfältigen Teilhabebarrrieren für Schüler:innen beschrieben – insbesondere für jene mit Blindheit und Sehbeeinträchtigung (BS) (Giese, 2021). Nicht zuletzt finden dabei

in Forschung die gelebten Erfahrungen von betroffenen Schüler:innen kaum Beachtung (Haegele & Maher, 2023), sodass kritisch konstatiert werden muss, dass hier eher über als mit Menschen mit BS geforscht wird (Ashby, 2011).

Im partizipativen Forschungsprojekt „Smart Sport Assistance“ untersuchen wir aus ableismuskritischer Perspektive (Buchner et al., 2015) gemeinsam mit 19 Schüler:innen mit BS an einer Förderschule Teilhabebarrrieren sowie digitale Lösungsansätze im BuS-Unterricht. Im Rahmen des Mosaic Approach (Clark, 2005) wurden mittels Gruppeninterviews, Schultouren, Fotos und Feldprotokollen Daten erhoben und inhaltsanalytisch ausgewertet. Teilhabebarrrieren erwachsen u.a. aus der Kollision individueller Raum- und Materialbedarfe gegenüber gesetzlich regulierten Ö-Norm-Vorgaben. Gleichwohl imaginieren die Schüler:innen konkrete digitale Lösungsansätze, z.B. einen „digitalen Klingelball“, der auch in Ruhe akustische bzw. optische Signale sendet. Diese Ansätze werden in Kooperation mit drei Höheren Technischen Lehranstalten (HTL) umgesetzt und gemeinsam im BuS-Unterricht erprobt. Durch die gemeinsame Auseinandersetzung mit den identifizierten Barrrieren und Lösungsansätzen soll das Projekt einerseits zur Ermächtigung der Schüler:innen mit BS beitragen und andererseits die Schüler:innen der HTLen für die Belange von Menschen mit Behinderung sensibilisieren.

Raumluftqualität in Klassenzimmer – Mit welchen Maßnahmen kann sie verbessert werden?

Gabriel Rojas; Sebastian Goreth; Simon Beck; Elena Krois; Christian Hechenberger

Die COVID-19 Pandemie hatte das öffentliche Bewusstsein über die Wichtigkeit einer ausreichenden Belüftung von Klassenzimmern schlagartig verändert. Aber hat dies zu einer nachhaltigen Veränderung des Lüftungsverhaltens oder gar zu einer Verbesserung der Raumluftqualität in Schulen geführt? Und wie kann gesunde und lernförderliche Raumluftqualität in Klassenräumen gewährleistet werden?

Das dreijährige Citizen Science Projekt DIGIdat untersucht diese Fragen mit Hilfe von ca. 750 aktiv teilnehmenden Schüler:innen und deren Lehrkräfte. In zehn Tiroler Schulen wird die Raumluftqualität messtechnisch erhoben und die Auswirkung

unterschiedlicher Lüftungsstrategien analysiert. Themenbereiche wie Komfort und Energieeffizienz werden in Zusammenhang mit der Raumluftqualität ebenso empirisch beleuchtet. Zur Erhebung relevanter Messdaten dienen cloudbasierte Sensoren. Diese messen in den Klassenräumen diverse Raumlufteigenschaften, wie Temperatur, Luftfeuchtigkeit und Kohlenstoffdioxid-Konzentration (CO₂), sowie Feinstaub (PM_{2.5}). Für den Verbau wurde eine spezifische Gehäuseform konstruiert, welche mittels 3D-Drucker vervielfältigt werden kann. Die Schüler:innen werden in fachdidaktisch aufbereiteten Workshops schrittweise an die Programmierung der Sensoren herangeführt und betreuen diese anschließend an ihren Schulen. Während im ersten Jahr die Erhebung des Istzustandes im Vordergrund steht, werden im weiteren Projektverlauf gemeinsam mit den Schulen verschiedene Maßnahmen zur Verbesserung der Raumluftqualität entwickelt, getestet und bewertet sowie mit interessierten Stakeholder (Architekt:innen, Planer:innen, Schulbetreiber:innen, ...) diskutiert.

Der Vortrag berichtet über Erfahrungen, Herausforderungen und erste Ergebnisse des im Rahmen des Sparkling Science Programms des österreichischen Bundesministeriums für Bildung, Wissenschaft und Forschung geförderten Projekts.

WORKSHOPS

A workshop is an interactive format where the participants will collaboratively (further) develop something new. The workshop conveners will use interactive methods to facilitate this development. A combination of interactive and non-interactive methods is possible if the interactive methods prevail.

Wandel gemeinsam gestalten: Mit Partner*innen Citizen-Science-Ideen verwirklichen – wie gelingt das?

Florence Mühlenbein; Linn Merle Jördens; Silke Voigt-Heucke; Gesine Heinrich

Ob Gesundheit, Umwelt oder Mobilität: Globale Veränderungen unserer Zeit werden im lokalen Raum für alle spürbar. Citizen Science kann hierbei ein Schlüssel sein, um diese Prozesse gemeinsam zu gestalten und eine Vielfalt an Perspektiven einzubeziehen. Dabei gehen viele Citizen-Science-Projekte über die Perspektiven von Wissenschaftler*innen und Bürgerforschenden hinaus und umfassen - im Sinne einer Transdisziplinarität - Kooperationen unterschiedlicher Akteur*innen. In den vielfältigen Perspektiven steckt das Potenzial, durch die Zusammenarbeit eine Wissensvielfalt zu schaffen und mit ihr neue Wege zur Bearbeitung von drängenden Fragen und komplexen Herausforderungen unserer Gegenwart und Zukunft zu finden. Diese Kooperationen bringen zugleich Hürden mit sich, die überwunden werden müssen. Fest steht: Citizen-Science-Projekte stehen und fallen mit dem Gelingen der Zusammenarbeit.

Unser Workshop lädt ein, sich zu den Erfolgsfaktoren von Kooperationen im Citizen-Science-Kontext auszutauschen und voneinander zu lernen. Im World-Café-Format diskutieren und reflektieren die Teilnehmenden Haltungen, Rollen und Erwartungen in Verbundprojekten und lernen Methoden und Herangehensweisen für die erfolgreiche Zusammenarbeit kennen. Begleitend geben die Referentinnen dabei Einblicke und Erfahrungen aus dem Wettbewerb "Auf die Plätze! Citizen Science in deiner Stadt" weiter. Die Session richtet sich an alle, die sich für Kooperationsprojekte interessieren oder bereits erste Erfahrungen sammeln konnten.

Der Wettbewerb "Auf die Plätze! Citizen Science in deiner Stadt" setzt den Fokus darauf, den Austausch zwischen Wissenschaft und Gesellschaft nachhaltig zu

stärken und Citizen Science als Format für Zusammenarbeit sichtbar zu machen. Er fördert Ideen, die lokale Themen mithilfe von Citizen Science in den Mittelpunkt rücken - dazu bedarf es der Einbindung von Perspektiven der Wissenschaft, kommunaler Verwaltung und Zivilgesellschaft.

Let's talk about data – Wie kann Co-Interpretation von Daten in Citizen Science gelingen?

Julia Gantenberg; Sophia Segler

In Zeiten multipler Krisen sind wir auf wissenschaftliche Informationen angewiesen, um uns ein möglichst objektives und aktuelles Bild machen zu können – sei es, um Klimamodellierungen lesen, Corona-Maßnahmen beurteilen oder die Auswirkungen sozialer Konflikte einschätzen zu können. In unserer zunehmend datafizierten Welt bedeutet dies, über Data Literacy, d.h. entsprechende Kompetenzen in Datenlesefähigkeit und -interpretation zu verfügen (Schüller et al., 2019; Gapski et al., 2018).

Auch im Kontext von Citizen Science ist Data Literacy von Bedeutung (Balázs et al., 2021). Dies zum einen für den Erkenntnisgewinn (d.h. Umgang mit Daten) und zum anderen als Bildungsverantwortung im Sinne einer Scientific Literacy, die im besten Falle zu mehr Vertrauen in Wissenschaft beiträgt (Kloetzer et al., 2021; Bromme, 2020; Bonney, 2016). Vor allem im Bereich der Sozialwissenschaft kann es großes Potenzial haben, wenn Citizen Scientists auch bei der Dateninterpretation ihre lebensweltlichen Perspektivvielfalt einbringen. Doch gibt es bislang vergleichsweise wenige Projekte, die auch die Dateninterpretation kollaborativ gestalten. Wie kann ein Wandel gelingen?

Im explorativen Citizen-Science-Projekt "GINGER – Gemeinsam Gesellschaft erforschen" haben wir mit dem s Format „Public Data Sprint“ die partizipative Co-Interpretation von Daten erprobt. Unsere Erfahrungen wollen wir im Rahmen eines kollaborativen Workshops teilen und den Erkenntnisstand gemeinsam erweitern. Folgende Fragen sollen als Grundlage dienen: Welche Erfahrungen und Bedarfe gibt es auf Seiten der Akteur:innen? Welche Herausforderungen gibt es? Wer kennt unterstützende Tools? Was trägt zur Qualitätssicherung bei? Gibt es mehr oder weniger geeignete Daten und Interpretationsstufen für die Co-Interpretation? Welche (disziplinären) Kompetenzen, Ressourcen und Infrastrukturen braucht es dafür?

POSTERS

City Nature Challenge: Krems – Wachau – Melk

Tanja Lumetsberger

Seit 2020 organisiert der Biodiversitäts-Hub an der Universität für Weiterbildung Krems jährlich die City Nature Challenge (CNC; www.citynaturechallenge.at) für die Region Krems-Wachau-Melk. Dabei handelt es sich um einen mehrtägigen, jährlich im Frühjahr stattfindenden Bioblitz bei dem Bürger:innen wild vorkommende Arten in der Region beobachten und mittels der Beobachtungsplattform iNaturalist (www.inaturalist.org) dokumentieren. Gemeinsam mit der Online Community von iNaturalist werden daraufhin die Funde bestimmt.

Die CNC in Krems ist Teil einer großen Community von CNCs, die jährlich in hunderten Städten und Regionen weltweit von verschiedenen Organisator:innen veranstaltet werden. Ins Leben gerufen wurde die CNC 2016 von der California Academy of Sciences und dem Natural History Museum of Los Angeles County. Seit 2018 findet das Citizen Science Event weltweit statt. Seit 2020 nehmen auch österreichische Städte und Regionen an dem freundschaftlichen Wettbewerb zwischen Städten und Regionen teil und konkurrieren um die Kategorien „Welches Gebiet macht die meisten Beobachtungen?“, „Welches Gebiet dokumentiert die meisten Arten?“ und „Welches Gebiet kann die meisten Teilnehmer:innen motivieren, mitzumachen?“.

Das eigentliche Ziel der CNCs ist, die Bevölkerung wieder für die Wildnis vor der eigenen Haustüre zu begeistern und dadurch auch regionale Artenkenntnis aufzubauen und zu fördern. Durch eine wiederkehrende Teilnahme kann auch das Bewusstsein für kurzfristige Schwankungen und langfristige Änderungen in Artenvorkommen und -zusammensetzung bedingt durch zahlreiche Faktoren durch die Citizen Scientists hautnah erlebt werden.

Daten aus vier Jahren CNC in der Region Krems-Wachau-Melk liegen nun vor und geben Einblicke in die Artenvielfalt der Region, die von Teilnehmenden wahrgenommen und dokumentiert wurde.

Die City Nature Challenge: Krems-Wachau-Melk war Teil der Projekte Biodiversität (2017-2020) und ÖKOLEITA (2021-2023), gefördert vom Land Niederösterreich.

Roadkill: regelmäßiges Monitoring vs. Zufallsmeldungen in Bezug auf landschaftliche Einflüsse

Cornelia Rieder; Fanny Rosa Kaiser; Kerstin Filzmoser; Brigitta Kanda; Lukas Schabernag; Alexandra Wanka; Elisabeth Haring; Kathrin Pascher; Johann Zaller; Janette Siebert; Daniel Dörler; Florian Heigl

Im Projekt Roadkill melden Citizen Scientists Sichtungen von überfahrenen Wirbeltieren (Roadkills) auf Österreichs Straßen. Diese Meldungen werden dazu verwendet, um eine Übersicht über Roadkills zu bekommen, da offizielle Statistiken bislang nur jagdbares Wild umfassen. Bei den von den Citizen Scientists gemeldeten Daten handelt es sich um Zufallsfunde, d.h. es werden nur Sichtungen von überfahrenen Tieren gemeldet, aber nicht, wenn Citizen Scientists keinen Roadkill auf einer Strecke gesehen haben.

Ein entscheidender Faktor in diesem Zusammenhang ist der Umfang und die Repräsentativität der erfassten Daten. Meldungen über Zufallsfunde repräsentieren aufgrund ihrer zeitlichen und örtlichen Varianz in der Abdeckung selten die Gesamtheit der Region. Im Gegensatz dazu sind regelmäßige Monitoringprogramme darauf ausgerichtet, festgelegte Erhebungsabschnitte systematisch zu erfassen und bieten somit eine zuverlässigere Grundlage für statistisch repräsentative Ergebnisse.

In unserem Poster möchten wir erste Ergebnisse eines direkten Vergleichs zwischen Zufallsfunden und jenen aus einem systematischen, ebenfalls zum Teil von Citizen Scientists durchgeführten, Monitoring auf fünf verschiedenen 10 km langen Straßenabschnitten in Niederösterreich präsentieren. Ein Schwerpunkt der Analyse in Bezug auf mögliche Unterschiede soll auf landschaftlichen Einflüssen (Straßentypen, Siedlungsräume, landwirtschaftliche Flächen, etc.) liegen.

Die Erkenntnisse aus dem Projekt können dazu dienen, einen Wandel in der Methodik der Datenerhebung für Artenschutzmaßnahmen im Straßenbereich herbeizuführen. Aktuell werden Citizen Science-Daten kaum für naturschutzfachliche Bewertungen herangezogen. Nicht zuletzt sollen die

Ergebnisse auch einen Wandel im Bewusstsein der Öffentlichkeit zur Bedeutung der Reduzierung von Roadkills schaffen, da dieses bisher nur gering ausgeprägt ist.

Die Rolle der DNA-Analyse bei der Identifizierung von Roadkills

Fanny Rosa Kaiser; Cornelia Rieder; Kerstin Filzmoser; Brigitta Kanda; Lukas Schabernag; Alexandra Wanka; Elisabeth Haring; Kathrin Pascher; Johann G. Zaller; Daniel Dörler; Janette Siebert; Florian Heigl

Der steigende Biodiversitätsverlust stellt die Menschheit vor eine große Herausforderung. Eine Ursache dafür sind im Straßenverkehr getötete Wildtiere (Roadkills). Im Citizen-Science Projekt Roadkill werden österreichweit Daten zu Roadkills gesammelt. Diese werden verwendet, um die regionalen Ursachen für die Roadkills zu erforschen. Darüber hinaus können die Daten als Ausgangsbasis für zu etablierende Naturschutzmaßnahmen (Wildtierkorridore, etc.) Verwendung finden.

Citizen Scientists melden Daten über die Roadkill-App und -Website (www.roadkill.at). Es kann jedoch aus unterschiedlichen Gründen (Unkenntlichkeit aufgrund des Zerstörungsgrades, fehlende Artenkenntnis, etc.) zu falschen oder ungenauen Artbestimmungen kommen. Um Wirbeltiere besser identifizieren zu können, wurde nun DNA-Barcoding als zusätzliches Identifikationsmittel auf seine Möglichkeiten und Grenzen im Projekt Roadkill untersucht. Dafür wurden fünf Streckenabschnitte von je 10 km in Niederösterreich von Juli-Oktober regelmäßig dreimal pro Woche von Projektmitarbeitenden mit dem Fahrrad befahren und die Roadkills dokumentiert. Zudem wurden nicht-invasive Proben am Asphalt (frische oder getrocknete Blutflecken) von getöteten Tieren für die DNA-Analyse genommen und im Labor des Naturhistorischen Museums analysiert.

In diesem Poster möchten wir erste Ergebnisse aus den Vergleichen von Artbestimmung über Fotos und den Blutproben präsentieren. Ein Schwerpunkt wird darauf liegen, zu zeigen, ob die nicht-invasive Beprobung und Analyse mit DNA-Barcoding für die Artbestimmung geeignet ist. Wir erwarten, dass (I) die Methode erfolgreich angewendet werden kann und so neue Möglichkeiten für Citizen Scientists entstehen und (II) die aufgrund des Barcodings exakte

Artbestimmung dazu beiträgt, besonders für schwer identifizierbare Arten (Kleinsäuger, Sperlingsvögel, etc.) die Datenqualität erheblich zu verbessern und so zu einem Wandel in der Datenerhebung durch Citizen Scientists in Biodiversitätsprojekten führt.

Wissen teilen, Chancen schaffen: Die Expert*innen-Datenbank für Citizen Science

Theresa Serafin; Leonie Malchow; Silke Voigt-Heucke; Moritz Müller

Die Herausforderungen in der Praxis von Citizen Science (CS) sind vielfältig und umfassen Fragen der Bürgermotivation, des nachhaltigen Datenmanagements und der effektiven Kommunikation von Projektergebnissen. Die Klärung dieser Fragen ist im Projektverlauf entscheidend, damit citizen science ihr transformatives Potenzial in der Gesellschaft, Wissenschaft und Politik voll entfalten kann. In der deutschsprachigen CS-Community sind Expertise und Trainings für praxisrelevante Fragen vorhanden, jedoch ist die Suche danach oft umständlich und die bestehenden Trainingsangebote passen nicht immer zu der Dynamik des Projektverlaufs. Die Etablierung einer zentralen Expert*innen-Datenbank könnte die Vernetzung und das Capacity Building im Bereich Citizen Science nachhaltig in Deutschland wandeln und verbessern.

Die deutsche CS-Plattform Bürger schaffen Wissen startete auf Impuls der Community im Frühling 2023 einen kollaborativen Entwicklungsprozess für eine Expert*innen-Datenbank. Über Umfragen, Workshops und Netzwerktreffen hatten potenzielle Nutzer*innen der Datenbank die Möglichkeit, ihre Bedarfe und Vorschläge in die Entwicklung einfließen zu lassen. Das Ergebnis dieses Prozesses ist ein Konzept für eine Datenbank, die Wissen über die CS-Praxis auf der Plattform Bürger schaffen Wissen sichtbar macht, Möglichkeiten für persönlichen Austausch schafft und somit einen zentralen Bedarf der Community aufgreift.

Das Poster dokumentiert den Weg zur Expert*innen-Datenbank, präsentiert ihre Funktionen und reflektiert über die Chancen und Herausforderungen des kollaborativen Entwicklungsprozesses. Mit der Posterpräsentation wollen wir unsere Erfahrungen in der Plattformentwicklung mit der internationalen Community diskutieren und eine neue digitale Anlaufstelle für Capacity Building

und Vernetzung in der citizen science vorstellen, die wesentlich zur Realisierung des transformativen Potenzials von citizen science beitragen könnte.

„Ist auch mal was Neues“. Das Sparkling Science-Projekt SoKuL aus Schüler*innenperspektive

Barbara Pichler; Evelyn Hutter; Gert Dressel; Gradimir Atanasov; Sabine Bauer; Sylwia Gryszkiewicz; Martin Lutz; Jennifer Sluga; Fify Zakhary; Elisabeth Reitingner; Katharina Heimerl

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Mit Oktober 2022 startete das Sparkling Science-Projekt „Erzählen über Sorgeskulturen am Lebensende (SoKuL). Schüler*innen forschen im intergenerationalen und interkulturellen Austausch“. Schüler*innen der Schule für Sozialbetreuungsberufe Altenarbeit der Caritas Wien wirkten in unterschiedlichen Rollen in Erzählcafés (Erhebungsmethode) zum Thema Lebensende mit. Aus den gemeinsamen Reflexionen geht hervor, dass bereits zu Beginn der Projektteilnahme von Seite der Schüler*innen bedeutsame Erfahrungen gemacht wurden. Eine Schülerin sah es positiv, „mal was Neues“ zu erleben, ein Schüler reflektierte gegen Ende eines Erzählcafés: „(...) da konnte ich auch daraus was mitnehmen und lernen“. Nach einem Jahr der Zusammenarbeit interviewten sich Schüler*innen gegenseitig, um so zu erheben, was die Projektteilnahme (insbesondere das Erzählen, Zuhören, Co-Moderieren in den Erzählcafés sowie die ersten Auswertungsschritte) bei ihnen bewirkt und für sie verändert hat. Die Ergebnisse dieser Interviews werden als Poster in Co-Autor*innenschaft mit den Schüler*innen präsentiert. Innerhalb des Citizen Science-Diskurses (Eitzel et al 2013) lässt sich das Projekt in der Tradition der partizipativen Aktionsforschung und transdisziplinären Forschung (Hockley et al 2014, Dressel et al 2014, Ukowitz & Hübner 2019) verorten. Das geht mit einem Verständnis und auch Anliegen von Forschung einher, dass durch (partizipative) Forschungsprozesse in soziale Systeme interveniert wird und diese damit verändert werden. Mit der Interviewerhebung und -auswertung soll dieser Prozess aus der Sicht der Schüler*innen reflektiert sowie systematisch erfasst und dargestellt werden.

OPEN FORMATS

The open format gives space for focused exploration of topics – surprise us with something new.

Change in Schulen: Demokratie- & Wissenschaftsverständnis durch partizipative Ansätze stärken

Petra Siegele; Claudia Fahrenwald; Hans Karl Peterlini; Patrick Siegele; Georg Traska

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Wissenschafts- und Demokratieverständnis bereits in Schulen zu fördern, wird angesichts von Fake News und zunehmender Politikverdrossenheit unter jungen Menschen immer wichtiger. Denn so wie Wissenschaft rationale Politik ermöglicht, schützt Demokratie die Freiheit der Wissenschaften.

Unterschiedliche partizipative (Bildungs-)Ansätze und Projekte widmen sich der Thematik. So können im Citizen-Science-Projekt „Transform4School“ Schüler/innen eigene Erfahrungen in Demokratie und alternativen Handlungsweisen machen und daraus lernen. Im Projekt „Vielsprachiges Gedächtnis der Migration“ aktivieren Schüler/innen und Studierende die eigene Mehrsprachigkeit, reflektieren ihre Position in einer postmigrantisch vielfältigen Gesellschaft und produzieren lebensgeschichtliche Interviews. Im Bereich Holocaust Education haben sich Jugendliche mit lokaler Geschichte rund um die NS-Vergangenheit ihrer Umgebung auseinandergesetzt und einen öffentlichen Erinnerungspfad entwickelt. Und bei einem Projekt, das den Ansatz von Service Learning („Lernen durch Engagement“) verfolgt, gestalten Schüler/innen die Gesellschaft demokratisch mit, indem sie sich für gesellschaftliche Bedarfe engagieren.

Im Rahmen einer Fishbowl sollen partizipative Ansätze, wie Citizen Science, Service Learning oder Holocaust Education miteinander in Dialog gebracht werden. Welchen Beitrag können sie zu Wissenschafts- und Demokratievermittlung in Schulen leisten? Worin überschneiden bzw. unterscheiden sie sich und inwiefern können sie miteinander verschränkt werden? Wie kann Partizipation den Schulalltag verändern, ein demokratisches Miteinander und Vertrauen in Wissenschaft fördern? Wie wird damit das Wissenschafts- und Demokratieverständnis in

Schulen gestärkt? Und wie kann das zu einem Change bei Jugendlichen und in Schulen führen? Die Teilnehmenden sind eingeladen in einen offenen Austausch zu treten und ihre Erfahrungen und Ansichten zu diesen und weiteren Fragen zu teilen.

Viel-Falter Monitoring – Schmetterlinge beobachten für die Wissenschaft

Johannes Rüdisser; Friederike Barkmann

Schmetterlinge begeistern die meisten Menschen mit ihren bunten Farben und dem schwebenden Flug. Sie lassen sich leicht beobachten und kommen in unterschiedlichen Lebensräumen von Gärten bis ins Hochgebirge vor. Österreich beheimatet aufgrund der vielfältigen Lebensräume eine sehr diverse Tagfalterfauna und übertrifft mit 210 Arten die Anzahl in Deutschland deutlich. Leider sind viele der heimischen Schmetterlingsarten bedroht und auch früher häufige Arten werden immer seltener gesichtet. Wir wissen allerdings erstaunlich wenig über den genauen Zustand der Schmetterlingspopulationen. Mit dem Viel-Falter Tagfalter Monitoring wollen wir das ändern und einen Beitrag zur Erfassung der Biodiversität leisten. Dafür beobachten, bestimmen und zählen Freiwillige gemeinsam mit Forschenden des Instituts für Ökologie der Universität Innsbruck Tagfalter. Die Daten bieten eine wichtige Grundlage für die Forschung. Mit ihnen können die Ursachen für den Rückgang der Schmetterlinge und anderer Insekten genauer untersucht und gezielte Maßnahmen für den Erhalt und die Förderung artenreicher Lebensräume gesetzt werden. Durch die Beteiligung am Monitoring können naturbegeisterte Freiwillige die heimischen Tagfalter näher kennenlernen, bei Bestimmungskursen und Exkursionen ihr Wissen erweitern und sich mit anderen Freiwilligen und Forschenden austauschen. An unserem Marktstand vermitteln wir, wie das Viel-Falter Monitoring funktioniert und wie man sich daran beteiligen kann. Zudem gibt es viel Spannendes über Schmetterlinge zu erfahren.

Citizen Science Award 2024

Melanie Mayrhofer

Was ist der Citizen Science Award?

Jedes Jahr von April bis Ende Juli lädt der OeAD im Auftrag des BMBWF forschungsbegeisterte Schüler/innen, Jugendgruppen, aber auch Erwachsene und Familien aus ganz Österreich ein, sich beim Forschungswettbewerb „Citizen Science Award“ aktiv an Forschungsprojekten zu beteiligen. Sie erleben dabei hautnah, wie Wissenschaft funktioniert. Dadurch können Barrieren und Vorurteile abgebaut und das Vertrauen in und das Verständnis für Wissenschaft gestärkt und aufgebaut werden. Gleichzeitig können die engagiertesten Citizen Scientists Preise gewinnen. Bisher haben sich bereits knapp 22.500 Citizen Scientists an 58 Projekten beteiligt und mehr als 192.000 Forschungsbeiträge geliefert!

Themen und Tätigkeiten

Plastikmüll im Hochgebirge und in Böden dokumentieren, alte Dialektwörter transkribieren oder Hummelarten erforschen: Mitgeforscht werden kann an ausgewählten Projekten aus allen Forschungsgebieten. Dabei erheben und analysieren die Citizen Scientists mittels digitaler und analoger Methoden Daten, erfassen Beobachtungen, füllen Fragenbögen aus etc.

Alle Infos zu den teilnehmenden Projekten und den vielfältigen Mitmach-Möglichkeiten finden sich auf der Young-Science-Webseite des OeAD.

Kategorien und Preise

Mitforschen können Bürger/innen aller Altersgruppen in den Kategorien „Schulklassen/Jugendgruppen“, „Einzelpersonen“ und „Familien“. Schulklassen/Jugendgruppen gewinnen Geldpreise bis zu 1.000 Euro, Einzelpersonen und Familien Sachpreise. Die Preise werden jedes Jahr im Herbst im Rahmen des Young Science Kongresses vergeben.

Der Marktstand informiert interessierte Citizen Scientists über die aktuellen

Projekte und Mitforschmöglichkeiten. Außerdem können Forschende Informationen einholen, wie sie sich mit ihrem Projekt am nächsten Citizen Science Award beteiligen können.

Österreich forscht – Forschen Sie mit!

Alina Hauke; Florian Heigl; Daniel Dörler

Citizen Science-Projekte laden interessierte Menschen dazu ein, sich auf unterschiedliche Arten bei wissenschaftlichen Projekten zu beteiligen, ganz ohne langes Studium. Doch wie findet man diese Projekte? Dafür gibt es seit 2014 die Plattform "Österreich forscht", auf der man viele verschiedene Projekte finden kann. Derzeit heißen über 70 Citizen Science-Projekte aus ganz Österreich und von vielen verschiedenen Forschungsinstitutionen und aus zahlreichen Fachrichtungen interessierte Personen willkommen, um sich aktiv an Forschung zu beteiligen.

Bei „Österreich forscht – Forschen Sie mit!“, suchen wir gemeinsam mit Ihnen ihr persönliches Citizen Science-Projekt, und beantworten Ihnen Fragen, die Sie zu Citizen Science haben. Wir zeigen Ihnen, wie Sie die unterschiedlichen Funktionen auf "Österreich forscht" verwenden können und beraten Sie auch gerne persönlich, damit sie ihr Mitforschprojekt finden können. Dazu können Sie selbstständig auf einem großen Touchscreen die Projekte auf "Österreich forscht" durchstöbern, die Filterfunktion ausprobieren, den Blog kennenlernen und vieles mehr.

Erfahren Sie mehr über "Österreich forscht" und Citizen Science und werden Sie Teil eines Forschungsteams!

Pflanzenartenzusammensetzung im Wandel - Jugend erforscht die Ausbreitung von Invasiven Pflanzen

Renate Mayer

Die rasche Verbreitung invasiver Pflanzenarten (v.a. *Solidago* sp., *Fallopia japonica*, *Impatiens glandulifera*, verändert Landschaftsteile und die Artenzusammensetzung von Tieren und Pflanzen in unserer Landschaft. Innerhalb von kürzester Zeit bilden sich stellenweise Monokulturen. Schüler:innen erforschten im Sparkling Science Projekt CSI PhänoBiota den Zusammenhang zwischen Wetterbedingungen und Wuchsverhalten ausgewählter invasiver Pflanzenarten, die sich rasch und unkontrolliert ausbreiten. C.S.I. steht für Climate Science Investigation - „Auf Spurensuche gehen und invasive Neophyten im Jahresverlauf unter die Lupe zu nehmen.“ Ziel von „Forschen mit pflanzlichen Neuankömmlingen“ ist es, erfolgreiche Ausbreitungsstrategien dieser Pflanzen zu ergründen und den bestmöglichen phänologischen Zeitpunkt für optimale Entfernungsmethoden herauszufinden. Schüler:innen, Pädagog:innen und Expert:innen analysieren gemeinsam Herkunft, Verbreitung, Wuchsverhalten Standortverhältnisse sowie Vermehrungsmöglichkeiten in der Natur und unter Laborbedingungen (Rhizoboxen, geschlossene Gefäße). Wichtige Aspekte sind Nutzungsmöglichkeiten, Schadensausmaße und Gefahren für Menschen, heimische Arten und Lebensräume. Methoden zur Bekämpfung wurden an unterschiedlichen Standorten im Jahresverlauf getestet und Pflanzenteile im Mikroskop untersucht, um anhand von Energieflüssen (z.B. Stärkeeinlagerungen) herauszufinden, wann die unterirdische oder oberirdische Wuchskraft oder Energiespeicherung angeregt wird. Die Versuche fanden im Schulunterricht, bei Forschungspraktika und Freilandhebungen statt. Die Erkenntnisse fließen in weitere Projekte und bewussteinbildende Maßnahmen für die Vorbeugung und effektiver Eindämmung invasiver Pflanzenarten zur Wiederherstellung der heimischen Artenvielfalt ein und einen Wandel hinsichtlich achtsamen Umgang im Einsatz von Pflanzenmaterialien und in der Beseitigung zu bewirken, damit Hotspots der Ausbreitung zukünftig verhindert werden können.

Wissenschaft und Gesellschaft im (Kuppel-)Gespräch

Laura Soyer; Gerhard Schuster

Wissenschaft und Gesellschaft im (Kuppel-)Gespräch

Gemeinsam mit der Initiative „European Public Sphere“ hat das OIS Impact Lab Caring Communities for Future im Sommer 2023 eine Care-Tour in Österreich mit fünf Kuppelgesprächen im öffentlichen Raum organisiert.

Unter dem Dach der mobilen Holzkuppel wurden im Dialog mit Bürger:innen und Wissenschaftler:innen Gedanken und Ideen rund um das Thema Pflege, Sorgearbeit und Gemeinwesen ausgetauscht. Nach einem kleinen Rückblick auf die Care-Tour als Format für Dialog und Bürger:innenbeteiligung, wollen wir gemeinsam im Kuppelgespräch einen Ausblick auf Zukünftiges wagen: Kann ein solches Dialogformat in den Herausforderungen notwendiger gesellschaftlicher Transformation einen Zuversicht stiftenden Beitrag leisten? Wie können wir aus gemeinsamer Verantwortung zu neuen Horizonten der Hoffnung finden? Und wie kommen wir im offenen, alle einbeziehenden Gespräch zu dem, was wir für die Zukunft brauchen, was wir in die Zukunft mitnehmen wollen? Welche Rolle spielt dabei auch die Wissenschaft?

Roadkill – Tiere auf Österreichs Straßen

Florian Heigl; Janette Siebert; Daniel Dörler

Täglich werden in Österreich tausende Tiere im Straßenverkehr getötet. Doch welche Tierarten sind davon besonders betroffen und gibt es Hotspots, also Stellen, wo es vermehrt zu überfahrenen Tieren kommt? Und welchen Einfluss hat die umgebende Landschaft oder das Wetter?

Diesen und weiteren Fragen geht das Citizen Science Projekt Roadkill nach und jede*r kann mitforschen!

Bei uns am Stand möchten wir die zahlreichen Möglichkeiten des Mitforschens vorstellen und mit Ihnen über Ihre Erfahrungen mit Roadkills sprechen. Welche Tiere sehen Sie auf Ihren täglichen Wegen?

Mehrere interaktive Elemente erleichtern den Einstieg in die Thematik und zeigen gleichzeitig, welche Tiere besonders häufig von Besucher*innen auf Straßen gesehen werden.

„A Liadl, ans üwa KI“ – A Song all about AI

Kathrin Meyer; Thomas Meneweger; Martina Mara

In einem partizipativen Projekt haben wir gemeinsam mit Citizen Scientists, Künstler*innen und KI-Expert*innen drängende Fragen zu Künstlicher Intelligenz gesammelt und Antworten darauf kreativ aufbereitet, um einen Beitrag zur allgemeinen KI-Grundkompetenz (AI Literacy) zu leisten. Entstanden ist in Kooperation mit dem Singer-Songwriter Blonder Engel ein Song „A Liadl, ans üwa KI“. Dieser Song und das zugehörige Musikvideo sind der Impuls für unseren Marktstand.

Auch mit dem größten Bemühen und dem erfolgreichsten partizipativen Prozess gilt es in Projekten immer Kompromisse zu machen: Nie finden alle Fragen und Themen Platz. Nie können alle Ideen umgesetzt werden. Nie ist das Ergebnis für alle Menschen zugänglich und verständlich. „A Liadl, ans üwa KI“ wurde als Lied in oberösterreichischer Mundart verfasst, um eine ganz andere Zielgruppe zu erreichen als es etwa englischsprachige Fachpublikationen zu KI schaffen. Aber was ist mit Menschen, die den österreichischen Dialekt nicht verstehen? Die aufgrund einer Beeinträchtigung überhaupt keine Musik hören können? Oder die die gewählte Stilrichtung nicht anspricht?

Daher forschen wir weiter und fragen am Marktstand: Was sind für dich die brennendsten Fragen zu KI? Wie passt für dich unser Song als Antwort darauf? In welcher Sprache würdest du den Song singen? In welchem Musikstil würdest du deine Fragen gerne beantwortet bekommen? Alle Besucher*innen sind eingeladen, ihre Beobachtungen, Gedanken und Ideen einzubringen und somit das „Liadl“ anzureichern und als Förderung von KI-Kompetenz vielfältiger zu machen.

We Talk About Science – Schüler:innen kommunizieren Wissenschaft

Alina Majcen; Philipp Spitzer

Die letzten Jahre haben den Bedarf und die Notwendigkeit einer adäquaten Kommunikation wissenschaftlicher Ergebnisse an die Bevölkerung aufgezeigt. Für die Zielgruppe Jugendliche fehlen bislang noch Kriterien für eine vertrauensvolle und verständliche Kommunikation von Wissenschaft. Das Projekt „We Talk About Science“ untersucht daher, wie Kinder und Jugendliche Wissenschaftskommunikation wahrnehmen und bewerten. Bei diesem Projekt wird im Sinne von Citizen Science mit Schüler:innen verschiedener Altersgruppen als Expert:innen ihrer Zielgruppe zusammengearbeitet. Der Fokus liegt dabei auf der Kommunikation von den Schüler:innen selbst, welche dazu angeregt werden, die konsumierende Rolle zu verlassen und selbst wissenschaftskommunikative Produkte zum Themenbereich „Kohlenstoffdioxid“ zu erstellen. Der Recherche- und Entstehungsprozess wird dabei reflexiv und forschend begleitet.

Beim Citizen Science Festival wird der Marktplatz-Infostand einen kleinen Einblick in das Projekt „We Talk About Science“ geben. Zum Anschauen, Lesen und Hören werden zahlreiche Produkte, die von den Schüler:innen erstellt worden sind, ausgestellt und präsentiert. Lassen Sie sich von den vielen Facetten von „Kohlenstoffdioxid“ überraschen.

Colouring Dresden: Eine Citizen-Science-Plattform zur Erfassung von Gebäudewissen: Erfahrungen, Ergebnisse, Ausblick

Tabea Danke; Robert Hecht; Theodor Rieche

Das Citizen Science-Projekt „Baukultur und klimagerechte Architektur in Dresden: Gebäudewissen kartieren, erforschen und vermitteln“ hat das Ziel, Informationen über Dresdner Gebäude auf der offenen digitalen Plattform „Colouring Dresden“ zu sammeln. Diese Plattform ermöglicht es Nutzer*innen, Gebäudeinformationen wie Baujahr, Konstruktion und Materialität in eine interaktive Karte einzutragen, zu überprüfen, herunterzuladen und zu nutzen.

Colouring Dresden nimmt in vielerlei Hinsicht eine führende Rolle ein. Es fungiert als zentraler Knotenpunkt für die Sammlung, Visualisierung, Diskussion und Bewertung zukünftiger Entwicklungsmöglichkeiten im Bereich klimagerechter Architektur. Dabei handelt es sich um die erste Colouring Cities Plattform in Deutschland, die aus dem internationalen Netzwerk „Colouring Cities Research Programme (CCRP)“ hervorgegangen ist. Als Deutschland-Hub trägt Colouring Dresden dazu bei, den Wissensstand in der Citizen Science-Forschung im Bereich Gebäude zu verbessern. Dies geschieht durch die Bereitstellung des offenen Quellcodes für neue Colouring-Projekte in anderen Städten, den Austausch von Wissen über Citizen Science-Aktionsformate und die Weitergabe von Erkenntnissen aus verschiedenen Evaluationsmethoden.

Der Marktplatz bietet die Gelegenheit, das Dresdner Projekt mit seinem Fokus auf verschiedene Citizen Science-Aktionen und Evaluationsmethoden vorzustellen und die Plattform direkt auszuprobieren. Dabei wird der ko-kreative Ansatz deutlich gemacht, der dazu dient, Wissen über Gebäude zu vermitteln und die Identifikation mit Architektur in der gebauten Umwelt zu fördern. Diese Darstellung zeigt die Mehrwerte dieses Ansatzes auf und betont, dass großes Potenzial besteht, weitere Colouring Cities-Initiativen mithilfe des offenen Quellcodes und der evaluierten Ergebnisse zu starten. Dies kann dazu beitragen, die Transformation im Bauwesen voranzutreiben.

Die folgenden, vom Naturhistorischen Museum Wien ausgewählten Aktivitäten stehen den Besuchern ebenfalls zur Verfügung.

TeaBag Index

Anna Wawra

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AGES - Österreichische Agentur für Gesundheit und Ernährungssicherheit GmbH
| AGES - Austrian Agency for Health and Food Safety, Österreich

Citizen Science an der AGES

Die Österreichische Agentur für Gesundheit und Ernährungssicherheit (AGES) wird eine Vielzahl seiner Citizen Science Tools und Materialien präsentieren, u.a. Soil Plastic App, Tea Bag Index App, Bodenquizz, Pollenmemory, Mosquito Alert App. Ein Team unterschiedlicher AGES Forschungsgruppen wird den interaktiven Stand betreuen.

Citizen Science at AGES

The Austrian Agency for Health and Food Safety (AGES) will present a variety of its Citizen Science tools and materials, including the Soil Plastic App, Tea Bag Index App, Soil Quiz, Pollen Memory, Mosquito Alert App. A team from various AGES research groups will be in charge of the interactive stand.

Blue Gold+ Sharing Water

Regina Hügli, Elisabeth Kopf

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Das edukative Spiel BLUE GOLD+ SHARING WATER bietet vernetztes Wissen rund um die Ressource Wasser, lädt zum Dialog und der Ideenentwicklung für einen Wandel im Umgang mit dem „blauen Gold“. Ein „Wasserwissensfall“ macht zudem lokale und globale Zusammenhänge als begehbare Installation begreifbar.

NHM on tour – Elektrolastenrad Ida 001

Iris Ott

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Das Naturhistorische Museum Wien kommt mit einem Elektrolastenrad zu den Bürger*innen in die Bezirke. Mit dem Fahrrad "Ida 001" wird eine multimediale Station zum Thema Lichtverschmutzung transportiert, welche dazu einlädt, bei Forschung mitzumachen und an gesellschaftlichen Debatten teilzunehmen.

Das Projekt wurde gefördert von der Wirtschaftsagentur Wien. Ein Fonds der Stadt Wien. Das Fahrrad wurde gefördert vom Wiener Ökostromfonds mit der aktuell laufenden Förderung für elektrische Lastenfahrräder für Betriebe.

AmphiBiom – Lebensraum für Wechselkröte und Co

David Hamernik, Maria Krall

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Im Projekt AmphiBiom erforschen wir gemeinsam mit Ihnen die Vorkommen der Wechselkröte in Österreich und schaffen neue Lebensräume für diese und andere Amphibien.

Mit spielerischen Elementen, wie einem Quiz und einem Memory, zu Wechselkröten und anderen Amphibien, wecken wir das Interesse für diese faszinierenden Tiere. Eine interaktive Karte ermöglicht die Erkundung geeigneter Gewässer für Wechselkröten.

Zudem kann jede*r vor Ort den Rufen der Wechselkröte lauschen und bei einem „Rufmonitoring“ die eigene Artenkenntnis testen.

More info:

 <https://2024.ecsa.ngo>

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