



European Research Council
Established by the European Commission



CITIZEN SCIENCE IN ERC PROJECTS

MAPPING ERC
FRONTIER RESEARCH

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In a nutshell

The European Research Council (ERC) encourages researchers and their teams to push the frontiers of knowledge. With the intention to map the breadth and diversity of the citizen science activities it supports, this factsheet offers a brief overview of the ERC's portfolio on citizen science. It also includes highlights from a selected number of projects across scientific domains.



69
projects



19
countries



€125 Million
budget



54%
women

42
Social Sciences
and Humanities

17
Life
Sciences

9
Physical Sciences
and Engineering

Citizen Science in ERC projects

Citizen science is a term coined to describe activities conducted by scientists in collaboration or consultation with the public at any stage of a research project. Its key feature is the **active role of the citizens in doing research**, from (co)design of the research questions, data collection and processing, data interpretation and analysis, up to publication and dissemination of results, and the implementation of new tools and policies.

This factsheet provides a snapshot of ERC funded research developing citizen science activities. It covers 69 projects identified via keyword searches in advanced analytics and text-mining tools with the input from scientific and ethics officers in the ERC Executive Agency. While this does not represent an exhaustive list of ERC projects using citizen science, their activities are varied. They range from citizens and local communities photographing new auroral phenomena; collecting samples of fruit flies in rural areas; to using geographical analysis and visualisation tools coupled with their local environmental knowledge; or annotating performed music structures in an online platform.

When looking at its geographical distribution, the **United Kingdom (20), Spain (9), France (6), Netherlands (6) and Ireland (5) host the largest share of projects.** In terms of research domains, the top two panels in Social Sciences and Humanities (SH) are ERC panel SH2 'Institutions, Governance and Legal Systems' (18 projects) and SH3 'The Social World and Its Diversity' (13). In Life Sciences (LS), most projects are found in the LS8 panel 'Environmental Biology, Ecology and Evolution' (10) and LS9 'Biotechnology and Biosystems Engineering' (15). In Physical Sciences and Engineering (PE), panel PE9 'Universe Sciences' is the most represented (4).

The word cloud represents the most prominent keywords associated to the projects, based on the portfolio analysis undertaken.



Starting
Grants
25



Consolidator
Grants
23



Advanced
Grants
13



Proof of
Concept
Grants
7



Synergy
Grants
1

How ERC grantees engaged citizens in research

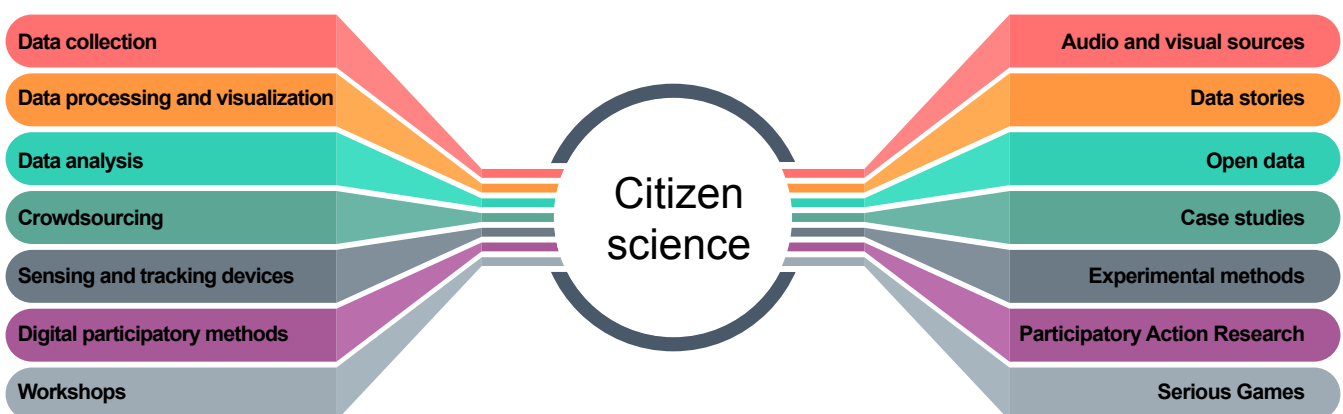
There is a wide **spectrum of engagement between scientists and citizens, from researcher-led and top-down initiatives to bottom-up and participatory type of research.** The 69 projects showcase a plurality of approaches, which illustrate different roles and levels of participation, governance and purpose of the activities, and various impact and outcomes.

A wider availability of digital and online technologies, such as smart phones, cheap electronics, miniaturisation of sensors, open source and crowdsourcing platforms, and social media, has allowed for **more citizen- or community-generated data sets and platforms.**

There is a strong focus on **environmental and climate change.** For instance, citizens can monitor air pollution and indoor air quality in their homes or neighbourhoods with ready-to-use or co-created sensors. As another example, volunteers can host weather stations to collect data on temperature and rainfall to investigate climate adaptation. In the area of **health and genomics**, crowdsourced breathing, coughs and voices collected by daily devices can improve COVID-19 testing, and also support continuous diagnostics of diseases. In another project, volunteers can have their personal genomes sequenced and use or share their genomic data for free and open research.

Participatory workshops, events and tools are the core of many citizen science activities. An open and constant engagement is seen in advisory groups who participate in the development and refinement of the research questions or topics of concern. The use of photography, video and testimonials by citizens (in blog and social media posts, or in “data stories”), or owner-directed events to discuss relevant findings are other examples. In some cases, **citizens can help to define the research** in terms of the “why” (purpose of their involvement), “what” and “how” (available or co-created tools to be used).

Some projects put in place **an action-oriented approach.** Citizens share reliable and accessible tools, methods and data in near-real-time with other citizens, researchers, advocates, policymakers, journalists, civil servants and policymakers. The purpose is to gain a fuller understanding of the phenomena they study. It can also be to generate data to support community projects, to request government action and to help guide public decision-making. Citizen science activities can lead to evidence for shaping policy and other activities by NGOs and local groups or associations, and ultimately to foster wide communities of practice and/or communities of concern.



ERC stories on citizen science

Muki Haklay has developed geographical analysis and visualisation tools that can be used by people with limited literacy, in a culturally appropriate way. This Geographic Information System (GIS) interface and algorithms provided communities with tools to combine their local environmental knowledge with scientific analysis to improve environmental management. An interdisciplinary team of anthropologists, geographers, ecologists, and computer scientists worked with local indigenous partners on case studies in critically important, yet fragile and menaced ecosystems in different locations (Congo basin, Namibia, Brazilian Amazon, and the UK). See [ECSAVis](#) project and [research group](#).

bioinformatic analysis modules that introduce students to big data analysis; and a service and learning methodology that allows citizens to investigate the effects of climate change on local biodiversity. See [DROSADAPTATION](#) project and [MCTF!](#)

Frans Snik started the iSPEX project as an educational spin-off from his activities developing SPEX (Spectropolarimeter for Planetary EXploration). He developed a low-cost add-on for smartphone cameras for volunteers to monitor dust particles in the atmosphere, filling in blind spots of established ground-based atmospheric measurement networks. iSPEX was one of the first massive citizen science projects of its kind and led to several activities in the Netherlands: at the Dutch environmental protection agency, through the Citizen Science Lab at Leiden University, and a national strategy and associated national network for citizen science (CS-NL). See [FALCONER](#) project.

Minna Palmroth encouraged amateur stargazers to take pictures of a certain type of aurora borealis. Her team could later confirm a new auroral form in one of the least studied regions of the atmosphere. Named 'dunes' by the hobbyists, the phenomenon is believed to be caused by waves of oxygen atoms glowing due to a stream of particles released from the Sun. Palmroth published a book/guide for aurora borealis watchers', born out of her cooperation with Northern Lights enthusiasts in the hobbyists' Facebook group. Thousands of magnificent amateur photographs were surveyed and categorised for the book. See [PRESTISSIMO](#) project, [ERC Story](#) and [ERC Video](#).

Jacob Sherson has developed citizen science games under the umbrella of the ScienceAtHome platform with more than 300,000 contributors. Here, complex natural science problems related to quantum computers, NP-hard computer science problems and Millennium Math Challenges are explored alongside systematic cognitive/social science studies and large-scale game-based assessment of basic and complex cognitive skills. The associated Games4Good division explores games fostering public participation in social dilemmas such as the CoronaMinister game (crowdsourcing solutions for corona containment) and crea.visions (to allow AI-enhanced generation of future scenarios). See [MECTRL](#) project.



Courtesy MCTF! project

Josefa Gonzalez is co-leading Melanogaster Catch the Fly! (MCTF!), the European Citizen Science network in adaptation genomics. School teachers and students collect and classify *Drosophila* species (fruit flies), which are then sequenced and analysed to understand how organisms adapt to the environment. The data is shared through the EU *Drosophila* Population Genomics Consortium (DrosEU). Activities also include teacher training courses in genomics and science communication;

ERC stories on citizen science

Elaine Chew has called upon citizen scientists to hear and mark musical structures like the groupings and boundaries performers create. Her team then uses data analytics and data science to decipher the expressive devices and their functions. By linking these expressive structures to tangible physiological effects, they capture how music affects individuals. The research is expected to advance personalised digital music therapeutics. Citizen science activities are centred on the CosmoNote web portal. CosmoNote presents synchronised, layered visualisations of continuous and discrete information, such as music audio and events, tempo and loudness, and harmonic tension. See [COSMOS](#) project and [ERC Podcast](#).



Courtesy UnderSCORE project

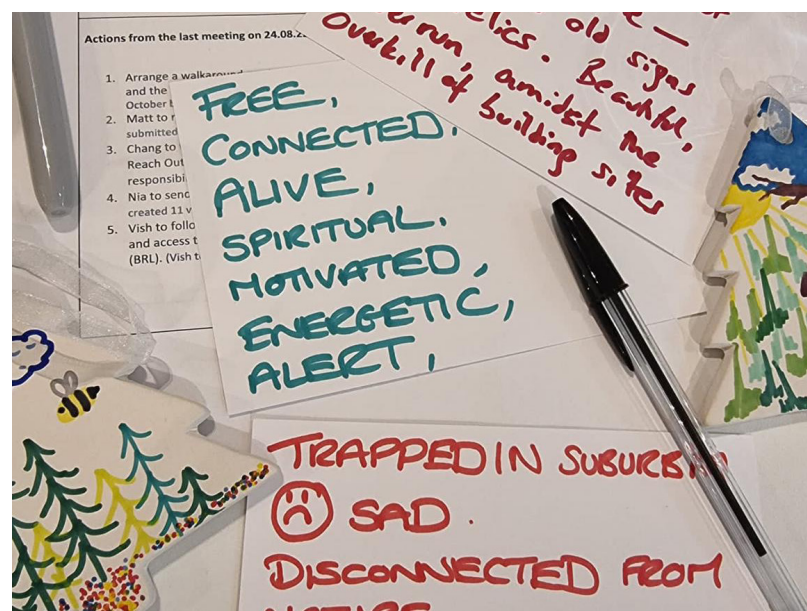
Stefania Milan has run hackathons and “datathons” with volunteer open-source developers in the improvement of social media tracker tools. 800 Dutch voters were also collectively tracking the impact of Facebook’s personalization algorithms in the 2021 Dutch national elections. In her previous ERC project, DATACTIVE, digital rights advocates and citizens collectively set the priorities of the research agenda, and a multilingual COVID-19 blog and open-access book was published from the perspective of vulnerable communities (migrants and refugees, survivors of domestic violence, caretakers, gig workers, nationals from various countries in the Global South). See [ALEX](#) and [DATACTIVE](#) projects. See [ERC Story](#) and [ERC Podcast](#).

Kris Verheyen did two repetitions of a citizen science project where 84 and 28 participants weekly interacted with agrobiodiversity in landscape observatories (mini-gardens planted with ten vegetable crops) in the provinces of East-Flanders and Antwerp in Belgium. Participants were asked to do weekly visits and

perform tasks according to a scientific protocol (e.g. weeding, harvesting). He has found that participatory and citizen science projects have potential to change perspectives and behaviour towards (functional) agrobiodiversity in rural areas. See [UnderSCORE](#) project and [RTD Success story](#).

Sarah Leeber called out for women to participate in the Isala activity within the ERC project Lacto-Be. Its objective is to map the presence and abundance of lactobacilli in the human vagina and how these lactobacilli are influenced by lifestyle, life course and environment. Her team has invited healthy women to take their own vaginal swabs and therefore empower them to take their health into their own hands. More than 6000 women registered and around 3342 have sent back their self-sampling kits to the lab. Isala provides participants with the opportunity to co-create with the Isala scientists, as they welcome their questions, testimonials, creative ideas and remarks. See [Lacto-Be](#) project.

Marcus Collier is measuring for the first time the societal attitudes to urban wild spaces by asking citizens to study them. The team is working with urban communities to identify as many research questions as possible to apply in the field. So far, case study locations are in Dublin, London, Glasgow, Valetta, Melbourne, Copenhagen, New York, New Jersey, and Bogotá. Next, the team will engage citizens in co-creating an online instrument to enable ecological data collection. Citizen scientists will also record their perceptions towards formal and informal urban wild spaces to reveal whether engagement alters their values and environmental behaviour. See [NovelEco](#) project.



Courtesy NovelEco project

