# How to address open science in EU projects

## Recommended open science practices with a special focus on citizen science

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# Recommended open science practices

- Early and open sharing of research
  - share research on preprint servers such as Zenodo, ArXiv, MedRXiv, PsyArxiv, SocArxiv etc.
  - preregistration of the research plan in a public repository (e.g. OSF, PROSPERO)
  - publication of registered reports prior to data collection where relevant to the discipline.
- Use of open research infrastructure for knowledge sharing and research dissemination
- Actions to increase the reproducibility of your research
  - standardize and document experimental protocols
  - disclose negative results
- Participation in open peer review
  - BMJ, BMC, Royal Society Open Science, Nature Communications, PLOS
- Open collaboration within and beyond the scientific community through public engagement, citizen science, and involvement of end-users

# How is citizen science understood in Horizon Europe?

*Citizen and civil society engagement is a **programme principle and operational objective** that refers to the **opening up of R&I processes to society** to develop better, more innovative and more relevant outcomes, and to increase societal trust in the processes and outcomes of R&I.*
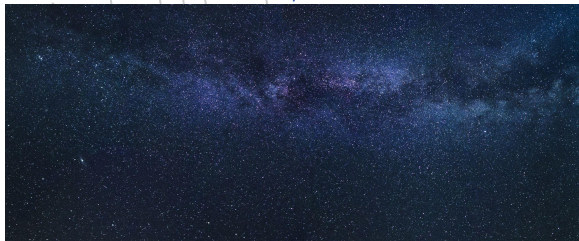
*Engagement can range from the **identification and conceptualisation** of R&I priorities (e.g. through deliberative or other participatory processes), to the **implementation, utilisation and assessment** of R&I results (e.g. through data collection, data analysis, discussion and publication or presenting scientific results, working in fab-labs to develop new innovations, testing innovations and solutions, and evidence-based advocacy).*

- Co-creation: **citizen science or user-led innovation**, involve citizens or end-users directly in the development of new knowledge or innovations, through a range of different levels of participation.
- 'Citizens' should be understood as **individuals acting on their own** initiative and not on behalf of their employer or sectoral interests. It **does not refer to any legal citizenship(s)** that people may or may not hold.
- 'Engagement' means the **involvement** of citizens and civil society in [...] **in co-creating R&I contents** [...].
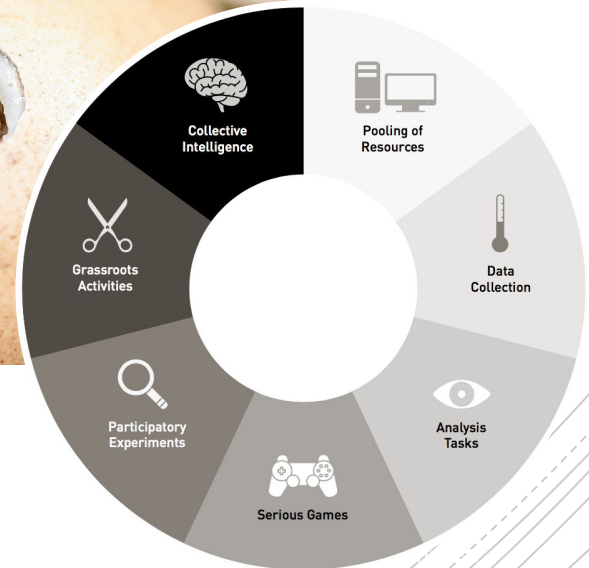
# Pooling of Resources

Sanz et al. 2014, White Paper on Citizen Science for Europe, European Commission

# SETI@home
## (University of Berkeley)

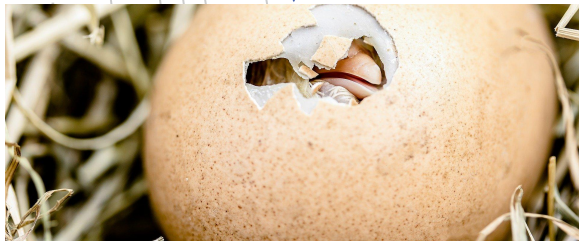Österreich *forscht*
www.citizen-science.at

- SETI@home (Search for Extraterrestrial Intelligence)

  - Computer with internet connection (virtual supercomputer)

  - Programme automatically analyses data from radio telescopes

- How can you participate?

  - Download and install the software

  - Software uses unused computing capacity when there are no other tasks at hand

Picture from Felix Mittermeier by Pexels (https://www.pexels.com/de-de/foto/blauer-und-lila-kosmischer-himmel-956999/)

Collective Intelligence

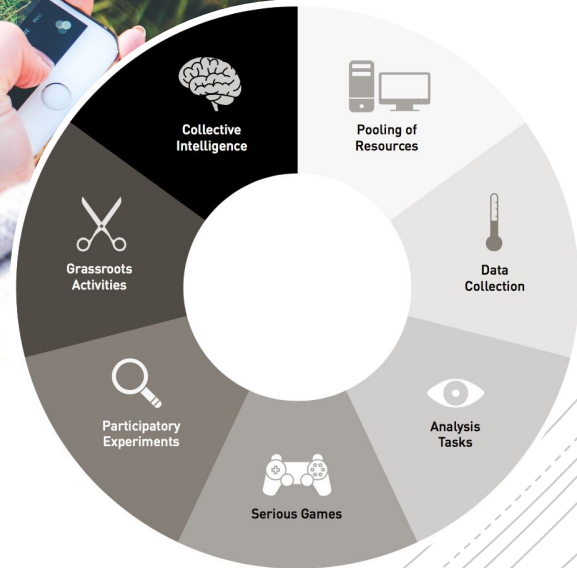Sanz et al. 2014, **White Paper on Citizen Science for Europe,** European Commission

**NestCams**
**(University of Vienna)**

- How are breeding behaviour and breeding success connected in Grey Geese and Northern Bald Ibises?

- Analyzing video clips of breeding birds

- How can you participate?

  - Watch video clips online
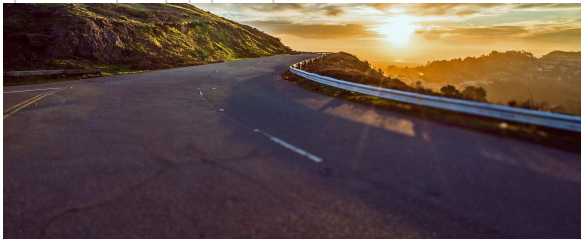  - Describe behaviour (i.e. "code" the behaviour)

# Data collection

Collective Intelligence

Pooling of Resources

Data Collection

Analysis Tasks

Serious Games

Participatory Experiments

Grassroots Activities

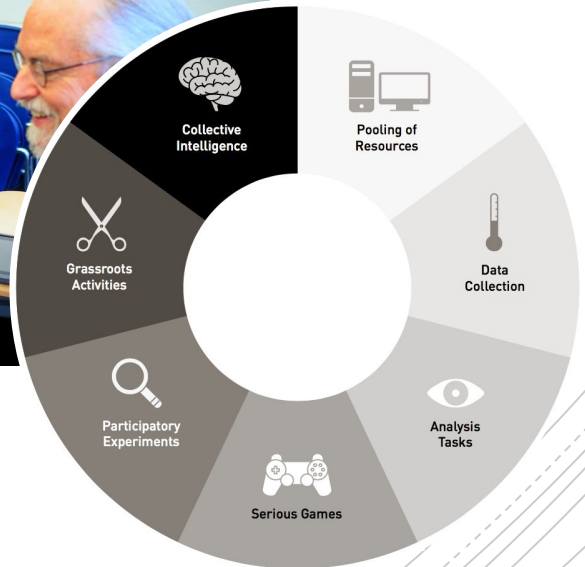Sanz et al. 2014, White Paper on Citizen Science for Europe, European Commission

**Roadkill**
(University of Natural Resources and Life Sciences Vienna)

- Overview on road-killed animals in Austria
  - Create awareness in citizens for roadkill
  - Mitigate hot spots together with NGOs and authorities
- How can you participate?
  - Report roadkills via smartphone apps or website
  - Identify road-killed species

# Analyses

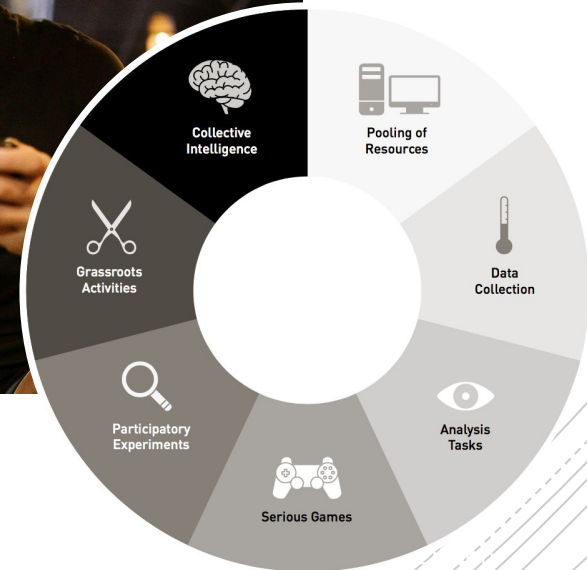Sanz et al. 2014, White Paper on Citizen Science for Europe, European Commission
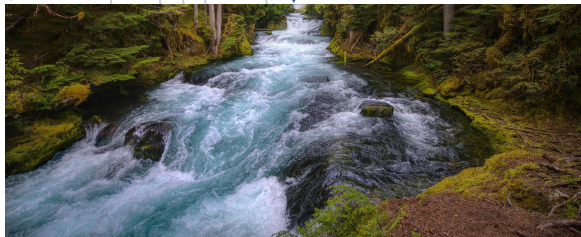
Picture Pile
(IIASA)

- Analyses of land cover through dedicated campaigns (e.g. deforestation of tropical rainforests)

- Contribution to the solution of global challenges such as climate change or malnutrition

- How can you participate?

  - Compare recent satellite images with older ones and identify changes

  - Improving global landscape datasets

Picture from Pixaybay Bild von Rudy and Peter Skitterians (https://pixabay.com/de/photos/baumst%c3%a4mme-holz-protokollierung-498538/)

# Serious Games

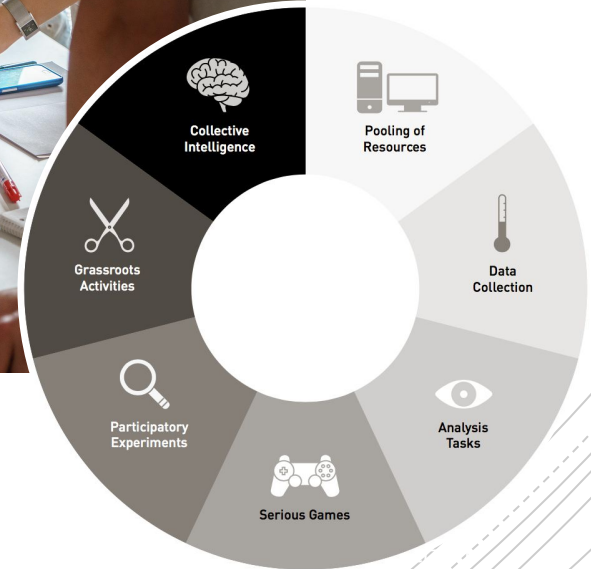Sanz et al. 2014, White Paper on Citizen Science for Europe, European Commission

**Crowdwater**
(University of Zurich)

- Improve forecasting of floods and droughts, soil moisture, waste load…

- How can you participate?
  - Citizen scientists carry out digital water level measurements with the smartphone
  - Crowdwater-Game: Water level images already uploaded are evaluated again by participants using reference images
  - Citizen scientists collect championship points and win prizes

Picture from Pixabay from Hardebeck Media  (https://pixabay.com/de/photos/mckenzie-fluss-zentral-oregon-wald-5129717/)

Participatory Experiments

Sanz et al. 2014, White Paper on Citizen Science for Europe, European Commission
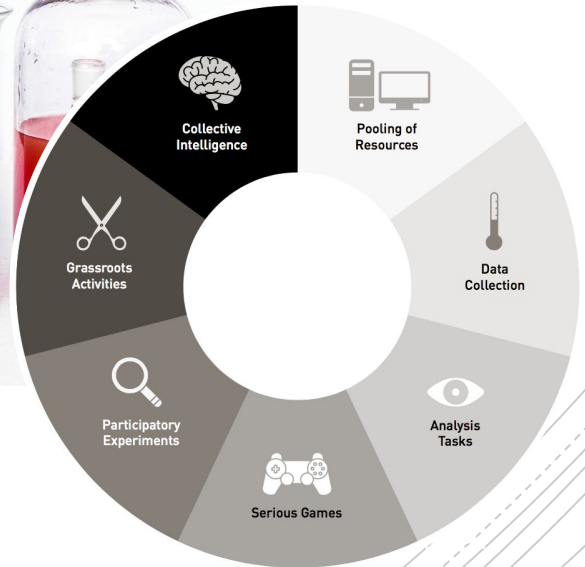
**Mapping for Change**

- Involvement of participants from the beginning to the end of the project (UCL) for positive and sustainable improvement of the environment.

- How can you participate?

    - In concrete projects (e.g. Love Lambeth Air, My Accessible EU...)

    - Send an email with your idea to Mapping for Change and develop a new project together

Bild von mladapo auf Pixabay
(https://pixabay.com/de/photos/london-flug
zeug-landung-2513684/)

# Grassroots activities

Sanz et al. 2014, **White Paper on Citizen Science for Europe,** European Commission

## Project SafeCast

- Project Safecast

- Radioactivity measurements with homemade Geiger counters

- How can you participate?
  - Actively: Order Geiger counter kit, perform measurements, upload data
  - Passively: Use data from other citizen scientists and answer your own questions

Picture by MetsikGarden at pixabay (https://bit.ly/2N3CiA8)

# EU-citizen-science-projects (1/3)

**Projects on citizen science:**

- [CS-TRACK: Expanding our knowledge on Citizen Science through analytics and analysis](#)
- [EU-Citizen.Science: The Platform for Sharing, Initiating, and Learning Citizen Science in Europe](#)
- [NEWSERA: Citizen Science as the new paradigm for Science Communication](#)
- [INCENTIVE: Establishing Citizen Science Hubs in European Research Performing and Funding Organisations to drive institutional change and ground Responsible Research and Innovation in society](#)
- [Time4CS: Supporting sustainable Institutional Changes to promote Citizen Science in Science and Technology](#)
- [Doing It Together science (DITOs)](#)

# EU-citizen-science-projects (2/3)

**Environmental citizen science projects:**

- [CitieS-Health: Citizen Science for Urban Environment and Health](#)
- [ACTION: Participatory science toolkit against pollution](#)
- [D-Noses: Distributed Network for Odour Sensing, Empowerment and Sustainability](#)
- [CROWD4SDG: Citizen Science for Monitoring Climate Impacts and Achieving Climate Resilience](#)
- [WeCount: Citizens Observing UrbaN Transport](#)
- [EnviroCitizen: Citizen Science for Environmental Citizenship: Backyard Birding and the Potential for Cultivating Green Engagement](#)

# EU-citizen-science-projects (3/3)

**Technological citizen science projects:**

- [CSI-COP: Citizen Scientists Investigating Cookies and App GDPR compliance](#)
- [FRANCIS: Frugal Innovation by Citizens for Citizens](#)


**Citizen science projects from the humanities/social sciences:**

- [CoAct: Co-designing Citizen Social Science for Collective Action](#)
- [COESO: Collaborative Engagement on Societal Issues](#)

# EU-Citizen.Science

- establishing EU-Citizen.Science as knowledge and community-platform for CS
- Deepening of the CS-knowledge base
- Empowerment of diverse stakeholder to start their own CS-activities
- Connecting and strengthening CS and policy making
- Mainstreaming CS in public engagement



Screenshot from EU-Citizen.Science

# Links

- European Citizen Science Association
  - [WG Citizen Science Networks](#)
  - [EU-Citizen.Science](#)
    - [Trainings/MOOCS](#)
    - [Organisations](#)
- National citizen science project platforms/portals/networks, e.g.
  - Austria: [Österreich forscht](#)
    - [Projects](#)
    - [Blog](#)
      - [Publications](#)
      - [Events](#)
    - [Conference](#)
  - Germany: [Bürger schaffen Wissen](#)
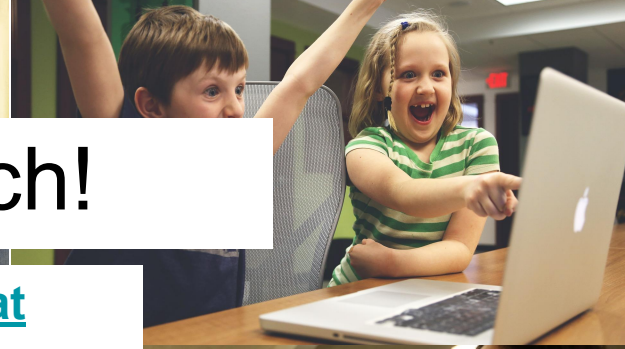  - Spain: [Observatorio de la Ciencia Ciudadana en España](#)

# Links and publications

- Books:
  - [Citizen Science: Innovation in Open Science, Society and Policy](#)
  - [The Science of Citizen Science](#)
- Papers:
  - [Co-Creating and Implementing Quality Criteria for Citizen Science](#)
  - [Peer-reviewed publishing of results from Citizen Science projects](#)
  - [Opinion: Toward an international definition of citizen science](#)
  - [The threefold potential of environmental citizen science](#)
  - [Citizen Science Terminology Matters: Exploring Key Terms](#)
  - [Contours of citizen science: a vignette study](#)
  - [The Open Innovation in Science research field: a collaborative conceptualisation approach](#)

# Thank you very much!

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