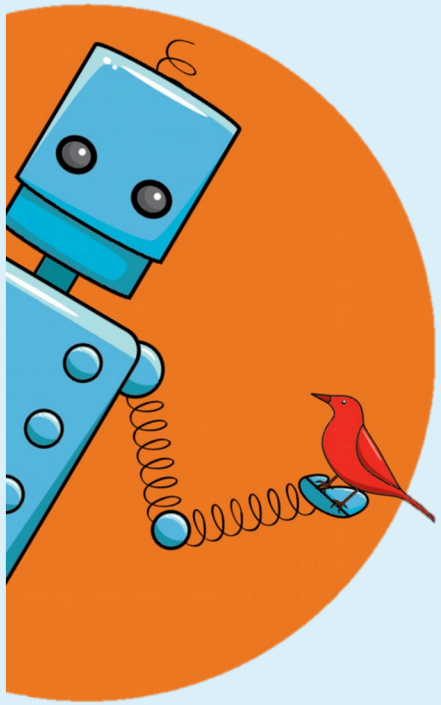


Research Libraries as Hubs for Citizen Science

Darlene Cavalier
Professor of Practice, Arizona State University

Thomas Kaarsted
Director, SDU Citizen Science and Deputy Library Director

Anne Kathrine Overgaard
Head of Research Support and Innovation, SDU Health Science

Today’s presentation

Why Citizen Science?

ASU, Scistarter.org and public libraries

Citizen Science and research libraries

The case from SDU Library

What is citizen science?

A global movement that enables people from all walks of life to contribute to real scientific research in collaboration with scientists.

Citizen Science can involve...

Observing	Biodiversity, Night sky
Monitoring	Air quality, Pollinator activity, Bird Migration
Measuring	Water quality, Light pollution, Marine debris
Analyzing	Online Data, Trap camera images
Collecting	Biological samples

in your backyard, while exploring your interests, through your hobbies, with your family, and more!

Citizen Science is Serious Science

Because of citizen scientists …

We know the human belly buttons contain 50+ species of bacteria *(Belly Button Biodiversity, 2012)*

3.5 months of lab-equivalent research was completed in one weekend through 2,566 hours of volunteer participation *(Stall Catchers, 2019)*

Hundreds of exoplanets have been discovered, including "Percival," an exoplanet in a habitable zone *(Planet Hunters TESS, 2024)*

126 birds species identified as "lost to science" *(iNaturalist, eBird, Xeno-canto, 2024)*

We've discovered that some invasive ants spread by hitchhiking *(Taiwan, 2024)*

Because of citizen scientists …

ZOONIVERSE

THE ZOONIVERSE WORKS

840,556,298

CLASSIFICATIONS SO FAR

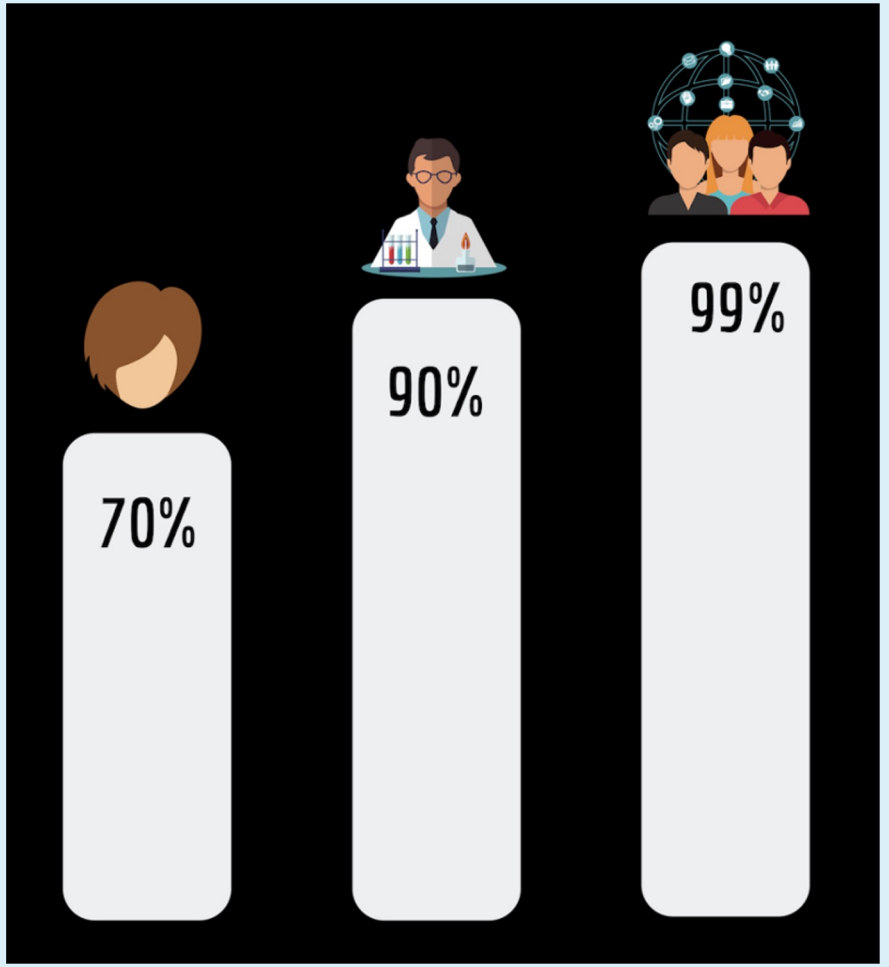
2,772,015

REGISTERED VOLUNTEERS

iNaturalist

214,281,494 OBSERVATIONS

3,391,992 OBSERVERS



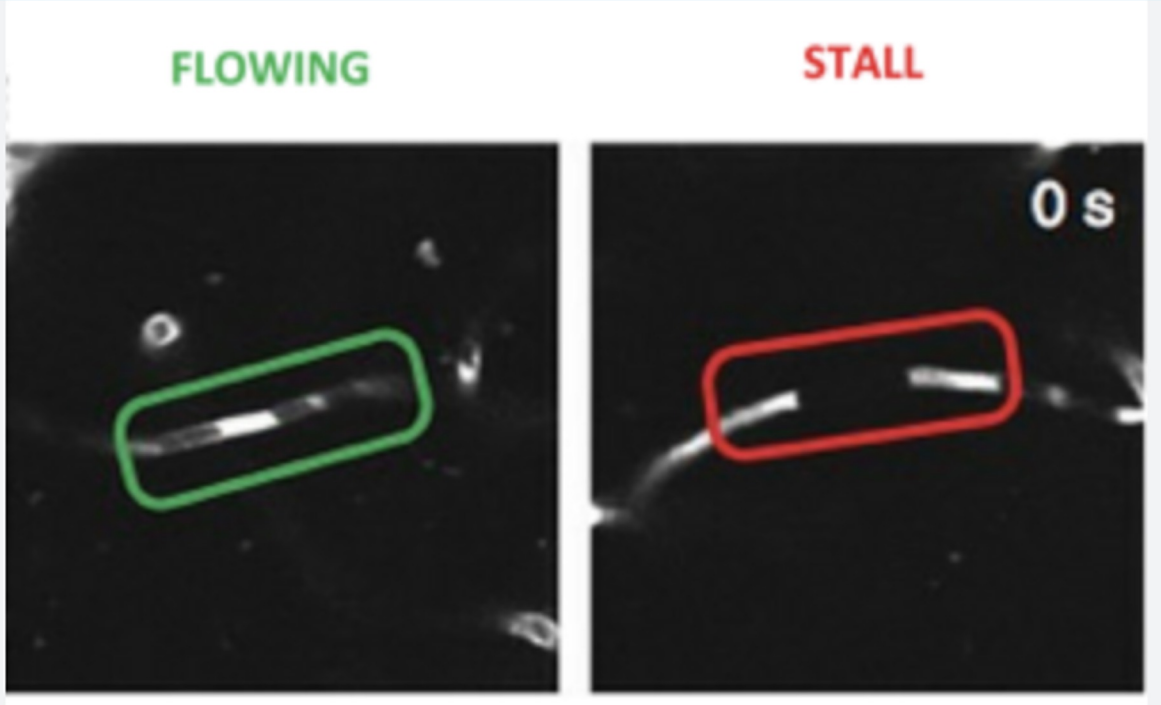
crowd answers →

99% accuracy!

Pietro Michelucci
Human Computation Institute

Because of citizen scientists …

Stall Catchers citizen science project



16.9 million annotations. Analysis has helped answer key questions about **why brain blood flow is reduced** in Alzheimer's patients, **how it affects their cognitive function**, and how we might **develop a treatment t**hat restores blood flow.

Playing to strengths

Machines	Humans
Counting	Inference
Precision	Visual Perception
Objectivity	Linguistic Ability
Calculation	Abstraction
Persistent Storage	World Knowledge
Data Integrity	Sociocultural Awareness
Process Execution	Creativity

Slide by Pietro Michelucci
Human Computation Institute
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Professional Associations

Journal

Policy

Degrees

Certificates

Careers

Crowdsourcing and Citizen Science Act of 2016

This bill authorizes executive agencies to:

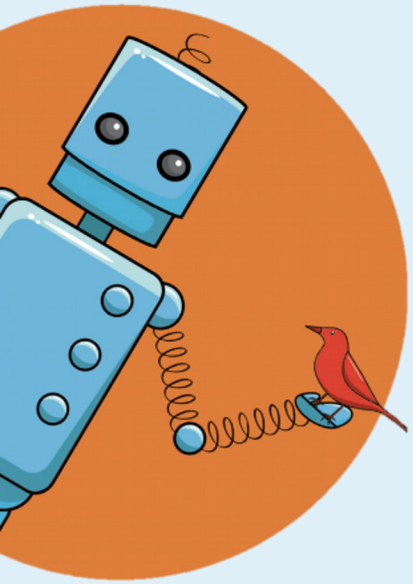
- use crowdsourcing and citizen science approaches to conduct activities designed to advance their missions,
- accept volunteer services performed as part of a crowdsourcing or citizen science project, and
- enter into an agreement to share administrative duties for such activities with private sector entities or state, tribal, local, or foreign government agencies.

Agencies shall: (1) make public and promote such projects to encourage broad participation of consenting participants, and (2) endeavor to make data collected through such projects open and available, in machine readable formats, to the public.

The General Services Administration shall identify and develop relevant products, training, and services to facilitate the use of crowdsourcing and citizen science activities.

What could you do with 2,000 field assistants?

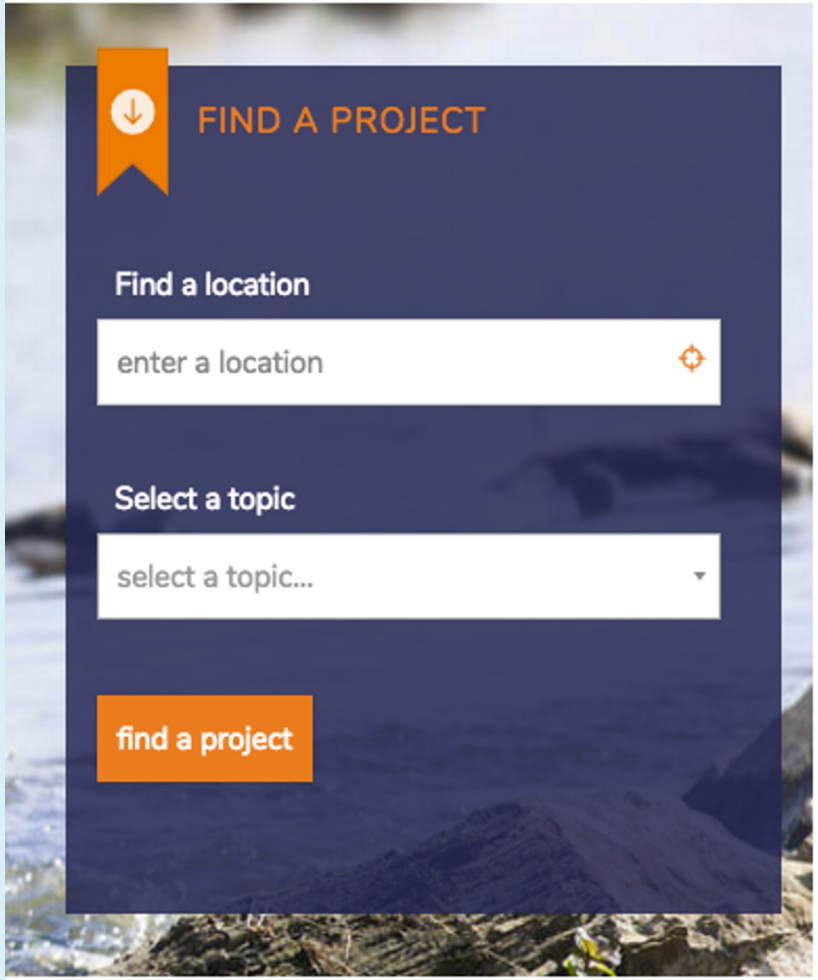
North Carolina State University offers a competition open to any researcher anywhere to have their participatory research project featured by the Citizen Science Campus to extend its reach. The selected project will receive $2,000 toward an undergraduate research assistant, logistical guidance, advertising support, and more.



The Role of SciStarter

SciStarter connects millions of people to thousands of projects in need of their help.

SciStarter
Science we can do together.



Project Finder

Enter a word or phrase

Enter a location

All Activities

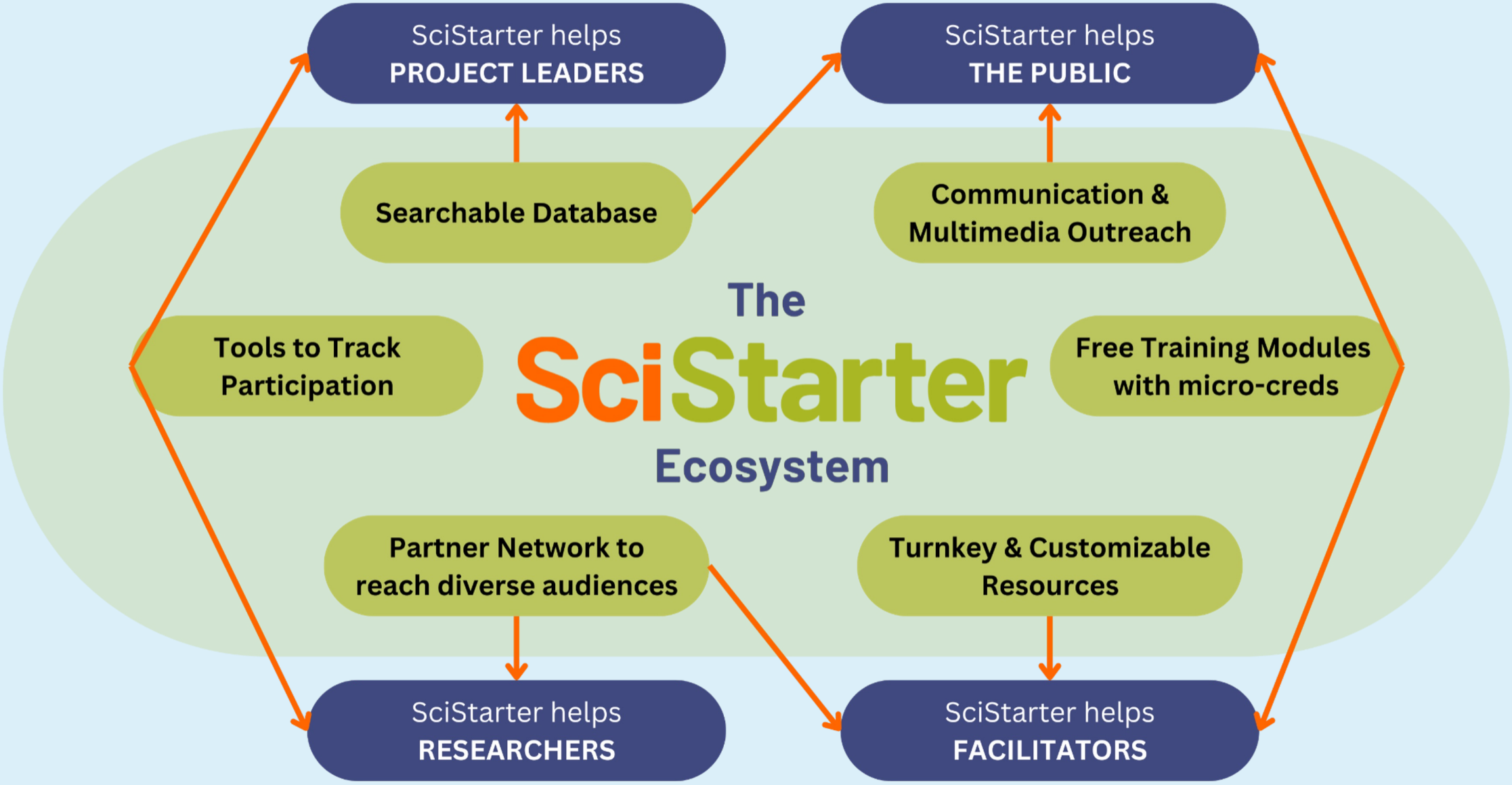
All Topics

×has classroom materials

×elementary school (6-10 years)
×middle school (11-13 years)
×high school (14-17 years) ×college
×adults ×seniors

clear form | find projects

SciStarter
Science we can do together.

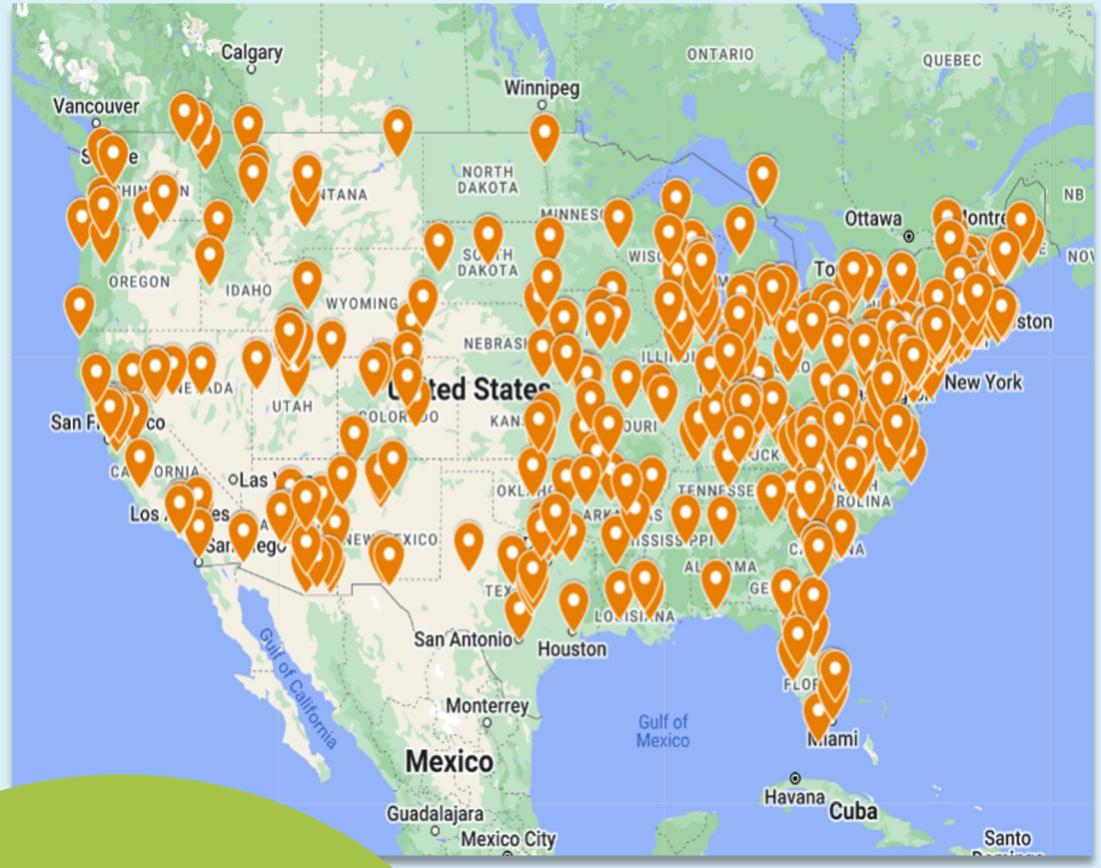


Core Partners

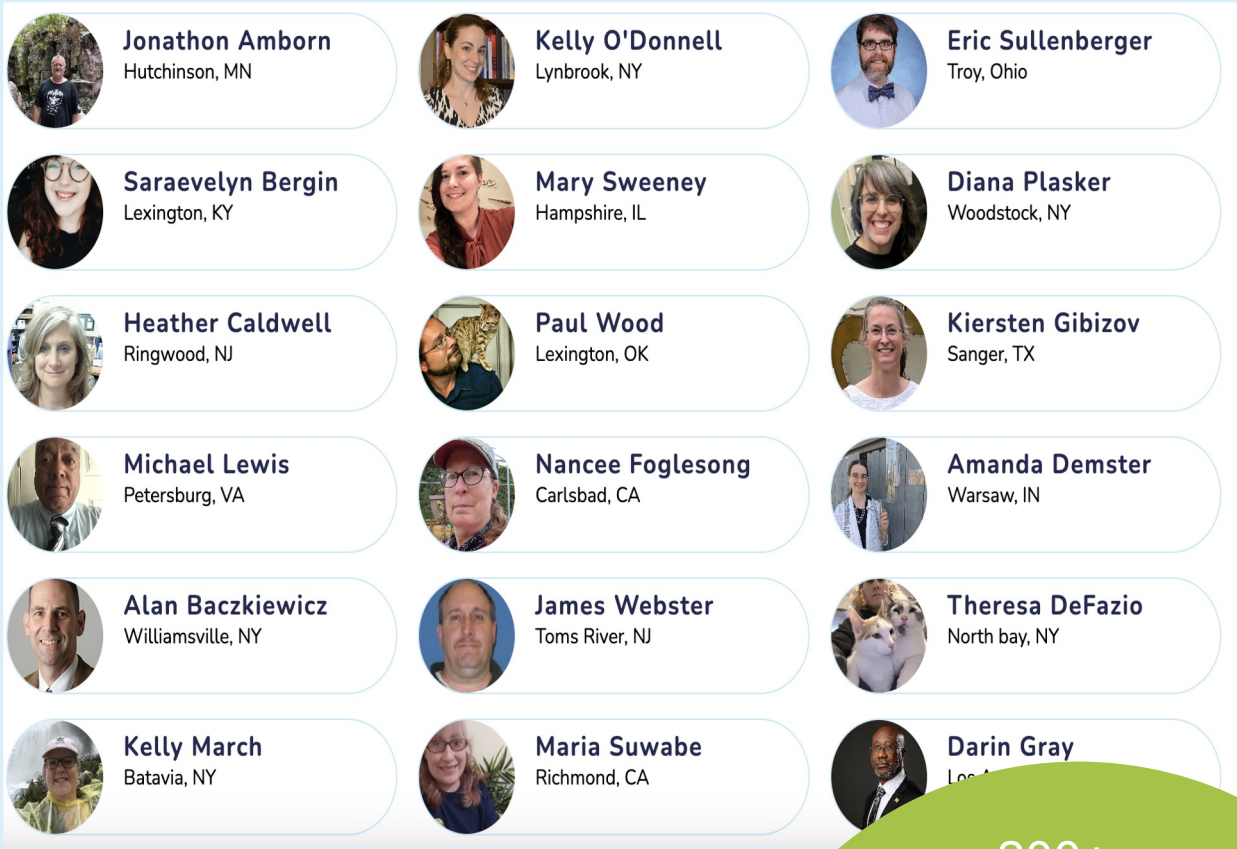
New from SciStarter
Science we can do together.
&
ASU School for the Future of Innovation in Society
Arizona State University

CHECK IT OUT!
CITIZEN SCIENCE
AT YOUR LIBRARY

Citizen and Community Science Library Network



SciStarter Ambassadors



~1,000 Libraries!

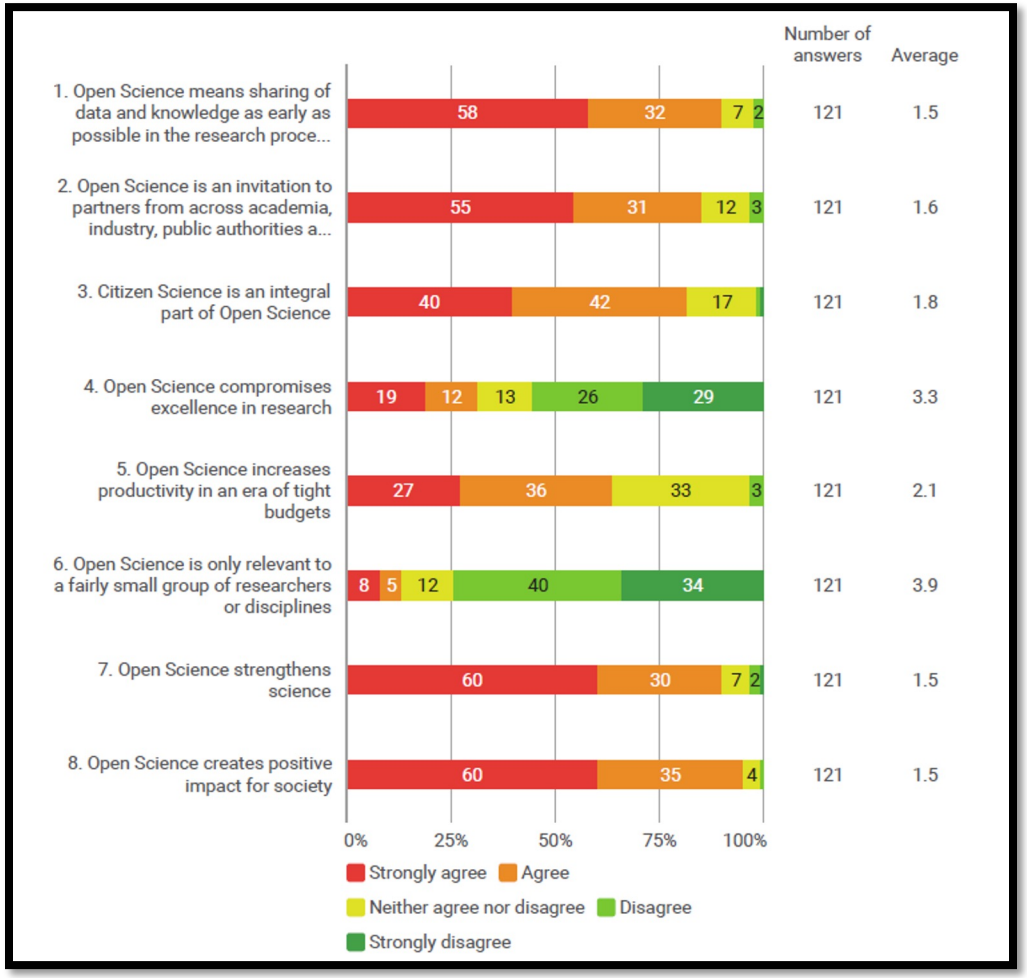
SciStarter.org/ambassadors
SciStarter.org/library

200+ Ambassadors

How can research libraries support Citizen Science?

Citizen science at universities: Trends, guidelines and recommendations

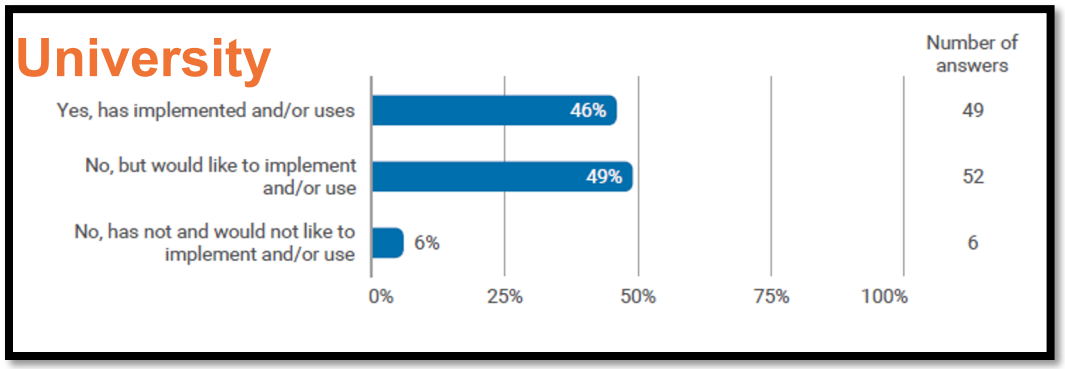
What libraries in Europe report:

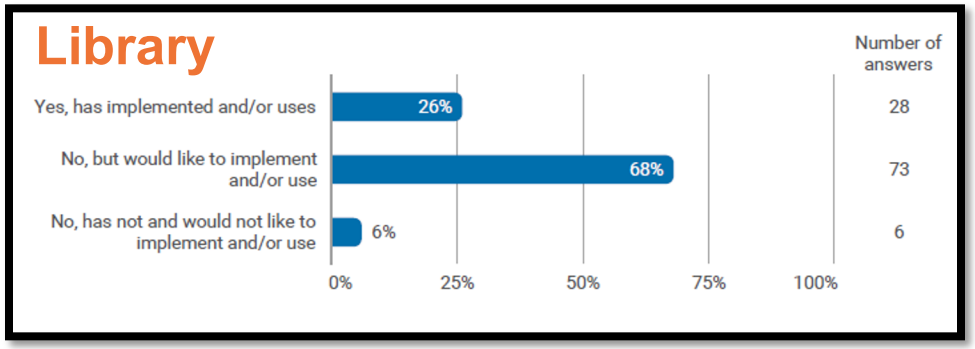


- The overall trend displayed here is a very high awareness and endorsement of OS principles
- 80% or respondents agree that CS is an integral part of open science
- Concerns about ethics and data quality:
  - *37% of respondents agree that CS leads to reduced data quality*
  - *Citizen Science gives rise to ethical considerations in research. To this, 59% of respondents agreed (18% strongly)*

Kaarsted, T.; O. Blake; K.N. Nielsen; B. Alving; L.T. Rasmussen; A.K. Overgaard; S.M.B. Hansen (2023): How European Research Libraries Can Support Citizen-Enhanced Open Science. *Open Information Science*, vol. 7, issue 1. https://doi.org/10.1515/opis-2022-0146

Potential and Practice





- This shows that there is CS potential already within some universities, but the library is not yet involved
- 23% or respondents are beginning to experiment with CS, while a large majority are not currently employing CS but would like to begin
- 8% consider CS a core service

Overall findings

High level of understanding of Open Science

Elements of open science are commonplace among the sample and are being implemented

Understanding of Citizen Science is high

However, lack of implementation and key barriers

Resources and policy are lacking

Many transferable skills that could benefit CS – easy wins to be exploited – identify these moving forward

Skills in Citizen Science

a. Advocacy
b. Project coordination
c. Project management
d. Arranging events
e. Facilitation of workshops
f. Teaching
g. Evaluation
h. Writing or assisting in grant proposals
i. Communication incl. SoMe, web, posters, flyers etc.
j. Research data management
k. Publication of FAIR data
l. GDPR
m. Societal impact

Reported skills European research libraries (2023)

Key skills exist

In one section of the survey, focus was on skills and competencies within the respondents' libraries, as well as assessing barriers to developing CS. The results from the question presented in Figure 1 show a high level of skills across varied areas within libraries.

- Over three quarters of respondents indicate they have skills in advocacy, arranging events, facilitating workshops, teaching, and communications. These are all core transferable skills for citizen enhanced open science.
- Between 50-74% of respondents record skills in the following seven areas: project coordination, project management, evaluation, research data management, publishing FAIR data, preservation of data and protocols, and GDPR.
- The only areas with less than 50% of respondents indicating competencies are writing grant proposals and other.

Skills: Conclusion

Research libraries seem uniquely positioned if they were to engage in Citizen Science projects, building research support services and engaging and/or communicating with the public.

Barriers exist

When asked about the main barriers to the library's engagement with OS and CS, respondents could rank a list of 7 options on a Likert scale.

- Lack of resources (82% in agreeance)
- lack of external funding (76% in agreeance)
- and lack of administrative resources (70% in agreeance),

Also, the personal journey of library directors

LIBER Citizen Science Working Group

Introduction

Citizen Science, or the participation of the general public in the scientific research process, is an important element in establishing new links between science and society. There are several ongoing efforts to create a definition for citizen science or to adopt the best terminology for public engagement in research activities.

One good description of citizen science used by the European Commission is:

> Citizen Science refers to the general public engagement in scientific research activities when citizens actively contribute to science either with their intellectual effort or surrounding knowledge or with their tools and resources.

The LIBER Roadmap to Open Science makes a set of four strong recommendations to European research libraries, recommendations which remains guidelines for our working group.

Join our group

Are you passionate about Citizen Science, and how we can support research librarians in acquiring the training they need? We need your energy!

Contact us

Group chairs

View all group members

Tiberius Ignat

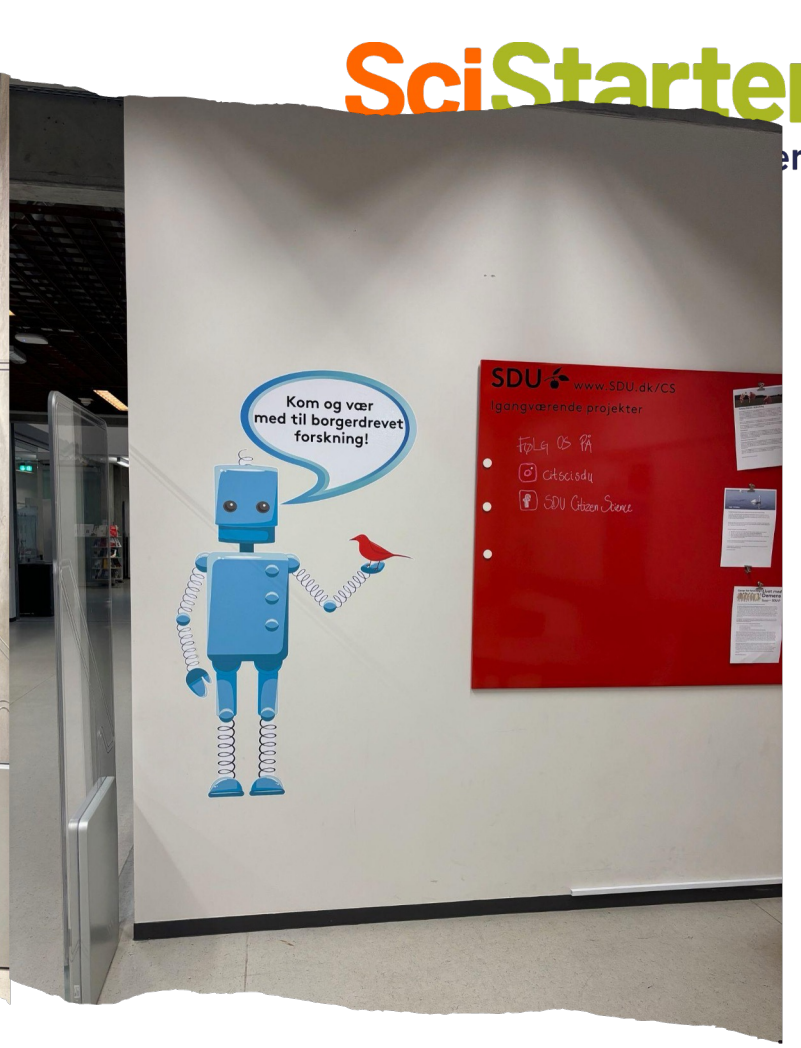
Scientific Knowledge Services (SKS)
Switzerland, Director

SciStarter
Science we can do together.

Research Libraries and Citizen Science:
Is it worth the trouble?

Research Libraries makes a difference for research and researchers in the new research and funding landscape

SDU



- Citizen Science Center in the Research Library
- Is Citizen Science really important?
- Why disturb the research libraries?
- How can research libraries play a crucial role in supporting researchers using Citizen Sciece methods?
- What about the gap identified in the project mentioned before?

The SDU Citizen Science Knowledge Center 2021

Push-strategy with a close link to top-management

Key push-factors:
Pilots with top-professors, collaboration library-faculty, partnerships, stubbornness, hard work, ..

Why promote Citizen Science

- CS can contribute to excellence
  - Enlarged scope of R&I through additional research questions
  - Higher quantity and quality of data collected
  - More angles of discussion and analysis
  - Increased robustness, if high quality methodology
- CS can contribute to effectiveness
  - R&I more closely aligned with needs, values and expectations of society
  - Triggering behavioral changes
  - More likely to lead to quicker and larger uptake of R&I results
- CS can contribute to trust in science
  - Opening R&I systems to society
  - More variety on supply side
  - Increased transparency and mutual learning

Gabrielle Leo, Policy Officer, EU Commision, CERN 2023

Library roles in the future?

Connection between Open Science (OS), Citizen Science (CS), and Societal Impact

Societal Impact of Open Science (OS):

- The review highlights that OS generates a variety of societal impacts, including improvements in education, awareness, climate and environmental action, policy and governance, equity and empowerment, health, and public trust in research.

Dominance of Citizen Science (CS) in Impact Evidence:

- The evidence of societal impact is predominantly linked to CS initiatives.
- CS directly impacts societal issues by engaging the public in research and data collection, which often leads to behavioral changes and empowerment within communities.

The article underscores the importance of CS in achieving societal impacts through OS.

Cole et al. (2024): https://doi.org/10.1098/rsos.240286

What is societal impact??

*‘**Societal impact refers to the ways in which research contributes to developments in society** and **research can have impact in society in many ways**.’*

SDU

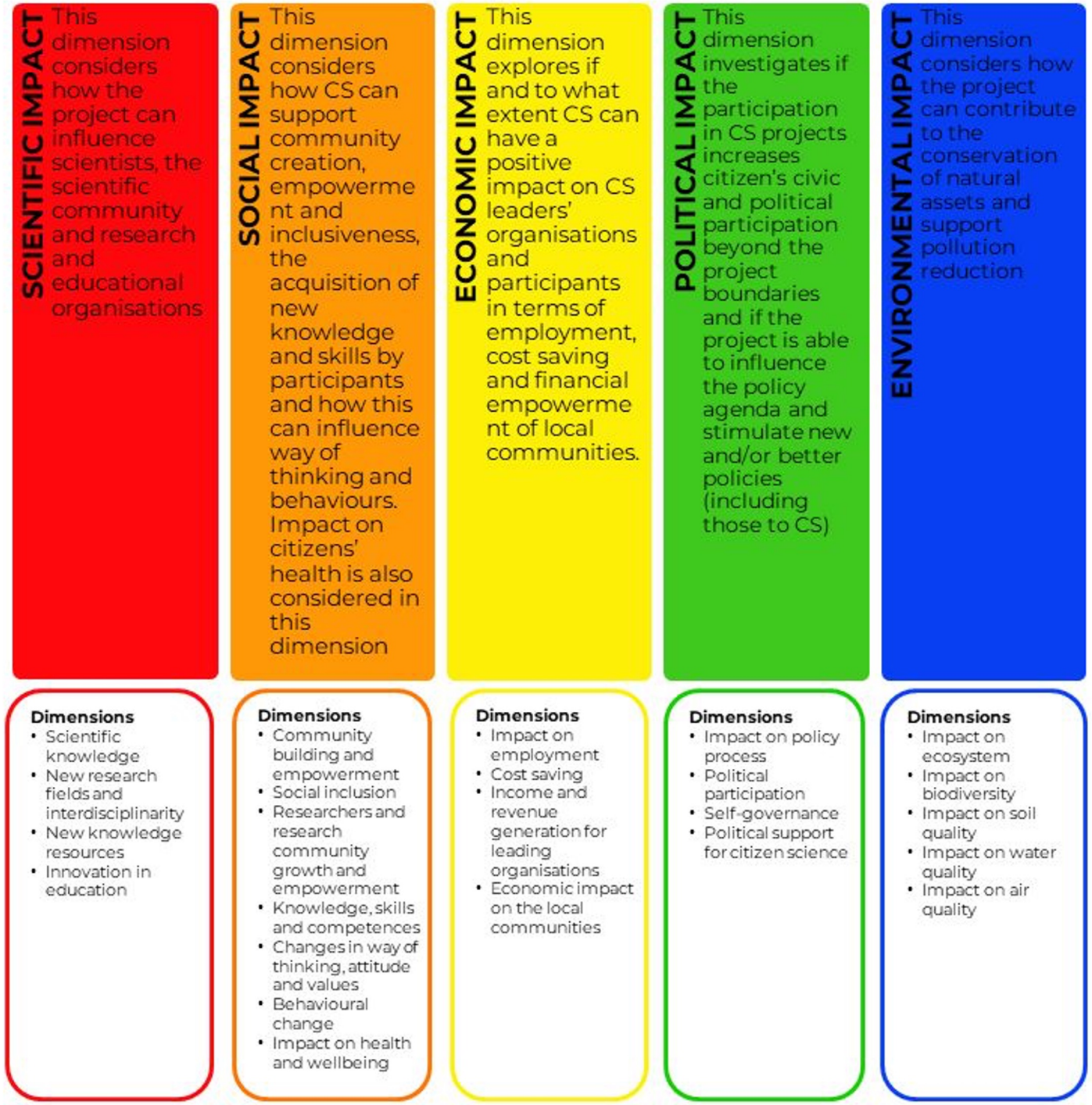
IMPACT & Money

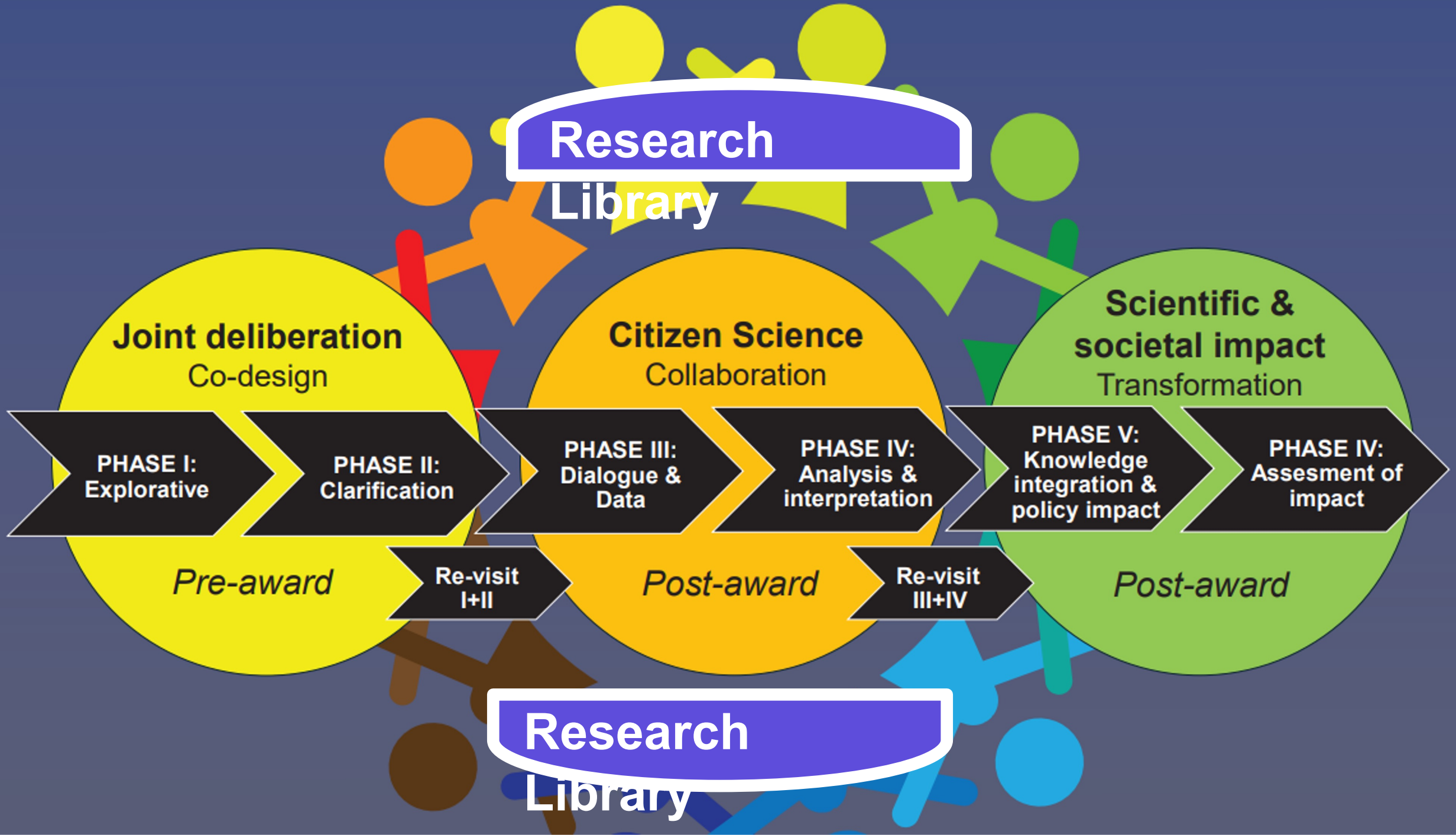
Researchers **need** external funding!

External funders ask for impact - both scientific and societal impact. And for involvement of citizens and relevant stakeholders to ensure and anchor societal impact.

Citizen Science can be a lever for both! But researchers need support...

Source: Passani et al. (2022): A participatory, multidimensional and modular impact assessment methodology for citizen science projects



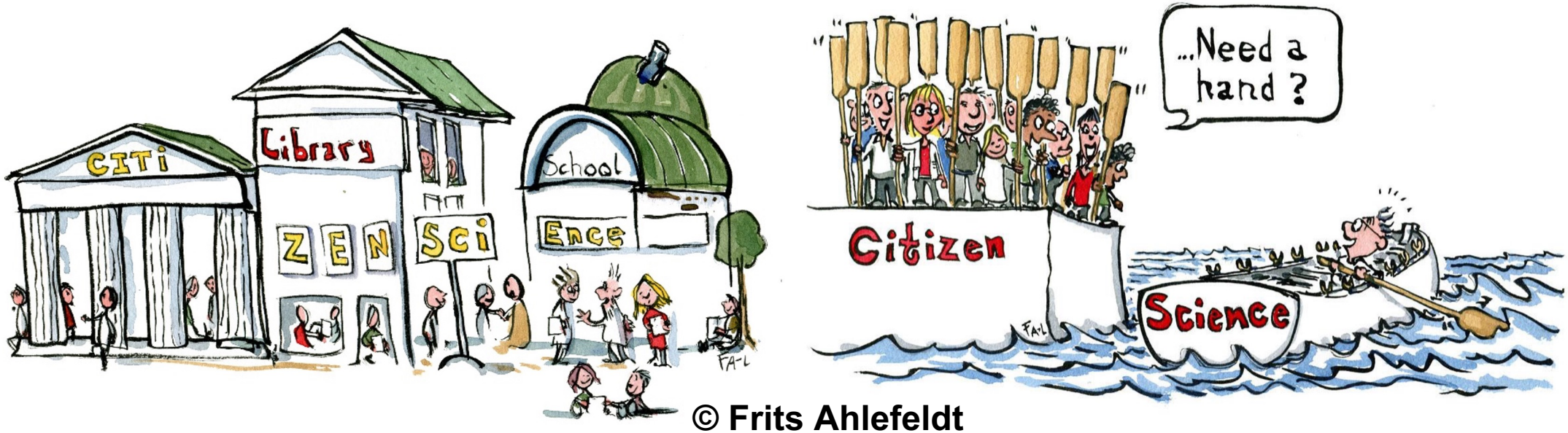

Research Library
Joint deliberation
Co-design
Citizen Science
Collaboration
Scientific & societal impact
Transformation
PHASE I: Explorative
PHASE II: Clarification
PHASE III: Dialogue & Data
PHASE IV: Analysis & interpretation
PHASE V: Knowledge integration & policy impact
PHASE IV: Assesment of impact
Pre-award
Re-visit I+II
Post-award
Re-visit III+IV
Post-award
Research Library

Research Libraries in this landscape

– at least in Europe

..

© Frits Ahlefeldt



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The answer:

Researchers need both the Research Libraries AND the citizens to reap the benefits of citizen science!!

- as well as the research advisors and grants-writers ..

And Research Libraries can tie the knot in this collaboration!

SDU externally funded projects (with CS)

Our History (Velux)

Lakes in Spare Time (Villum)

PACA (SDU Climate Cluster)

B-Shapes (Horizon Europe)

CEOS_SE (Erarmus+)

EPICUR (WP5)

VILPA (Danish Heart Foundation)

AntCom (Marie Curie Network)

Climate Blue (InterReg)

FUSION (InterReg)

To overcome the barriers:

Sustainable Citizen Science support at research libraries can be achieved when the library takes the role to tie the knot in the collaboration between researcher, citizens, other stakeholders, research advisors/grant-writers - AND USE EXTERNAL FUNDING TO GENERATE THE NEEDED RESSOURCER AND FUNDING TO BRING THEIR SKILLS AND COMPETENCES IN PLAY IN CITIZEN SCIENCE PROJECTs!

And in this way supporting both scientific and societal impact ..

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Thank you!