



ITHAKA S+R



apereo



ALFRED P. SLOAN
FOUNDATION

This material is based upon work supported by Alfred P. Sloan Foundation under Grant No. G-2025-25223."

Findings from a Workshop on Sustaining Open Source Software in the Research Enterprise

Chelsea McCracken

Researcher

Ithaka S+R



"This material is based upon work supported by the National Science Foundation under Grant. No. 2512157. Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation."

Winter 2026



Agenda

1

Introduction

- Workshop overview
- Executive summary

2

Detailed reporting

- Defining sustainability
 - Motivational
 - Archival
 - Relational
 - Infrastructural
- Challenges & proposed solutions
 - Barriers to open culture
 - Attributing responsibility
 - Measuring usage
 - Value proposition
 - Extra-institutional support

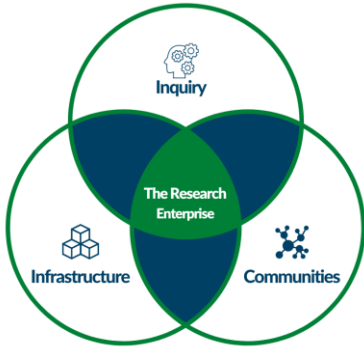




We help academic and cultural communities know what is coming next, learn from rigorous and well-designed research studies, and adapt to new realities and opportunities.



Ithaca S+R's Research Enterprise Program



Selected Recent projects:

- University Open Source Program Offices
- AI Implementation and Governance at Emerging Research Institutions
- Coordinating Research Data Support Services Across Campus
- Leveraging Data Communities to Advance Open Science
- University Research Workforce Tracker



Project Overview

Much of the research that takes place throughout the research enterprise—in higher ed, government labs, and private industry—relies on open source software (OSS).

A subset of this OSS, open source research software (OSRS), is often developed in colleges and universities by researchers themselves, and ensuring its continuing availability is important for the transparency and replicability of open science.

However, existing strategies for sustaining open source software do not always work for OSRS, particularly in the higher ed context.

With generous funding from the National Science Foundation, Alfred P. Sloan Foundation, and a gift from Chan Zuckerberg Initiative, we convened a workshop for stakeholders to explore solutions to this challenge.

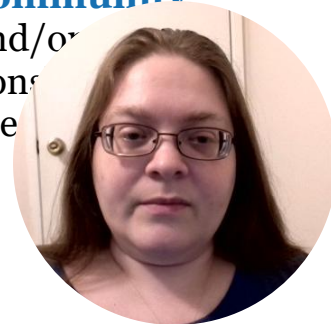


Project Activities

- **Sustaining Open Source Software in the Research Enterprise (SOSSRE)**
 - One-day, in-person workshop
 - August 8, 2025
 - Offices of ITHAKA, New York, NY
- Organized by Ithaka S+R and the Apereo Foundation
- Total of 39 participants including open source experts in research, higher education administration; private industry; and nonprofits

Project Goals

- **Define sustainability** in the context of OSRS and articulate unique sustainability challenges and resources in that context.
- Identify potential **methods for sustaining OSRS** within higher education, determine their feasibility, and prioritize them for implementation.
- Strengthen a **sense of community** among people who use and/or contribute to OSRS and catalyze relationships between this group and peer OSS communities.



Current Status

- Today we are reporting out from the workshop, focusing primarily on ideas and observations made by participants.
- In early 2026, we will publish two deliverables:
 - Final public report sharing our findings and recommendations
 - A practical guide focused on workflows and decision frameworks



Executive summary



Executive summary (1/3)



- **Software as scholarship.**

Existing incentive structures for researchers do not adequately acknowledge the scholarly value of OSRS. A movement to reform incentives to recognize software as a research artifact and to transform existing citation practices and requirements throughout the research enterprise would improve sustainability.



- **Value of collaboration.**

As the research enterprise as a whole trends towards collaboration, open source practices and communities can serve as a guide for researchers. Developers of open source research software who form interdisciplinary teams may experience sustainability benefits.



- **Student workforce development.**

Students have much to contribute to the open source workforce given their willingness to do mundane tasks in service of their own learning. Students also have much to gain from real-world experiences with OSS. This alignment between open source goals and the university mission creates opportunities for sustainability.



Executive summary (2/3)



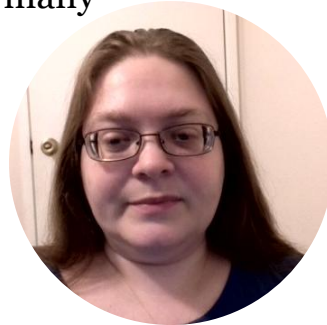
- **Funding OSS as infrastructure.**

Perpetual grant funding is not a recommended approach to ensure sustainability for most OSRS. Funding models comparable to those of buildings and utilities may be a better approach. Many potential models could work, including government budget line items, endowments, new funding models for grants, institutional membership dues, stock options, and user donation subscriptions. While not all these ideas are feasible in the short term, the common underlying factor is the provision of a continuous, reliable funding stream that OSS projects could rely upon.



- **Software catalogues.**

A key challenge for OSRS sustainability is discovery. A system for categorizing and tagging software—likely developed by an entity outside the academy—would improve many sustainability challenges, although it is not clear what model would be most effective.



Executive summary (3/3)



- **Institution-wide coordination.**

OSRS sustainability benefits when there is some central point for institutional OSS activity. Whether that is an administrator, an Open Source Program Office (OSPO), a Tech Transfer Office (TTO), or the library, it is valuable to have someone at an institution whose job it is to advocate for open source.



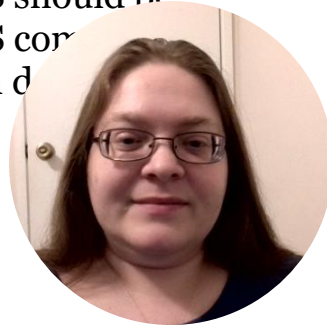
- **Thinking beyond the institution.**

For researchers seeking to sustain OSRS, opportunities abound outside the limits of their own institutions.



- **Sector-wide standards.**

Sustainability differs depending on the goals of the project: while some OSS should be actively maintained indefinitely, others should be documented and archived. The OSS community would benefit from collectively developing a set of standards whereby researchers can determine which of these two categories their project belongs to at a given time.



Defining sustainability in OSRS

In the SOSSRE workshop's morning sessions, participants examined the concept of sustainability and its relevance to OSRS with an eye toward understanding the challenges to be solved.



Approaches to defining sustainability in OSRS



Motivational: Sustainability is defined by the goals of the software and the individual incentives of the people working on it.



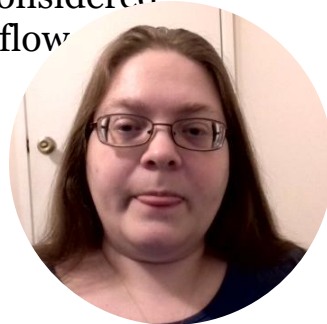
Archival: Sustainability is defined by preservation in the scholarly record and is conceptualized as similar to cataloguing and documenting the provenance of historical artifacts.



Relational: Sustainability is defined by the strength and resilience of relationships between people and depends on the leadership and culture of communities.



Infrastructural: Sustainability is defined by the extent to which software is considered to be infrastructure, a communal resource to which other communal resources flow



Why sustain a project?

- Defining sustainability requires understanding **the goal of sustaining** an OSRS application.
- **One user vs. many:** Sustainability for purpose-built OSRS to solve a specific research problem—**“Q-tip software”** — means documenting and archiving it. Sustainability for reusable **“hammer software”** means designing for reuse.
- Sustainability is also defined differently based on **real-world impact** and **adaptability**.



Motivations of workers

- Defining sustainability requires understanding **why people choose to spend their time** working on an OSRS application.



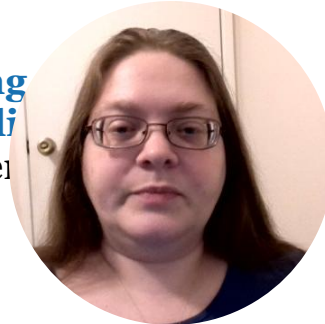
“Fun”: Workers may find it difficult to do the mundane tasks required for sustainability.



“Profit”: Goals may not align with the project, or they may be difficult to retain.



In academia, **learning promotion**, and **utility** motivate OSRS workers.



Archival sustainability: OSRS in the scholarly record

- Sustainability is defined by ensuring that OSRS is catalogued, tracked, and properly attributed.



Since OSRS is used to produce research findings, it must be **discoverable** to be sustainable. This is especially true for publicly-funded research. But OSRS lacks standardized cataloguing systems.



It is often difficult to assess the **trustworthiness** of an OSRS application to determine whether it should be used for a research task. While **usage** could be an indicator of trustworthiness, it is notoriously difficult to track.



OSRS cannot be properly cited without attributing it to someone, but it can be difficult to determine **ownership** of an OSRS application (the researcher(s)? institution? t



Relational sustainability: A functional community

- Sustainability is defined by having a dedicated worker community that persists over time. Challenges include:



Change management: Lack of standardized playbooks for sustainability. Communities can struggle to persist through change.

Governance: Communities should be democratic and welcoming to new members to be sustainable.



Leadership: Strategies for changing leadership over time are helpful for sustainability.



Communication: “Non-negotiable” quality of sustainable communities.



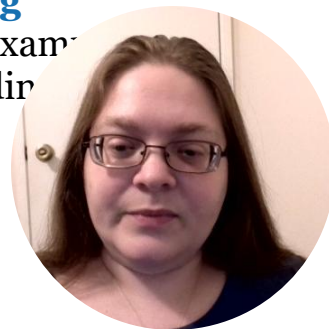
The commons

- Sustainability is defined by whether OSRS is categorized as infrastructure.
 - **Awareness:** Stakeholders in the research enterprise are often **unaware** of the resources required to sustain the open source infrastructure they rely on.
 - **OSRS as an ecosystem:** Sustainability challenges include determining responsibility and understanding dependencies.



Funding

- In this view, sustainability means a continuous, reliable funding stream.
 - **Year-to-year and grant funding** can create sustainability problems. While a few OSRS have been successful at operating this way long-term, for most it does not work.
 - Participants pointed to **funding models for existing infrastructure** as examples of how sustainable funding can be defined elsewhere



Summary of challenges

Challenge 1: How can we overcome researchers' cultural barriers to open culture?

Challenge 2: Who should be responsible for sustaining OSRS?

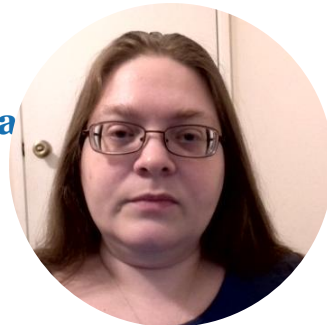
Challenge 3: How can we know who is or could be using an OSRS product?

Challenge 4: What is the value proposition for universities? Why should they prioritize OSRS?

Challenge 5: What extra-institutional support is needed to sustain OSRS?



Proposed solutions represent brainstorming, not screened for feasibility.



1: How can we
overcome
researchers' cultural
barriers to open
culture?



Proposed solutions

Credit for software

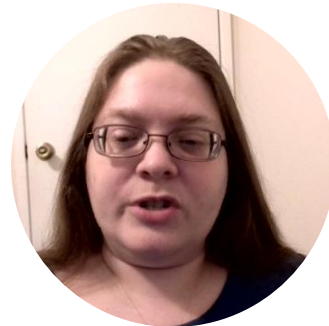
Reforming incentives

- Funder-required software deposit & citation
- Training and support for software citation
- RTP reform

Community norms

Community management

- Creating and updating codes of conduct for international participants
- Best practices for internal communication



2: Who should be responsible for sustaining OSRS?



Proposed solutions



Project level:

Individual researchers and users



Institutional level:

Institutional leaders and institution-level offices



Research enterprise level:

Government and private sectors, funders and NGOs, academia-adjacent networks

Importance of student labor

Coursework, independent study, internships, work-study, fellowships

Campus coordination

No consensus on who this should be: Open Source Program Office, Tech Transfer Office, library, senior leader

Most expansion needed

Potential models for continuous funding as well as labor supply

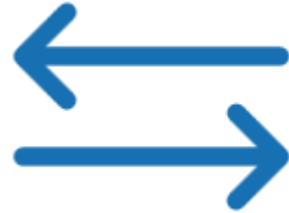


3: How can we know who is or could be using an OSRS product?



Usage is an important but paradoxical metric

- As a metric, OSRS usage data is similar in importance to the **impact factor** for traditional scholarship
- But many methods for collection of usage data go **counter to open source values** and cannot be used



Direct tracking

Technical methods for measuring how many people are using OSRS



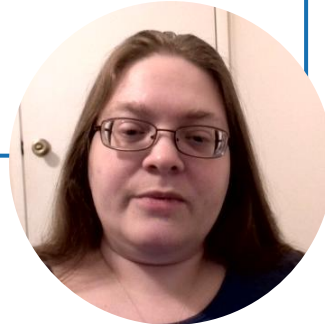
Market research

Estimating and understanding the usage of or need for particular OSRS



System-level mapping

Tracking OSRS usage across the sector with knowledge graphs



4: What is the value proposition for universities? Why should they prioritize OSRS?



Once a value proposition is finalized, propagate it through onboarding and trainings

Mission alignment

Teaching & learning mission

- High-impact practice
- Workforce development, CV
- Easily incorporated into coursework

Research mission

- Open science
- Interdisciplinary collaboration
- Community engagement
- Public trust

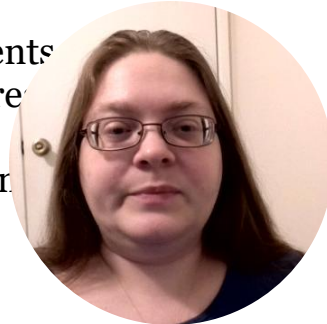
Reputational benefits

Societal benefit

- Public good rather than profit
- Stewardship of resources
- Bottom-up structure counters elitism narrative

Compete for prestige

- Attract top faculty who value collaboration
- Attract top students opportunity for re experience
- Grants from oper.



5: What extra-institutional support is needed to sustain OSRS?

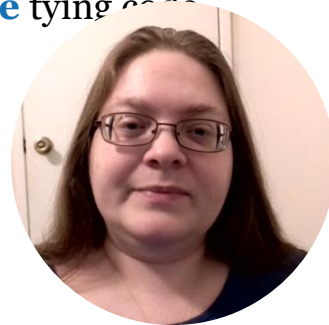


Leadership

- **Consulting service** that would supply guidance, expertise, and labor for a given project by request
- **Functional tools, information resources** such as standards, playbooks, templates, version control systems
- **Training networks** like I-Corps
- **Funder leadership:** funding software-as-a-service, developing “Patreon for OSRS”

Cataloguing

- **Database:**
 - Help researchers identify if their software is novel
 - “Nutrition facts label” describing usage
 - Calculate impact factor
- Research-focused **software development forge site** tying code to data



Initial Findings:



- Sustaining OSRS is a complex challenge with entrenched cultural and structural barriers that will take significant time and investment to overcome.
- The key communities that will need to collaborate may not yet fully understand each others motivations, goals, and workflows.
- Much work needs to be done to articulate compelling reasons why university leaders should prioritize investments in this area.





Thank you!

chelsea.mccracken@ithaka.org

