Making research software visible:
new models for sustaining development

- "The software you use today will be available - and continue to be improved and supported - in the future"
  - Availability, extensibility, maintainability
- The *research community* is able to continue to do their work, in new and better ways

BETTER SOFTWARE BETTER RESEARCH

Arguing for sustainability

The argument for contributing to open source is that it's not a public good but a common-pool resource because it takes some effort to maintain the resource so everyone can benefit

Allison Randal
Ex-President, OSI
allisonrandal.com

	Excludable	Non-excludable
Rivalrous	**Private goods** food, clothing, cars, parking spaces	**Common-pool resources** fish stocks, timber, coal
Non-rivalrous	**Club goods** cinemas, private parks, satellite television	**Public goods** free-to-air television, air, national defense

https://www.rhyslindmark.com/club-goods-digital-infrastructure-and-blockchains

Software Sustainability △
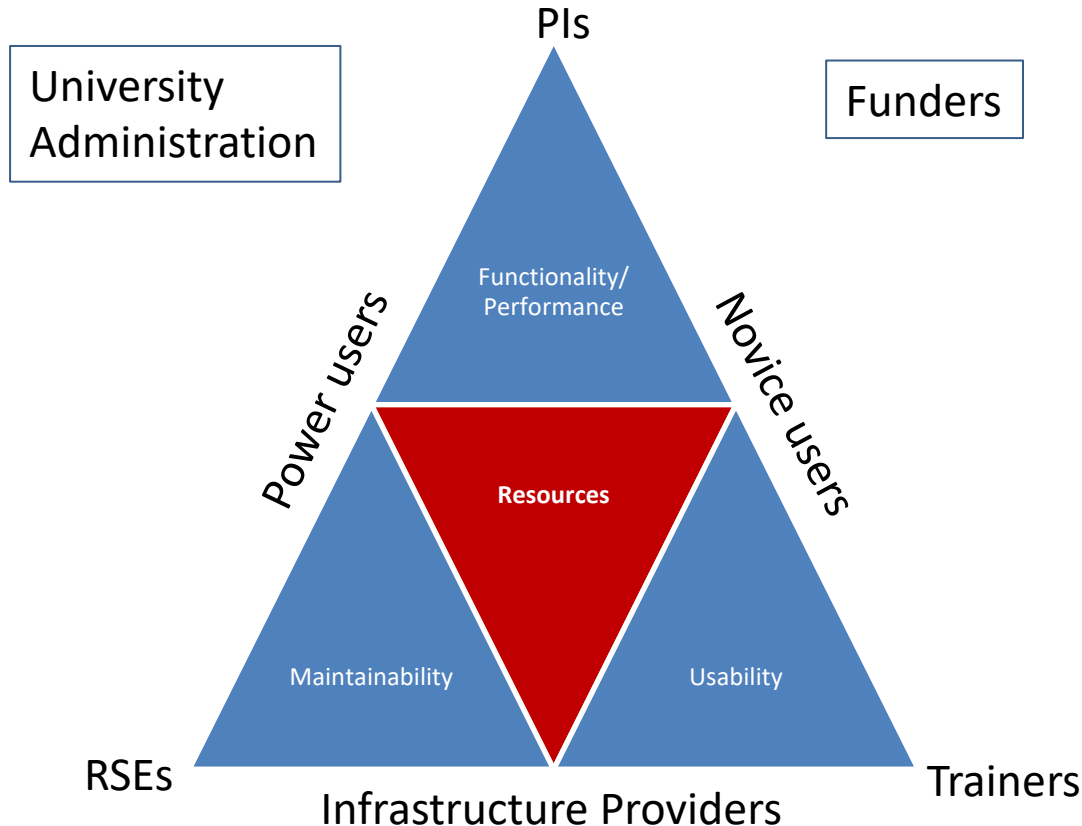
- Stakeholder labelling is provocative rather than accurate!

- The challenge is the number of decision-makers, and each wants something different

- Funding not the primary issue?

Competition vs Collaboration

Tension between what
a software project
needs to do
versus
what contributors
want to do

Undead software

Understanding when software should be "forcibly retired" – sadly no silver bullets

Sustainability is also about knowing when to stop development– resources are limited
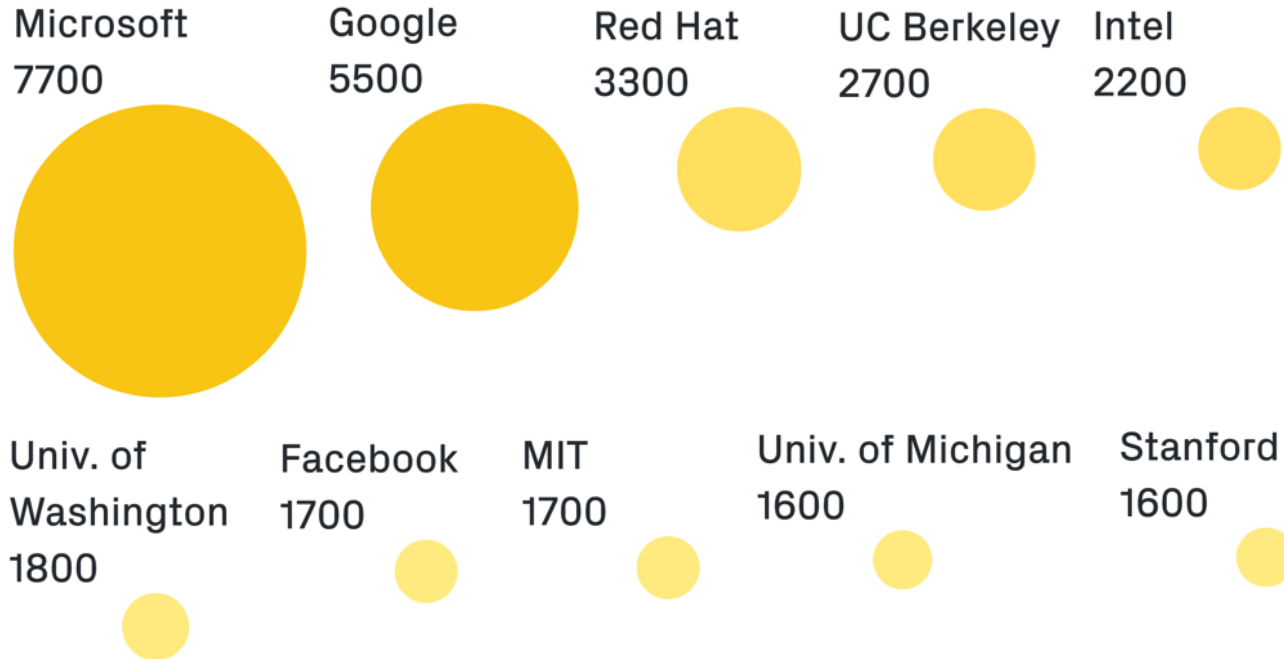
Photo by Daniel Jensen on Unsplash

Contributing to OSS

Microsoft
7700

Google
5500

Red Hat
3300

UC Berkeley
2700

Intel
2200

Univ. of
Washington
1800

Facebook
1700

MIT
1700

Univ. of Michigan
1600

Stanford
1600

- Pytorch was the fastest growing software project
- Universities were 5 of the top 10 contributing organisations
- Literally billions of lines of code

1,000's of contributions to top GitHub projects in 2018
https://octoverse.github.com/projects
Software Sustainability Institute

NUMFOCUS
OPEN CODE = BETTER SCIENCE

RSE
SOCIETY OF RESEARCH
SOFTWARE ENGINEERING

THE COMMONS
CONSERVANCY

CS&S Code for
Science &
Society

GitHub Sponsors
Beta

TIDELIFT

QUANSIGHT
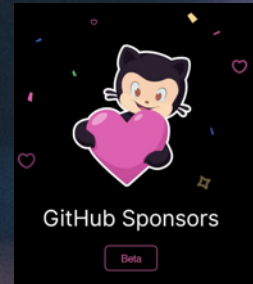
Ideas to change the culture

1. Persuade your organisation to associate its brand with open source software (inc scientific software)

2. Promote working on *existing* OSS projects as part of UG and Masters programs, so it's seen as valuable career development for students and staff

Ideas to change the culture

3. Agree a set %age of Research Software Engineering group time to contribute to OSS important to your organisation

4. Ask your information services (IT services, library) department to implement subscriptions to the most significant research software your organisation relies on

Take home messages

- Sustainability of research software should focus on *research* as the primary stakeholder, but…

- Many decision-makers for research software so…

- We need to shift the way that open source research software development is *perceived*

  - Celebrate OSS contributions

  - Recognise contributing to OSS as career development

  - Acceptance of new models to contribute to maintenance and support of software

Slides: https://doi.org/10.6084/m9.figshare.8986499

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Additional References

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- Rhys Lindmark – Club Goods, Digital Infrastructure, and Blockchains: https://www.rhyslindmark.com/club-goods-digital-infrastructure-and-blockchains/

- Juan Nunez-Iglesias – Why citations are not enough for open source software: https://ilovesymposia.com/2019/05/28/why-citations-are-not-enough-for-open-source-software/

- Tidelift – 2018 Professional Open Source Survey https://tidelift.com/about/2018-Tidelift-professional-open-source-survey-results

- Robert A Muenchen – The Popularity of Data Science Software: http://r4stats.com/articles/popularity/

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- Victoria Stodden
- WSSSPE community

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- Greg Wilson
- Jonah Duckles
- Tracy Teal
- Instructor Community

Additional Input:
- Allison Randal

Software Sustainability Institute

www.software.ac.uk

About the Institute

Software Sustainability Institute

A national facility for cultivating better, more sustainable, research software to enable world-class research

- Software reaches boundaries in its development cycle that prevent improvement, growth and adoption
- Providing the expertise and services needed to negotiate to the next stage
- Developing the policy and tools to support the community developing and using research software

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Arts & Humanities Research Council

BBSRC

EPSRC
Engineering and Physical Sciences Research Council

E·S·R·C
ECONOMIC & SOCIAL RESEARCH COUNCIL

MRC Medical Research Council

NERC SCIENCE OF THE ENVIRONMENT
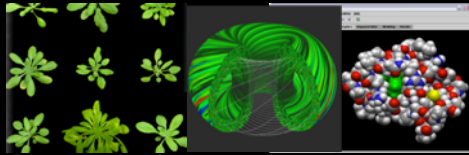
Science & Technology Facilities Council

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Software

Helping the community to develop software that meets the needs of reliable, reproducible, and reusable research
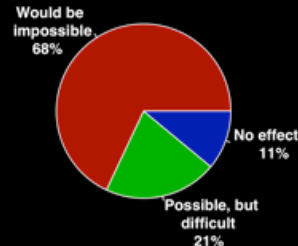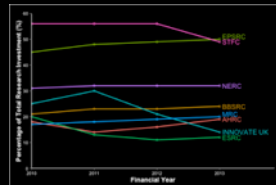
Training

Delivering essential software skills to researchers via CDTs, institutions & doctoral schools

Outreach

Exploiting our platform to enable engagement, delivery & uptake

Policy

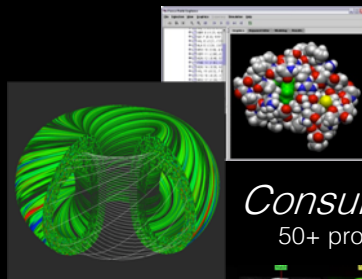Collecting evidence on the community's software use & sharing with stakeholders

Community

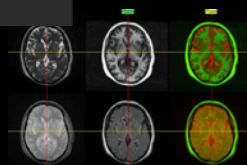Bringing together the right people to understand and address topical issues

Software

Consultancy
50+ projects

Advice

130+ evaluations
4 surgeries

Training

Courses
35+ UK SWC
workshops
1000+ learners
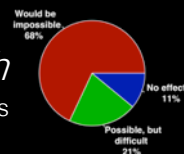
Guides
80+ guides
50,000 readers

Outreach

Website & blog
150+ contributed articles
20,000 unique visitors per month
3,000 Twitter followers

Research
740 researchers
50,000 grants
analysed

Campaigns

300+ RSEs engaged   2100 signatures   13 issues highlighted

Policy

Workshops

20+ workshops organised

Fellowship
61 domain
ambassadors

Community