

Supporting the Invisible Foundations of Science

Dario Taraborelli **Chan**
@readermeter **Zuckerberg**
@cziscience **Initiative** 

Open Source in Action • Montreal, November 18, 2019





Juli Arancio | @Cassandreces@sch...
@Cassandreces

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Katie Bouman mentions all the open source software used for building the first image of a blackhole #EPFLOpenScienceDay



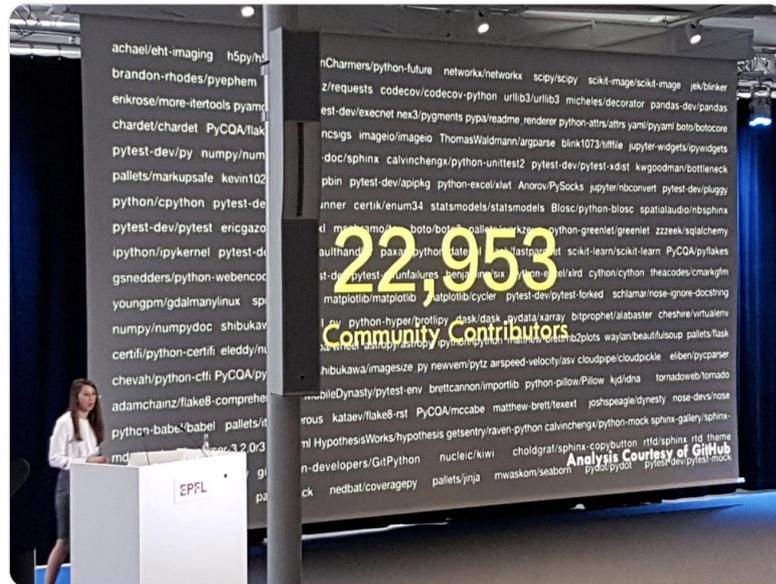
5:40 AM - 18 Oct 2019



Andrea Hacker
@ahacker

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And she concludes: this is an example for how #openscience makes something that seems impossible possible. And it takes a community #EPFLOpenScienceDay



5:37 AM - 18 Oct 2019

matplotlib

140,000+
dependents

Lowry et al. (1951)

300,000+
citations



Support the creators and maintainers of open resources that enable collaborative, reproducible research.

Make these critical contributions to science *visible, fundable, and recognized.*



Essential Open Source Software for Science

The majority of open source software for science is undervalued and lacks funding for maintenance, growth, development, and community engagement—especially after the initial phase when it's linked to original research.



How much funding?

Funding between **\$50K** and **\$250K**

Grants are for **one year**

Applications can be submitted at any of 3 cycles starting in **June 2019, December 2019, June 2020**

For what purpose?

Not limited to developing new software
Funding can be used for:
documentation, usability, project management, community engagement

Proposals supporting **multiple open source projects** for joint work welcome.

The application pool

293 applications • 475 open source projects
(each application can include up to 5 projects)

- Most projects are hosted on GitHub (90%)
- Strong representation from Python / R / Javascript, among other languages
- Most applications are from academic orgs (65%).
- A sizable % are from industry or non-profits, globally distributed.

Applications by field



What we've learned so far

Community reaction



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.@czscience is offering grants to open-source projects that provide essential infrastructure for biomedical research.

Really cool program, I hope other institutions follow suit and acknowledge the value of OS software and the crucial role that it plays



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Smart move by @ChanZuckerbeg to fund core costs of open source research software in the biomedical field. We need more funders committed to supporting software that advances whole research communities



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literally all the biomedical research i do relies on open source software. thanks so much to those who make, support, maintain, teach, or build community for open source. if that's you, consider applying to the new [@czscience](#) grants. \$\$\$.



Follow

This is huge! Open source software powers science, but it is rarely recognized, and only sporadically funded. Funding it is one of the surest way to accelerate science itself.



Follow

New initiative to support open source software for scientific research from [@czscience](#) - really excited to see what this can do to help [#softwaresustainability](#)

Community reaction



The screenshot shows the top of a Nature journal article. The header includes the Nature logo and navigation icons. The article title is "How to support open-source software and stay sane" and the author is Anna Nowogrodzki. The main image is a red background with a white speech bubble containing a black silhouette of a person falling.

nature
International journal of science

TOOLBOX · 01 JULY 2019

How to support open-source software and stay sane

Releasing lab-built open-source software often involves a mountain of unforeseen work for the developers.

Anna Nowogrodzki

<https://doi.org/10.1038/d41586-019-02046-0>

Why citations are not enough for open source software

Juan Nunez-Iglesias

2019-05-28 18:41

<https://ilovesymposia.com/2019/05/28/why-citations-are-not-enough-for-open-source-software/>

NumFOCUS tools used to discover treatments and cures for disease

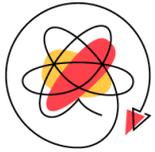
The creation story of CellProfiler is emblematic of the way in which scientific research software is developed, deployed, and eventually widely adopted—often somewhat by happy accident. It also illustrates the ongoing challenge of finding sustainable funding models for maintenance of critical research tools.



<https://numfocus.org/case-studies/curing-disease-with-numfocus-tools>

Evaluation criteria

Impact



Quality



Feasibility



Diversity



Impact



Project X is a dependency for over 100K open source repositories. It has never received dedicated funding for maintenance.

Project Y is currently downloaded over 10M times/week. Its maintainer is given 2 days/week by their employer to work on open source projects.

Even the most mature and established scientific open source projects struggle for funding.

Quality



Metric	Submitted	Eligible	Shortlisted	Top-scoring
has diversity statement	60%	62%	65%	69%
has code of conduct	46%	47%	51%	64%
has documentation	90%	92%	99%	100%
has issue tracker	88%	91%	97%	93%
has community forum	57%	59%	74%	84%
has contributing guidelines	52%	55%	68%	73%
has examples	81%	83%	89%	89%
has package distribution	47%	52%	67%	78%
has continuous integration	60%	62%	70%	78%

<50%

50-75%

75-100%

100%

Feasibility

About half of the applications requested the maximum allowed funding.

A 12-month grant can help stabilize many of these projects.

It is *not yet a solution* to the overall problem of their sustainability.

Diversity



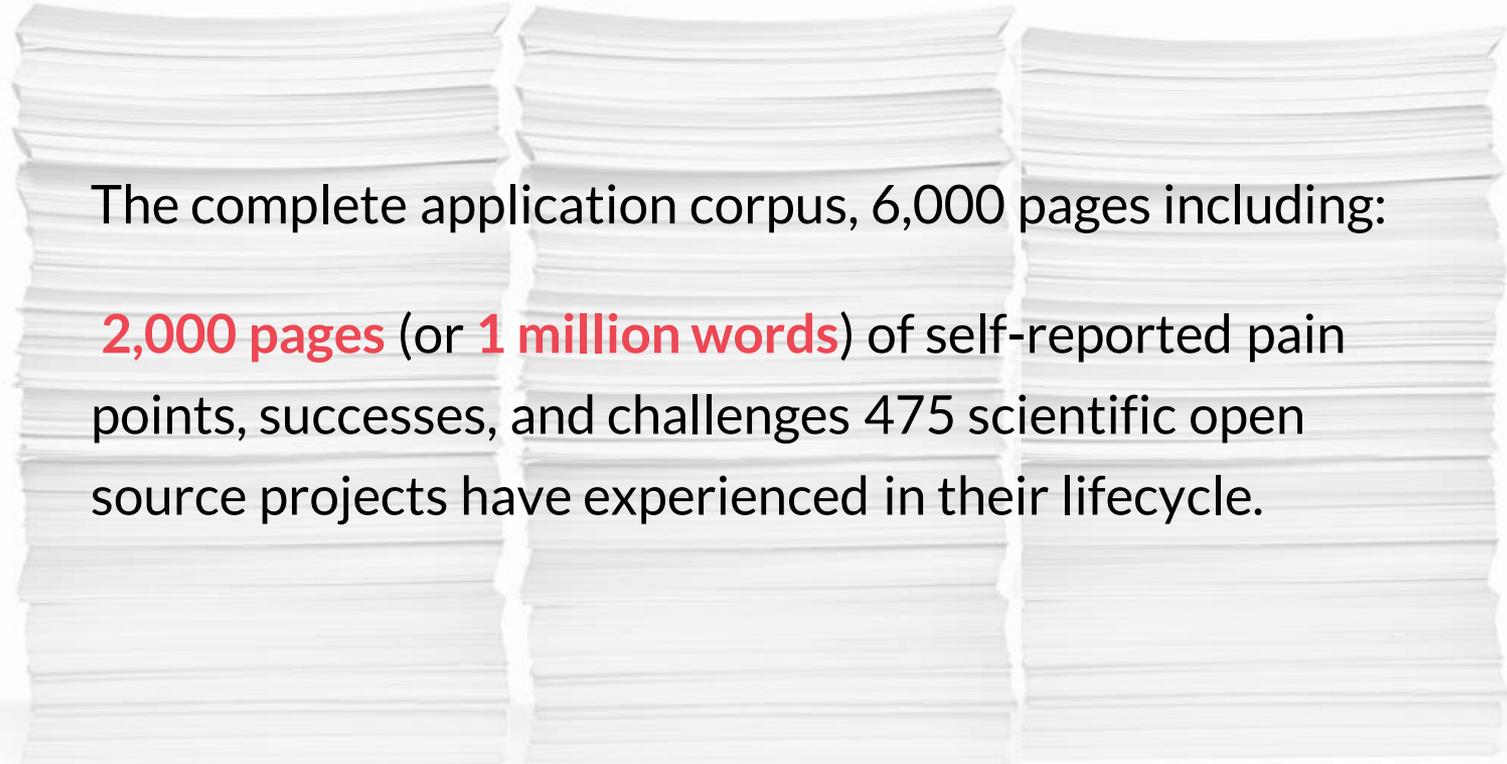
The gender of the lead applicant is significantly skewed towards men

60% of applications included a diversity statement.

The proportion is 70% for proposals led by a woman.

46% of projects applying for funding adopted a **Code of Conduct.**

Qualitative data

The background of the slide features three vertical stacks of papers with deckled edges, rendered in a light gray color. The text is overlaid on these stacks.

The complete application corpus, 6,000 pages including:
2,000 pages (or **1 million words**) of self-reported pain points, successes, and challenges
475 scientific open source projects have experienced in their lifecycle.

Supporting the invisible foundations of science



Support science and technology
that will make it possible to
**cure, prevent, or manage all
diseases** by the end of the century

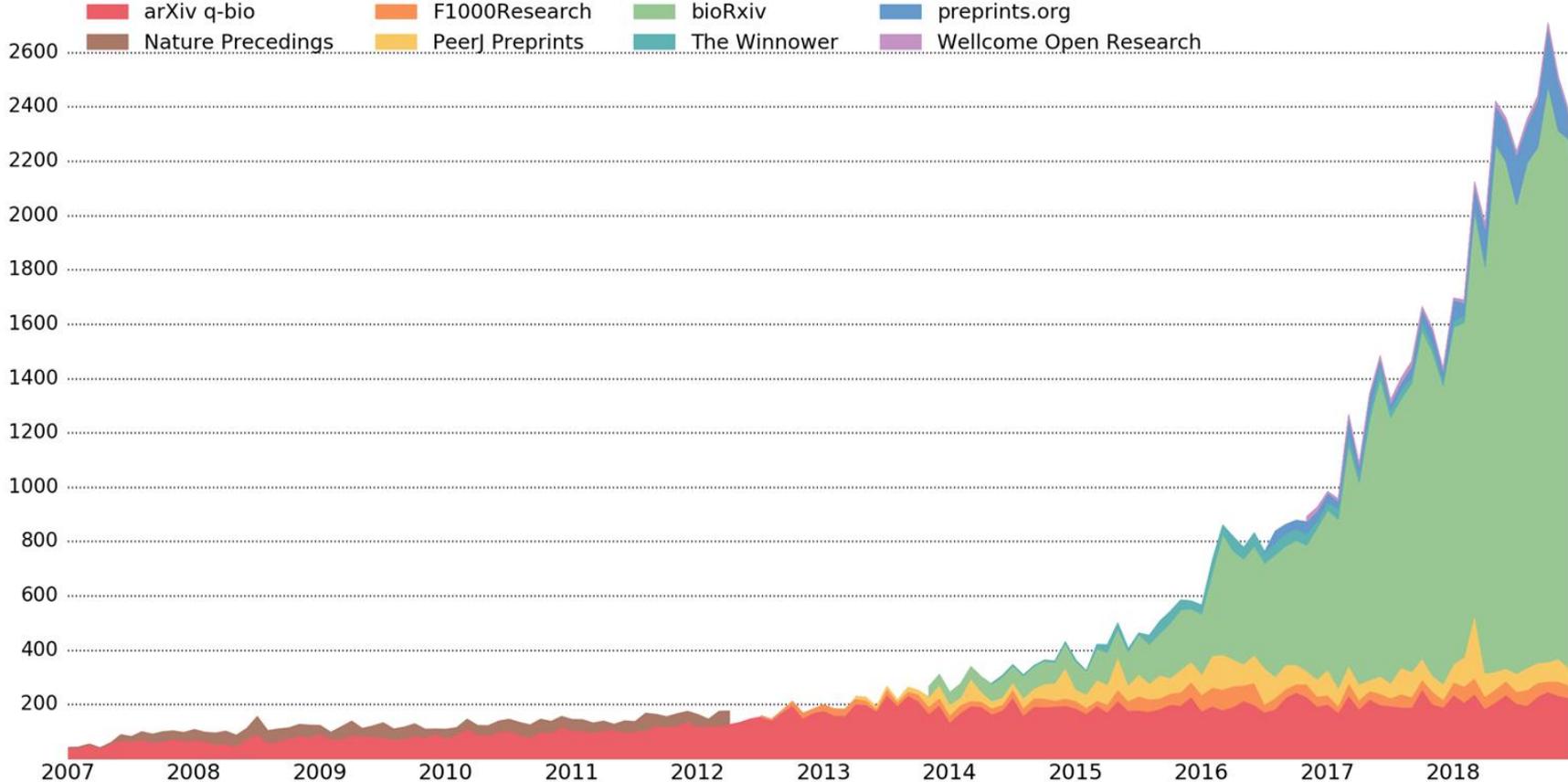
80 years

Accelerate biomedical science by
developing **new tools and
technologies** and supporting **open,
collaborative models** of research

10 years

Accelerate the dissemination of results in biomedicine: **bioRxiv**

Preprints per Month



Build computational capacity among scientists: **The Carpentries**



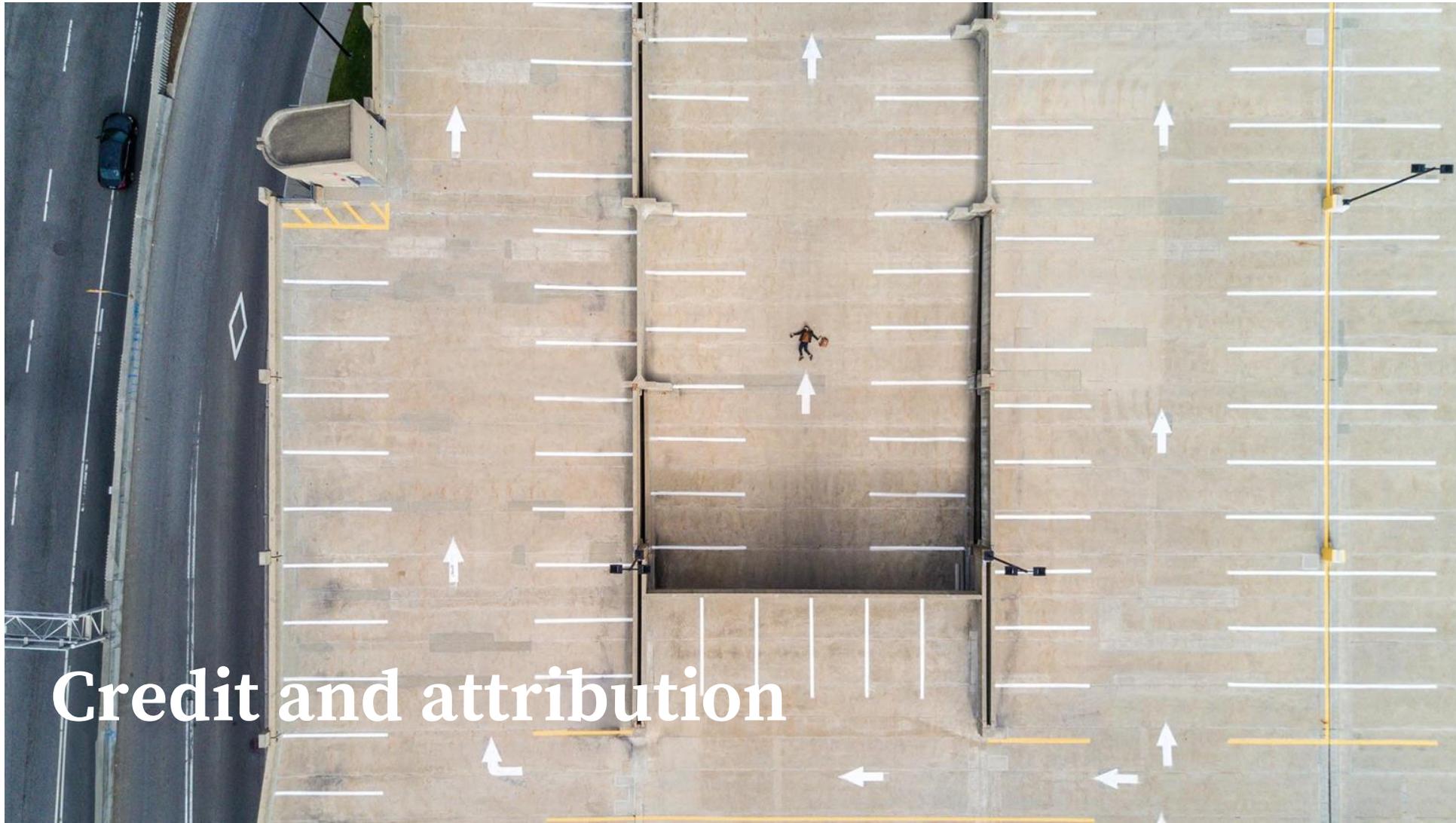


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Sustainable funding



Credit and attribution

Thank you

