



Open and Reproducible
Research with
community-driven
Research Software
metrics



Emmy Tsang
@emmy_ft

Yo Yehudi
@yoyehudi

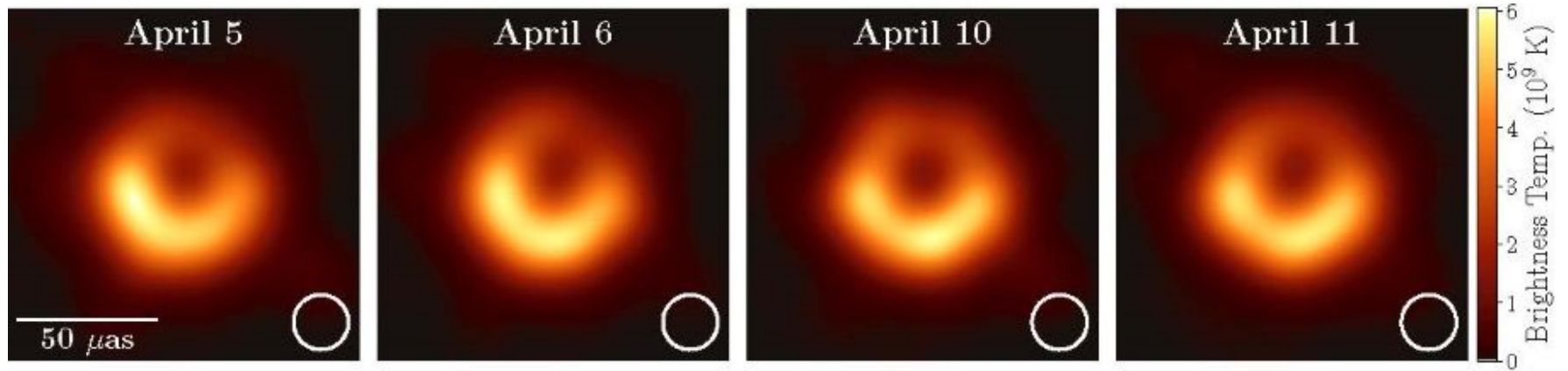
Mateusz Kuzak
@matkuzak



How is open source software used in
research and science?



Open source software in research



The first image of a black hole!

The Event Horizon Telescope Collaboration, Akiyama, K., Alberdi, A., Alef, W., Asada, K., Azulay, R., ...Yamaguchi, P. (2019). First M87 Event Horizon Telescope Results. IV. Imaging the Central Supermassive Black Hole. *Astrophys. J. Lett.*, 875(1), L4. doi: 10.3847/2041-8213/ab0e85 (Licence: CC-3.0)

Open source software in research

SETI@home

SETI@HOME Project Science Computing Community Site Join Login


What is SETI@home?

SETI@home is a scientific experiment, based at [UC Berkeley](#), that uses Internet-connected computers in the Search for Extraterrestrial Intelligence (SETI). You can participate by running a free program that downloads and analyzes radio telescope data.

[Join SETI@home](#)

Already joined? [Log in](#).

User of the Day

 **Jesus Miguel**
hola

News

Low available work.

For a couple of reasons, the result table has grown to the point where it no longer fits in main memory. That has been slowing the validators and assimilators, which is causing the result table to grow further.

We'd like to get it down to a manageable size before our Tuesday outage. To that end we are throttling work generation to a rate at which the table size is shrinking. We hope that this rate will increase as the table gets smaller.

So for the next few days work will be hard to come by (but not zero).
18 Jan 2020, 18:51:01 UTC · [Discuss](#)

Why do people run SETI@home?

Check out [Stars in Their Eyes?](#), a research paper from the University of Geneva about why people run SETI@home.

<https://setiathome.berkeley.edu/>



How many of you have worked
in science or research before?

Metrics in research

Metrics in research

As well as all of the metrics you might see in other open source orgs or companies, research has other pressures

A traditional output: The research paper

- Researchers typically write up their results in peer-reviewed papers, published in research journals.
- This is a format well-suited to writing up a lab experiments (and terrible for summing up/describing software)!

A traditional output: The research paper



- Software doesn't look much like a paper, but we end up shoehorning it in to papers anyway.
- What happens after we've updated our software?
More papers about software updates?

A traditional output: The research paper



- It's possible to publish a paper about software without showing the software

“For this review, unfortunately I did not have access to a computer with the correct operating system, so I assume that the application functions as described”

A traditional metric: Citations

Citation: The number of times a given paper has been cited by other papers.



People often don't think/remember/know how to cite software - leaving research software engineers worse off, due to their non-traditional outputs

Other traditional metrics

Journal / conference prestige

of papers

 **Problem** 

Can these research paper-based metrics accurately reflect the quality of the research software?

Another metric: Research Excellence!

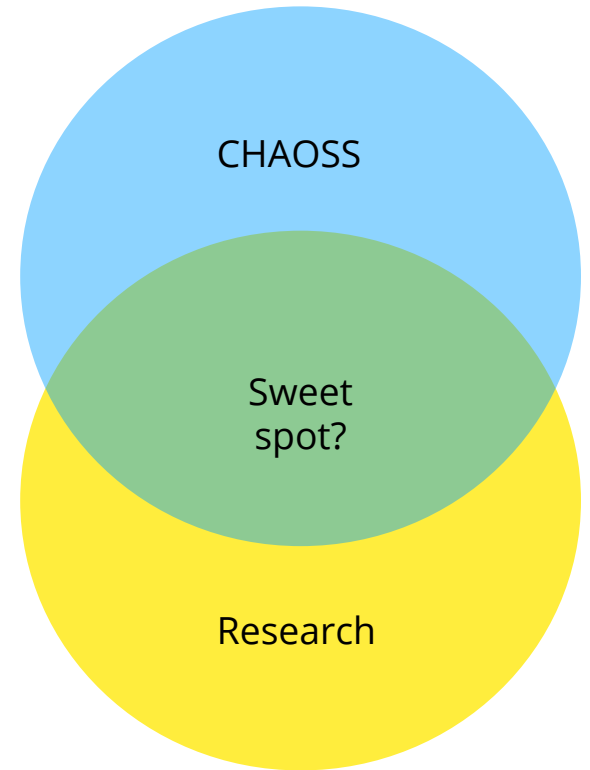
In the UK, the Research Excellence Framework asserts:

“In assessing outputs, the sub-panels will look for evidence of originality, significance and rigour”

So, what does “originality, significance and rigour” mean in software?

CHAOSS + Research metrics - how do we measure?

Many/most of the CHAOSS metrics apply to research quite clearly, but some are company/organisation specific and may not be aware of grant funding models (as opposed to corporate sponsorship) and research environment pressures.



Discussion

In groups of 2-4, discuss one or both of:

- Which CHAOSS metrics could be useful for research software
- Which *other* metrics might be useful, even if not CHAOSS-ey?

Go to <http://sli.do> (enter code chaosscon2020) - enter ideas / thoughts real-time!

Results

Go to <http://sli.do> (enter code chaosscon2020) - enter ideas / thoughts real-time!

- To follow up or view results, visit <http://bit.ly/CHAOSScon-2020-research>

Thank You

Go to <http://sli.do> (enter code chaosscon2020) - enter ideas / thoughts real-time!

View sli.do results & get involved by going to <http://bit.ly/CHAOScon-2020-research>

Mateusz Kuzak, Research Software Community
Manager, the Netherlands eScience Center, t @matkuzak
g @mkuzak m.kuzak@esciencecenter.nl

Emmy Tsang, Innovation Community Manager @ eLife
t @emmy_ft / @eLifeInnovation g @emmyft
e.tsang@elifesciences.org

Yo Yehudi, Software Developer, University of Cambridge,
& EngD student, University of Manchester
t @yoyehudi g @yochannah yy406@cam.ac.uk