The Journal of Open Source Software: Using Open Source Practices to Build Community and Sustainability

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As of 26 July 2024

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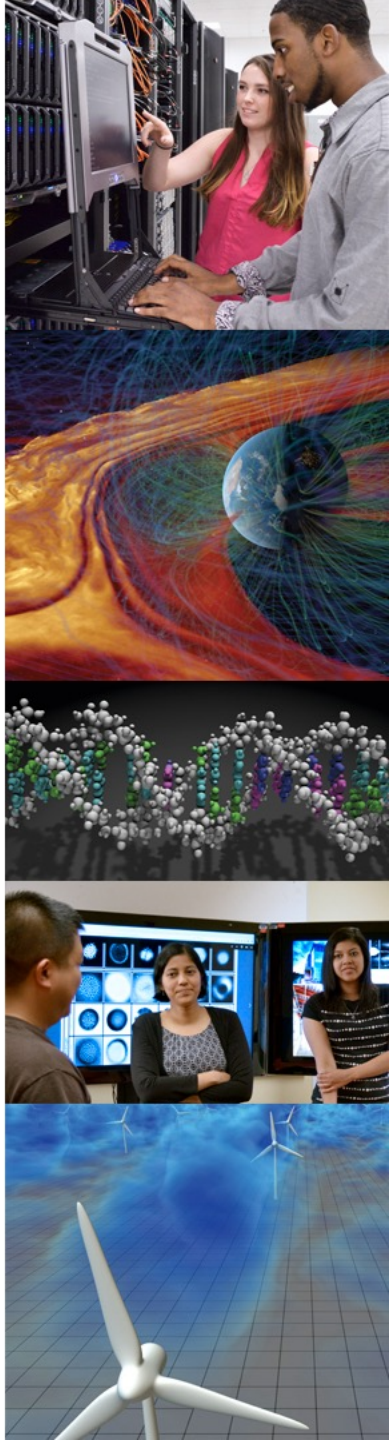
Software isn't a creditable research activity



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How to better recognize software contributions

1. Find some way to fit software into current (paper/book-centric) system

2. Evolve beyond one-dimensional credit model

We want to do 2, but it’s a long struggle, so let’s start with 1

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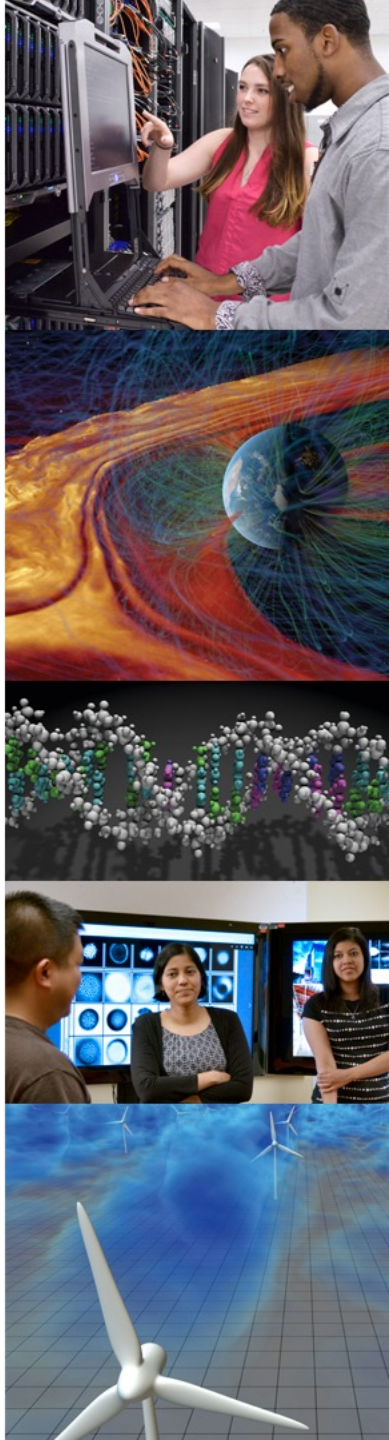
What if we just wrote papers about software?



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Journal of Open Source Software (JOSS)

- Gives us something easy to cite 👍
- No changes required to existing infrastructure 👌
- Publishing in existing journals raises profile of software in a community 🤘

But

- Writing another paper can be a ton of work 😅
- Many journals don't accept software papers 🤬
- For long-lived software packages, static authorship has major issues 😕
- Many papers about the same software may lead to citation dilution 👊

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Journal of Open Source Software (JOSS)

- Solution
  - Make it as easy as possible for authors to write software papers
  - Paper preparation (and submission) for well-documented software should take no more than an hour
  - Make the system developer-friendly for authors, reviewers, editors
  - The primary purpose of a JOSS paper is to enable citation credit to be given to authors of research software
  - Accepted software equivalent to accepted paper

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Journal of Open Source Software (JOSS)

- JOSS uses open-source practices
  - GitHub issues for reviews
  - GitHub notifications to invite reviewers
  - Open collaborative discussion in reviews
  - Editors are a community, make high-level decisions collectively
  - Bot-driven commands, usable by authors, reviewers, editors, track editors
  - Paper is written in source (markdown), compiled to other formats (PDF, JATS)

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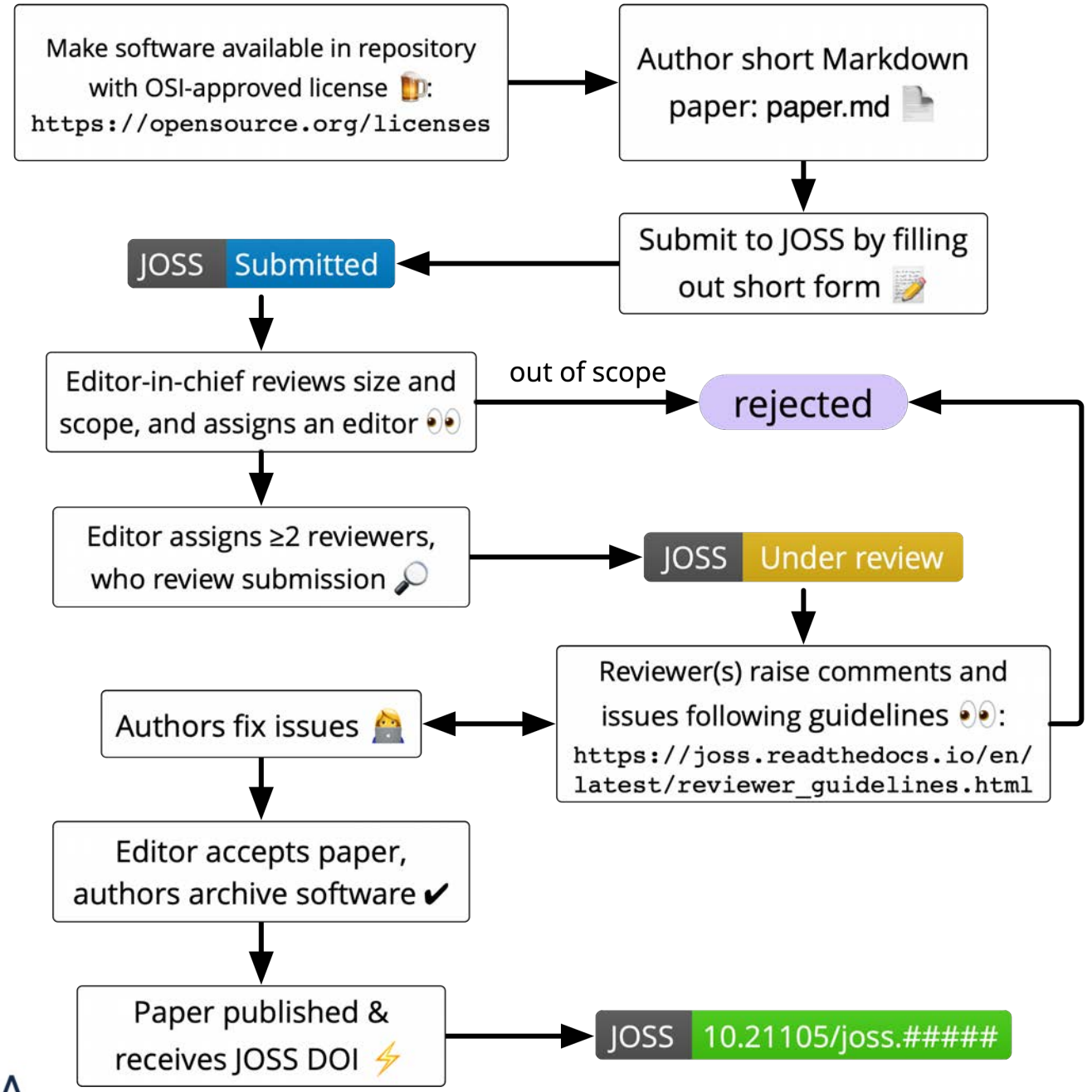

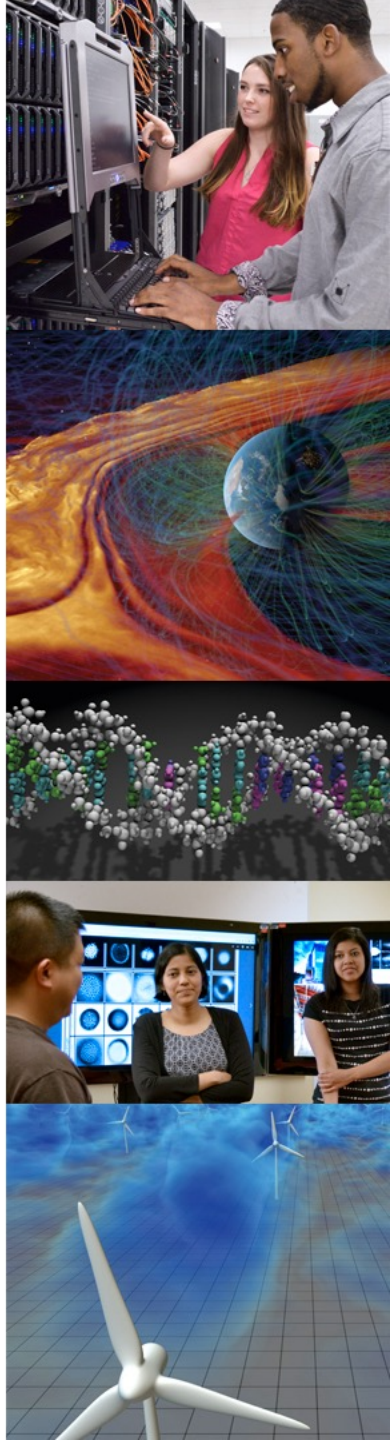

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Submissions that don’t succeed

- We rejected papers that were out of scope (not research software) from the start
- From 2020 we enforced our substantial scholarly contribution criteria much more rigorously
  - We want papers that are at least three months of work (https://blog.joss.theoj.org/2020/07/minimum-publishable-unit)
  - Partially related to Scopus criteria – see later slide
- Now rejecting about 25% of submissions before review for scope
- Plus another 5% during review
- Balancing peer-review & credit for authors

  and

  academic trust in JOSS papers being equal to peer-reviewed journal papers
- Submissions also can be withdrawn when authors give up
  - Don’t want to or don’t have time to make the changes reviewers request

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JOSS and (scholarly) infrastructure ecosystem

- Reviews: GitHub
- Website*: Heroku
- Bot*: Heroku (and via GitHub Actions)
- Software archiving: up to author, including Zenodo, figshare, institutional repositories, etc.
- Compiling papers*: pandoc
- Metadata and DOIs: Crossref
- Paper and review archiving: Portico
- Note: we don't believe in strongly-integrated systems, but rather, support standard APIs that allow competition and change at each layer

* open source – available via https://github.com/openjournals

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JOSS reviewers

- Editor's pre-review job is to find reviewers
  - Authors suggest reviewers, from list who have volunteered to review for JOSS and external
  - Editors have knowledge of field and reviewers
  - Can search Google, Google Scholar, etc.
  - Can use previous JOSS authors
  - Can use an ML-based notebook that does topic matching
- Editor's review job is to help reviewers and author come to agreement
  - Nudge for timeliness
  - Provide guidance on review process and criteria

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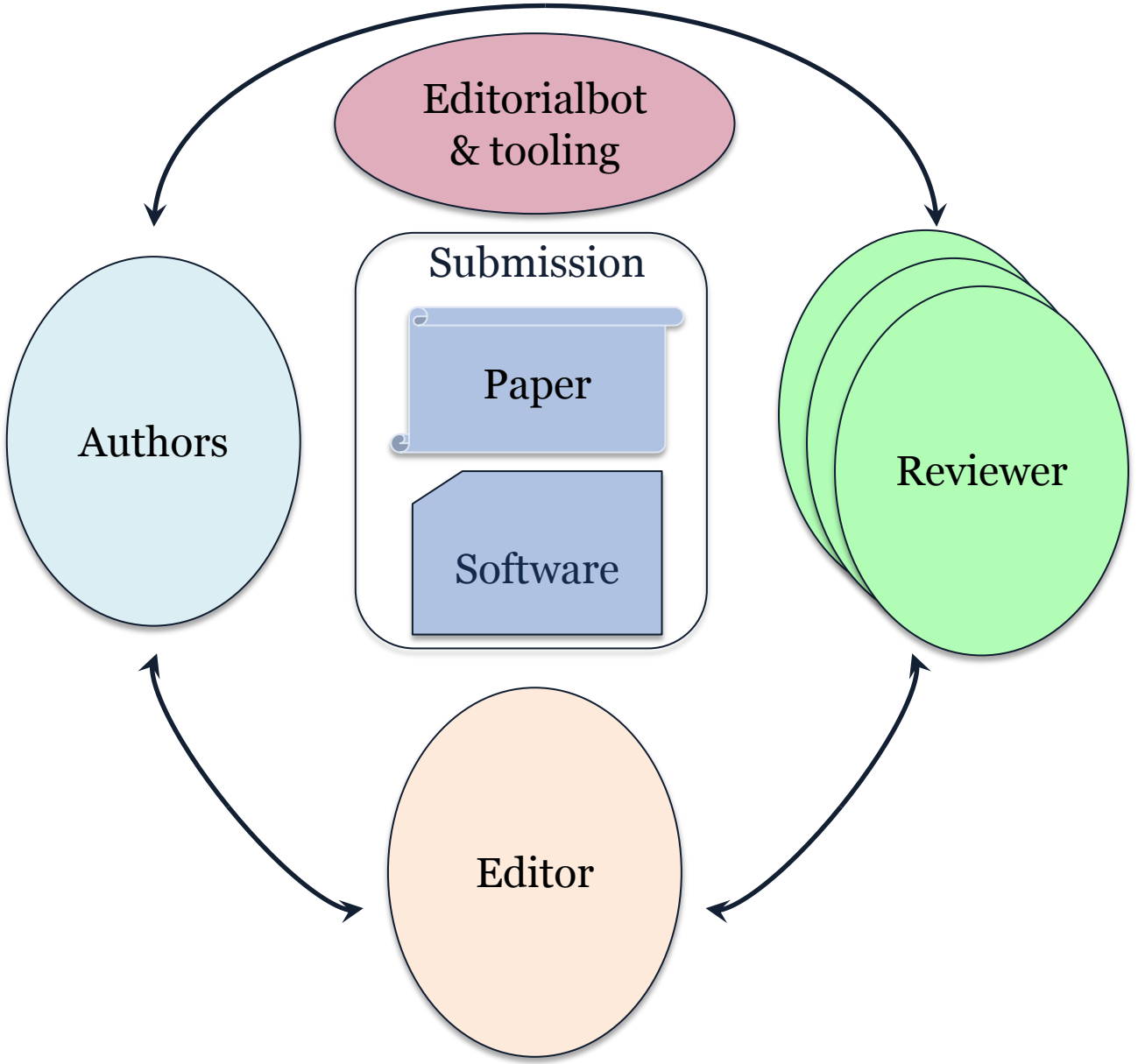
JOSS reviews as collaboration



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JOSS reviews

- Checklist-driven
  - Agree to Conflict of Interest & Code of Conduct
  - General checks: repository URL, license, contribution and authorship
  - Functionality: installation, functional claims, performance
  - Documentation: statement of need, installation instructions, example usage, functionality documentation, automated tests, community guidelines
  - Software paper: summary, statement of need, state of the field, quality of writing, references

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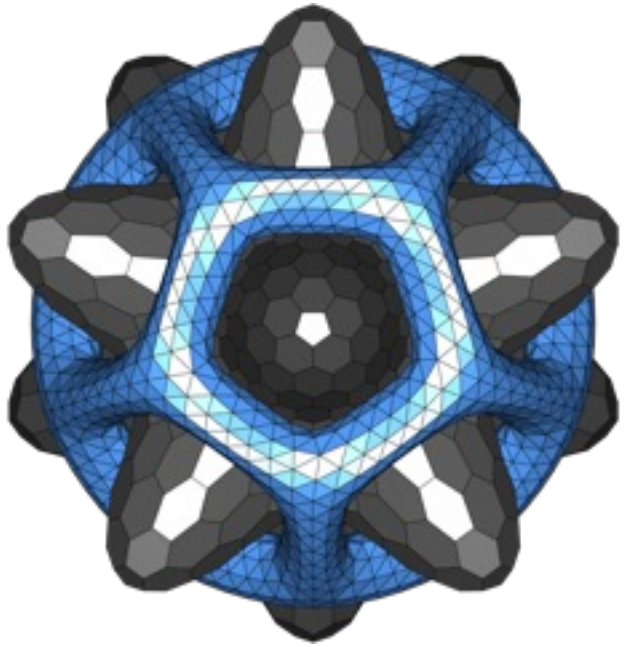
JOSS review criteria



- Some criteria have guidance
  - Installation
  - API documentation
  - Community guidelines
  - Automated testing
- These have levels, e.g., for installation
  - Good: The software is simple to install, and follows established distribution and dependency management approaches for the language being used
  - OK: A list of dependencies to install, together with some kind of script to handle their installation (e.g., a Makefile)
  - Bad (not acceptable): Dependencies are unclear, and/or installation process lacks automation

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JOSS as a community

- JOSS practices (these levels) have influenced reviewers and developers in terms of what's good and what's minimally acceptable
  - Similar to rOpenSci's influence in the R community
- Cultures change based on rules and incentives
- JOSS provides rules, and at a high-level, tries to nudge incentives
- Over time, community changes, and JOSS levels also change (stricter)
- If software was cited directly, JOSS papers wouldn't be needed, but JOSS reviews and JOSS community would still be important in shaping values

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JOSS communication

- Functional: GitHub issues (public), Slack (mostly private)
- Blog: calls for editors & general news about the journal
- Outreach: new papers & general news posted on Mastodon, X (until Jun 2023)

- New JOSSCast podcast
  - Each episode features an interview with different authors of published papers in JOSS
  - Aimed at researchers & the public, to demonstrate the value of open-source research software, the latest developments, and how they're changing the way research is conducted
  - Hosted by Arfon Smith and Abby Cabunoc Mayes
  - New episodes every other Thursday.
  - Available via Apple, Spotify, YouTube, RSS

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Observations on working openly

- Reviewers often volunteer into a JOSS reviewers pool
  - \+ Generally need relatively small number of invites to identify reviewers (~2-3 invites per reviewer)
  - – Semi-regular emails from people annoyed they haven't been asked to review yet
  - – Vanity software package 'pile-on'
    - for high-profile open source projects, often have many reviewers volunteering
  - – Good reviewers can become well known quickly, potentially leading to overuse and reviewer burnout
- Zero privileged information in the system: Reviewer reports, editorial decisions available to all
- Increases transparency:
  - \+ Public declarations of potential conflicts
  - \+ Editorial decisions documented in the open
  - \+ Clear expectations of authors
  - \+ Reduces complexity of infrastructure
  - \+ People can link to their reviews
  - – However, sometimes authors chase reviewers, editors, etc.
  - – Potential cultural barriers to entry for some and negative dynamics for junior staff

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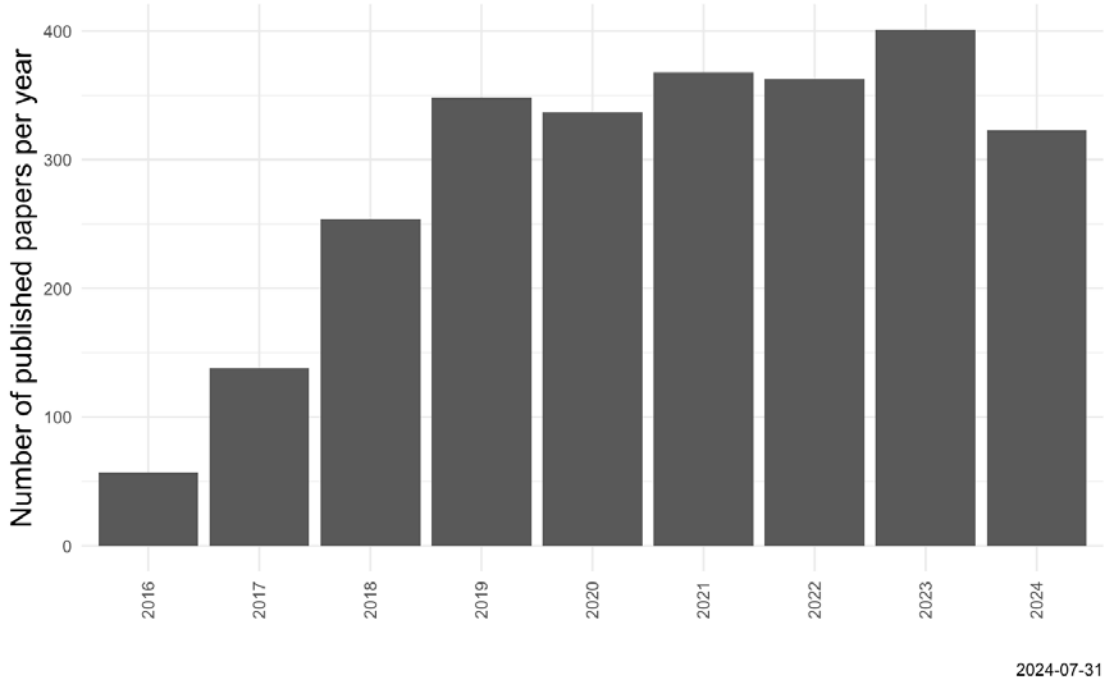
Scaling JOSS

- Most of our challenges are about scaling people processes:
  - AEiC/managing editor rotations
  - More editors
  - Term limits for editors (to avoid burnout)

- Technology improvements:
  - Smarter reviewer assignments
  - Better monitoring tools for editors
  - Tools to help authors prepare their submissions

https://blog.joss.theoj.org/2019/07/scaling



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JOSS costs

- JOSS depends on volunteers
- Actual costs we pay:
  - Annual Crossref membership: $275/year
  - Annual Portico membership: $250/year
  - JOSS paper DOIs: $1/accepted paper
  - JOSS website hosting: $19/month
  - JOSS domain name registration: $10/year
- ~$3-4/paper, at 500 papers/year
- Doesn't include $50k infrastructure development paid by Sloan grant, GitHub usage, user donations, AAS fees
- Calculated and documented mid-2019
  - https://blog.joss.theoj.org/2019/06/cost-models-for-running-an-online-open-journal
- Mostly still correct, except for we didn’t include Portico, or plan to pay for handling legal issues
  - Because the system is open, people can see submissions by others
  - They can complain: e.g., this was based on my work; I should be credited; I should be an author; this shouldn’t be allowed; don’t go forward with this or I will sue you
  - Maybe it’s better to have these issues arise before publication

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JOSS collaborations

- When AAS articles include new software, authors can jointly submit
  - Science paper to AAS
  - Software paper to JOSS
- Reviews done in parallel; published papers cite/linked via DOIs; AAS pays JOSS $50/paper
- JOSS infrastructure also used by Journal of Open Source Education (JOSE), JuliaCon Proceedings, EuroPar artefact publication (& open to more)

https://blog.joss.theoj.org/2018/12/a-new-collaboration-with-aas-publishing

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JOSS & indexing gatekeepers

- JOSS is not currently included in the Web of Science / Clarivate master list of journals
  - Some institutions (and countries) only credit authors who publish on the list
  - Submitted in Dec 2019
  - Resubmitted in May 2023, desk rejected in Feb 2024 for not having
    - Editor titles and affiliations listed (which we generally have)
    - A postal address for the publisher (which we don't have, because …)
- PubMed Central & MEDLINE
  - Long delay while we automated the processing of JATS from markdown & bibtex
  - Applied Feb 2023, received questions May 2023, answered , scientifically approved in Mar 2024, still working on technical issues related to file organization/naming to meet requirements
- Similarly, submitted for Scopus Mar 2018
  - Rejected 2019 for missing documentation, added ethics statement and other docs, resubmitted Sep 2019
  - Rejected Mar 2020 with main negative "this journal does seem to accept most submissions. Reviewing is somewhat limited."
- Lessons:
  - Limited time/interest by those in the active JOSS community (who generally already have published in JOSS)
  - Getting indexed is hard, especially for a new "publisher"
  - Getting indexed is hard, especially for a "non-standard" journal like JOSS
  - This requires dedicated and ongoing attention which is hard for a volunteer team.

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JOSS & POSI 1.0: self-assessment

Governance

💚 Coverage across the research enterprise
💛 Stakeholder Governed
💚 Non-discriminatory membership
💚 Transparent operations
💚 Cannot lobby
💛 Living will
💚 Formal incentives to fulfil mission & wind-down

Sustainability

💚 Time-limited funds are used only for time-limited activities
💛 Goal to generate surplus
💛 Goal to create contingency fund to support operations for 12 months
💚 Mission-consistent revenue generation
💚 Revenue based on services, not data

Insurance

💚 Open source
💚 Open data (within constraints of privacy laws)
💚 Available data (within constraints of privacy laws)
💚 Patent non-assertion

(💚 = good, 💛 = less good)
(as of 14 Feb 2021, https://blog.joss.theoj.org/2021/02/JOSS-POSI, slightly updated)

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Concerns raised by POSI (1.0 & 1.1) & other

- Governance = editorial board members, who mostly represent North America and Europe, are mostly white, are mostly male, and are mostly hands-on researchers, primarily from universities and national laboratories
- Living will: JOSS mission might be fulfilled; journal would no-longer be necessary; we don't have a plan for winding down JOSS, but believe that the core assets associated with the journal (software, article metadata, papers) are appropriately preserved as part of our ongoing operations
- Goal to generate surplus & create financial reserves: these are issues, though our costs are quite low and some of us would likely donate enough to cover them for a year or two
- Additional concerns not in POSE: as a volunteer-sustained organization, we run on the edge of what we can do, and doing additional things is very hard or impossible; key volunteer departures would cause many problems and be hard to recover from)

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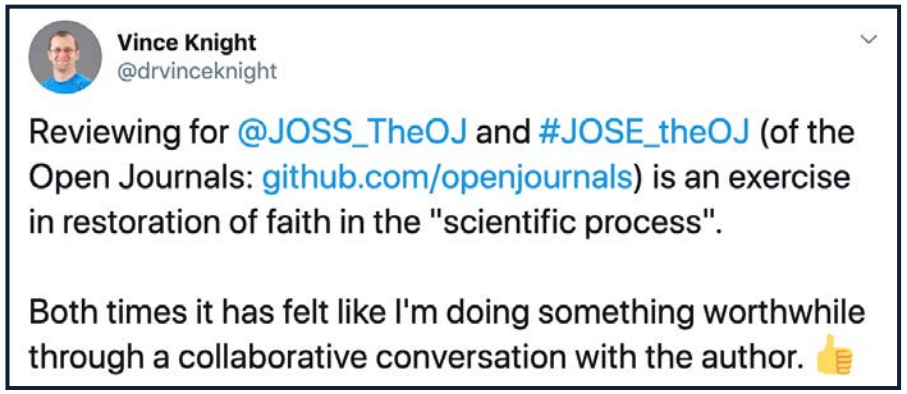
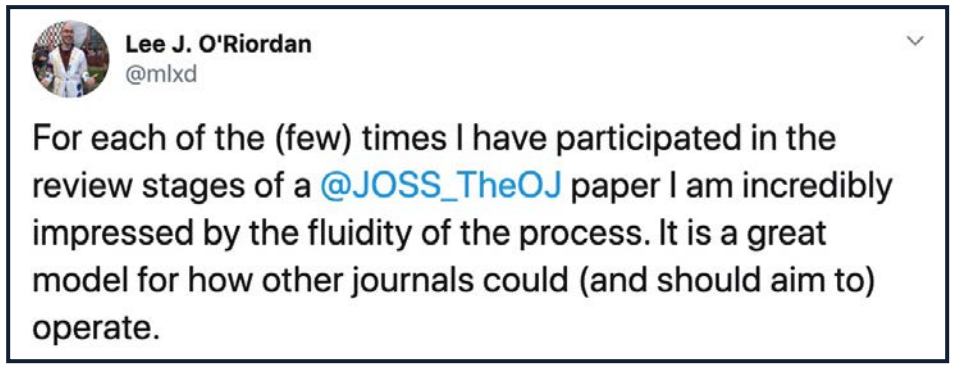
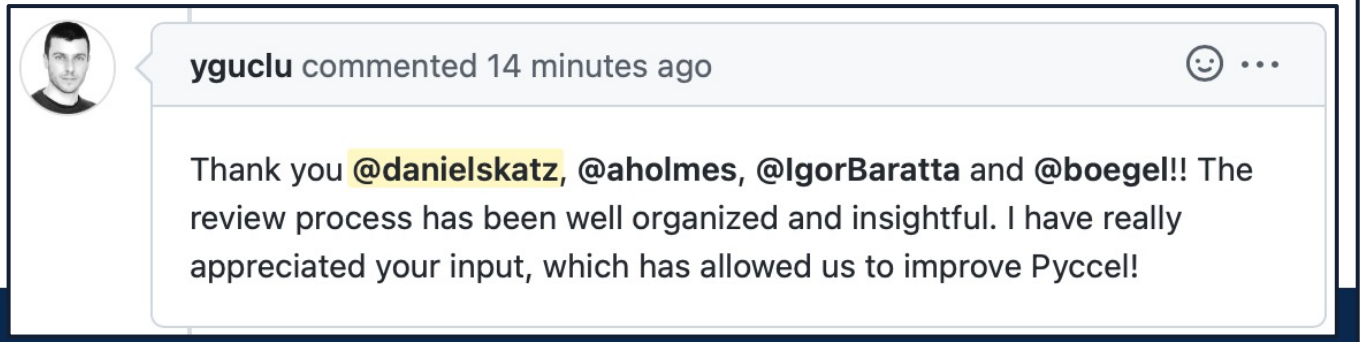
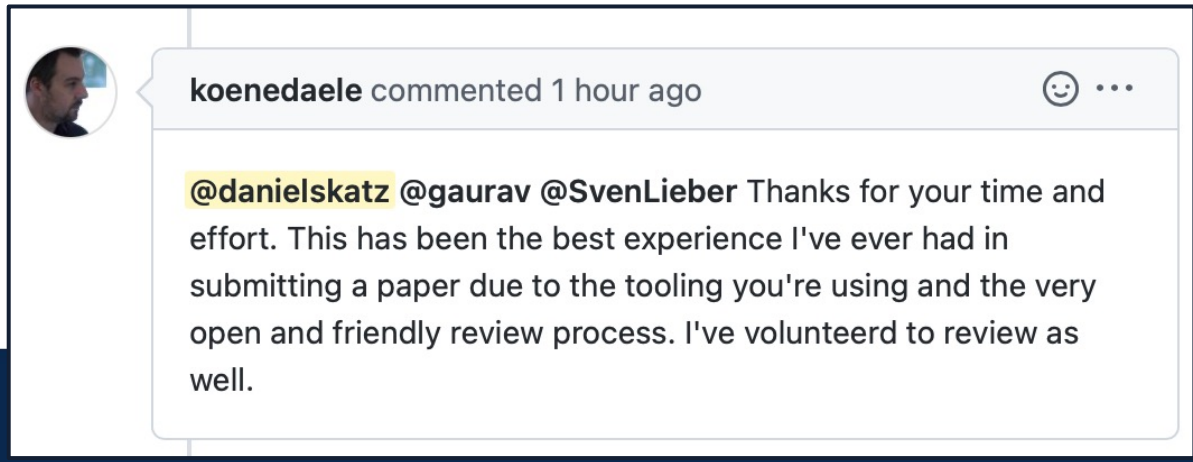
Reviewer feedback









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Thanks!

https://joss.theoj.org/

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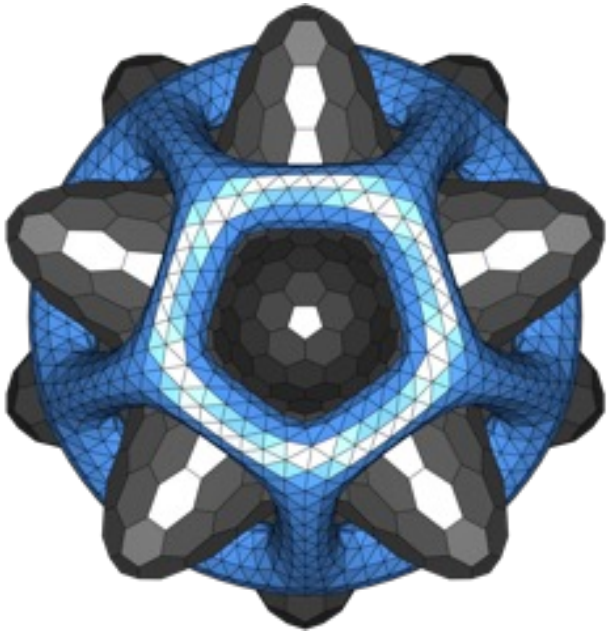

Open Source Initiative

GORDON AND BETTY MOORE FOUNDATION

Alfred P. Sloan FOUNDATION

NUMFOCUS
OPEN CODE = BETTER SCIENCE

ROpenSci