Giving software its due through community-driven review and publication

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The recent editorial, “Giving Software its Due,”¹ documents barriers to research progress that arise from challenges facing researchers who develop software. In particular, it highlights the challenge of developing research software when it is not recognized in the scholarly record through citation. Software citation^{2,3} is required for these researchers to build up a track record and sustain a career in Science.

As the editorial board of the Journal of Open Source Software (JOSS), we share these concerns. JOSS addresses this challenge by providing a novel lightweight publishing process specifically for research software (Figure 1). Unlike existing journals that focus on addressing a scientific research question JOSS emphasizes a detailed evaluation of the software itself through stringent peer review⁴: Reviewers, selected for both methodological and domain expertise ensure that software is shared through a standard license approved by the Open

Source Initiative (OSI)⁵, that documentation and community support comply with established best practices, that code works as documented, and that any performance claims are justified. The review criteria emphasize the usefulness of the software as a general research tool, and the review process contributes to improving software quality. A published JOSS paper serves as a citable unit of research that directly refers to a specific, reviewed software version. This also means that software can be published separately from the research paper that used it, and can include a different author list, to acknowledge the contributions of software developers to the research program.

The JOSS review process is open, public, and collaborative, mirroring the culture of open source and JOSS is itself an open-source project⁶. The papers are made openly accessible, there is no cost for authors to publish, and they retain the copyright of their papers. JOSS is sustainable by virtue of an ecosystem of open platforms, such as GitHub and Zenodo and openly available tools that we developed⁷. With these tools and our team of volunteer editors and reviewers, we are able to keep the operating costs of the journal very low (~\$3/paper). Thus, we believe that JOSS can be sustainable for a long time with very modest amounts of funding. While JOSS specializes in software, the JOSS model and tools could also work for other contributions to science, such as open data resources, workflows and protocols, and open educational resources.

JOSS may not solve all of the challenges affecting software sustainability^{8,9}, but it provides an effective approach to addressing the central issue of scholarly credit for research software. The journal evidently satisfies a pressing need, having already published more than 500 articles in approximately three years of existence. We have also partnered with other publishers¹⁰ to provide a platform for software publications to be reviewed in tandem with domain publications that use the software. We welcome similar arrangements with other publishers and journals, which would allow authors to submit their software to JOSS as a companion publication to their articles. We join Nature Methods editors in calling on authors to cite the software they use in their research.

References

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Figure 1: The lightweight JOSS publication pipeline emphasizes public review on software rather than on classical research results. JOSS itself is uniquely built on free-to-use platforms such as GitHub and Zenodo, resulting in an openly accessible peer-reviewed published software paper (based on Figure 3 in ref 6).