

Research Software Engineering

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- Types of software

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- Publication economy

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- Software development practices

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- Software development practices
- Problem / Solutions

Types of research software

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- Low-level libraries

- ▶ BLAS, FFTW, LAPACK

L	A	P	A	C	K
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 - ▶ Julia, NumPy, ROOT

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 - ▶ Lab-dependent

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$$\mathcal{GP} \left(\begin{matrix} \hat{U} \\ E \end{matrix} \right)$$

[1]

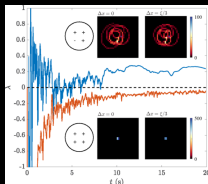
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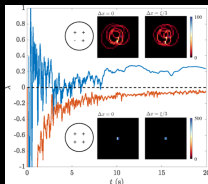
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Different labs need different software, but most labs need
some form of software

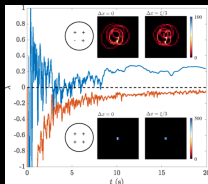
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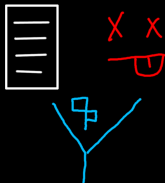
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Scientific software usually requires some form of
domain-specific knowledge

Publication economy

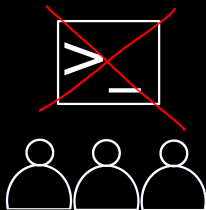
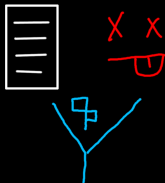
Publication economy

- Publish or perish



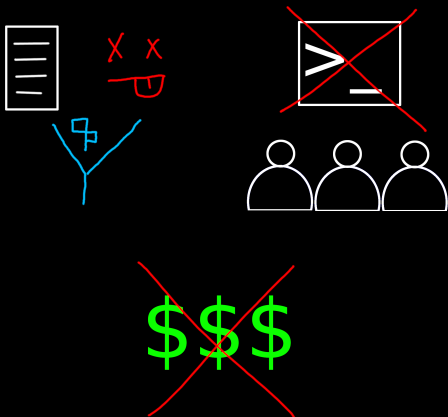
Publication economy

- Publish or perish
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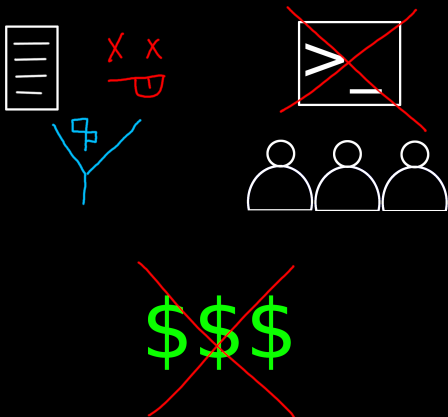
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If results depend on software, this software *must* be robust

Software development practices

(For those trained *in academia*)



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- The Matlab problem
 - ▶ Few functions, structs, loops, include files



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Academia does not encourage good software development

Problem Statement

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Research Software Engineers
are not funded with money or
publications

Solutions

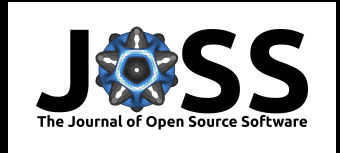
Solutions

- Journal of Open Source Software



Solutions

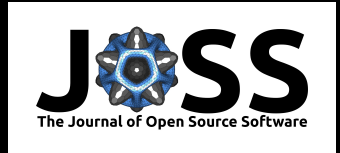
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Solutions

- Journal of Open Source Software
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- Review code alongside publications

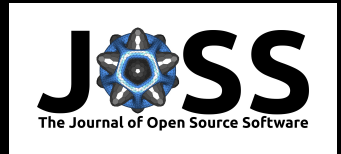


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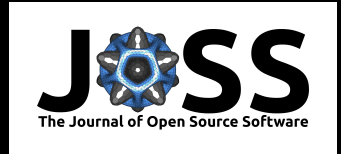
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- Embrace open source and contribute back when necessary



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Headway has been made in all of these areas

If scientists are in the business of creating high-quality, replicable scientific results, the software they use *must be* considered part of this process