

Annotated bibliography for building an ecosystem of practice in scientific computing

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Overview

Baker (2017). Code alert

Scientific computing is a critical skill for ecologists.

Scientific computing benefits science

Pevzner and Shamir (2009). Computing has changed biology — biology education must catch up

Needed for reproducibility

Lowndes et al. (2017)

Needed for next generation ecology

White et al. (2015). The next generation of action ecology: Novel approaches towards global ecological research

Action ecology, macroscale questions

Hampton et al. (2015). The Tao of open science for ecology

Open science.

Poisot et al. (2016). Synthetic datasets and community tools for the rapid testing of ecological hypotheses

Macroscale questions.

Needed for quantitative analyses

Barraquand et al. (2014). Lack of quantitative training among early-career ecologists: A survey of the problem and potential solutions

Touchon and McCoy (2016). The mismatch between current statistical practice and doctoral training in ecology

We need to build an ecosystem of practice for scientific computing

The use of these skills should be normalized amongst ecologists at UC Davis, and the training required to progress ecologists from scientific computing novices to beginners to competent practitioners should be supported. This will require sustainable buy-in from the

Hannay et al. (2009). How do scientists develop and use scientific software?

Scientific computing skills are largely self-taught.

Stevens et al. (2018)

The Carpentry model offers a way forward

Freeman et al. (2014). Active learning increases student performance in science, engineering, and mathematics.

Wilson (2014). Software Carpentry: Lessons learned

Wilson et al. (2014). Best practices for scientific computing

Wilson et al. (2017). Good enough practices in scientific computing

Teal et al. (2015). Data Carpentry: Workshops to increase data literacy for researchers

The ecosystem we build will have concomitant benefits

Hampton and Labou (2017): Careers in ecology

We need broader training in our PhD. We need teaching training in our PhD.

References

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Freeman, S., S. L. Eddy, M. McDonough, M. K. Smith, N. Okoroafor, H. Jordt, and M. P. Wenderoth. 2014. Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences* 111:8410–8415.

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