



# Looking at Software Sustainability and Productivity Challenges from NSF

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# Context: NSF SI2 Program

- NSF provides funds to support PIs to develop and maintain the software that is needed for NSF-funded research and education projects
- Rajiv Ramnath will talk about SI2 in the Federal Agency panel later today



# Challenges

- **Funding models.** NSF supports projects for up to 5 years; lifetime of software projects can span 20+ years
- **International funding.** Software collaborations span countries, but most funding agencies don't
- **Career paths for software-focused researchers.** University structure & academic culture rewards publications, not software
- **Incentives, including credit.** How should software be cited? How are all software contributions recognized?
- **Training.** What software engineering practices work in science?
- **Interdisciplinary work.** Much software requires knowledge from more than one field – this doesn't fit our siloed system
- **Portability.** How to deal with changing hardware, middleware, and languages?
- **Dissemination.** How do we document available software with usage examples, strengths, weaknesses, and user experiences?



# Lessons Learned

- Both funding agency and academic culture do not change as quickly as scientific practices, and that continued effort is needed to raise these issues
- We have dealt with some of them internally at NSF, through SI2 as a whole, and specifically, through Institutes, EAGER awards, workshops & hackathons, and are working towards additional community workshops and national activities intended to create awareness of the problems and of successes and failures in attempting to solve them



# Conclusions

- Overall, we believe that the SI2 program has been very successful to date, but that there is a lot of work remaining, including carrying out the institute process, and both leading and pushing academic community to develop solutions to the existing sustainability and productivity challenges.
- Material taken from:
  - Katz, Daniel S. and Ramnath, Rajiv. Looking at Software Sustainability and Productivity Challenges from NSF. arXiv.org, 17 August 2015, <http://arxiv.org/abs/1508.03348>

