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An Exploration of the Mentorship Needs of Research Software Engineers

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Today We Will Discuss

- Mentorship as a strategy to enable the career growth and retention of RSEs
- Key needs that RSEs may have in providing and receiving mentorship
- Directions for future work in this space

Introduction

- The RSE movement is flourishing!
  - RSE departments at universities and national labs
  - National, non-profit RSE organizations
  - RSE conferences, workshops, and other colloquia
- Sustaining that growth by promoting the skill development and career advancement of RSEs will be a priority

Introduction: Looking Towards The Future

- Looking beyond exascale computing, we anticipate many more disruptive cycles of innovation in computing technologies. RSEs will need to keep growing and learning.
- This is also a retention challenge. We must sustain a community of practice that can meet present and future needs.

Background: Mentorship

- By **mentorship**, we mean a relationship in which a more experienced or more knowledgeable person (a mentor) helps to guide a less experienced or less knowledgeable person (a mentee).

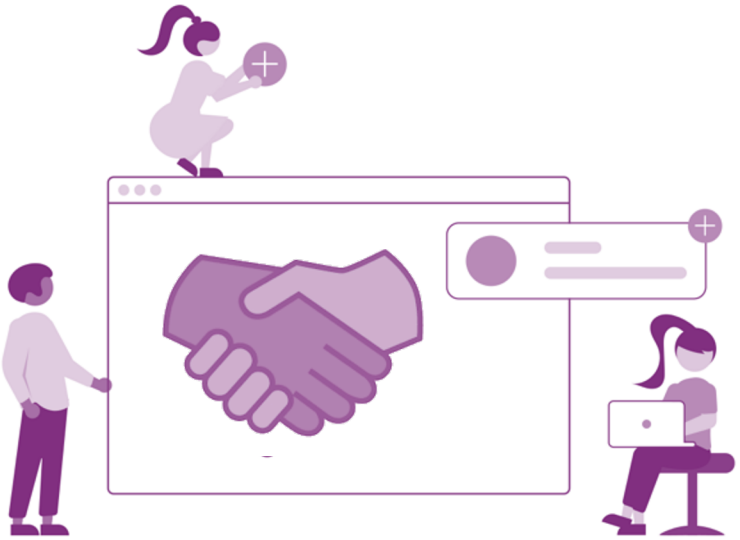
Background: Mentorship

- Benefits of mentorship
  - For mentees: career support (i.e., training, coaching, and advocacy) and psychosocial support (i.e., role modeling, counseling, and friendship)
  - For mentors: personal satisfaction, opportunities for learning through teaching, and reinforce their sense of professional identity
- Mentorship is low-hanging fruit for professional growth / career development

Mentorship Needs of RSEs

Interdisciplinary Mentorship Networks

Long-term Mentoring Relationships



Training Soft Skills

Interdisciplinary Mentorship Networks

- A unique trait of RSEs is their interdisciplinary backgrounds and the interdisciplinary character of their work.
- A unique requirement for effective RSE mentorship is the availability of multiple mentors across different domains.
- No single mentor will be able to supply the necessary organizational, engineering, and domain expertise to a new RSE.

Need: Interdisciplinary software engineers must be conversant in multiple disciplines. An effective network of willing software engineers, domain experts, and organizational culture mentors will boost an RSE's confidence, skill set, and career growth opportunities.

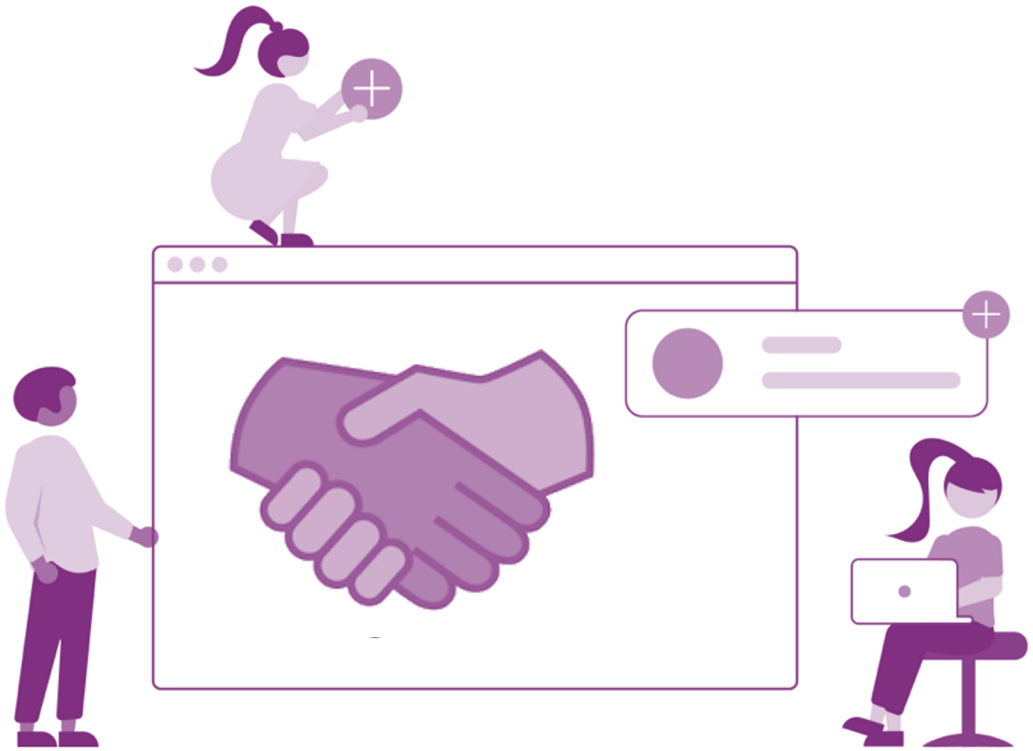
Long-term Mentoring Relationships

- Developers at major tech firms tend to hop between jobs frequently. At universities and national labs, professors and staff scientists may remain with the same institution for decades.
- If we intend to retain RSEs, we need a mentoring model that facilitates long-term, ongoing career growth.
- This is distinct from most mentorship programs in software industry, which focus on onboarding.

Need: Mentorship should not stop once an RSE shows a certain level of independence but instead needs to remain a high-level priority throughout the career of any RSE.

Training Soft Skills

- RSEs must communicate with domain experts, navigate research institutions as a software professional, and articulate software engineering best practices in the scientific domain.
- Soft skills are key to success. Unfortunately, RSEs almost never receive any formal training on applying those kinds of skills.



Need: Mentorship can and should include counseling mentees on relationships with colleagues, encouraging self-reflection, and lining up work opportunities to exercise soft skills.

Discussion (1/2)

- Mentorship is something we can start taking action on **now**.
- In the long-run, RSEs would benefit from **explicit institutional support** for mentorship.
  - Formal mentorship programs,
  - Tailored training for RSEs who want to offer mentorship
  - Incentives for engaging in mentorship
  - Protected time for mentors and mentees to interact.

Discussion (2/2)

- There are other forms of learning and engagement worth pursuing. Teams and organizations can devote resources to **team learning activities** that promote peer learning and consensus-building.
- There is a need for **more research** in this space to support effective policy-making.
  - Surveys of the RSE community to identify specific learning needs
  - Experience reports on mentorship within RSE teams
  - Tailored guidance for national labs and universities looking to implement RSE mentorship programs.

Conclusion

- Across many disciplines, mentorship is considered a vital channel through which workers acquire the mix of skills, knowledge, and sense of professional identity that they need to thrive.
- In this work, we…
  - Made the case for RSE mentorship
  - Identified distinct mentorship-related needs that RSEs
  - Proposed directions for future work