CI Professional Mentoring and/or Professional Development Plan

Organization: The University of Illinois' National Center for Supercomputing Applications has a long history in building, operating, and supporting scientific cyberinfrastructure. It has depended on cyberprofessionals to do this, and in turn, it has helped lead the way in the recruitment and development of cyberprofessionals. Playing a leadership role within the Research Software Engineer (RSE) movement [1-3], NCSA has put in place and refined an organizational structure that emphasizes the retention, growth, and career progression of cyberprofessionals within organizational units focused on various career paths (e.g., Research Software Engineers, Security Engineers, Systems Engineers, etc). This structure is coordinated at the organization level through project assignments to promote staff stability; to foster interaction among staff and projects to cross pollinate and reuse developments such as software; and to train cyberprofressionals, with senior staff members serving as mentors to newer cyberprofessionals who come from non-engineering domains or industry, or who are recent graduates.

Career Counseling: In software, all RSEs are placed in a team with a Lead RSE who has 10-15 years of experience supporting scientific efforts, and who serves as both a manager and an advisor in the academic sense. The Lead RSE works with their 4-6 team members in regards to progression across an established 5-level career path, which, in addition to development, includes at the higher levels aspects of fostering collaborations, outreach and engagement, overseeing projects in terms of deliverables, publishing, and eventually serving as senior personnel and/or Co-PI on proposals with collaborators. Leveraging their years of experience, Lead RSEs mentor team members in these aspects as well as others such as software best practices, working with and guiding students in technical aspects and the adoption of best practices, awareness of latest technologies, software architecture towards reuse, and community building and improving sustainability.

Training and Support: Cyberprofessionals are provided training and support in a number of ways. NCSA now conducts an annual Cyberambassadors program [4], which new staff members are encouraged to participate in and become credentialed. Additionally, each year staff are allotted funds to participate in a workshop, conference or other career development activity of their choice. On the future workforce side, the Center has run an NSF-awarded Cybertraining internship program for undergraduates [5]. Lastly, supporting involvement in all such resources, each staff member is allocated 5% of their time away from specific projects to provide them with the flexibility to participate.

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[1] Research Software Engineers, https://researchsoftware.org

[2] D. Katz, K. McHenry, C. Reinking, and R. Haines, "Research Software Development & Management in Universities: Case Studies from Manchester's RSDS Group, Illinois' NCSA, and Notre Dame's CRC," *ACM/IEEE International Conference on Software Engineering, International Workshop on Software Engineering for Science (SE4Science),* 2019. http://doi.org/10.1109/SE4Science.2019.00009

[3] D. Katz, K. McHenry, and J. Lee, "Senior level RSE career paths (with an s)," *SeptembRSE: The Virtual RSE Conference,* 2021. https://doi.org/10.5281/zenodo.5531838

[4] CyberAmbassadors, https://colbrydi.github.io/cyberambassadors

[5] CyberTraining: CIP: NCSA Internship Program for CI Professionals, https://www.nsf.gov/awardsearch/showAward?AWD_ID=1730519

Notes:

CI Professional Mentoring and/or Professional Development Plan *(if applicable): Any proposal that requests funding to support a CI professional must upload a document titled "CI Professional Mentoring and/or Professional Development Plan" in the Supplementary Documentation section of Research.gov or FastLane. CI Professionals are the professional staff who develop, deploy, manage, and support effective use of the CI (e.g., research software engineers, programmers, IT professionals, data scientists, system administrators, CI facilitators, etc.) The document must describe the mentoring and/or professional development activities that will be provided for such individuals. In no more than one page, the planned activities must be described that are targeted specifically for CI professionals supported by the project, regardless of whether they reside at the submitting organization, any subrecipient organization, or at any organization participating in a simultaneously submitted collaborative proposal. Proposers are advised that the CI Professional Mentoring and/or Professional Development must not be used to circumvent the 15-page Project Description limitation. The mentoring and professional development activities provided to CI professionals supported on the project will be evaluated under the Broader Impacts review criterion. Examples of mentoring and professional development activities include, but are not limited to:*

- *career counseling;*
- *training in preparation of and opportunities to prepare grant proposals, publications and presentations;*
- *guidance on finding opportunities for professional training and career advancement*
- *guidance on effectively collaborating with researchers and other professionals from diverse backgrounds and across multiple science and engineering disciplines;*
- *and providing information on and training in responsible professional practices.*

- Organizational structure around CI professional areas
- Structured based on mentoring by senior members
- Career paths addressing growth in tech development plus scientific collaboration
- RSE community involvement, paper
- CI Professional REU involvement (Dan Lapine's effort)
- The 5%
- Leverage past projects/institutional knowledge
- Leverage cross-pollination, 50/50
- 35 year history with folks here from the beginning?
- Cyberambassadors
- Career development funds