

The Virtual Residency: A Training Program for Research Computing Facilitators

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ABSTRACT

Cyberinfrastructure (CI) Facilitation is the process of helping researchers use research computing systems and services to advance their computing-intensive and/or data-intensive research goals. The growing need for CI Facilitation isn't being met by traditional academic degree and certificate programs, so informal education is needed for preparing and improving CI Facilitators. The Virtual Residency (VR) is a program that teaches key CI Facilitation skills to pre-service and in-service CI Facilitators. Via a combination of (a) workshops, (b) biweekly conference calls, (c) a Grant Proposal Writing Apprenticeship and (d) a Paper Writing Apprenticeship, the VR has been teaching this target population since 2015. The VR program as a whole has so far served 523 participants from 266 institutions in every US state and 3 US territories plus 7 other countries.

1 Introduction

Cyberinfrastructure (CI) Facilitation is the process of working directly with researchers to help them use research computing systems and services to advance their computing-intensive and/or data-intensive research goals. These systems and services are often (but not always) large scale and/or advanced. The need for CI Facilitation is growing rapidly, for three reasons: (1) These resources are becoming increasingly difficult to use; in particular, they have deeper storage hierarchies and more hybrid parallelism. (2) The need for CI is growing in two directions: more disciplines are using CI than in the past, and within each discipline, more researchers are discovering a need for CI. (3) There is a growing gap between the daily experience of computing for most people, which is weighted in favor of handhelds, versus large scale research computing contexts, which typically feature Linux, command line, remote, shared, batch computing.

The growing need for CI Facilitation isn't being met by traditional academic degree and certificate programs, because the number of CI Facilitators is still too small to justify establishing such programs. As such, informal education is the most fruitful approach to preparing new CI Facilitators and improving the effectiveness of extant CI Facilitators.

Such researcher-facing roles require an unusual combination of skills, including but not limited to technology, communication, collaboration, and synthesizing historically disparate ecosystems for research and CI. Although training for some of these skill areas has long been widely available (for example, in a variety of relevant

computing technologies), for many of these topics, no training for researcher-facing CI professionals was available prior to establishing the Virtual Residency (below) in 2015. For example, while there are many training programs for communication skills in general, prior to the Virtual Residency there were no such programs specifically focused on the complexities and nuances of communication by CI Facilitators with researchers, other CI professionals, funding agencies and other relevant interlocutors and stakeholders.

2 The Virtual Residency Program

These issues drove the need for the Virtual Residency (VR) [1,2,3], a program to teach essential CI Facilitation skills via informal education, which held its first workshop for CI Facilitators in summer 2015, and has continued to hold summer workshops annually. The 2015-17 workshops were conducted at an introductory level, designed to be appropriate for both pre-service and in-service CI Facilitators, including CI professionals for whom CI Facilitation is only part of their duties (e.g., CI system administrators who help researchers to use their local CI resources). The 2018 workshop was originally designated intermediate, but roughly 2/3 of its material was at an advanced level, focused on institutional CI leadership. The 2019 workshop, planned for June 2-7, is a mix of introductory and intermediate content.

The VR program includes: (a) the VR workshops; (b) biweekly VR calls, primarily focused on developing the upcoming VR workshop; (c) a Grant Proposal Writing Apprenticeship, started in 2017, that teaches a crucial CI leadership skill, by developing a grant proposal as a group, which has so far submitted two proposals; (d) a Paper Writing Apprenticeship, started in 2018, and similar to (c), that recently submitted a paper to PEARC'19.

To date, the VR components collectively have had 523 participants from 266 institutions in every US state and 3 US territories plus 7 other countries, including 39 Minority Serving Institutions (15% of VR institutions), 64 non-PhD-granting academic institutions (24%), 78 institutions (29%) in 25 of 26 Established Program for the Stimulation of Competitive Research (EPSCoR) jurisdictions, and 185 Campus Champion institutions (70% of VR institutions, 64% of CC institutions).

ACKNOWLEDGMENTS

This work was partially supported by National Science Foundation grant nos. 1440783 (“CC*IE Engineer: A Model for Advanced Cyberinfrastructure Research and Education Facilitators”), 1548562 (“XSEDE 2.0: Integrating, Enabling and Enhancing National Cyberinfrastructure with Expanding Community Involvement”) and 1620695 (“RCN: Advancing Research and Education Through a National Network of Campus Research Computing Infrastructures – The CaRC Consortium”). Portions of this paper were originally developed for various grant proposals, grant reports and conference submissions.

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