

Roundtable: Experiences in The Advanced Cyberinfrastructure Research and Education Facilitators Virtual Residency Program

Creator: Henry Neeman, University of Oklahoma

Roundtable Participants:

Marcus Bond, Southeast Missouri State University

Dana Brunson, Oklahoma State University

James Deaton, OneNet

Perdeep Mehta, Samuel Roberts Noble Foundation

Horst Severini, University of Oklahoma

Oklahoma Supercomputing Symposium

September 21, 2016

What is an ACI-REF?

- Advanced Cyberinfrastructure Research & Education Facilitator (term invented by Miron Livny)
- Work with users -- researchers and educators -- to help them improve their research and/or education productivity using advanced cyberinfrastructure.
- Typically, one or a few ACI-REFs have responsibility for an entire institution, or multiple institutions.
- Some ACI-REFs are:
 - faculty or former faculty;
 - postdocs or former postdocs;
 - research staff or former research staff;
 - IT professionals;
 - graduate or undergraduate students.

Virtual Residency

- OU (PI Henry Neeman) submitted a proposal to the Campus CI Engineer subprogram:
 - “A Model for Advanced Cyberinfrastructure Research and Education Facilitators”
 - \$400K
 - Highlights the relationship between OU and the original ACI-REF project.
- Included:
 - National training regime: Provide a “virtual residency” program for Campus CI Engineers and other ACI-REFs, open to not only CC*IIE awardees and ACI-REF members but any institution that needs.

ACI-REF Virtual Residency: Why?

- CI Facilitators have strong experience within their discipline (often non-CS).
- Most CI Facilitators and CI Engineers haven't been faculty.
- Sometimes little or no research experience (especially for SDN-focused CI Engineers).
- Even if strong research background, typically little or no experience with research outside their own discipline.
- When the Virtual Residency started in 2015, there were no local, regional or national programs to teach people how to be an ACI-REF.
- In the olden days, you could take your time learning how to do this -- but not anymore

Lots of Interest

■ Participants

- 2015: 50 total from 38 institutions in 26 states and territories (28 onsite and 22 offsite via videoconferencing), including:
 - 21 institutions in 12 EPSCoR jurisdictions;
 - 5 Minority Serving Institutions;
 - 5 non-PhD-granting institutions.
- 2016: 98 total from 67 institutions in 33 states & territories plus 3 other countries (43 onsite and 56 offsite via videoconferencing), including:
 - 20 institutions in 13 EPSCoR jurisdictions;
 - 10 Minority Serving Institutions;
 - 13 non-PhD-granting institutions.

What Did We Cover?

- How to work with researchers who are using CI.
 - How to talk to them.
 - How to help them.
- How to contribute to, and ultimately to lead, grant proposals.
 - Some already us knew how to do this, so our job was to help the rest.
- Science DMZ Track
 - How to manage a Science DMZ.
- Computational Science & Engineering Track
 - Get some practice working with researchers.

What Weren't We Trying to Do?

- On the Computational & Data-enabled Science & Engineering track, we **WEREN'T** trying to cover a lot of ~~technical content~~.
 - People can learn that from other sources.
- Instead, the goal was to learn them the **PROFESSION** of ACI-REF.

What Was the Hidden Agenda?

- The real goal was to prepare for an upcoming transition to:
 - more need for this kind of skilled workforce, but
 - fewer people who know how to do it, with
 - no mechanism to prepare a sufficiently large cohort.
- Some of the participants already knew how to do this.
 - But it took a very long time to learn on their own.
 - To keep up with demand, the community needs us to streamline the process so that new ACI-REFs can become fully productive quickly.
- These are the CI leaders of tomorrow.

ACI-REF Workshop Agenda 2016

- SUNDAY (evening pizza party)
 - Welcome and virtual residency overview
 - Introduction to Research
Cyberinfrastructure Facilitation
 - How to Give a CI Tour
- MONDAY
 - Early AM: Effective Communication:
How to Talk to Researchers about Their Research
 - Computational and Data-enabled Science & Engineering (CDS&E) Track
 - Mid AM: Deploying Community Codes
 - Early PM: Real user presents their CDS&E research
 - SCIENCE DMZ Track
 - Mid AM: OpenFlow - Lecture
 - Early PM: OpenFlow - Lab
 - Mid PM: Faculty: Tenure, Promotion, Reward System
- TUESDAY
 - Very Early AM: Project Guidelines
 - Early AM: Grant Proposal Basics
 - Mid AM: Exploring the Faculty
Entrepreneurial Mindset
 - CDS&E Track
 - Early PM: How to do an intake interview
 - Early PM 2: Real users: CI consulting practicum (“speed dating”)
 - Mid PM: Best Practices from ACI-REF Phase 1
 - Mid PM 2: Ongoing assistance of researchers
 - SCIENCE DMZ Track
 - Mid AM: Exploring Open Daylight - Lecture
 - PM: Exploring Open Daylight - Lab
- WEDNESDAY
 - Early AM: CI Milieu
 - Mid AM: Creating and Evaluating Training workshops
 - Late AM: Creating Effective Documentation
 - PM: BREAK (free time)

ACI-REF Workshop Agenda

■ THURSDAY

- Early AM: The Shifting Landscape of CI Funding Opportunities
- How to Design a Cluster
- CI user support
- CDS&E Track
 - Early PM: Real users present CDS&E research
 - Mid PM: “Speed Dating”
- SCIENCE DMZ Track
 - Early PM: The Software in SDN
 - Mid PM: Exploring SDN Software

■ FRIDAY

- Early AM: So You Want to Write a CI Proposal
- Mid AM: Research Data Management
- Lunch: Stories from the trenches
- Early PM: Project work time
- Mid PM: Project work time
- Late PM: Project presentations from early departers

■ SATURDAY

- AM: Project presentations

What's the ACI-REF Career Path?

- Preferably an advanced degree in a STEM discipline.
 - But, at most doctoral institutions, you could easily have only one person doing everything CI-related (HPC sysadmin, ACI-REF, Campus Champion, proposal writing, etc).
- ACI-REF Virtual Residency early on
- Campus Champion
- Lots of CI workshops (National Computational Science Institute, Linux Clusters Institute, XSEDE, etc)
- Coalition for Academic Scientific Computation and Campus Research Computing (CaRC) Consortium
- Institutional center deputy director, then director
- Aspiration: training and mentoring opportunities at every career stage

Why ACI-REF is the Best Job Ever

Every day, you get to see how the work you do helps other people to be successful.

Acknowledgements

- Portions of this material are based upon work supported by the National Science Foundation and the Department of Defense under the following grants:
 - Grant No. EPS-0814361, “Building Oklahoma's Leadership Role in Cellulosic Bioenergy”
 - Grant No. EPS-0919466, “A cyberCommons for Ecological Forecasting”
 - Grant No. EPS-1006919, “Oklahoma Optical Initiative”
 - Grant No. OCI-10310029, “MRI: Acquisition of Extensible Petascale Storage for Data Intensive Research”
 - Grant No. OCI-1126330, “Acquisition of a High Performance Compute Cluster for Multidisciplinary Research”
 - Grant No. ACI- 1229107, “Acquisition of a High Performance Computing Cluster for Research and Education”
 - Grant No. EPS-1301789, “Adapting Socio-ecological Systems to Increased Climate Variability”
 - Grant No. ACI-1341028, “OneOklahoma Friction Free Network”
 - **Grant No. ACI-1440783, “A Model for Advanced Cyberinfrastructure Research and Education Facilitators”**
 - Grant No. ACI-1440774, “ENabling CyberInfrastructure via Training and Engagement”
 - Grant No. ACI-1531128, “MRI: Acquisition of Shared High Performance Compute Cluster for Multidisciplinary Computational and Data-Intensive Research,” OSU, \$950K
 - Grant No. ?, “DURIP-ARO: Heterogeneous Cluster for Cyber-Physical System Security Analytics,” TU, \$200K
 - Grant No. CNS-1531270, “MRI: Development of Heterogeneous Cluster for Cyber-Physical System Hybrid Analytics,” TU, \$180K
 - **Grant No. ACI-1546711, “EAGER: Fact-Gathering and Planning for a National-Scale Cyberpractitioner Program,” Internet2, \$41K**
 - **Grant No. ACI-1620695, “RCN: Advancing Research and Education Through a National Network of Campus Research Computing, Infrastructures – The CaRC Consortium, “Clemson U, \$748K**
- Dell provided seed systems for the OU Research Cloud (“OURcloud”) and the OU Science DMZ.