The Advanced Cyberinfrastructure Research and Education Facilitators Virtual Residency Program

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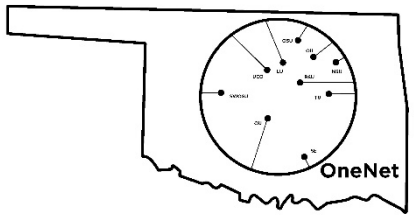

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What is an ACI-REF?

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- 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.

ACI-REF: Define Narrow or Broad?

Should "ACI-REF" be well-defined, or intentionally vague?

- U Oklahoma (OU) is ranked ~#100 in the US (e.g., US News, NSF external research funding rankings).
- We can barely cobble together 1.5 FTE of ACI-REF internal funds.
- Therefore, at most ~100 institutions can afford 2 ACI-REF FTE, and maybe ~50 can afford 3 or more ACI-REF FTEs.
- There are 329 US institutions with Carnegie classification of "doctoral."
- Narrow definition => no profession (~100 people = exception)
- Broad, vague definition => maybe a profession (~1000 people)
- Or, convince institutional administrations to reprioritize funding (per Jim Bottum).

What's the ACI-REF Career Path?

- Preferably an advanced degree in a STEM discipline.
  - But, at many 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.

Virtual Residency

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 we started the Virtual Residency 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 ….

Virtual Residency Attendees 2015-17

2015-17: 286 people from 173 institutions in 51 US states & territories (missing TN, USVI, Guam) plus 5 other countries (Canada, Kenya, Mexico, Nigeria, United Kingdom):

- 36 (13%) from 26 (15%) Minority Serving Institutions
- 38 (13%) from 33 (19%) non-PhD-granting institutions
- 94 (33%) from 59 (34%) institutions in 25 of 27 (93%) EPSCoR jurisdictions
- 206 (72%) from 114 (66%) of Campus Champion institutions (49% of CC institutions)

Virtual Residency Funding

- 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.
- This proposal 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.

What Do 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.
- Computational Science & Engineering Track
  - Get some practice working with researchers.
- Science DMZ Track (2015-16)
  - How to deploy and manage a Science DMZ.

What Aren't We Trying to Do?

- We **AREN'T** trying to cover a lot of ~~technical content~~.
  - People can learn that from other sources.
- Instead, the goal is to teach the **PROFESSION** of CI facilitation.

What's Our Hidden Agenda?

- The real goal is 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 facilitators can become fully productive quickly.
- These are the CI leaders of tomorrow.

ACI-REF Workshop Agenda 2015

- SUNDAY (evening pizza party)
  - Welcome and virtual residency overview
  - Introduction to Research Cyberinfrastructure consulting
  - 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: CI User Support
- TUESDAY
  - Very Early AM: Project Guidelines
  - Early AM: Faculty: Tenure, Promotion, Reward System
  - CDS&E Track
    - Mid AM: Benchmarking & Tuning
    - Early PM: Real users present CDS&E research
    - Mid PM: Real users: CI consulting practicum ("speed dating")
  - SCIENCE DMZ Track
    - Mid AM: Exploring Open Daylight - Lecture
    - Early PM: Exploring Open Daylight - Lab
    - Mid PM: Real users' high bandwidth research
- WEDNESDAY
  - Early AM: Using Videoconferencing and Collaboration Technologies for Consulting
  - Mid AM: Writing Grant Proposals
  - PM: BREAK (free time)

ACI-REF Workshop Agenda 2015

- THURSDAY
  - Early AM: The Shifting Landscape of CI Funding Opportunities
  - CDS&E Track
    - Mid AM: Finding and Provisioning Remote Resources (XSEDE, OSG)
    - Early PM: Real users present CDS&E research (“speed dating”)
    - Mid PM: Catch-up on unfinished talks
  - SCIENCE DMZ Track
    - Mid AM: The Software in SDN - Lecture
    - Early PM: The Software in SDN - Lab
    - Mid PM: Real users' high bandwidth research
- FRIDAY
  - Early AM: So You Want to Write a CI Proposal
  - Mid AM: Panel: 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

Theme #1

1. How to Understand and Work with Real Researchers
   - Introduction to Research Cyberinfrastructure consulting
   - How to Give a CI Tour
   - Effective Communication: How to Talk to Researchers about Their Research
   - Real User Presents Their Research
   - CI User Support
   - Faculty: Tenure, Promotion, Reward System
   - Real users: CI facilitation practicum (“speed dating”)
   - Panel: Stories from the Trenches

Theme #2

2. Technical Content
   - Deploying Community Codes
   - Benchmarking & Tuning
   - Using Videoconferencing and Collaboration Technologies for Consulting
   - Science DMZ Content [2015-16]
     - OpenFlow
     - Exploring Open Daylight
     - The Software in Software Defined Networking

Themes #3-4

3. Proposal Writing
   - Writing Grant Proposals
   - The Shifting Landscape of CI Funding Opportunities
   - So You Want to Write a CI Proposal
4. The Cyberinfrastructure Milieu
   - Finding and Provisioning Remote Resources (XSEDE, OSG) [2015 only]

Biweekly Calls

- Discuss facilitation issues, technical, leadership etc
- Over 100 people have participated so far.
- 31 people have given or volunteered to give lightning talks.

Proposal Writing Apprenticeship

- Add-on to learn how to write grant proposals, by writing a grant proposal.
- 59 people have participated so far.
- Started by writing a 1-pager about intermediate Virtual Residency workshops (~$50K).
- Encouraged to expand to an NSF CyberTraining proposal ($500K).

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Thanks for your attention!

Questions?

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