Advanced Cyberinfrastructure Research & Education Facilitators
Virtual Residency: Overview

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Advanced Cyberinfrastructure Research & Education Facilitators Virtual Residency Workshop 2017
Sunday July 30 2017
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Let’s Introduce Ourselves!

- Let’s go around the room.
- Tell us:
  - your name;
  - your institution;
  - your role at your institution;
  - why you wanted to attend the ACI-REF Virtual Residency workshop;
- What do you hope to get out of this week?
Outline

- This is an experiment!
- Advanced Cyberinfrastructure Research & Education Facilitators
- National Science Foundation’s Campus Cyberinfrastructure Programs
- You’re Next …
This is an Experiment!

- Everything about this week is either time-tested (2015-17), or exciting and new, or both.
- Those of you who are new are only the third cohort of what we intend to be a national program.
- This means that you’re helping us to pioneer a new way of developing the next generation Cyberinfrastructure (CI) workforce.
You Voted with Your Feet

- Originally, we thought most of the interest would be in learning how to be a Campus CI Engineer.
- But it turned out that by far the biggest national need is learning how to help researchers do the computing-intensive and data-intensive parts of their research.
  - 2015: Science DMZ Track: 14% (7 of 50)
  - 2016: Science DMZ Track: 21% (22 of 104)
  - 2017: Science DMZ Track **not offered**
Only You …

… can make this Virtual Residency a success.

- Ask questions -- the only dumb question is the one you don’t ask.
- Volunteer your ideas and experiences.
- Ultimately, it’s you who will have to be in charge, not us.
Advanced Cyberinfrastructure Research & Education Facilitators
What is an ACI-REF?

- Advanced Cyberinfrastructure Research & Education Facilitator (term coined by Miron Livny, U Wisconsin)
- Work with users -- researchers and educators -- to help them improve their research and/or education productivity and aspirations using advanced cyberinfrastructure.
- Typically, one or a few ACI-REFs have responsibility for an entire institution, or multiple institutions.
- At some institutions, CI facilitation is part time; at other institutions, it’s a full time job. It can come from:
  - faculty or former faculty;
  - postdocs or former postdocs;
  - research staff or former research staff;
  - IT professionals;
  - graduate or undergraduate students.
A Little Background

- In 2013, a team of 13 institutions led by Clemson U submitted an 8-figure proposal on this issue, to provide multiple ACI-REFs at each institution over a 4 year period.

- The proposal also included funding for advanced networking.
OU’s Piece

OU’s piece included some extra components:

- a component about EPSCoR jurisdictions, shared with HI, SC, UT (note that UT has now graduated from EPSCoR);
  - EPSCoR: Established (formerly Experimental) Program for the Stimulation of Competitive Research: a federal program to promote and increase STEM research in states that get less than 0.75% of federal research funding.
    - NIH (known as INBRE)
- a Virtual Residency to teach how to be an ACI-REF -- THIS!
Ah, if only ….

Unfortunately, the NSF wasn’t able to fully fund that proposal. The team ended up reducing down to 6 institutions for 2 years, and no advanced networking.

“Phase 1:”
- Clemson U
- Harvard U
- U Hawai’i
- U Southern California
- U Utah
- U Wisconsin

“Phase 2:”
- Arizona State U
- Emory U
- Ohio Supercomputer Center
- Stanford U
- Sunshine State Education & Research Computing Alliance (SSERCA)
- U Oklahoma
- U Washington
National Science Foundation’s Campus Cyberinfrastructure Programs
And then …

- In 2012-13, the NSF had a program called “Campus Cyberinfrastructure - Networking Infrastructure & Engineering” (CC-NIE).
  - Two subprograms: One for deploying networking equipment, one for innovative networking research.
  - OU, OSU, Oklahoma Innovation Institute, Langston U, OneNet: “OneOklahoma Friction Free Network”
- In 2014, that was followed by “Campus Cyberinfrastructure - Infrastructure, Innovation & Engineering” (CC*IIE).
  - Several new subprograms, including “Campus CI Engineer.”
So …

- In 2014, OU 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 ACI-REF project.

- We put Clemson’s Phase 1 PI on our External Advisory Committee.

- OU was the only institution that was all of:
  - ACI-REF Phase 2 (so already involved)
  - EPSCoR (and was to have co-lead the ACI-REF EPSCoR thrust)
  - CC-NIE awardee (so need a Campus CI Engineer already)
Objectives

- **Data-Intensive Research Facilitation:** Via Software Defined Networking (SDN) across OFFN, facilitate end-to-end management, by researchers, of high bandwidth/high performance data flows through a distributed hierarchy of open standards tools, providing researchers with a new layer of transparency into network transport at OU, among OneOCII institutions, and with ACI-REF members.

- **Oklahoma ACI-REF project:** Lead and facilitate adoption of the ACI-REF approach across Oklahoma, leveraging extant and emerging capabilities within OneOCII.

- **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.

- **Research Experiences for Undergraduates (REU) Sites/Supplements:** Foster undergraduate research at OU via a culture of integrating REU sites and supplements into Science, Technology, Engineering & Mathematics (STEM) research, including by all research themes on this proposed CC*IIE project.
Success!

Reviewer comments

- “This energetic, detailed and ambitious proposal from the University of Oklahoma deserves the highest priority for support. … There are no major weaknesses in the proposal and many strengths. …”
- “The broader impacts are nicely defined in terms of … the idea of a residency program …. A residency program and enhancement of undergraduate research are strong enhancements to the proposal. …”
- “This is one of the better proposals regarding … additional outreach via the budgeted virtual residency program. …”

[Emphasis added.]
Even More Success!

From a review from the Clemson-led Research Coordination Network grant that created the Campus Research Computing (CaRC) Consortium, regarding broader impacts:

- “The ACI-REF virtual residency held at OU Supercomputing Center may be … notable … (the web site’s description of the workshop looked outstanding) -- assuming it was available to a broader community and not just the [Phase 1] awardees.”
  - 2015: 49 of 50 participants (98%), from 37 of 38 institutions (97%), were “not just the [Phase 1] awardees.”
  - 2016: 90 of 99 participants (91%), from 60 of 66 institutions (91%), were “not just the [Phase 1] awardees.”
  - 2017: 228 of 241 preregistrants (95%), from 159 of 165 institutions (96%), were “not just the [Phase 1] awardees.”
Virtual Residency
For OU’s 2014 Campus CI Engineer proposal, we had 33 institutions in 23 US states and territories that expressed interest in the Virtual Residency workshops, including:

- 19 institutions in 13 EPSCoR states;
- 3 Minority Serving Institutions;
- 7 non-PhD-granting institutions.
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 55 offsite via videoconferencing), including:
- 20 institutions in 13 EPSCoR jurisdictions;
- 10 Minority Serving Institutions;
- 13 non-PhD-granting institutions.
2017: 241 preregistrations so far (52 onsite, 189 remote), from 165 institutions in 51 US states & territories and 4 other countries, including:

- 56 institutions in 26 of 27 EPSCoR jurisdictions (missing USVI);
- 27 Minority Serving Institutions;
- 25 non-PhD-granting universities and colleges, 3 community colleges, 3 secondary schools;
- 101 (46%) of 219 Campus Champion institutions;
- 55 (68%) of 81 member institutions of the Coalition for Academic Scientific Computation;
- all 28 of the Campus Research Computing (CaRC) institutions.

**DISCLAIMER:** Not everyone who preregisters will attend ....
Lots of Interest (cont’d)

Total 2015-17: 205 institutions in EVERY STATE IN THE US, 3 US territories (DC, PR, GU) and 8 other countries, including:

- 66 institutions in 26 EPSCoR jurisdictions (no USVI);
- 34 Minority Serving Institutions;
- 34 non-PhD-granting colleges and universities, 3 community colleges, 3 secondary schools;
- 125 (57%) of 219 of Campus Champion institutions;
- 61 (75%) of 81 of Coalition for Academic Scientific Computation institutions;
- all 28 of the Campus Research Computing (CaRC) institutions.

**DISCLAIMER:** That’s if everyone who’s registered so far actually participates, which of course won’t actually happen.
Agenda

- You can get a copy of the agenda in your web browser: [http://www.oscer.ou.edu/acirefvirtres2017.php#agenda](http://www.oscer.ou.edu/acirefvirtres2017.php#agenda)
- Everything on it is subject to change without notice:
  - We may drop some of the sessions.
  - We may add sessions that we think are needed.
- You’re going to help us learn how to help you learn.
What Are We Here to Accomplish?

- Learn how to work with researchers who are using CI.
  - Learn how to talk to them.
  - Learn how to help them.
- Learn how to contribute to, and ultimately to lead, grant proposals.
  - Some of you already know how to do this, so you’ll help us help the rest to learn.
  - Not everyone here will do this for a living, but it’ll help you to understand it regardless, because your customers do it.
- Get some practice working with researchers.
What Aren’t, and Are, We Trying to Do?

- We **AREN’T** trying to teach you a lot of technical content.
  - You can learn that from other sources.
- We **ARE** trying to teach you the **PROFESSION** of CI facilitation.
What Are We Really Here For?

- We’re really here 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 us here already know how to do this.
  - But it took a very long time to learn on our own.
  - To keep up with demand, the community needs us to streamline the process so that new CI facilitators can become fully productive quickly.
- You’re the leaders of tomorrow.
You’re Next ...

http://freapp.us/apps/android/com.im.uncle.sam/
A Growing Need, a Growing Breed

- The Coalition for Academic Scientific Computation (CASC) is a group of most of the mid-to-large academic and government CI centers in the US.
- When OU joined CASC in 2004, there were roughly 35 member institutions.
- Now there are 81.
- So the growth has been significant.
- But, there are a total of 329 institutions that have a Carnegie classification of “doctoral.”
- So the growth potential is substantial.
Get Ready to Be in Charge

- Baby Boomers: born 1946-1964 (ages 53-72)
- Generation X: 1965-1984 (ages 33-52)
- Millennials: roughly ages 13-33

“Roughly 10,000 Baby Boomers will turn 65 today, and about 10,000 more will cross that threshold every day for the next 19 years.” -- Pew Research Center, 2010  
http://www.pewresearch.org/daily-number/baby-boomers-retire/

Who do you think is going to have to take up the mantle they’re currently carrying?
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.
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T-shirts Coming!

100% Cotton!

Arriving this week!

Remote attendees: We’ll get them to you, but only if you show up as having joined us on Zoom!
Thanks for your attention!

Questions?

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