Virtual Residency: Overview

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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;
- 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 exciting and new.
- Those of you who are new are only the second cohort of what we want 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

- We thought most of the interest would be in learning how to be a Campus CI Engineer.
- But it turned out that a big chunk of the national need is learning how to help researchers do the computing- and data-intensive parts of their research.
  - 2015: Science DMZ Track: 14% (7 of 50)
  - 2016: Science DMZ Track: 21% (22 of 104)
- Since we do both here, we can teach both here.
  - So we can serve both sides of the national need.
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)
- 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.
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 is now graduating from EPSCoR);
    - EPSCoR: Experimental Program for the Stimulation of Competitive Research: 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 have Clemson’s Phase 1 PI on our External Advisory Committee.
- OU is the only institution that is 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. …”
Even More Success!

From a review from a recently funded proposal that joins the teams of the Clemson-led ACI-REF Phase 1 and OU’s Campus CI Engineer grant, regarding Phase 1 broader impacts:

- “The ACI-REF virtual residency held at OU Supercomputing Center may be … notable … (the website’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, from 37 of 38 institutions, were “not just the [Phase 1] awardees.”
  - 2016: 95 of 104 accepted registrants, from 69 of 75 institutions, were “not just the [Phase 1] awardees.”
Virtual Residency
Lots of Interest 2014

- 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.
In 2015:

- We had applications from over 65 people at 50 institutions in 31 US states and territories.
- The final headcount was 50 (28 onsite, 22 remote) from 38 institutions in 29 US states and territories, including:
  - 19 attendees from 14 institutions in 12 EPSCoR states;
  - 5 attendees from 5 Minority Serving Institutions;
  - 5 attendees from 5 non-PhD-granting institutions.
In 2016, as of Sat Aug 6:

- **Applications**: 116 from 80 institutions in 35 US states plus 4 other countries (Canada, India, Nigeria, UK)
- **Confirmed registrants**: 104 from 74 institutions in 34 US states plus 4 other countries (as above), including:
  - 27 attendees from 21 institutions in 13 EPSCoR states;
  - 10 attendees from 9 minority serving institutions;
  - 13 attendees from 13 non-PhD-granting institutions (including 3 from 3 @ MSIs);
  - 43 registrants onsite, 61 attendees remote;
  - of 2015’s 38 institutions, 24 (63%) are registered to return, plus 2 of 2015’s attendees who are now at new institutions;
  - 73 registrants are from 47 institutions that have Campus Champions, including 33 Champions.
Agenda

- You’ve got a copy of the agenda in front of you.
- 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.
- Science DMZ Track
  - Learn about Science DMZs, Software Defined Networking etc.
- Computational Science & Engineering Track
  - Get some practice working with researchers.
What Aren’t We Trying to Do?

- On the Computational & Data-enabled Science & Engineering track, we **AREN’T** trying to teach you a lot of technical content.
  - You can learn that from other sources.
- Instead, our goal is 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/
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 ~85.

So the growth has been significant.

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 52-71)
- Generation X: 1965-1984 (ages 32-51)
- Millennials: roughly ages 12-32

“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

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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- Grant No. ACI-1341028, "OneOklahoma Friction Free Network"
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Dell provided seed systems for the OU Research Cloud ("OURcloud") and the OU Science DMZ.
OK Supercomputing Symposium 2016

FREE!
Wed Sep 21 2016
@ OU

Reception/Poster Session
Tue Sep 20 2015 @ OU
Symposium
Wed Sep 21 2015 @ OU

ACI-REF Virt Res Overview
Thanks for your attention!

Questions?

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