Developing the HPC Workforce of the Future
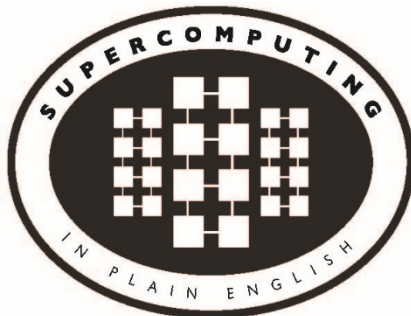
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Associate Professor, College of Engineering

Adjunct Associate Professor, School of Computer Science

RMACC HPC Symposium 2015, Wednesday August 12 2015

Outline

- Qualifications for the Job
- ACI-REF
- ACI-REF Virtual Residency

Qualifications for the Job

Qualifications

- Degree in a STEM discipline (PhD preferred but not essential) or comparable work experience.
  - In many cases, specific STEM discipline isn't all that important.
- Computational STEM background preferred, but IT professionals do this too.
- Some experience with software development.
- Excellent soft skills
  - Written and oral communications.
  - Natural explainer.
  - Able to see other people's point of view.

Minimal Qualifications?

- Baseline technical skills
    - These don't have to be terribly deep -- a lot of technical stuff can be learned from a book.
- Always wanting to learn new things and be on the cutting edge.
- Really great with people
- Solid habits of mind
    - Constant, effective communication
        - Written and oral
    - "A soft answer turneth away wrath."

The Most Important Thing I Did

The most important thing I did in grad school was be an officer in a student organization.

- Everyone was a volunteer.

- I didn't pay them and I couldn't fire them.

- There was a lot of work to do: how to get them to want to?

- That's pretty much how my job works now:

  - We have a group of about 10 who report to me, but most of them do things for a living that I don't do and can't tell them what they should do.

  - But I work with 1000+ users, who I don't pay and can't fire, but I need them to do things.

ACI-REF

A New Career Path

- Advanced Cyberinfrastructure Research & Education Facilitator (ACI-REF)
- Work with researchers and educators to facilitate the computing- and data-intensive aspects of their research.
- Become a Cyberinfrastructure leader within the institution.

ACI-REF: SW & HW

- Software
  - Deploy community software packages.
  - Port and optimize (including parallelize) homebrew software.
- Hardware
  - Facilitate design, acquisition and deployment of compute and storage systems.
  - Within smaller cyberinfrastructure organizations, might also do system administration.

ACI-REF: Writing

- Writing grant proposals.
  - Start as Senior Personnel, then Co-PI, then PI of your own proposals.
- Writing publications: journal articles, conference papers, technical reports, white papers.
  - As co-author with researchers that you've helped.
  - As first author on publications about the computational work you do.

ACI-REF: Administration-Facing

- You become the face and voice of computing- and data-intensive research at your institution.

- Your institution's officers look to you for guidance on the best ways to address evolving and emerging needs.

- You can also take on key roles regionally, nationally and internationally.

ACI-REF: National-Facing

- XSEDE Campus Champions
- Conference committees
- Proposal review panels
- Publications and posters
- ACI-REF community

ACI-REF
Virtual Residency

ACI-REF Virtual Residency

- First week of June
- 50 participants (28 onsite, 22 videoconferenced)
    - 39 institutions
    - 26 states and territories
    - 21 institutions in 12 EPSCoR jurisdictions
    - 5 Minority Serving Institutions,
    - 5 non-PhD-granting institutions

Virtual Residency Structure

- Plenaries
- Breakout sessions in two tracks
  - Computational & Data-Enabled Science & Engineering
  - Software Defined Networking
- Practica

Plenary Topics

- Introduction to Research Cyberinfrastructure Consulting
- How to Give a Cyberinfrastructure Tour
- Effective Communication: How to Talk to Researchers About Their Research
- Cyberinfrastructure User Support (slides provided by Memo Belgin)
- Faculty: Tenure, Promotion, Reward System (Prof. Bruce Mason, OU Physics)
- Using Videoconferencing and Collaboration Technologies for Consulting (S. Patrick Calhoun, OSCER & JUB Sheriff, OU IT)
- Writing Grant Proposals (Linda Mason, Oklahoma State Regents for Higher Education)

Plenary Topics (cont'd)

- The Shifting Landscape of CI Funding Opportunities (Dr. J. Barr von Oehsen, Clemson U)

- So You Want to Write a Cyberinfrastructure Proposal

- Stories from the Trenches

CDS&E Breakout Track

- Deploying Community Codes (Josh Alexander, OSCER)
- Practicum: Real Users and Their CDS&E Research: Prof. Amy McGovern, OU Computer Science
- Benchmarking & Tuning (Brett Zimmerman, OSCER)
- Practicum: Real Users and Their CDS&E Research (Prof. Randy Kolar & Dr. Kendra Dresback, OU Civil Engr)
- "Speed Dating": Real Users and Their CDS&E Research (multiple STEM research teams)
  - Two sessions (Tue & Thu)

CDS&E Breakout Track

- Finding and Provisioning Remote Resources
  - XSEDE: Jeff Pummill, University of Arkansas
  - Open Science Grid:
    - Horst Severini, OSCER/OU High Energy Physics
    - Elizabeth Prout, Indiana University (via video)
    - Rob Gardner, University of Chicago (via video)

SDN Track

- OpenFlow lecture

- OpenFlow lab

- Exploring Open Daylight lecture

- Exploring Open Daylight lab

- Practica: Real Users' High Bandwidth Research (High Energy Physics, Warn on Forecast)

- The Software in SDN lecture

- The Software in SDN lab

OK Supercomputing Symposium 2015

2003 Keynote:
Peter Freeman
NSF
Computer & Information
Science & Engineering
Assistant Director

2004 Keynote:
Sangtae Kim
NSF Shared
Cyberinfrastructure
Division Director

2005 Keynote:
Walt Brooks
NASA Advanced
Supercomputing
Division Director

2006 Keynote:
Dan Atkins
Head of NSF's
Office of
Cyberinfrastructure

2007 Keynote:
Jay Boisseau
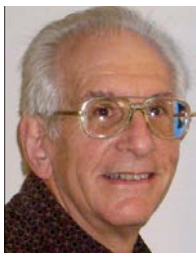Director
Texas Advanced
Computing Center
U. Texas Austin

2008 Keynote:
José Munoz
Deputy Office
Director/Senior
Scientific Advisor
NSF Office of
Cyberinfrastructure

2009 Keynote:
Douglass Post
Chief Scientist
US Dept of Defense
HPC Modernization
Program

2010 Keynote:
Horst Simon
Deputy Director
Lawrence Berkeley
National Laboratory

2011 Keynote:
Barry Schneider
Program Manager
National Science
Foundation

2012 Keynote:
Thom Dunning
Director
National Center for
Supercomputing
Applications

2013 Keynote:
John Shalf
Dept Head CS
Lawrence
Berkeley Lab
CTO, NERSC

2014 Keynote:
Irene Qualters
Division Director
Advanced
Cyberinfarstructure
Division, NSF

2015 Keynote:
Jim Kurose
NSF
Computer & Information
Science & Engineering
Assistant Director

FREE!
Wed Sep 23 2015
@ OU

Reception/Poster Session
Tue Sep 22 2015 @ OU
Symposium
Wed Sep 23 2015 @ OU

HPC Workforce
RMACC HPC Symp, Wed Aug 12 2015

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Thanks for your attention!

Questions?
www.oscer.ou.edu