Facilitation:

Best Practices and Lessons Learned from the ACI-REF Project
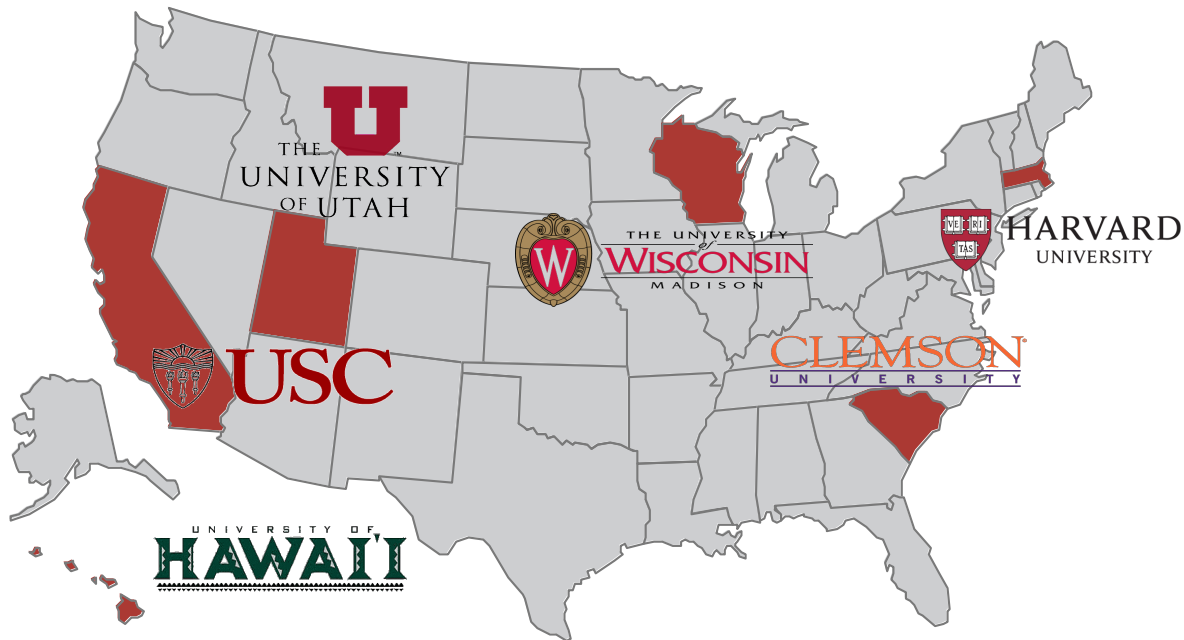
Lauren Michael (Wisconsin), lead ACI-REF

OU Virtual Residency 2016

The ACI-REF Project

ACI-REF
Advanced CyberInfrastructure
Research & Education Facilitators

- $5.3M NSF award supporting project leadership and 2 Facilitators at each of 6 partnering sites for 2 years

- research and development of the "Facilitator" role for adoption by the community

ACI-REF Mission

Empowering Would-Be Computational Researchers

- We are dedicated to forging a **nationwide alliance of educators to empower local campus researchers** to be more effective users of advanced cyberinfrastructure (ACI)**.**

- In particular, we seek to work with the **"long tail" of ACI users**—those scholars and faculty members who traditionally have not benefited from the power of massively scaled cluster computing but who recognize that their research requires access to more compute power than can be provided by their desktop machines.

- To do so, the consortium is building a **coordinated network of ACI-REFs**, campus champions whose mission is to **leverage existing resources and "make a difference" in supporting their local campus researchers**, while also unifying member institutions under common objectives.

The ACI-REF Facilitators!

ACI-REF
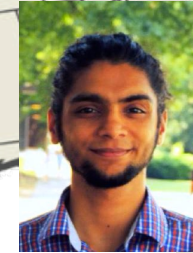
Advanced CyberInfrastructure - Research and Education Facilitators

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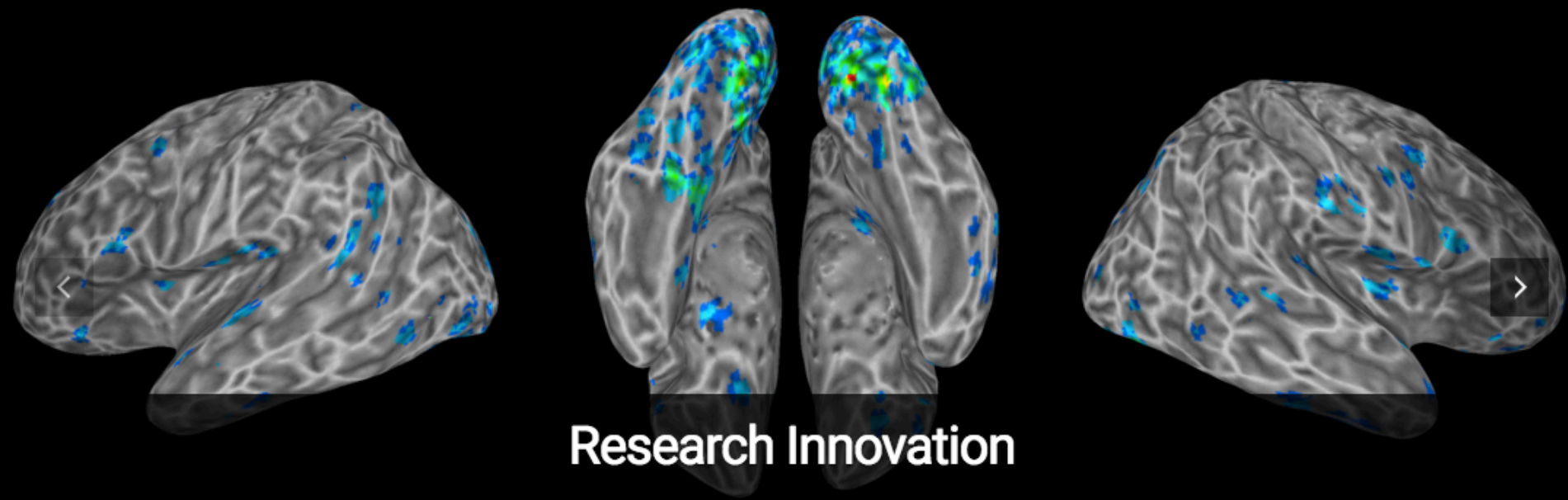
Research Innovation

Enabling research results that would not be possible without advanced cyberinfrastructure resources and facilitation.

Learn more

ACI-REF **Deliverables**

- Year 1: Staffing, Getting on our feet

- Year 2: Building a network, and looking forward and outward

- Deliverables:

  - Facilitation of Researchers

  - Best Practices of Facilitation

  - Metrics standards and recommendations

  - Evaluation standards

  - PIs: **RCN (CaRC)** and ACI-REF2 projects

What is Facilitation?

… to accelerate ACI-enabled *transformations* to research …

Gaps in Research Cyberinfrastructure Support

~~Users~~ are people.

Researchers are people.

Gaps in Support: Communication with Users

- Communication via typical online documentation and one-to-many training is primarily one-way, and with little room for personalization

- Help-desk efforts are often shared by a number of staff, many of whom may prefer working with technology over working with people

- (Compute) experts struggle to clearly communicate technical information to novices

Ambrose, Susan A. *How Learning Works*.
Software Carpentry. "Instructor Training," http://swcarpentry.github.io/instructor-training/

Gaps in Support: **Personalization**

- Recommendations should consider not only the validity, scalability, and efficiency of solutions, but also the ease of implementation for the user and any necessary learning

- Researchers feel that their needs are better met when support staff empathize with their perspective and pressures

- Perceptions of existing documentation and capabilities may limit a researcher's ability to imagine new research pathways

Ambrose, Susan A. *How Learning Works*, and
Software Carpentry. "Instructor Training," http://swcarpentry.github.io/instructor-training/

Gaps in Support:
Problems versus Solutions

- Cyberinfrastructure experts, especially those with significant interest in emerging technologies, are prone to favoring exciting and/or known solutions over searching for the most relevant solutions

- Helpdesk-style support is mostly *reactive* and biased toward *small* and *near-term* issues

- The needs of non-traditional users of cyberinfrastructure may not be satisfied by established solutions for *traditional* users (including human and learning solutions)

Best Practices of Facilitation

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What is Facilitation, and What Skills Should Facilitators Possess?

http://aci-ref.github.io/facilitation_best_practices/

Research Computing *Facilitation*

- proactive engagement
- personalized guidance
- teach-to-fish
- technology-agnostic
- relationship building
- professional networking
- advocating for researchers

On Engaging the Long Tail …

EQUALITY

EQUITY

designated, dedicated, deliberate
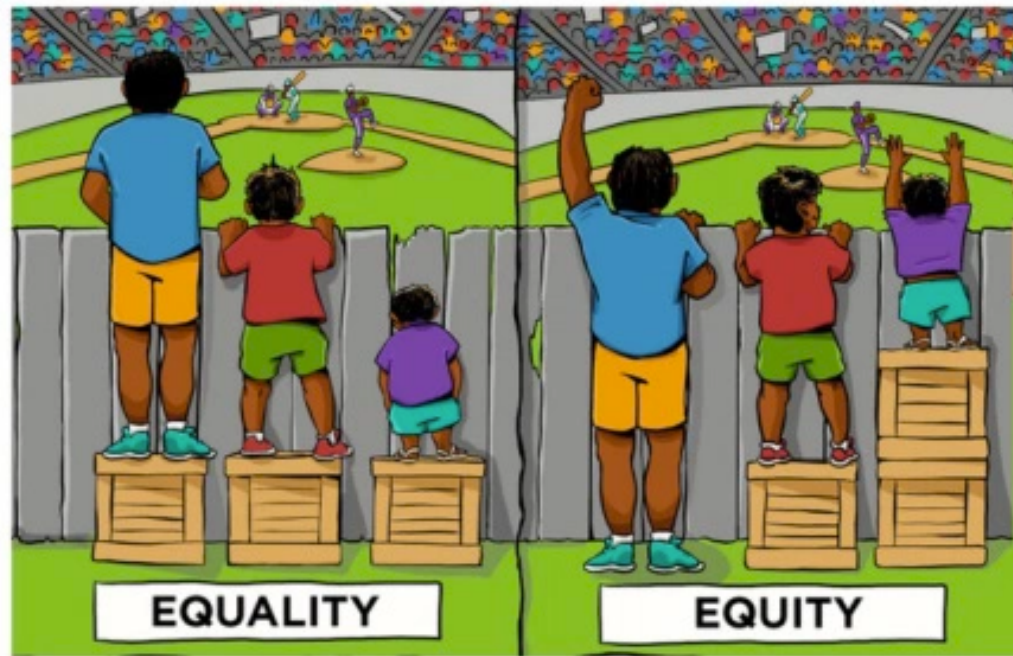
interactioninstitute.org – Arthur Maquire

L Michael and B Maas. Research Computing Facilitators: The Missing Human Link in Needs-Based Research Cyberinfrastructure. ECAR, May 16, 2016.

ACI-REF Best Practices of Facilitation

What is an ACI-REF, and What Activities Exemplify Facilitation?

Introduction and Main Ideas

Major Activities of Facilitation

Definitions

Appendix

Contribute

Acknowledgements

Learn more about the ACI-REF program

Major Activities
of Facilitation

1. Getting Established
2. Outreach
3. Engagement with Researchers
4. Implementing a Researcher's ACI Plan
5. Assisting Researchers in the Use of ACI
6. Education and Training of Researchers
7. Enhancing ACI Knowledge
8. Facilitating Connections
9. Interfacing with ACI Resource Providers
10. Self-Assessment and Using Metrics

Chapters Already Available Online

Other Chapters Coming Soon!!!

- **Building/configuring cyberinfrastructure systems**, managing software or middleware installations across systems, etc. (perhaps better associated with the roles of Systems Administrator, Network Engineer, Application Specialist, etc.)

- **Development of software** for specific groups (better defined as Computational Scientist, Research Software Engineer, etc.)

- **Performing computation work for specific research projects**, outside of testing recommendations (better defined as Researcher, Computational Scientist, etc.)

- **Managing other staff** at ACI resource-providing organizations

- **Managing special projects** (technology enhancements, internal projects, etc.) within ACI resource-providing organizations

are *NOT* Facilitation
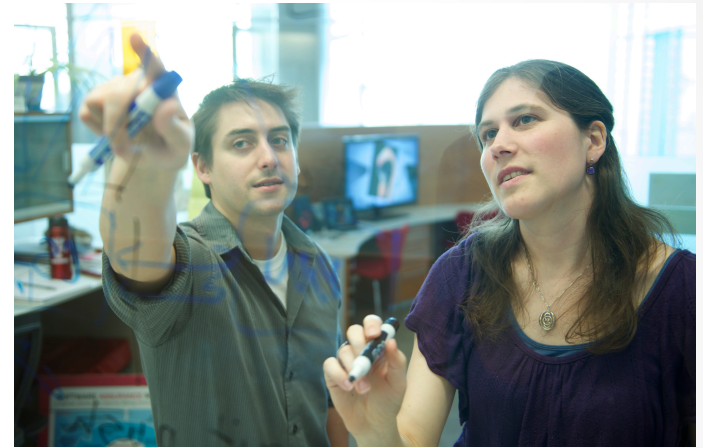
… by the way

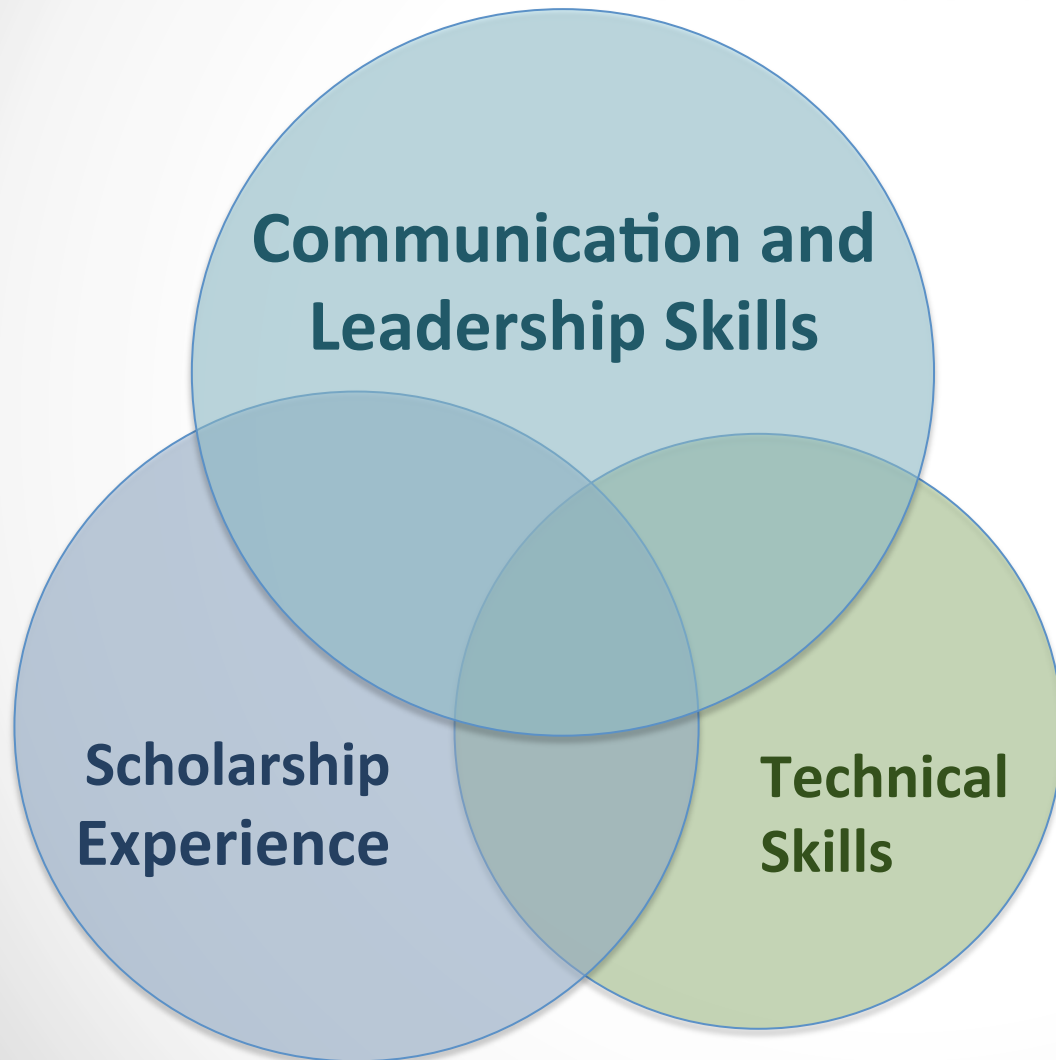**"Research Software Engineers"**

http://www.rse.ac.uk/

(UK program)

Conference, Sep 15-16

http://www.rse.ac.uk/conf2016.html

Research Computing Facilitators

Communication and Leadership Skills

Scholarship Experience

Technical Skills

What Skills and Background Should Facilitators Possess?

Motivation

- empathy for integrating ACI into their own research
- desire to help other researchers achieve success for themselves
- interest in a wide range of research areas, beyond their own domain of expertise
- desire for constant learning and an ability to learn quickly
- persistence in understanding multiple aspects of a problem before identifying appropriate solutions

What Skills and Background Should Facilitators Possess?

Interpersonal Skills

- strong networking and leadership skills
- truly excellent written and verbal communication, including comfort in public speaking
- demonstrated effectiveness in teaching technical information
- ability to translate between the vocabulary of researchers and that of other ACI technical staff

What Skills and Background Should Facilitators Possess?

Technical Background

- prior experience conducting research projects that employ the use of ACI

- ability to understand research publications

- interest in advancing personal knowledge of a range of ACI technologies

Other

- advanced skills in time management and context-switching

A "**palette**" of Facilitation

- by ACI type: networking/file transfer, research computing, data storage, etc.

- by supported research domain(s): campus-wide vs. smaller units (colleges, departments, centers, etc.)

- In combination with other roles
  - when staffing is short
  - within a team of expertise

-

Major Activities
of Facilitation

1. Getting Established
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5. Assisting Researchers in the Use of ACI
6. Education and Training of Researchers
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9. Interfacing with ACI Resource Providers
10. Self-Assessment and Using Metrics

Chapters Already Available Online

Other Chapters Coming Soon!!!

Promoting awareness and understanding of the facilitator role and of ACI resources to potential users of ACI resources and to various administrators, including entities who exist within and external to the institution. Effectively targeting key audiences.
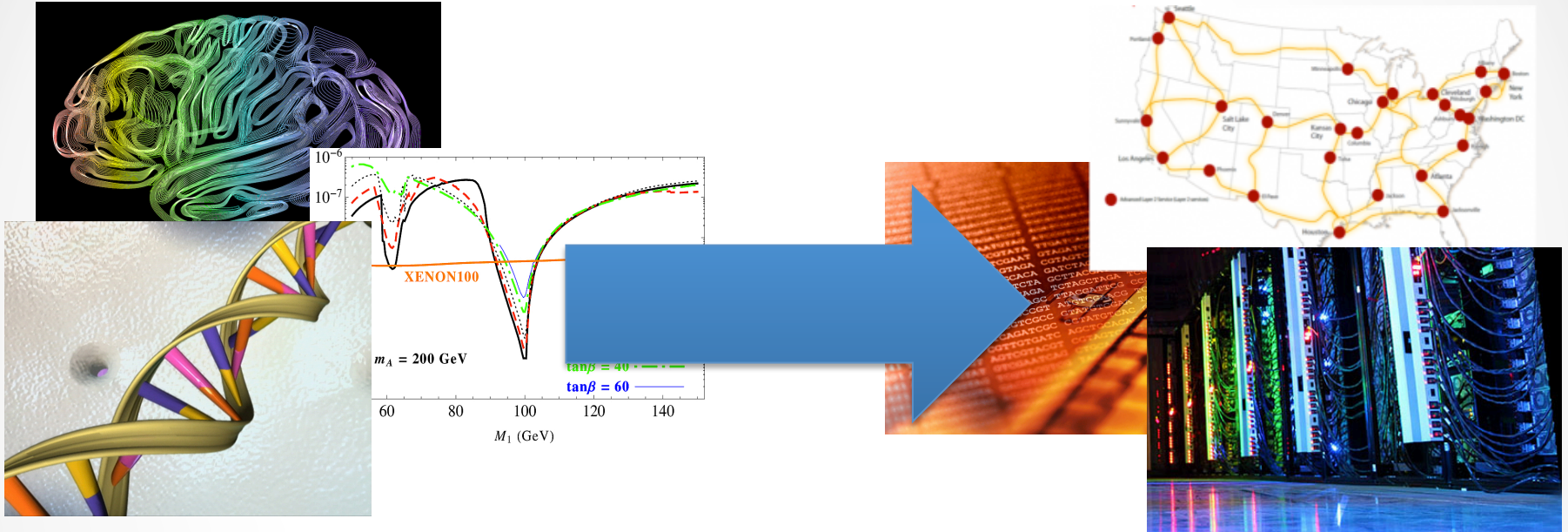

Outreach

Engagement
with Researchers

One-on-one and small-group meetings to understand researcher goals and practices, recommend appropriate ACI resources, identify potential knowledge gaps, and develop an overall plan for utilizing ACI resources. Record-keeping of engagements and following up.

Implementing a Researcher's
ACI Plan

Working with researchers to establish longer-term in using ACI capabilities for specific research projects. Following-up with researchers proceeding through a plan. Working with ACI resource providers for expertise and to accommodate necessary technical solutions.

Establishing proactive and reactive support routes for researchers who use ACI resources, including standards of response. Promoting learning and user empowerment in providing support for user-reported or observed issues. Leveraging external technical expertise.

Assisting

Researchers in the Use of ACI

Education & Training
of Researchers

Identifying and leveraging existing learning resources for ACI topics and resources. Developing novel materials for in-person learning and self-directed learning, including both education (knowledge/awareness) and training (skills/practice). Leveraging established practices for effective teaching.
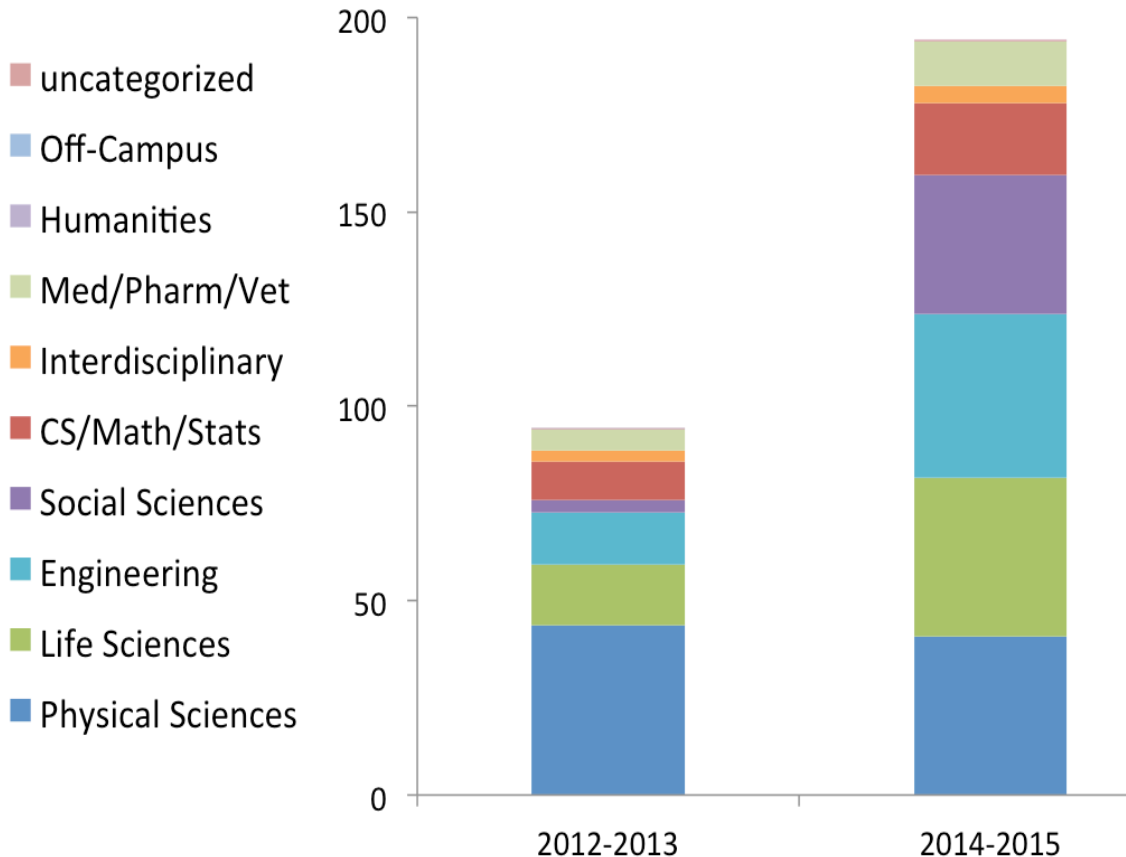
Closely-Related Topics

- Monday - How to Talk to Researchers about Their Research (Henry)

- Earlier Today – Intake Interviews

- Next – Ongoing Assistance (panel)

- Tomorrow – Creating and Evaluating Training Workshops (Christina Koch)

- Tomorrow - Creating Effective CI Documentation and Other Learning Materials (panel)

Infrastructure
Technology + People
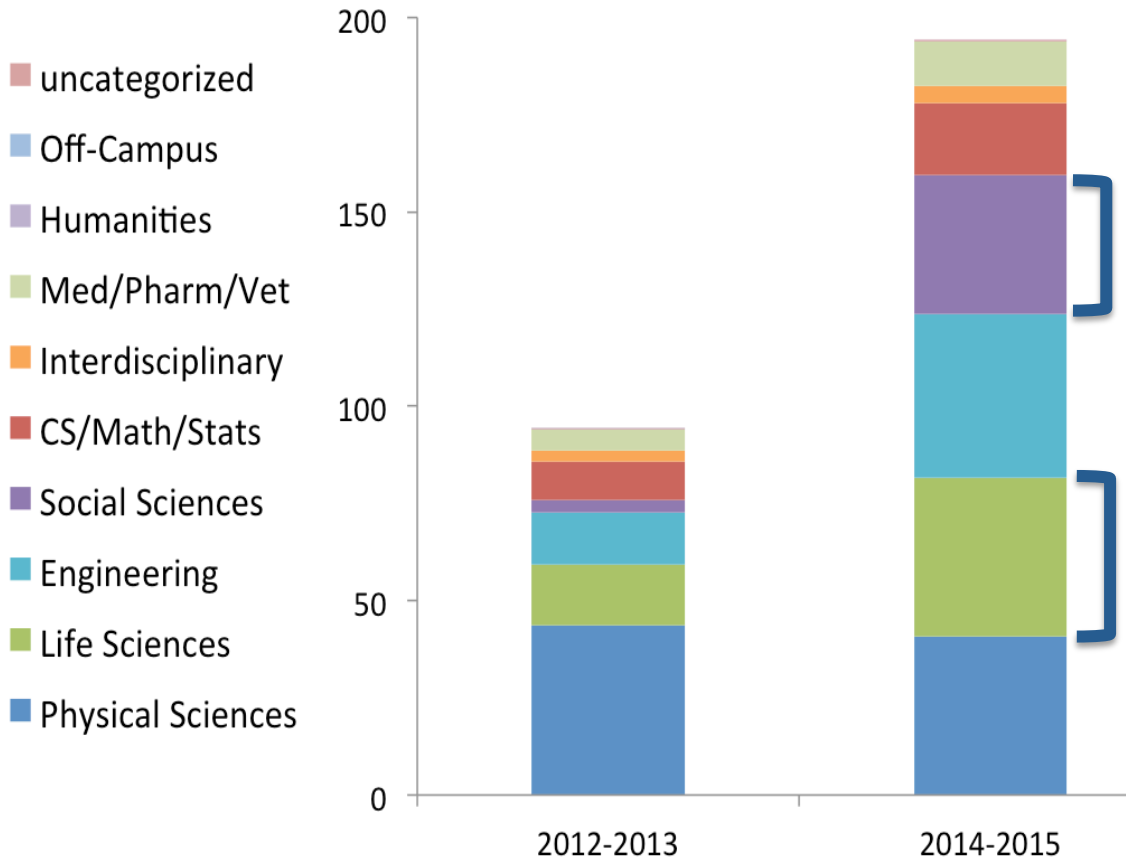
Compute Hours Delivered by CHTC

UW-Madison Facilitators hired: Jan 2013, Nov 2014

L Michael and B Maas. Research Computing Facilitators: The Missing Human Link in Needs-Based Research Cyberinfrastructure. ECAR, May 16, 2016.

Infrastructure
Technology + People

Compute Hours Delivered by CHTC

>95% high *throughput* computing

L Michael and B Maas. Research Computing Facilitators: The Missing Human Link in Needs-Based Research Cyberinfrastructure. ECAR, May 16, 2016.

Infrastructure
Technology + People

Compute Hours Delivered by CHTC

Legend:
- uncategorized
- Off-Campus
- Humanities
- Med/Pharm/Vet
- Interdisciplinary
- CS/Math/Stats
- Social Sciences
- Engineering
- Life Sciences
- Physical Sciences

X-axis: 2012-2013, 2014-2015
Y-axis: 0, 50, 100, 150, 200

>60% high *throughput* computing