

Cyberinfrastructure **Facilitation:**

Experiences at UW-Madison,
and Best Practices from ACI-REF

Lauren Michael
2016 Aug 19

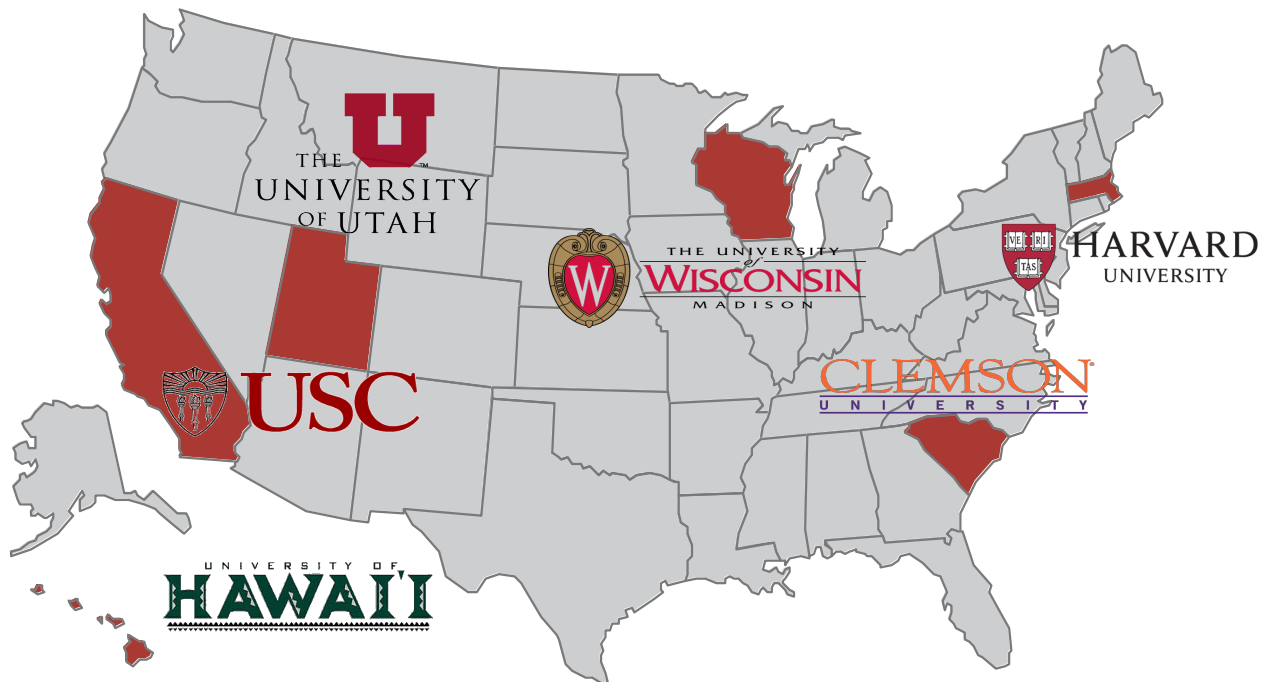
The ACI-REF Project

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- \$5.3M NSF award in 2014 supporting Facilitators and project leadership 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!



Martin Cuma



Anita Orendt



Wim Cardoen



Lauren Michael



Christina Koch



Bob Freeman



Erin Shaw



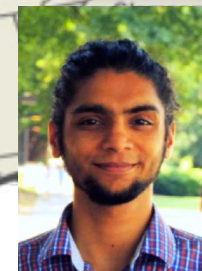
Cesar Sul



Sean Cleveland



David Schanzenbach



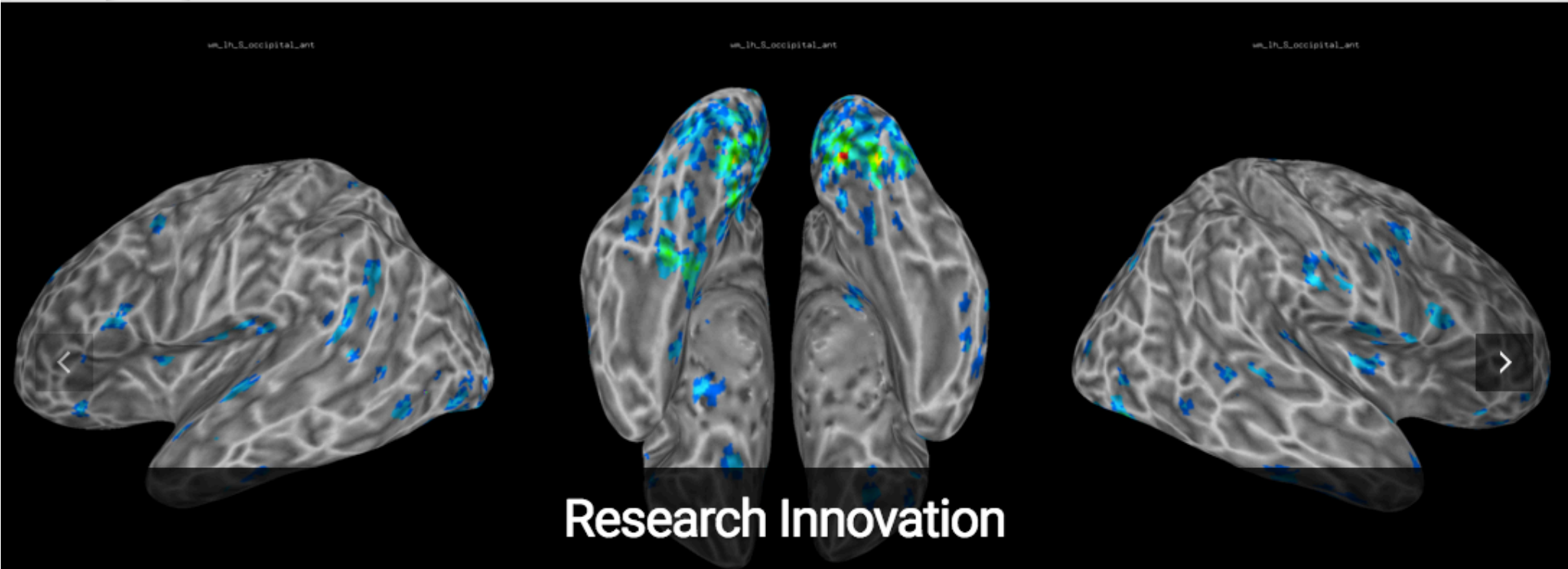
Ashwin Srinath



Patricia Carbajales-Dale



Marcin Ziolkowski



Research Innovation

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

Learn more

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 documentation-and-help-desk models is primarily one-way, and with little room for personalized recommendations
- Help-desk efforts are often shared by personnel in other roles, 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 applicability and efficiency of solutions, but also the ease of implementation by the researcher and any necessary learning
- Perceptions of existing documentation and capabilities may limit a researcher's ability to imagine new research pathways

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
- 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?

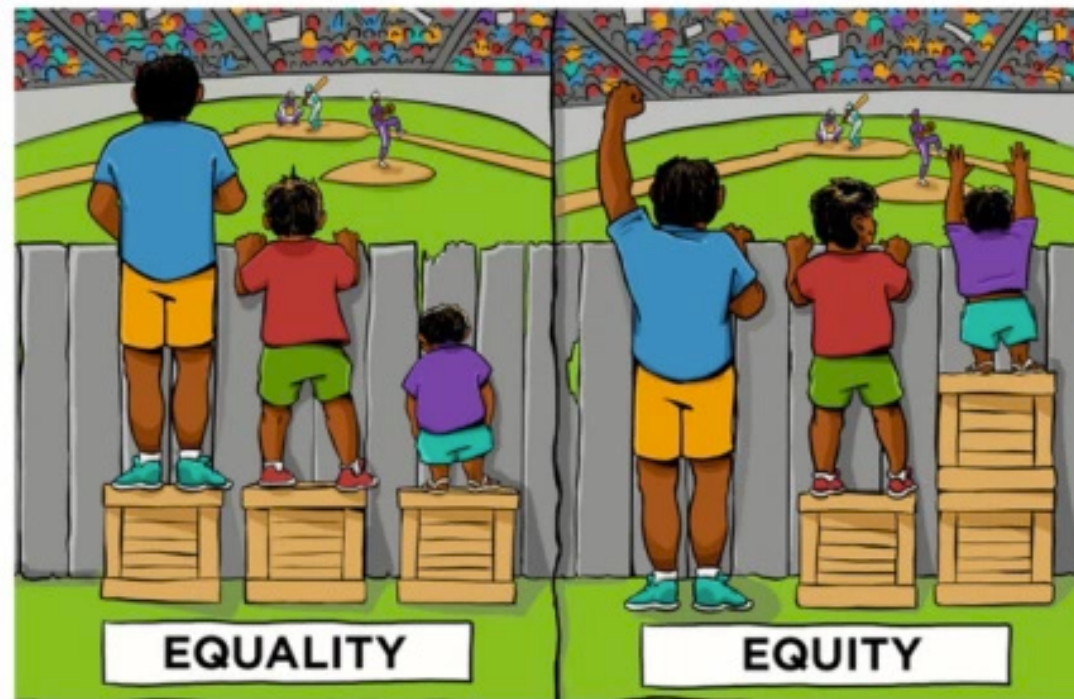
http://aci-ref.github.io/facilitation_best_practices/

Research Computing Facilitation

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

***designated, dedicated,
deliberate***

On Engaging the Long Tail ...



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



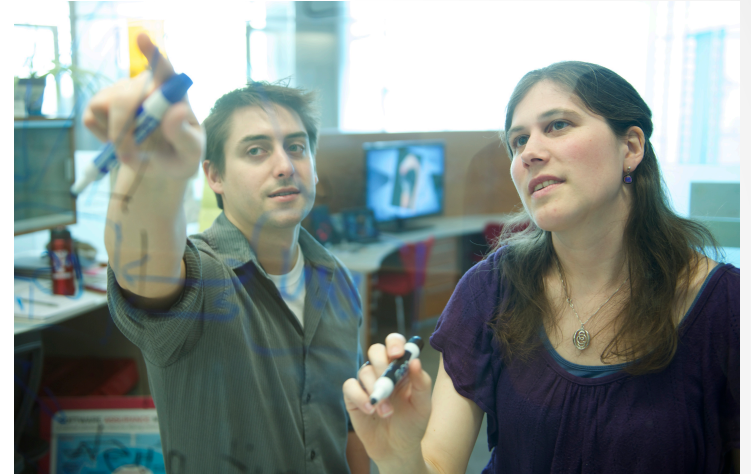
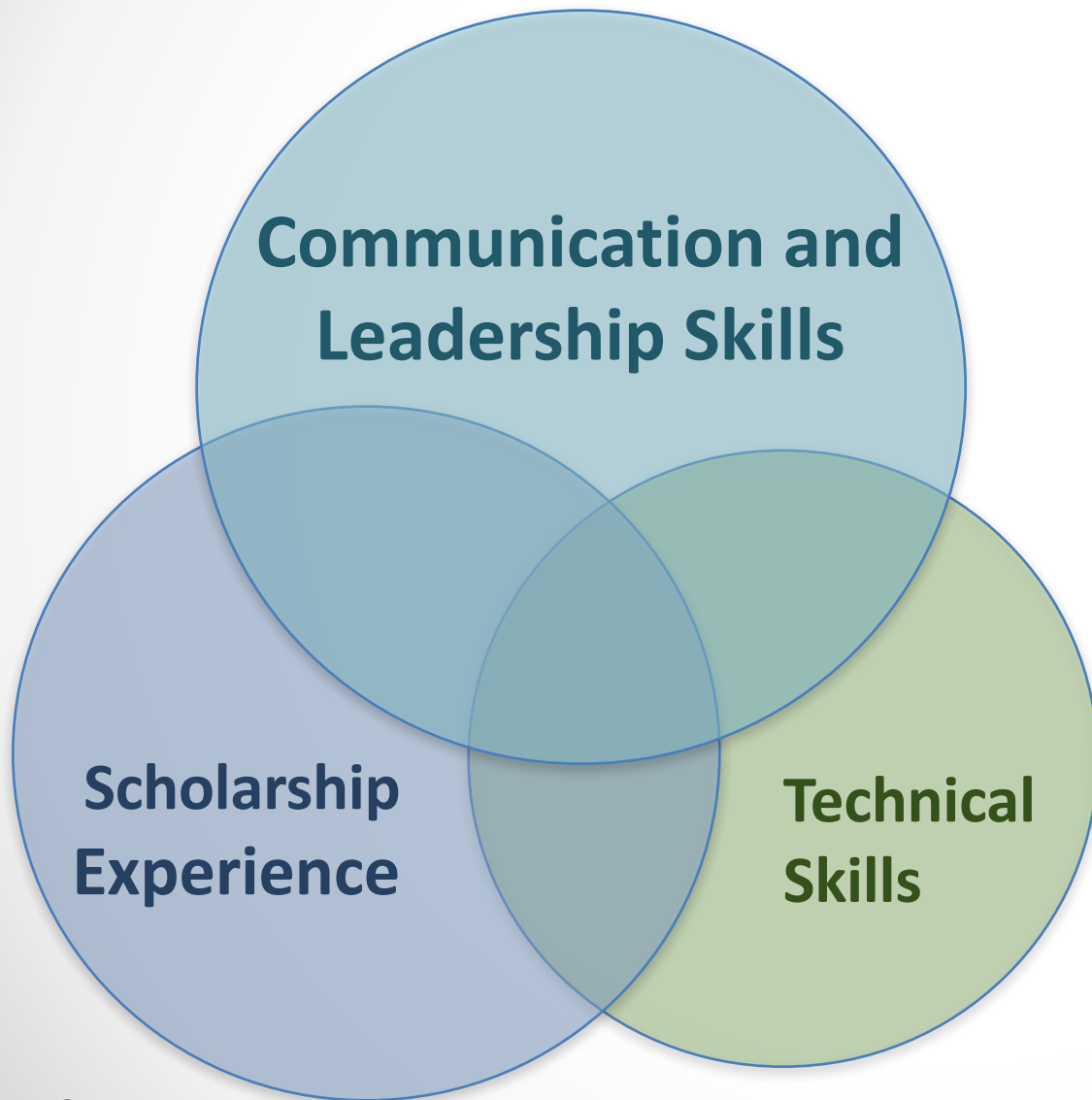
**Chapters Already
Available Online**

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

Research Computing Facilitators



My Background

- **Research Computing Facilitator** at UW-Madison since 2013
- B.S. Biology, Chemistry
 - computational research
- M.S. Biophysics
 - Ph.D. minor Life Sciences Communication
- Science Editor, *Daily Cardinal* 2010-11
- Extensive teaching/outreach



A “palette” of Facilitation

- By CI 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

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2. Outreach
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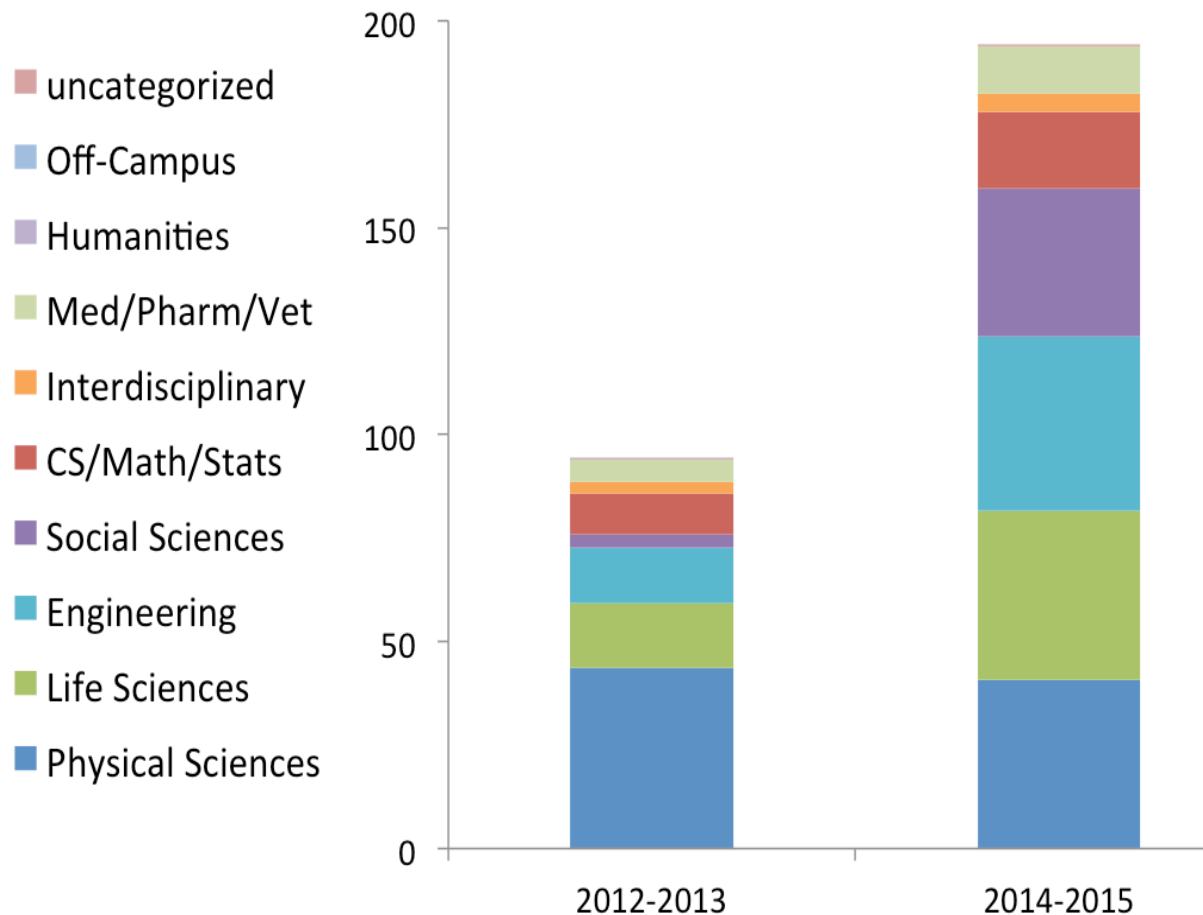
**Chapters Already
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Other Chapters Coming Soon!!!

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Infrastructure Technology + People

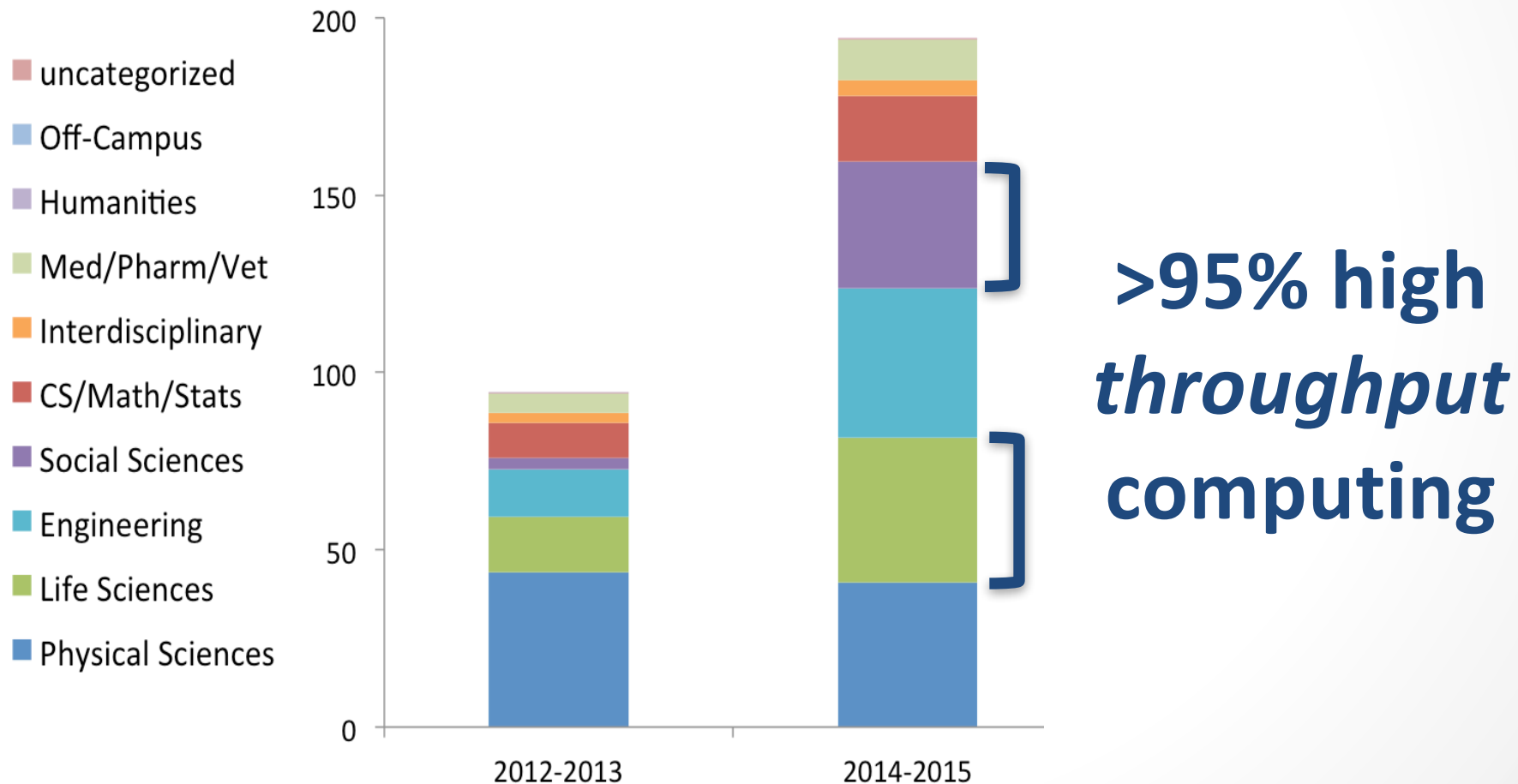
Compute Hours Delivered by CHTC



**UW-Madison
Facilitators hired:
Jan 2013, Nov 2014**

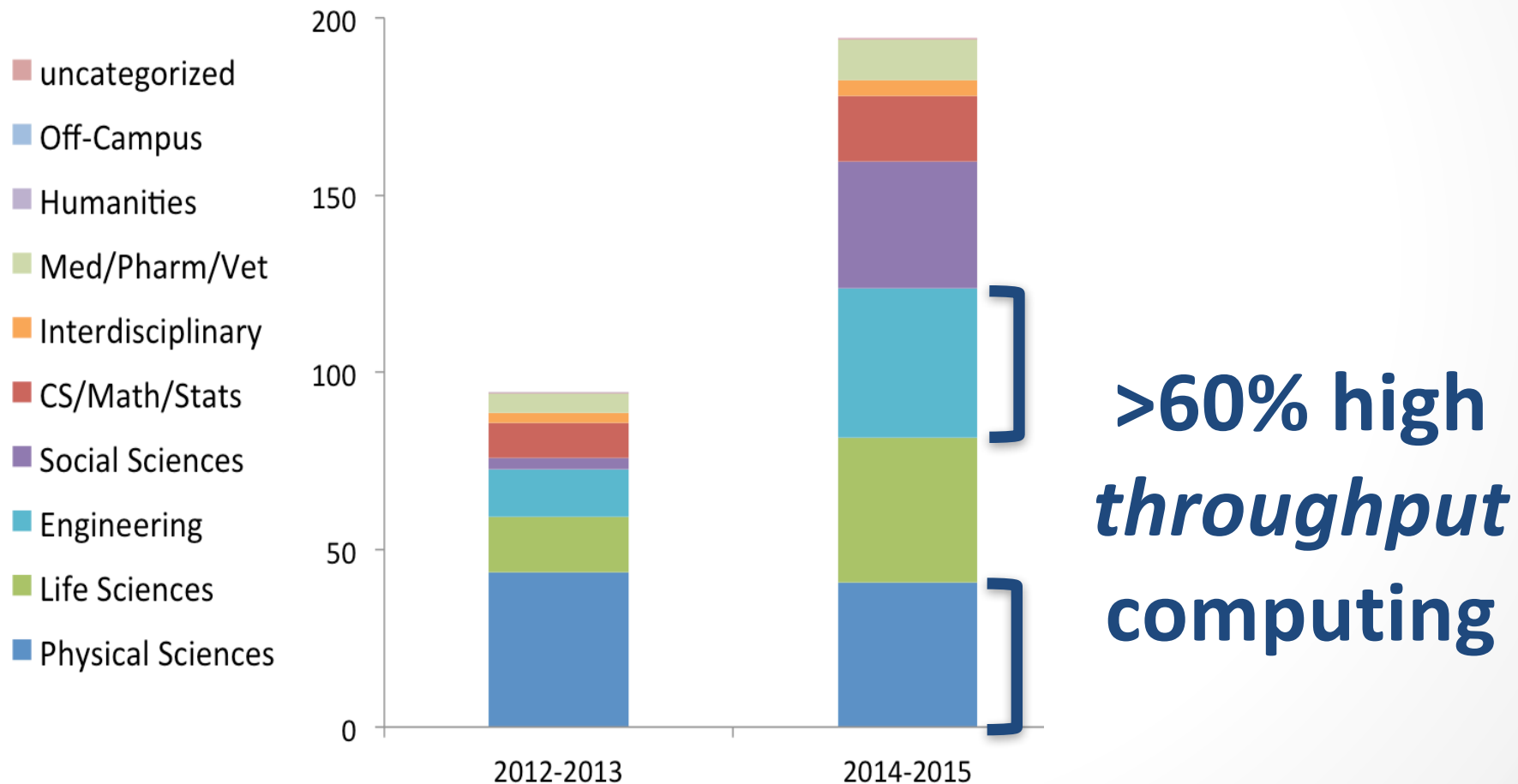
Infrastructure Technology + People

Compute Hours Delivered by CHTC



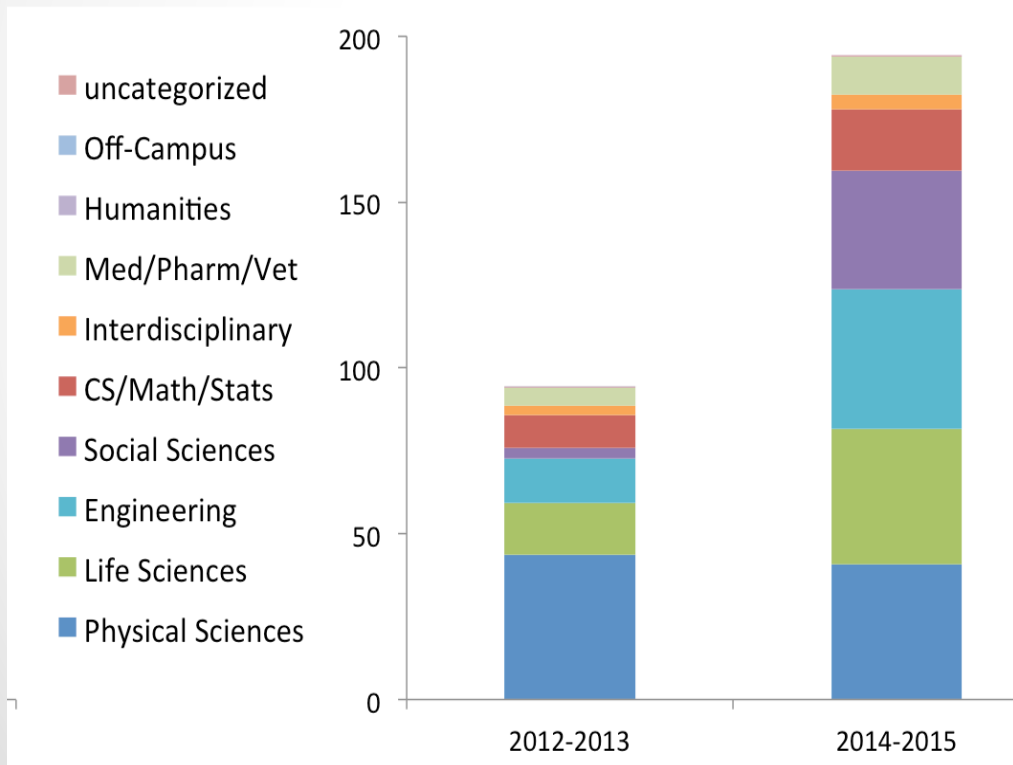
Infrastructure Technology + People

Compute Hours Delivered by CHTC



Understanding Facilitator Impact

Compute Hours Delivered at UW-Madison



“Lauren Michael’s value to the overall enterprise is hard to overestimate. Putting someone so capable of explaining procedures in simple but powerful terms greatly enhances the effective power and utility of the millions invested in the hardware.”

-Tom Givnish, Botany

“With extensive help from [RCFs] we adapted our workflow to run seamlessly on the HTC platform and have now utilized these resources to construct the largest computed diffusion database in the world.”

-Dane Morgan,
Materials Science and Engineering

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
 - Community discussions around CI personnel

Looking Forward

- ACI-REF Phase II (proposal in progress)
 - expanded set of campuses
- **CaRC** - “Campus Research Computing Infrastructures Consortium”
 - an NSF “Research Coordination Network” focused on sharing best practices in supporting Research CI needs
 - **communities around various CI roles** (Facilitators, Systems Administration, Network Engineers, Software Developers, Directors, etc.)