

The Cyberinfrastructure Landscape: Organizations

Mike Renfro^{1,2}

¹Tennessee Tech University

²Campus Champions Leadership Team

2024-06-25

Who am I? (Who are any of us, really?)

Back in the day

- ▶ ME student at a medium-sized public STEM-ish university who should have studied more instead of helping people do things in computer labs.
- ▶ Sysadmin/CAD/FEA co-op student at Oak Ridge National Lab before SGI Irix got its cameo in “Jurassic Park” (“It’s a Unix system: I know this!”).



Figure 1: Some skinny nerd, 1990

Who am I? (Who are any of us, really?)

Now

- ▶ Three ME degrees from the now-R2 university (1995, 1998, 2018)
- ▶ Mostly-solo practitioner of all things RCD at the same university (2000–2017, 2017–)
- ▶ Perpetually online member of multiple RCD organizations (2018–)
- ▶ Member of Campus Champions Leadership Team (2022–), CaRCC Emerging Centers Steering Committee (2024–)
- ▶ Compulsive advice-giver



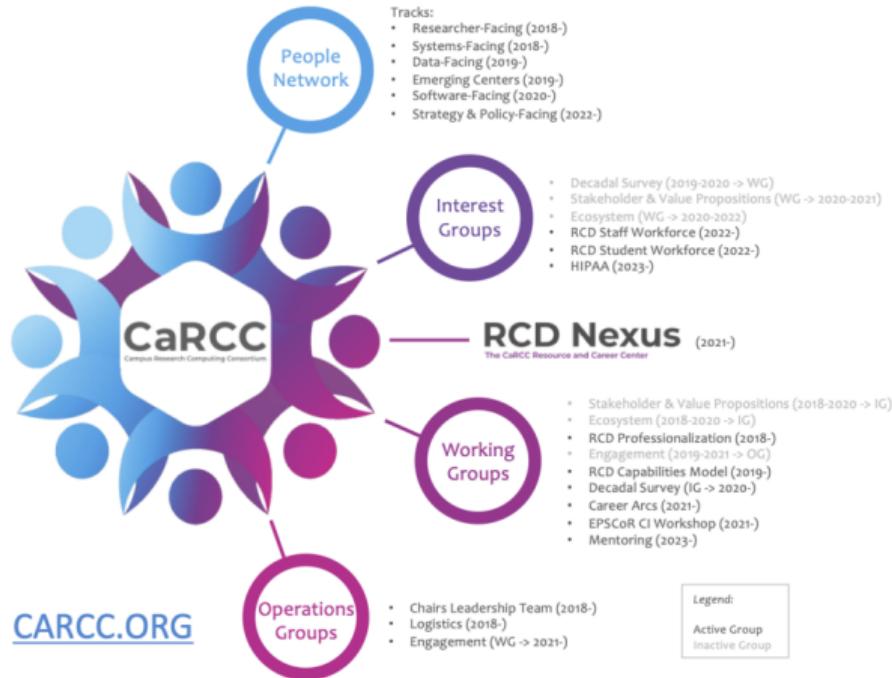
Figure 2: Same nerd, not remotely skinny, 2023

Campus Champions

- ▶ One of the original RCD communities (2008)
- ▶ Formerly funded by NSF XSEDE program
- ▶ Over 800 members from over 300 institutions in all 50 states
- ▶ Active mailing list for all topics and all RCD roles
- ▶ Monthly Zoom call with planned speaker/topic
- ▶ Monthly Zoom call for any other topics
- ▶ Additional visibility to their institutions' NSF ACCESS usage



Campus Research Computing Consortium (CaRCC)



PEARC Conference Series

- ▶ The de facto RCD people conference
- ▶ Small enough (782 attendees in 2023)
- ▶ Full range of publishing options
 - ▶ full papers
 - ▶ short papers
 - ▶ posters
 - ▶ visualization showcase
- ▶ Tutorials/workshops
- ▶ Birds of a Feather (BoF) sessions
- ▶ Panel discussions

Go at least once.

PEARC



Supercomputing Conference Series

- ▶ The de facto HPC stuff conference
- ▶ Huge
- ▶ Like, really huge (14k attendees in 2023, 18k in 2024)
- ▶ Lots of vendors
- ▶ Lots of recruiting
- ▶ Student Cluster Competition
- ▶ SCinet (local network providing 6.71 Tb/s WAN connectivity in 2023, 8.71 Tb/s in 2024)

Go at least once, but just once is probably ok, too.



Virtual Residency Program (you're in this photo, we hope you like it)

- ▶ Henry's already explained what we're doing here
- ▶ (Mike's opinion) best value experience for new RCD professionals, especially for under-resourced institutions or emerging programs

The Starter Pack
Researcher-Facing
Data-Facing
Software-Facing
Systems-Facing
Strategy- and Policy-Facing

Campus Champions
Campus Research Computing Consortium (CaRCC)
PEARC Conference Series
Supercomputing Conference Series
Virtual Residency Program
Where to Go from Here?

Where to go from here?



Figure 3: We have lots more groups (Cragin)

HOW STANDARDS PROLIFERATE:
(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC)

SITUATION:
THERE ARE
14 COMPETING
STANDARDS.

14?! RIDICULOUS!
WE NEED TO DEVELOP
ONE UNIVERSAL STANDARD
THAT COVERS EVERYONE'S
USE CASES.



SOON:

SITUATION:
THERE ARE
15 COMPETING
STANDARDS.

How to make sense of all these groups?

Campus Research Computing Consortium's **facings** (somewhat blurry boundaries, still):

1. Researcher-facing: outreach, advanced application support, co-creating along the research lifecycle
2. Data-facing: data discovery/collection, analysis/visualization, curation, preservation, policy compliance
3. Software-facing: software package management, research software development, optimization
4. Systems-facing: systems administration and operations, networking, architecture, security
5. Strategy- and Policy-facing: leadership, institutional alignment, culture, funding, external partnerships

Software Carpentry

Since 1998, Software Carpentry has been teaching researchers the computing skills they need to get more done in less time and with less pain. Our [volunteer instructors](#) have run [hundreds of events](#) for more than 34,000 researchers since 2012. All of our [lesson materials](#) are freely reusable under the [Creative Commons - Attribution license](#).

– <https://software-carpentry.org/about/>



CyberAmbassadors

- ▶ Originally an NSF workforce development project for RCD professionals
- ▶ Now expanded to include STEM students and professionals from all disciplines
- ▶ Strengthening skills in:
 - ▶ communications
 - ▶ teamwork
 - ▶ leadership
- ▶ PIs inducted into American Society for Engineering Education Hall of Fame in 2023



Research Data Access and Preservation Association (RDAP)

[RDAP] supports an engaged community of information professionals committed to creating, maintaining, advancing, and teaching best practices for research data, access, and preservation.

The RDAP community brings together a variety of individuals, including data managers and curators, librarians, archivists, researchers, educators, students, technologists, and data scientists from academic institutions, data centers, funding agencies, and industry who represent a wide range of STEM disciplines, social sciences, and humanities.

– <https://rdapassociation.org/>



Data Carpentry

Data Carpentry develops and teaches workshops on the fundamental data skills needed to conduct research. Our mission is to provide researchers high-quality, domain-specific training covering the full lifecycle of data-driven research.

– <https://datacarpentry.org>

Curricula for: [astronomy](#), [ecology](#), [genomics](#), [geospatial data](#), [image processing](#), [social sciences](#)



Library Carpentry

Library Carpentry focuses on building software and data skills within library and information-related communities. Our goal is to empower people in these roles to use software and data in their own work and to become advocates for and train others in efficient, effective and reproducible data and software practices.

– <https://librarycarpentry.org/about/>



US Research Software Engineer Association (US-RSE)

[US-RSE] is a community-driven effort focused on the increasingly important role of the Research Software Engineer.

- <https://us-rse.org/about/>

We like an inclusive definition of [RSEs] to encompass those who regularly use expertise in programming to advance research. This includes researchers who spend a significant amount of time programming, full-time software engineers writing code to solve research problems, and those somewhere in-between. We aspire to apply the skills and practices of software development to research to create more robust, manageable, and sustainable research software.

- <https://us-rse.org/about/what-is-an-rse/>



ACM SIGHPC Systems Professionals

We are a SIGHPC ACM Chapter focused on the systems staff who stand up high performance systems. This includes system admins, storage admins, networking admins, facilities staff—everyone who participates in the process of physically standing up HPC systems. Our community is focused on sharing solutions and failures associated with these complicated, novel, cutting-edge systems.

- <https://sighpc-syspros.org/>



Linux Clusters Institute (LCI)

The Linux Clusters Institute (LCI) is providing education and advanced technical training for the deployment and use of computing clusters to the high performance computing community worldwide.

Founded in 1998, it includes some of the world's foremost specialists in building and deploying clustered high-performance computing systems. LCI is the premier international forum to share information on management, administration, and advanced computing techniques for high performance clustered computing.

- <https://linuxclustersinstitute.org>



Coalition for Academic Scientific Computation (CASC)

The mission of CASC is to:

- 1. Advocate for the importance of and need for public and private investment in research computing and data services to support academic research.*
- 2. Serve as a trusted advisor to federal agencies on the direction of relevant funding programs.*
- 3. Actively engage in discussions of policies related to research computing and data services.*
- 4. Foster advancement of a robust and diverse community of current and emerging leaders in this field.*
- 5. Provide a forum for the community to share strategic ideas and best practices.*

CASC



EDUCAUSE Research Computing and Data Community Group

This community group discusses IT support for institutional research missions. The two broad categories of issues are: IT support for research administration, and IT support for research activities. The former includes: pre- and post-award support, interacting with Federal grant systems, regulatory compliance, and intellectual property management. The latter includes: centralized vs. decentralized approaches, high performance computing, advanced networking, informatics and enabling multidisciplinary/interdisciplinary/inter-institutional work.

EDUCAUSE



Regulated Research Community of Practice (RRCoP)

The Regulated Research Community of Practice (RRCoP) builds a network of people able to help each other in implementing an affordable but effective cybersecurity and compliance program at academic institutions.

- <https://www.regulatedresearch.org/about>

