

Cyberinfrastructure Landscape: Organizations

Timothy Middelkoop and Dana Brunson
Internet2
2022 OU Virtual Residency Workshop



We are interactive!

We ask you questions.
You ask us questions!

<https://www.menti.com/v3vxtrpnwn>



Warm up interactive:

What's your favorite breakfast food?

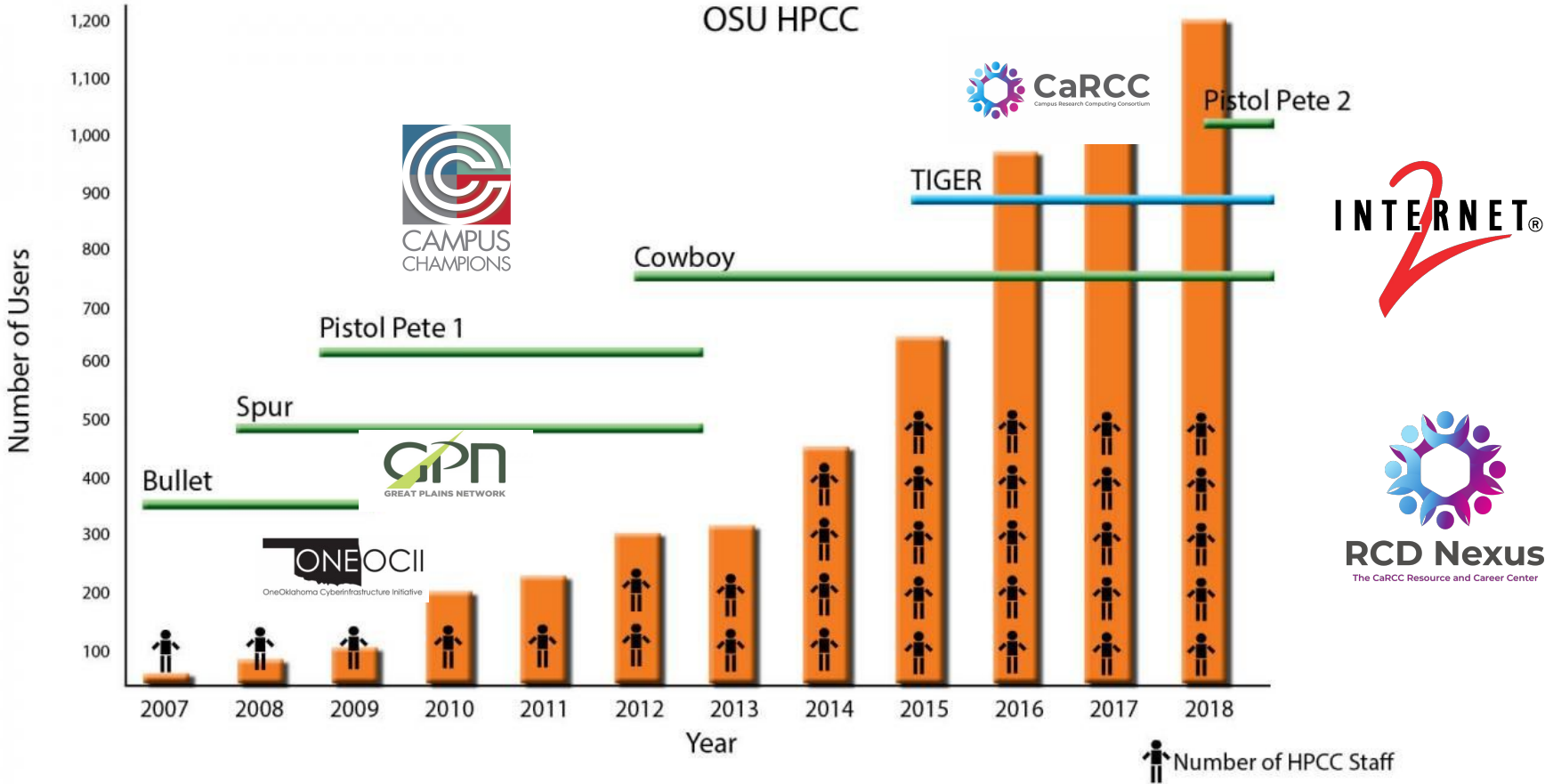


CI Landscape - Complicated, Diverse, and Rapidly Changing



Poll: Communities you interact/participate in the most?

Case Study: How Dana learned to love communities



Case Study: Tim



<https://munewsarchives.missouri.edu/news-releases/2019/0912-national-science-foundation-1-4-million-grant-will-help-develop-cyberinfrastructure-across-midwest/attachment/middelkoop-timothy-2/index.html>

Poll: Where are you in your CI Journey

Poll: How many CI/RCD people in your organization?

Starter Pack of Organizations

- XSEDE Campus Champions
- Campus Research Computing Consortium (CaRCC) People Network
- PEARC



Since 2008, a national community of practice, facilitating computing/data-intensive research and education



Every US state
Every EPSCoR jurisdiction

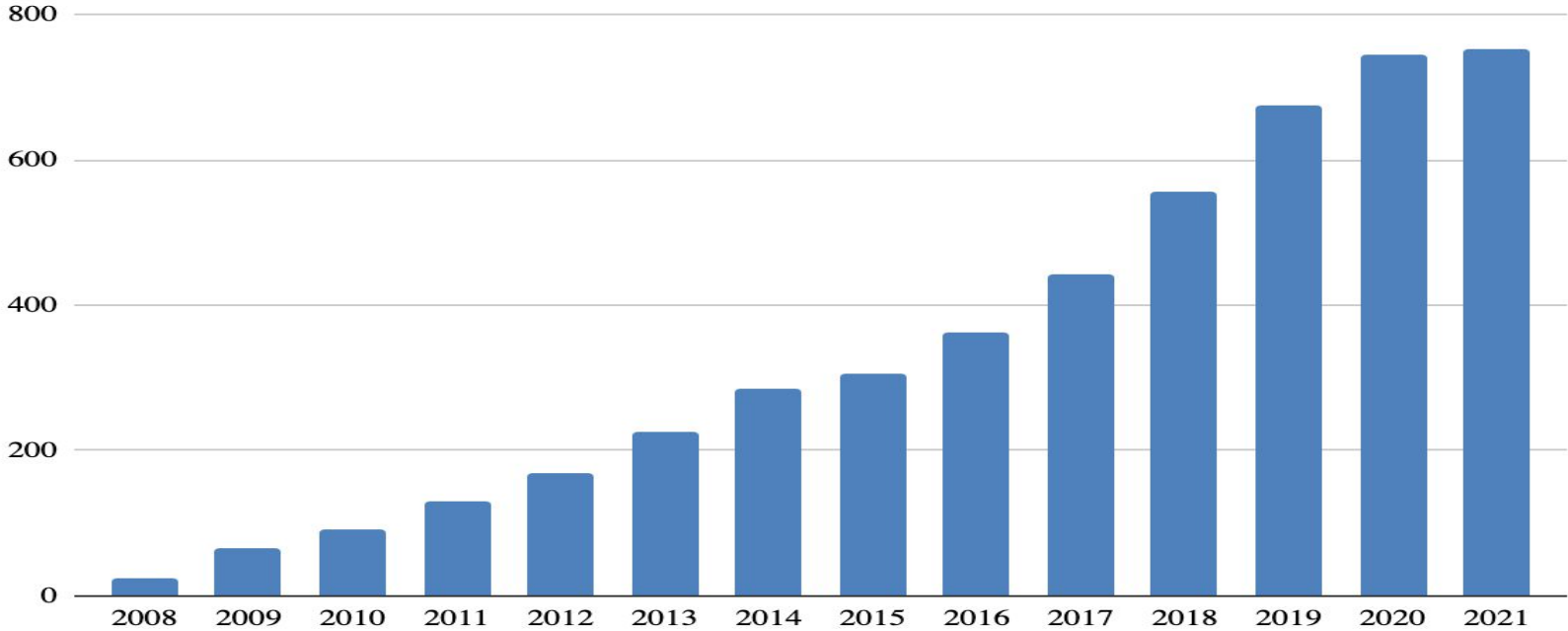
We help researchers do their
research using
cyberinfrastructure

<https://www.xsede.org/community-engagement/campus-champions>



XSEDE
Extreme Science and Engineering
Discovery Environment

Growth of Champions



The Campus Champions Program fosters a dynamic, welcoming environment for a diverse community of research computing and data professionals sharing knowledge and experience in digital research infrastructure



There are over **750** Campus Champions

Including CI organization leaders, faculty, researchers, students, as well as research-enabling and systems professionals

At over **350** academic, non-academic, and not-for-profit research-focused institutions

<https://www.xsede.org/community-engagement/campus-champions>



XSEDE
Extreme Science and Engineering
Discovery Environment

2018 Champion Climate study key findings highlights

- ❖ Champions reported high Overall Experience in the program. Newer members expressed **exceptionally high satisfaction** and accounted for more than half of the respondents.
- ❖ The Champion community's impact extends beyond individual knowledge and skills improvement to institutionalization of the Champion role, **changes in institutional research computing policy**, and inclusion of Champions in **strategic talent recruitment** for their organizations.
- ❖ Some Champions are considering **sustainability following XSEDE**. They would also like to see the program continue to expand beyond advocating for NSF systems to other agencies.
- ❖ Respondents from non-research-intensive organizations and members of marginalized groups including women and underrepresented racial/ethnic groups in HPC, report **positive experiences in the organization**.



Main Components of the Campus Champions Program

- All **Campus Champions Call** (3rd Tuesday of the month 3:00 ET) generally sessions from national programs for presentations, questions, and discussion.
- **Campus Champions Chat** (2nd Tuesday of the month 3:00pm ET) general discussion about current issues and new Campus Champions introductions.
- **CC-ALL**: A trusted and safe mailing list for open discussion about all things research computing and data; job postings.
- Campus Champions **Slack**: A way to connect with peers during and after events.

How to Become a Champion

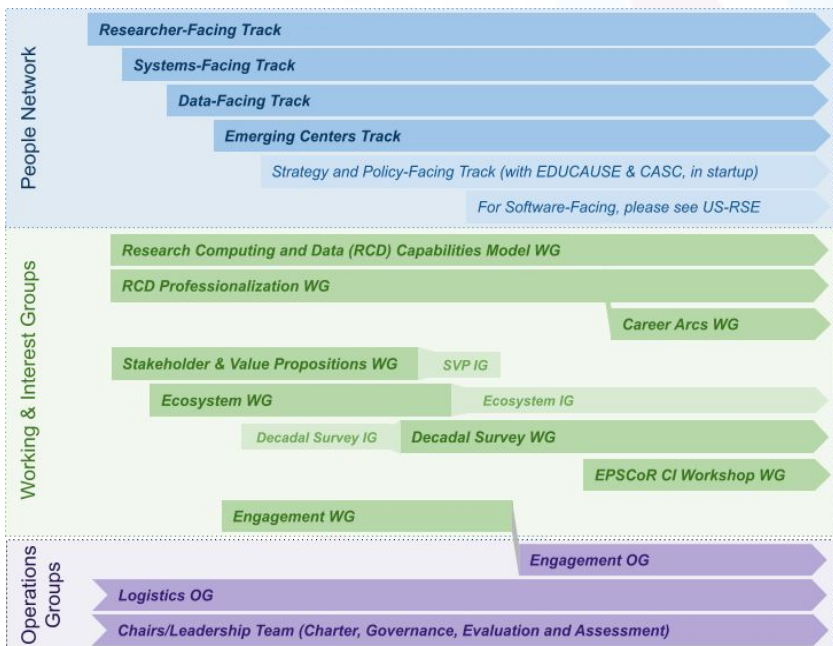
- Write to info@campuschampions.org and ask to get involved
- We'll send you a template letter of collaboration
- Ask questions, add signatures, send it back, and join the community
- More info: <https://www.xsede.org/community-engagement/campus-champions>

Stay tuned for evolution of Campus Champions Program with end of XSEDE this fall.

CaRCC: Campus Research Computing Consortium

We advance the frontiers of research by improving:

- the effectiveness of professionals in RCD positions
- their career development & visibility, and
- their ability to deliver services & resources for researchers. [Please join us!](#)



CaRCC Activities and Relative Timeline

[People Network](#) - Year-round remote conference, with call recordings posted on our [CaRCC YouTube Channel](#)

[Data-Facing](#): Data management, publishing/sharing, data science, data viz, workflows, transfer and networks, & other topics.

[Emerging Centers](#): Community for organizations developing or growing RC&D programs or centers

[Researcher-Facing](#): Consulting/facilitation, outreach, education/training, increasing communications & collaborations, RC tech, etc

[Systems-Facing](#): Systems planning, engineering, security, optimization, middleware, virtualization, and cloud, among other topics.

[Working and Interest Groups](#) - Activities that connect RCD professionals & organizations to increase knowledge sharing & enable research innovation

[Professionalization and Career Arcs](#): Workforce Survey, RCD Job Elements & Career Frameworks

[Capabilities Model for Research Computing and Data](#): Capabilities Model Introduction, Guide, and Assessment Tool; 2020 Community Dataset; and Regular Office Hours

[Engagement](#): Increase visibility & participation in CaRCC, esp. with underserved & underrepresented persons and organizations

[RCD Nexus](#): Resource & Career Center to provide products, tools, services, & community to build/sustain successful RCD operations

[EPSCoR CI Workshop](#): Plan to host a workshop to reduce the CI capabilities knowledge gap across EPSCoR jurisdictions, and address a recent "Call to Action" to increase CI access across EPSCoR

[Decadal Survey](#): Develop a decadal survey for RCD to distribute to the broader community to potentially guide joint efforts

RCD/CI Professional Roles: The facings

- **Researcher-facing:** Outreach, education, training, consulting, facilitation, advanced user support, etc. (e.g., CI Facilitator)
- **Systems-facing:** Systems planning, engineering, security, optimization, middleware, virtualization, and cloud, among other topics. (e.g., sysadmin, network engineer)
- **Data-facing:** Data creation; data discovery and collection; data analysis and visualization; research data curation, storage, backup, preservation, and transfer; and research data policy compliance. (e.g., Research Data Librarian)
- **Software-facing:** Software package management, research software development, research software optimization or troubleshooting, workflow engineering, securing access to software, etc. (e.g., Research Software Engineer)
- **Strategy and Policy facing:** Institutional alignment, culture for research support, funding, and partnerships and engagement with external communities. (e.g., HPC Center Director)

CaRCC's People Network = *Inclusive Community*

An ongoing "remote conference" to share/leverage expertise in various facings (Tracks)



Data-Facing:

Analysis, curation, preservation, compliance, movement



Emerging-Centers:

Newer or emerging RCD service leaders & programs



Researcher-Facing:

Consulting, bridging, facilitation, outreach, training



Systems-Facing:

Hardware, networks, security, compliance, data centers



Software-Facing:

Develop or contribute to research software, scripts, workflows



Strategy/Policy-Facing:

Institutional alignment, culture, funding, policy, community

Co-Coordinator: Lauren Michael, UW-Madison
Bob Freeman, Harvard Business School

The People Network - Track Details

- Each track has its own focus area and coordination
- Multiple communication channels: email list, Slack, monthly calls
- Monthly call topics decided by/for each track community; some multi-track & all-track topics
- Significant progress on shared infrastructure, continuity and leadership opportunities

Data-Facing

Coordinators:

- Amy Koshoffer
- Deb McCaffrey

Steering Committee:

- **Recruiting now!**

Software-Facing

Represented by US-RSE

Emerging-Centers

Coordinators:

- Rich Knepper
- Jane Combs

Steering Committee:

- Kirk Anne
- Patrick Clemens
- Alex Feltus
- Preston Smith
- Jason Wells

Strategy & Policy-Facing

*coming soon with EDUCAUSE
& CASC*

Researcher-Facing

Coordinators:

- Justin Booth
- Tobin Magle

Steering Committee:

- Gladys Karina Andino
Bautista
- Katia Bulekova
- Martin Cuma
- Christina Koch
- Janna Ore Nugent
- Annelie Rugg

Systems-Facing

Coordinators:

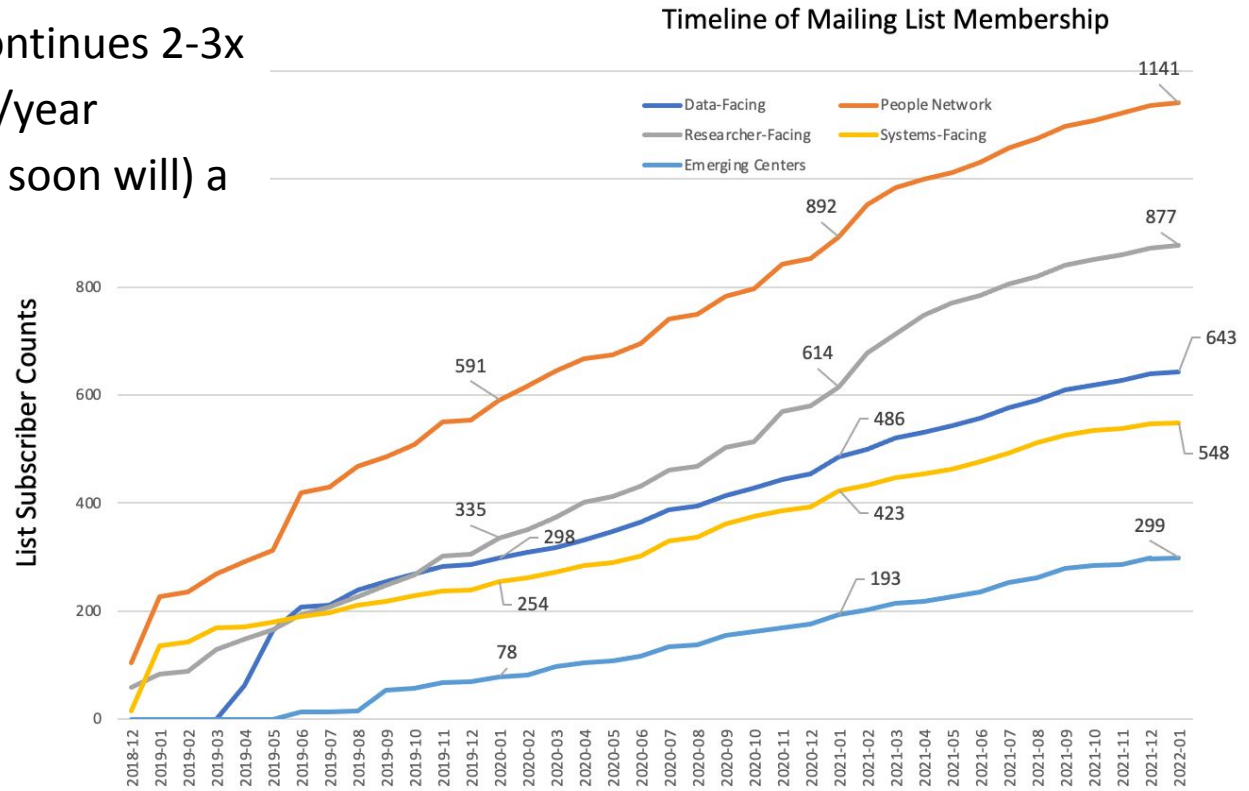
- Brian Haymore
- Betsy Hillery

Steering Committee:

- Sai Pinnepalli
- Jim Leous
- Jason Wells
- John Blaas
- **Position open now!**

The People Network - Growth and Engagement

- Membership growth continues 2-3x
- Call attendance > 1500/year
- All Tracks now have (or soon will) a Steering Committee!



The People Network - Highlights

Overall

- ~25 different people involved with leadership for calls
- Joint US-RSE / CaRCC calls (5/12 and 5/26) on RSEs in the workforce
- 1500+ call attendees in the last year
- Increased reach via YouTube:
 - 391 hrs of YouTube videos viewed (2020: 262 hrs; 1.5x increase)
 - 3900 video views & 73 new subscribers
- Strategy-Facing: Coming soon!

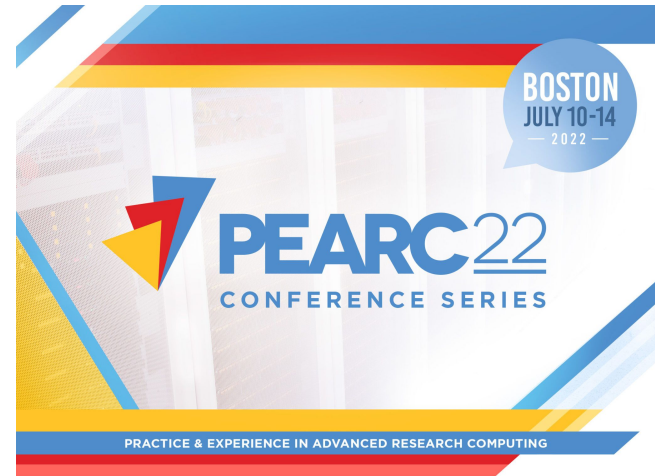
To join, fill in the google form linked from <https://carcc.org/people-network/>



Poll: What facing do you spend a *lot* of time on?

PEARC

- PEARC is the de facto annual meeting for the RCD profession.
- PEARC is about the **people** and the **profession** (all the facings)
- PEARC is the publishing venue for RCD – think promotion!
- Full papers, short papers, posters, panels, Bird's of a Feather (BoF's) ++
- A lot of great content, not just a “hallway” conference.
- Take advantage of the workshops
- Build your professional network (it takes work)



Matching People with Organizations

Poll: For those who are getting started: What do you need the most?

Poll: For those who are familiar with the communities: What do these organizations provide (for you)?

Some facing specific groups (add-on packs!):

- Software-Facing: US-RSE
- Systems-Facing: HPC Syspros
- Researcher-Facing: Virtual Residency Program (You are here!)
- Data-Facing: RDAP
- Strategy and Policy Facing: CASC

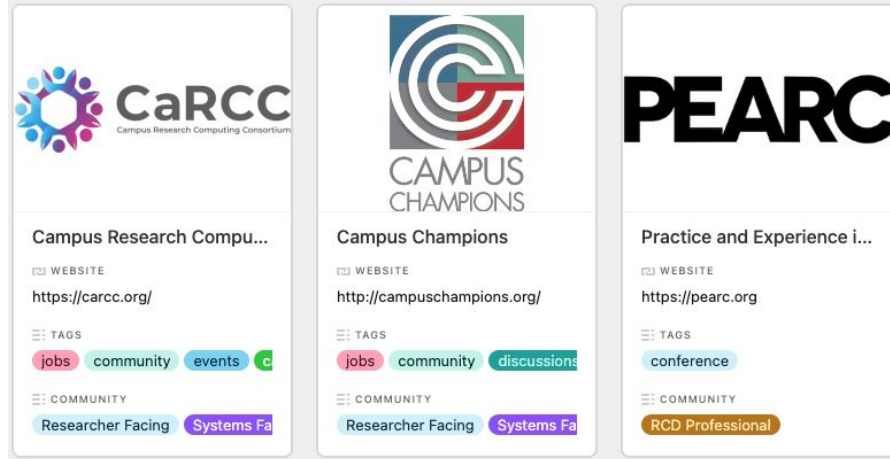


RDAP
ASSOCIATION



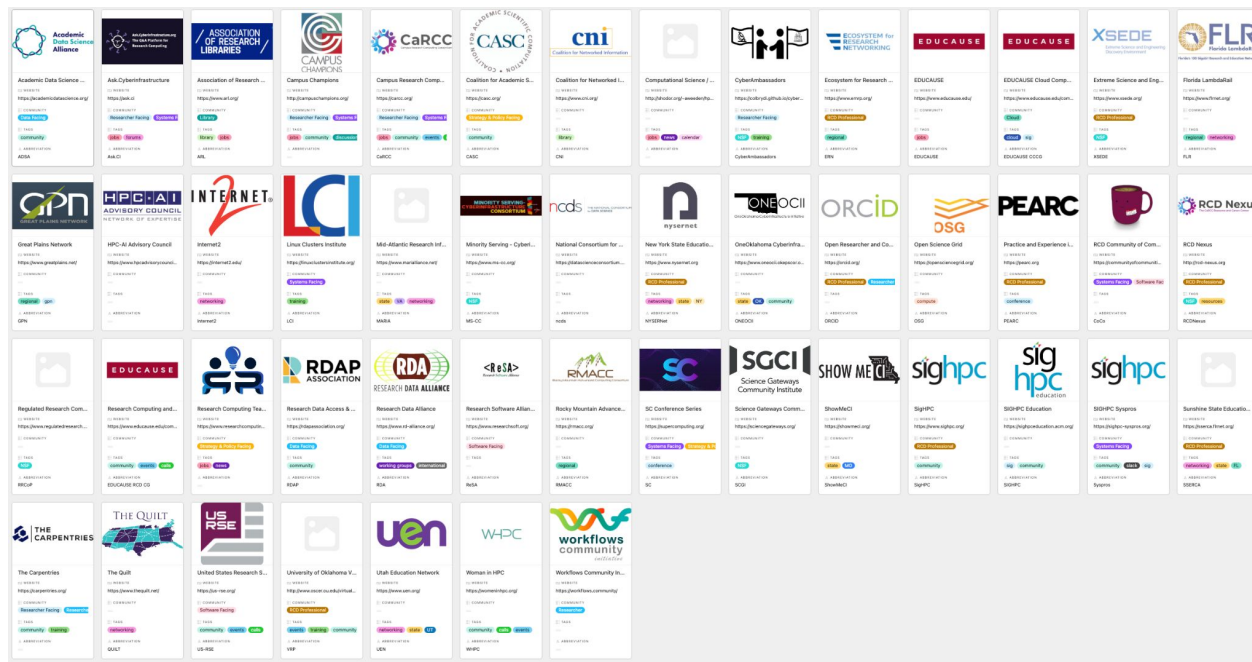
RCD Community Landscape (Demo)

- RCD Start Here: <https://airtable.com/shra4PuWtzEsfwW1H>
- RCD Next: <https://airtable.com/shreFF2mTAIpiPXpr>
- RCD Onboard: <https://airtable.com/shrkyYqDdEvNOI5OE>
- Data Table: <https://airtable.com/shr369iMAdVrCdjUI>



Poll: Wait there is more! What organizations did we miss?

Contribute! <https://airtable.com/shrkyYqDdEvNOI5OE>



Poll: Where would you start?

Things to consider

- Attend PEARC (<http://pearc.org>) at least once - this is the people conference.
- Attend SC (<http://supercomputing.org/>) at least once - this is the technology conference.
- Read about the RCD Facings (<https://carcc.org/rcd-professionalization/facings/>)
- Attend some training. (OU-VRP, CyberAmbassadors)
- Join the community by joining various organizations based on your work and interests (facings) (CaRCC People Network, US-RSE)
- Find your state and regional network and explore what they have to offer.
- Never stop learning.

Optional Topics

Yes, we can talk forever!
Let's hear your questions first!

What organization would you like to learn more about?

What do you have questions about?

What do you fear the most?

What are you excited about?



Thanks!

Dana Brunson

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Timothy Middelkoop

<tmiddelkoop@internet2.edu>




Resources

VIEWES RCD Next Filtered by Views Sorted by 1 field

Find a view

Public

- Gallery view
 - RCD Start Here
 - RCD Next**
 - RCD Onboard
 - Table View
 - RCD Data Entry
- Community Specific
- Strategy and Polic...
 - Researcher Facing
 - Data Facing
 - Software Facing
 - Systems Facing
 - Security
 - Network
- Development
- Experimental




University of Oklahoma Vi...

WEBSITE
<https://www.oscer.ou.edu/virtual...>

COMMUNITY
 RCD Professional

TAGS
 events training community

ABBREVIATION
 VRP




Minority Serving - Cyberin...

WEBSITE
<https://www.ms-cc.org/>

COMMUNITY
 RCD Professional

TAGS
 NSF

ABBREVIATION
 MS-CC



Trusted CI

WEBSITE
<https://www.trustedci.org/>

COMMUNITY
 RCD Professional

TAGS
 security NSF

ABBREVIATION
 Trusted CI




SIGHPC Syspros

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

COMMUNITY
 Systems Facing

TAGS
 community slack sig

ABBREVIATION
 Syspros



Research Data Access & P...

WEBSITE
<https://rdapassociation.org/>

COMMUNITY
 Data Facing

TAGS
 community

ABBREVIATION
 RDAP



Coalition for Academic Sci...

WEBSITE
<https://casc.org/>

COMMUNITY
 Strategy & Policy Facing

TAGS
 community

ABBREVIATION
 CASC



United States Research S...

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

COMMUNITY
 Software Facing

TAGS
 community events calls

ABBREVIATION
 US-RSE

RCD Nexus - The Research Computing and Data Resource and Career Center

An NSF-supported CI Center of Excellence Pilot

Dana Brunson, PI - Internet2 - Executive Director for Research Engagement

Scott Yockel, co-PI - Harvard - University Research Computing Officer

Claire Mizumoto, co-PI - UC San Diego - Director, Research IT Services

Tom Cheatham co-PI - University of Utah - Professor of Pharmacy & Director of RC/CHPC

Patrick Schmitz, co-PI - Semper Cogito

<https://carcc.org/rcd-nexus/>



Why an Research Computing and Data RCC?

- Researchers struggling to take advantage of ever-evolving RCD technology
 - No time to become technology experts
 - Rely heavily on RCD Professionals for tech services, support and facilitation.
- Institutions need support and guidance
 - To boot-strap, grow, and sustain their programs
 - To make the case to leadership that RCD is critical to research
 - To recruit, retain, and develop RCD professional staff
- RCD Professionals are clamoring for a shared voice
 - To advocating for the profession
 - For broader understanding of their roles
 - For training, mentoring, and professional development resources.

What will the RCD Nexus provide?

- RCD Nexus will advance and enable the nation's capacity for computational and data-intensive research
- Create tools, practices, and professional development resources:
 - Enhanced RCD Capabilities Model and Community Dataset Portal
 - Conduct RCD Workforce Staffing survey
 - Advance the adoption of HR Job Family Framework
 - Curate leading practices for Staff Professional Development
 - Curate leading practices for Involving Students in RCD/Workforce Development
- Gather these into an RCD Resource and Career Center
- Help bridge the gap for smaller institutions struggling to get RCD programs started to support their researchers.

RCD Pulse Survey

Joel Cutcher-Gershenfeld

**Research Computing and Data
Professionalization Pulse Survey
(supported by XSEDE Campus
Champions)**

Executive Summary – 11 Indicator Issues (n=204)

Points of Alignment on **What to Do**

- **Awareness of career opportunities** associated with research data and computing support.
- Documenting and supporting aspirational career paths for RCD professionals within **higher education**.

Pain Points (Important *and* Difficult)

- Advancing **diversity, equity, and inclusion** among RCD professionals.
- Protecting RCD professionals from **burnout** on the job.
- **Communication and coordination** among RCD professional organizations and consortia.

Low Hanging Fruit (Important *and* Easy)

- **Access to a professional network** of RCD professionals.

Points of Alignment on **What Not to Do**

- **NOT:** Each cyberinfrastructure professional organization or consortia “**staying in its lane**” and not “stepping on the toes” of others.
- **NOT: Controlling entry** into the profession in ways similar to what medical and legal professional societies do.

Points of Incomplete Alignment

- Documenting and supporting aspirational career paths for RCD professionals in the **commercial sector**.
- **Advocacy** on behalf of the RCD professional community.
- Groups of cyberinfrastructure professional organizations or consortia **hiring joint staff as shared resources** (e.g. subject matter experts, communication professionals, and other shared services).

Executive Summary – Priorities and Additional Observations

Top Five Priorities

1. Educational and professional development opportunities
2. Access to a network of other RCD professionals for assistance
3. Advancing diversity, equity and inclusion in the profession
4. Forming working groups to address priority issues for the profession
5. Coordination with other professional societies and consortia relevant to research computing and data

Anything Else?

- RCD respondents made extensive, heart-felt comments at the end of the survey, with most pointing to a professional association that is inclusive, developmental, and interdisciplinary.

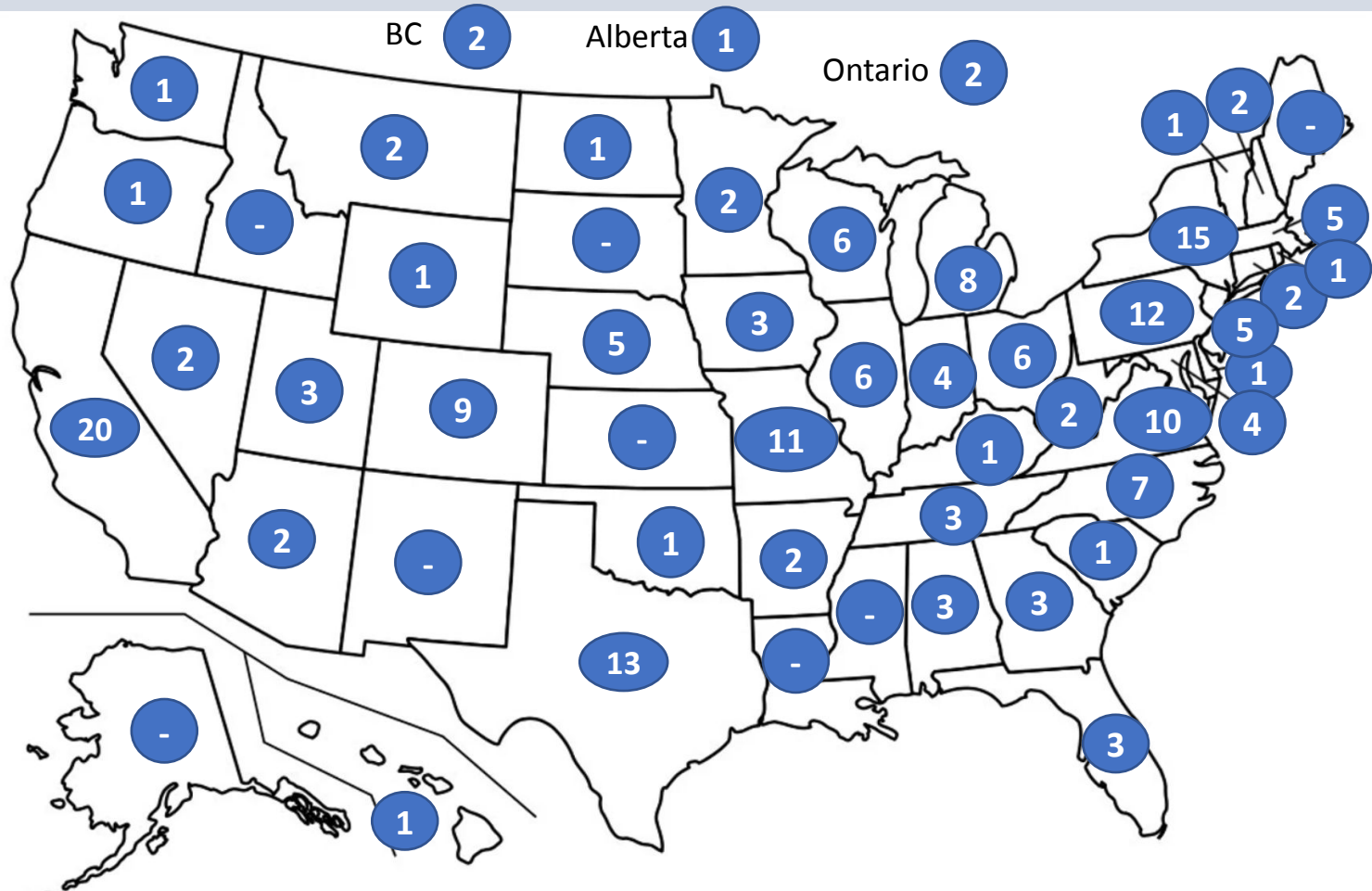
“Must Have” Comments

- Networking/Communication/Collaboration – 37%
- Professionals/Career Development – 27%
- Awareness/Advocacy/Recognition of RCD – 14%
- Resource Access – 8%
- Leadership/Mentorship/Sustainable Funding/Staffing – 8%
- Do we need another organization – 2%

Barriers to the “Must Have” Comments

- Organization/Culture/Careers – 29%
- Time – 20%
- People/CI Professionals/IT Community – 17%
- Funding/Tech/Resources – 10%
- Communications/Common Language – 9%
- Travel/Location – 6%
- N/A – 10%

Distribution of Respondents



Meet the Respondents (cont.)

Please indicate the research computing and data consortia or initiatives that you are associated with (check all that apply).

Association of Research Libraries (ARL)	4.9%	10
Big Data Hubs (NSF)	8.8%	18
Campus Champions(CC)	51.5%	105
Campus Research Computing Consortium (CaRCC)	67.2%	137
The Carpentries (software, etc.)	26.5%	54
Coalition for Academic Scientific Computation (CASC)	20.1%	41
Coalition for Networked Information (CNI)	8.8%	18
CyberAmbassadors	5.4%	11
Education Opportunities (HPC University, SIG HPC Education)	11.3%	23
EDUCAUSE	37.3%	76
EPOC/CI Engineers	2.9%	6
FAIR Data Initiative	6.9%	14
Global Environment for Network Innovations (GENI)	3.4%	7
HPC Systems Professionals	8.8%	18

Internet2	29.9%	61
Linux Clusters Institute	4.4%	9
Midscale Exp. Research Infrastructure Forum	0.5%	1
Minority Serving Cyber. Consort. (MS-CC)	2.5%	5
National Center for Women and IT (NCWIT)	2.9%	6
National Society of Black Engineers (NSBE)	1.5%	3
OSG	16.2%	33
Quilt(Regional Networks)	6.9%	14
Research Data Alliance (RDA)	8.3%	17
Research Data Access & Preservation Association (RDAP)	7.8%	16
Research Software Engineers (US-RSE)	10.3%	21
Science Gateways Community Institute	5.4%	11
Society for Adv. of Chicanos/Hisp. In Science	0.5%	1
United States Research Software Engineer Association (US-RSE)	6.9%	14
Virtual Residency	17.2%	35
Women in HPC (WHPC)	15.2%	31
Women in Networking (WINS)	3.4%	7
XSEDE (Extreme Science and Engineering Discovery Environment)	37.3%	76

Challenges for the RCD Profession

- Individuals do not understand RCD *as a career*
 - No formal career path structure
 - Little awareness of career potential
- RCD groups struggle to recruit and retain staff
 - Where to find people?
 - How to train and develop them?
 - How to ensure RCD profession matches broader workforce diversity?
 - How to compensate and promote them?
- Occupational distinction from
 - IT (i.e. Administrative/Enterprise IT)
 - Researchers in other disciplines



RCD Professionalization Timeline

July 15, 2021



RCN Meetings



RC Directors and Organizational Sociologist deliberate on the "CI Profession"

2016

CI Professionalization Workshop



30 Institutions gathered to create the Job Elements and Career Guide, validating the "-facings" concept, outlining their roles/responsibilities.

2018

RCD Workforce Survey



8 RCD professionals met over 5 months to create a national RCD survey, which will create the first large data set on the composition of the RCD workforce, a resource useful for individuals & hiring managers alike.

2020

facings term introduced



To describe "who" the CI professionals are, we described what entity the staff faced on a regular basis: researchers, systems, software/data, strategy/policy)

HR Job Family Matrix



6 RCD & 2 HR professionals met over 6 weeks and create a HR framework template with a unique RCD job family to be used by any institution.

[HR Job Family Matrix](#)

2021

Career Arcs



15 RCD professionals began meeting to brainstorm methods to convey themes of Career Arcs from individual interviews.

RCD Workforce Survey

Survey from June - September 2021

- Educational background, individual characteristics, and RCD facing
- Level of satisfaction with current position
- How included they feel in RCD field
- Job responsibilities and compensation
- 563 valid responses

Early observations:

- **Differences in feeling of belonging** between historically dominant identities and respondents from historically excluded groups.
- Large portion of respondents feel their work is valued by those they work with, but relatively **few felt their work was valued by their institution.**
- Overall, survey results **support prior qualitative assessments** of the challenges to recruit and retain talent, develop career pathways, and grow the profession.

Analysis still in progress on job responsibilities and compensation.

For more, see the paper to appear at PEARC'22: Christina Maimone, Scott Yockel, Timothy Middelkoop, Ashley Stauffer, and Chris Reidy. 2022. Characterizing the US Research Computing and Data (RCD) Workforce.

<https://carcc.org/rcd-professionalization/>

Elements of a Career Arcs Resource

- Narratives of how (and why) existing RCD staff got into these roles
 - Allow potential staff to see themselves in a story
 - Help groups/managers understand the diversity of career paths into RCD
 - Emergent patterns will identify gaps/opportunities, inform strategic planning, etc.
- Examples of effective recruitment programs
 - Targeted at staff: previous roles, training needed for RCD roles
 - Targeted at students: identifying candidates, making the pitch, effective training
- Next steps for existing RCD staff
 - Paths for advancement: Technical expertise, domain expertise, leadership, etc., etc.
 - Training requirements, sources/providers
- Career paths to and from industry and other non-academic areas
 - Staff transitions to and from industry

RCD Career Arcs

Survey from November 2021 - January 2022

- General characteristics of RCD professionals and their entry into RCD field
- Factors for RCD Career Entry, Advancement, and Satisfaction
- Factors for Changing Jobs, and/or leaving RCD for other domains
- 225 responses (159 complete)

Early observations:

- Top ranking answers to “What advancement Means”: **recognition**, salary, and influence on organizational strategy.
- Top factors motivating job changes: **more meaningful contribution**, professional development, and joining a more innovative organization.
- Women ranked **recognition and impact far more important than salary**, while men ranked them more equally.

Working group next steps: Additional analysis and interviews

For more, see the paper to appear at PEARC'22: Shafaq Chaudhry, Arman Pazouki, Patrick Schmitz, Elizabett Hillery, and Kerk Kee. 2022. Understanding Factors that Influence Research Computing and Data Careers.

<https://carcc.org/career-arcs/>