



# CASC

Coalition for Academic  
Scientific Computation

## Envisioning NAIRR State and Regional Hubs

March 9, 2026

Washington, D.C.

This event is supported by the National Science Foundation under Grant No. 2611153. Any opinions, findings, and conclusions or recommendations expressed in this event and related materials are those of the organizers and participants and do not necessarily reflect the views of the National Science Foundation.



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## Workshop Goals

**Workshop Goals:** Elevate and identify gaps, opportunities, nuances, and risks with building state (or regional hubs) for educational transformation in the following areas:

- **Computing Consortia:** Building statewide partnerships or multi-state advanced computing consortia/hubs
- **Governance/Coordination:** Advancing governance, coordination, and sustainable operating models for consortia/hubs
- **Faculty Engagement and Curricula Innovation:** Engaging faculty across all degree programs on how to adjust curricula and use CI for classroom instructions or projects
- **CI Workforce Development:** Expanding workforce development for CI professionals, faculty training and student onboarding
- **Industry/Philanthropy Engagement:** Industry and philanthropic engagement models that add long-term value

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## Workshop Overview

9:00	Welcome (CASC and NSF) and Overview	1:45	Faculty Engagement and Curriculum Innovation
9:15	Building Statewide or Multi-State Regional Consortia	2:05	Barriers to Adoption/Innovation
10:00	Challenges – Large and Small States	2:30	Break
10:45	Break	3:00	Developing a Statewide CI workforce
11:15	Stakeholder Alignment Cases and Mapping of Survey Results	3:20	Challenges – Large and Small States
12:00	Lunch	3:45	Industry Partnerships and Philanthropic Collaboration
1:00	Strategies for Upper-Administration Alignment	4:00	Roses, Buds, Thorns
1:20	Roses, Buds, Thorns	4:30	Summing Up Lessons Learned and Action Implications
		5:00	Adjourn

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**CASC** | Coalition for Academic  
Scientific Computation

## CASC Overview

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# Our Vision

CASC envisions a robust, sustainable ecosystem supporting academic research computing and data services, enabled by a vibrant community of leaders.

**CASC** | Coalition for Academic Scientific Computation

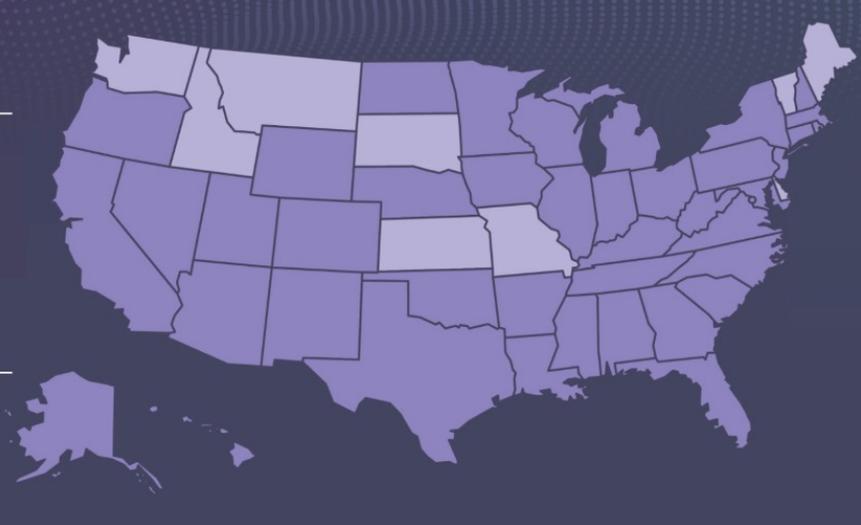
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## Computational Excellence in Every Corner

**105+**  
member institutions in  
40 states

**35+**  
years of research  
leadership



**CASC** | Coalition for Academic Scientific Computation

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# Coalition Value Proposition

"CASC serves as a think tank that influences federal sponsors, particularly on critical issues. With the rise of automation and AI potentially displacing a significant portion of the workforce, it's crucial for research institutions to collectively address these challenges."

Alisa Kang, Georgetown University



**Trusted Advisor**  
to federal agencies  
on funding programs



**Advocate**  
for public and private  
investment in RCD  
services in support of  
academic research

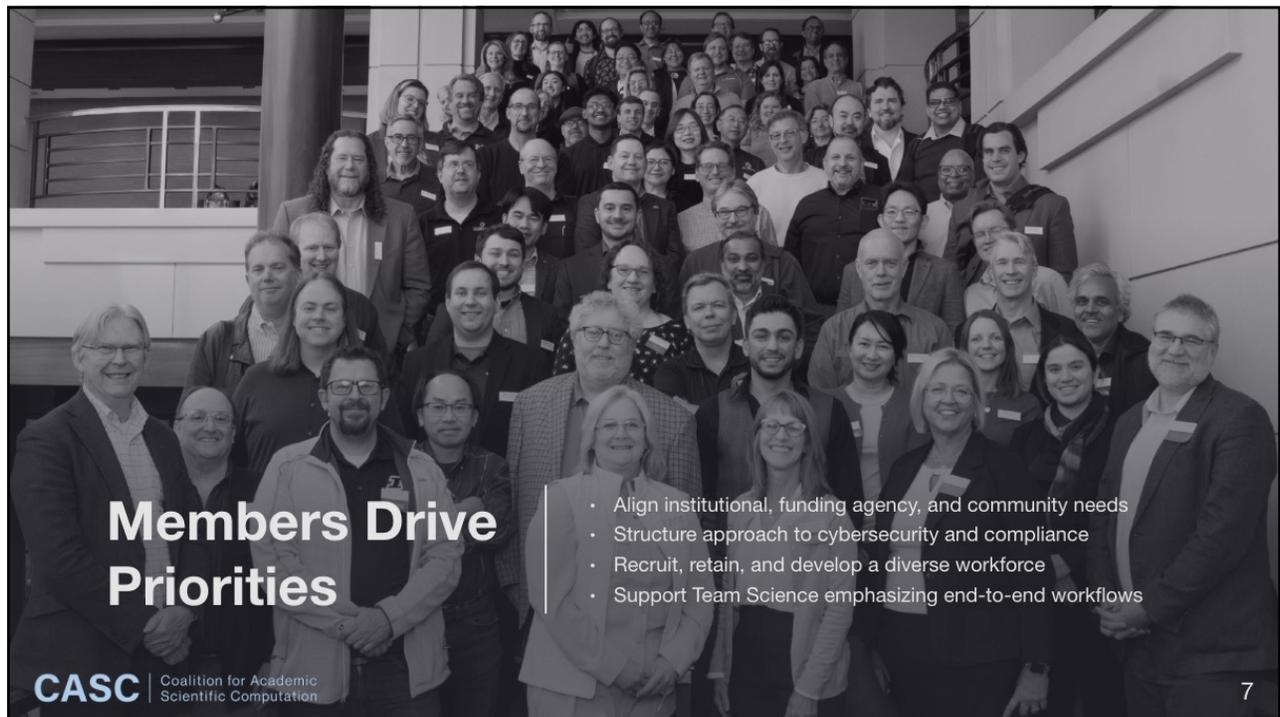


**Foster**  
diverse community  
of current and  
emerging leaders in  
computational fields



**Host**  
community forums to  
share strategies

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## Members Drive Priorities

- Align institutional, funding agency, and community needs
- Structure approach to cybersecurity and compliance
- Recruit, retain, and develop a diverse workforce
- Support Team Science emphasizing end-to-end workflows

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# Building Statewide or Multi-State Regional Consortia

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## Building Statewide or Multi-State Regional Consortia

### OARnet, an Illustrative Consortia

Pankaj Shah, Executive Director, OARnet  
pshah@oar.net



**OARnet Connectivity**

- **Connected Community sites:**
- Higher Education: 513
- K-12: 977
- State Government: 3360+
- Local Government: 164
- Libraries: 728
- Healthcare: 105
- Research: 27
- Public Broadcasting: 10
- Emergency Communications: 225

- OARnet also connects **OhioLINK** and the **Ohio Supercomputer Center**, fellow members of the Ohio Technology Consortium.
- 400G backbone Terabit capable
- 2x500G connection to Internet2
- Additional 100G to Ashburn & Chicago
- Connection into Chicago via Merit
- 17 data centers
- **All Ohio's colleges and universities connected at 10G or more**

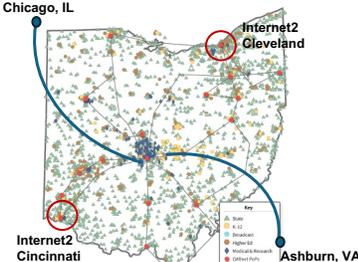
**Sustainable Business Model and Workforce**

- **Guiding Principles:**
  - Backbone is over provisioned and under subscribed – architected for large data flows
  - Capability to meet future requirements for research and real-time applications
- **Business model** is diversified beyond higher education, while keeping enhanced quality of service required for research and education
- Win-win for all, as the Total Cost of Ownership (TCO) is spread and predictable
- **Workforce:** Internship program – “just in-case” academic/research training versus “just in-time” industry/production environment – both required
- OARnet is an example of a **Quadruple Helix** – a partnership of academia, government, industry, and lab – supporting end users and society, as noted during recent DoE Genesis Mission Summit

**OARnet Use Cases**

Total 600 PB of data transported in 2025 over highly-scalable 5,500+ fiber miles

- From precision agriculture and drone testing to state parks, from college campuses and K–12 classrooms to quantum networking testbeds, OARnet's reach extends across Ohio and its borders



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### Barr von Oehsen, *The Keystone AI + Quantum Factory*

#### CHALLENGE PROJECT SEEKS TO ADDRESS

- HIGH BARRIER TO ENTRY**  
Modern AI/Quantum requires massive capital and 20–100 MW power/cooling that individual universities cannot sustain alone.
- FRAGMENTED RESOURCES**  
Disconnected research efforts limit Pennsylvania's ability to compete for large scale federal funding (DOE/NSF).
- WORKFORCE GAP**  
A critical shortage of talent skilled in emerging technologies threatens regional economic competitiveness.

#### SCIENTIFIC IMPACT OR BROADER IMPACT

- ECONOMIC SOVEREIGNTY**  
Anchors innovation and manufacturing in PA, retaining top talent and fostering a robust startup ecosystem.
- ACCELERATED DISCOVERY**  
Reduces time-to-insight for energy, life sciences, and materials discovery through shared high-performance resources.
- NATIONAL BLUEPRINT**  
Establishes a scalable model for state-led innovation, aligning with CHIPS Act, DOE, and NSF priorities.
- EDUCATIONAL INCLUSIVITY**  
The goal is to work with all colleges and universities within PA, community colleges, and K-12.

#### SOLUTION(S) OR DELIVERABLES

- STATEWIDE HYBRID ECOSYSTEM**  
A unified partnership connecting PA's R1 universities, PSC, and industry leaders into a shared network.
- INFRASTRUCTURE**  
Construction of a sustainable, next-gen data center (20–100 MW) designed for high-density compute.
- OPERATIONS**  
A service model providing democratized access to compute, workflow orchestration, and a workforce pipeline.
- WORKING COMMITTEES**  
Established groups focused on governance, infrastructure, funding, and government relations.

#### INITIATIVE STATUS & ENGAGEMENT

- CURRENT STATE**  
Coalition Established (Gov + Academia + Industry).
- NEEDS**  
Seeking Federal, Industry, and Philanthropic Co-investment.
- STATUS**  
Ready for transition to practice!
- CALL TO ACTION**  
Looking for collaborators and partners who want to join the fun!

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### Scotty Strachan, *NV-DICE (Nevada Vision for a co-Developed Impactful Cyberinfrastructure Ecosystem)*

Wild-area Wireless Enabling Science Team (WildWEST) Engagement Structure

Advisory Board:  
Core Science Partners  
ACCESS Support  
NSF/EPSCoR-Nevada  
The Quik  
Internet2  
ESIP WG's

NSHE/SCS NevadaNet 2025

WOULD ADDITIONAL TECHNOLOGY SUPPORT CONTRIBUTE TO YOUR RESEARCH SUCCESS?

I need A LOT more technology support 57%

I don't need any additional technology support 5%

I need A LITTLE MORE technology support 38%

"Team science" in literature

#### How to jumpstart regional Research IT?

Dr. Scotty Strachan, NV System of Higher Education, NevadaNet  
PI in NSF EPSCoR, CSSI, CC\*, SCIFE

**Advanced Computing resources** have been available for decades; yet NV institutions have no culture of use/practice: why is that?

**Campus administrations** invest in shiny stuff, not professionals; CI teams are small & unstable. *Pause AI for a moment: where are the Data?*

**Regional technology organizations** are naturally disposed towards community infrastructure (e.g., NSL, NevadaNet, WRCC).

**Need to take honest lessons** from decades of EPSCoR Track 1 statewide forced marriages.

**Geography matters**: science strengths, tech state of affairs, opportunities to scale impacts.

*Which tech foundations meet a given region where they are at to address strengths and gaps?*

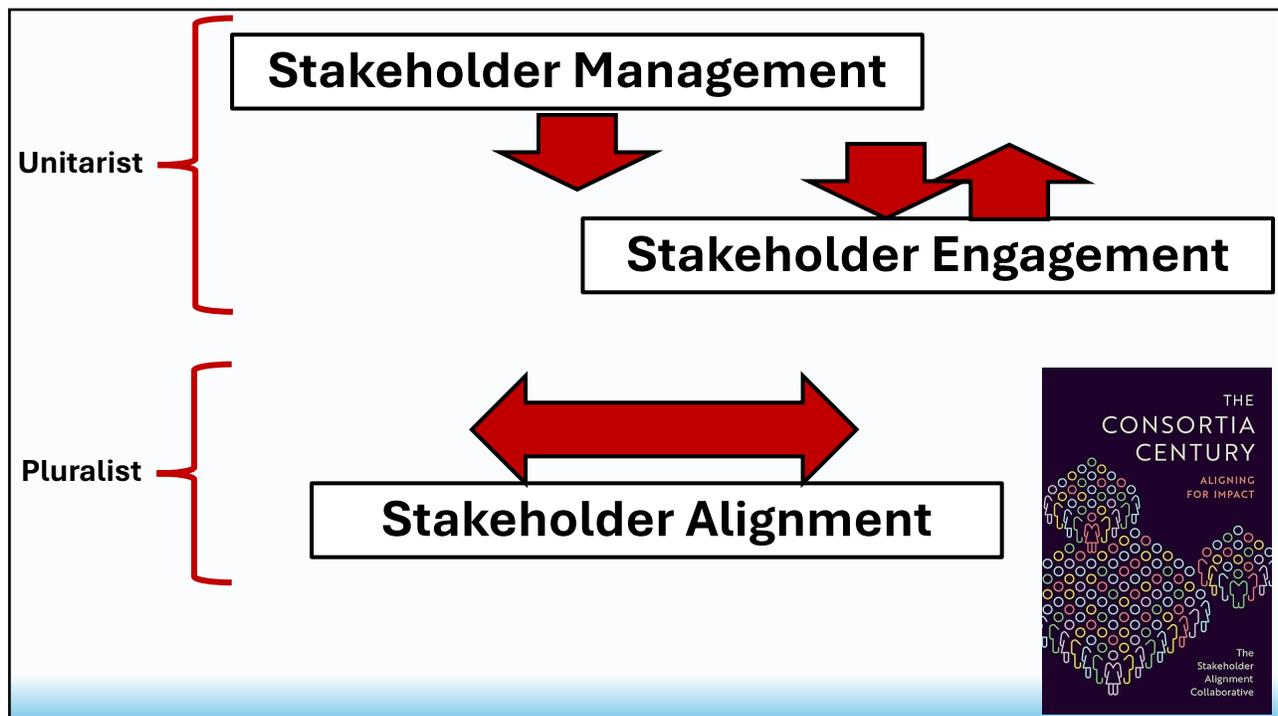
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# Stakeholder Alignment

## Illustrative Case Examples and Mapping of Survey Results

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## Illustrative Consortium: Biomarkers Consortium

### *Lesson: Carving Out a Pre-Competitive Space*

**Regulation**

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**Competition**

**Regulation**

**Public-Private Partnership**

Executive Committee

**Steering Committees**

- Oncology
- Metabolic Diseases
- Neuroscience
- Inflammation & Immunity

Project Teams

**Competition**

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## Illustrative Consortium: Ohio Technology Consortium.

### *Lesson: Vision and Policy Support*

**Vision**

OH-TECH propels Ohio's knowledge economy through the creation and adoption of next-generation technology and information solutions.

**Mission**

OH-TECH delivers world-class technologies, information and expertise to provide Ohioans with a strong foundation for education and workforce, scientific research and business innovation.

**Directive 2011-023 – Consolidation of Consortia**

The Chancellor of the Ohio Board of Regents has created five consortia organizations under the Chancellor's authority granted in division (U) of section 3333.04 of the Ohio Revised Code. The consortia are OARnet, Ohiolink, Ohio Learning Network, Ohio Supercomputer Center and Articulation and Transfer Network...

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## Illustrative Consortium: MGHPCC

**Lesson: Governance, Committee Structure**

**The MGHPCC is operated by the Massachusetts Green High Performance Computing Center Inc., a 501(3)c whose members are Boston University, Harvard University, the Massachusetts Institute of Technology, Northeastern University, the University of Massachusetts, and Yale University.**

### Officers and Directors

**Outreach Group:** The Research Education and Outreach Working Group is made up of representatives from each of the founding universities. The working group was formed to maximize the impact of the facility on current research, support the new collaborations that the facility makes possible, and encourage the submission of collaborative proposals for computationally intensive research and infrastructure.

**Program Management Group:** The Program Management group works with MGHPCC staff to ensure that business and technical operations for the facility work smoothly, and the facility is prepared to meet current and future business and infrastructure needs. Considerations include security, shared network infrastructure, space and power utilization, energy efficiency, budgeting, and cost allocation.

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## Illustrative Consortium: COPDESS

**Lesson: Three-Way Beneficial "Lock-In"**

The Coalition for Publishing Data in the Earth and Space Sciences (COPDESS) connects Earth and space science publishers and data facilities to help translate the aspirations of open, available, and useful data from policy into practice.



Publishers



Funders



Date Repositories

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## Illustrative Consortia: Protein Data Bank

### *Lesson: Co-evolution of Science and Governance*

**1957:** The first three -dimensional structure of a protein myoglobin was determined using the methods of x-ray crystallography

**No Charter**

**1971:** Protein Data Bank (PDB) established at Brookhaven National Laboratories (USA) and Cambridge Structural Database (UK) with 7 protein structures

**1989:** Guidelines for deposition established by an international committee

**1996:** A new representation for data established by an international working group

**1998:** Research Collaboratory for Structural Bioinformatics (RCSB) and Scientific Advisory Board (SAB) established with 9,000 structures

**Full Charter**

**2003:** Worldwide Protein Data Bank (wwPDB) established with partners in the USA, Europe, and Japan

**Global Charter;  
Mirror Sites (US,  
EU, Japan)**

**2025:** wwPDB Core Archives and Federated Resources and other data resources added; **over 230,000 entries**, and **over 60 million daily downloads**

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## Meet the Stakeholder Survey Respondents (n=103)

### Primary Role:

- Statewide and System-Level Higher Education Leader 11% n=11
- Faculty and Academic Leader 21% n=22
- Cyberinfrastructure Leader 49% n=50
- Statewide and Regional Research and Education (REN) Leader 15% n=15
- Industry and Philanthropy Leader 5% n=5

### All Roles that Apply:

- Statewide and System-Level Higher Education Leader 26% n=27
- Faculty and Academic Leader 38% n=39
- Cyberinfrastructure Leader 66% n=68
- Statewide and Regional Research and Education (REN) Leader 24% n=25
- Industry and Philanthropy Leader 6% n=6

### CI Expertise:

- Expert 26% n=27
- Highly knowledgeable 23% n=24
- Fairly knowledgeable 32% n=33
- Somewhat knowledgeable 15% n=15
- New to the concept 4% n=4

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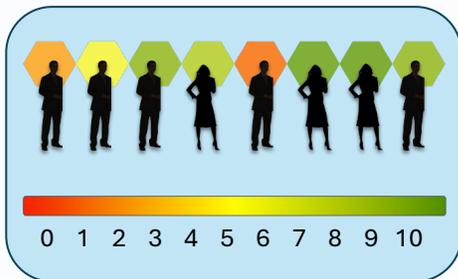
## Meet the Respondents (cont.)

- North-East (Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont) 20% n=21
- South-East (Alabama, Arkansas, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia) 17% n=17
- East North-Central (Illinois, Indiana, Michigan, Ohio, Wisconsin) 13% n=13
- West North-Central (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota) 13% n=13
- South-Central (Arkansas, Louisiana, Oklahoma, Texas) 7% n=7
- Mountain-West (Colorado, Nevada, Wyoming) 9% n=9
- California 4% n=4
- South-West (Arizona, New Mexico, Utah) 5% n=5
- North-West (Idaho, Oregon, Montana, Washington) 8% n=8
- Alaska, Hawaii, Puerto Rico, Guam, additional U.S. territories 5% n=5

A total of 86 respondents provided an email so they could see the stakeholder mapping survey results.

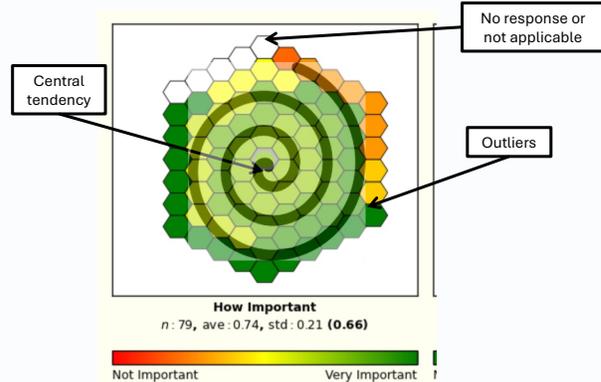
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## WayMark: How We Convey the Messages in the Data



To support the analysis, we use a visualization method developed with NSF funding, which assigns each stakeholder a color-coded hexagon, ranging from shades of red for negative views, shades of green for positive views, and shades of yellow for neutral views. These are combined in a z-flower such as the example to the right.

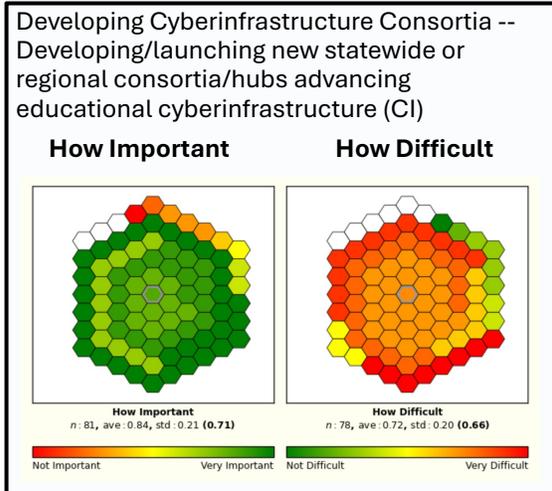
**How Important : Industry/Philanthropy Engagement-- Engaging industry and philanthropy in educational CI in ways that add long-term value**



**How to read a z-flower:** First, look to the middle to see the central tendency; then look to the outer edges to see the outliers; finally, look to the whole z-flower to get the overall picture.

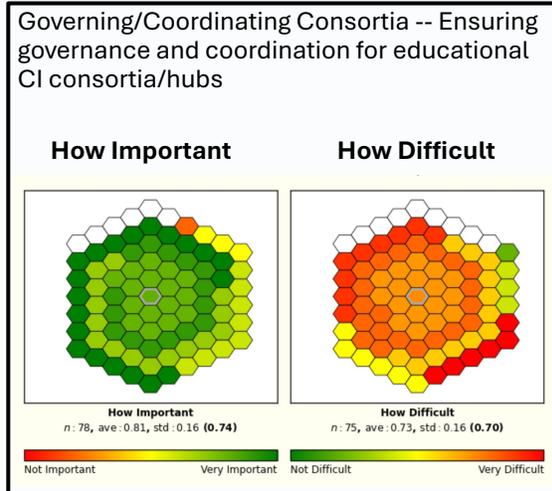
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# Statewide/Regional Hubs / Governing Consortia



**88% 7-10 Importance**

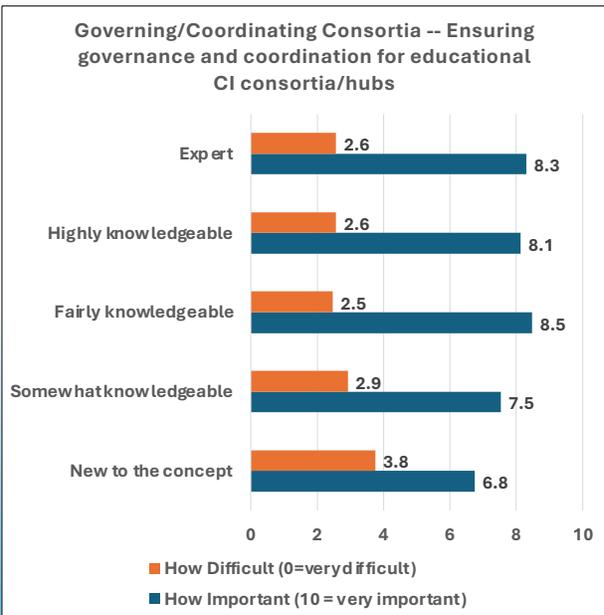
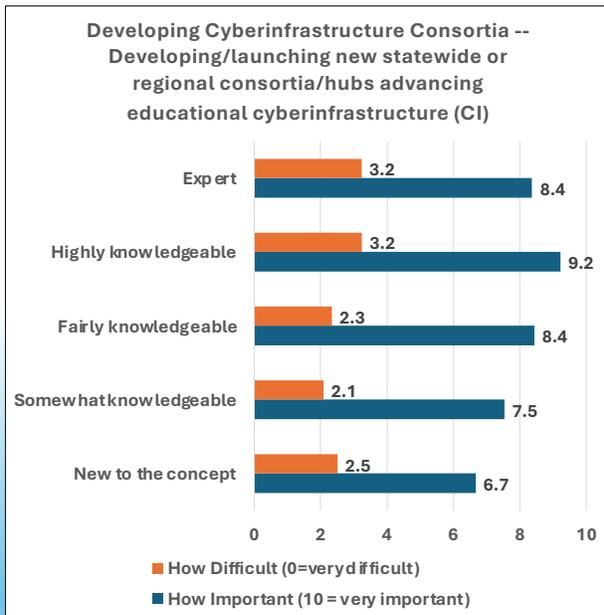
**76% 7-10 Difficulty**



**83% 7-10 Importance**

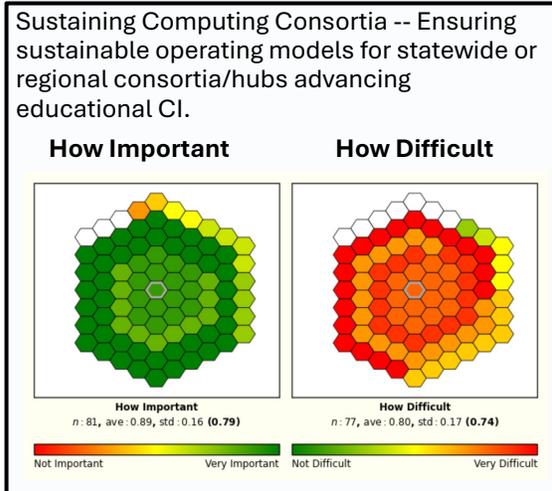
**71% 7-10 Difficulty**

25



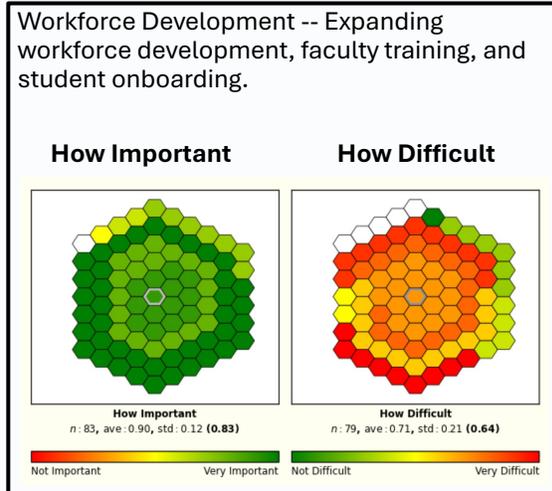
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# Sustaining Consortia / Workforce Development



**90% 7-10  
Importance**

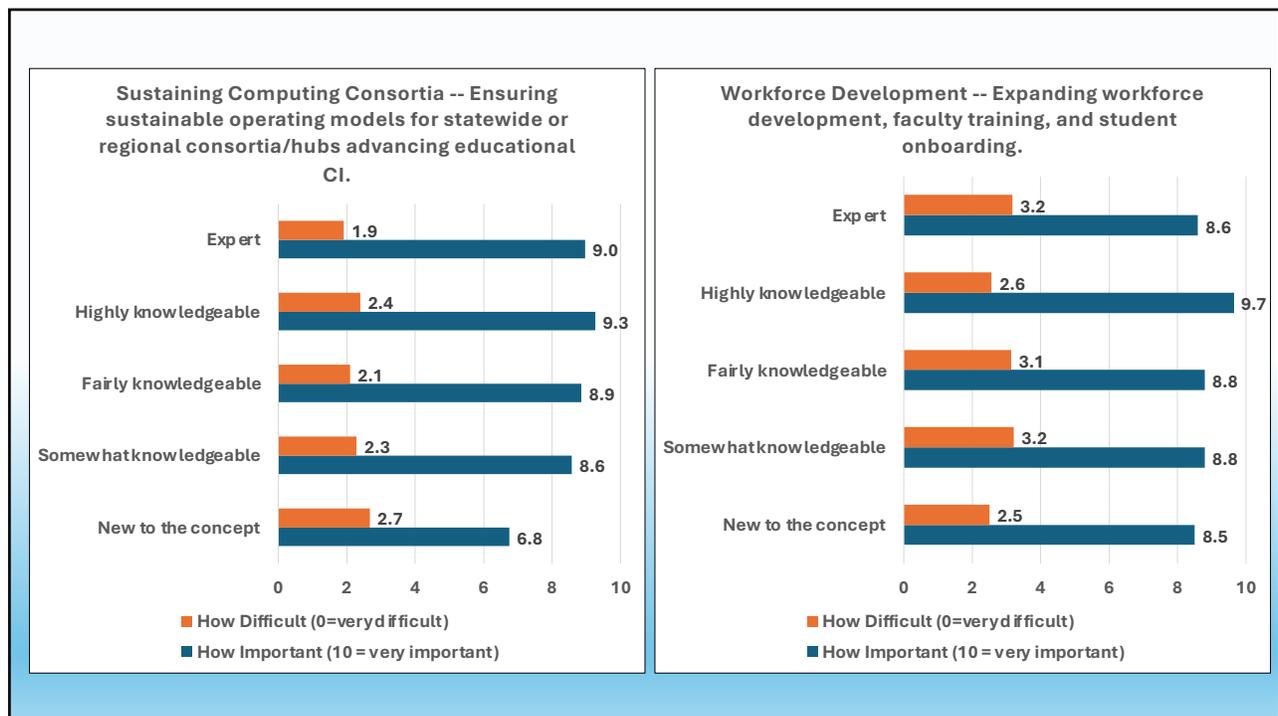
**86% 7-10  
Difficulty**



**94% 7-10  
Importance**

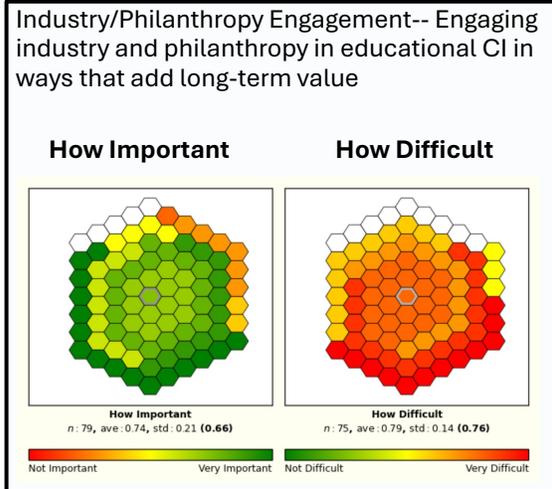
**64% 7-10  
Difficulty**

27



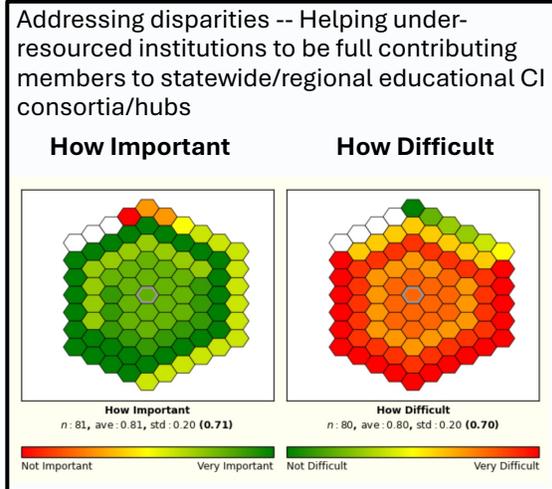
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# Industry and Philanthropy / Addressing Disparities



**73% 7-10**  
**Importance**

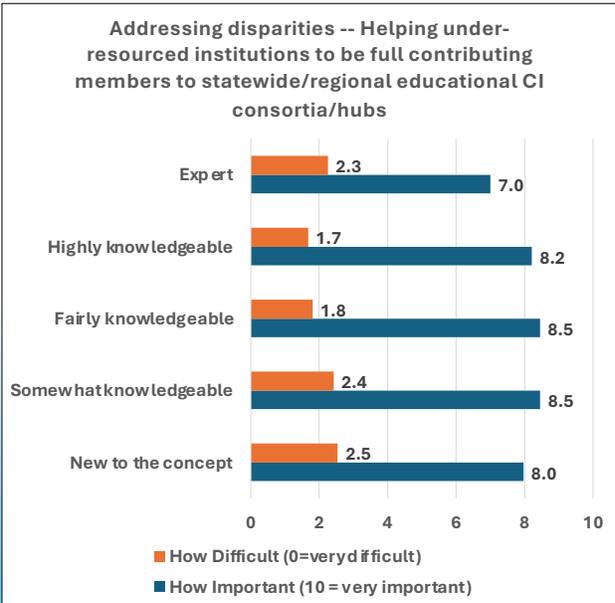
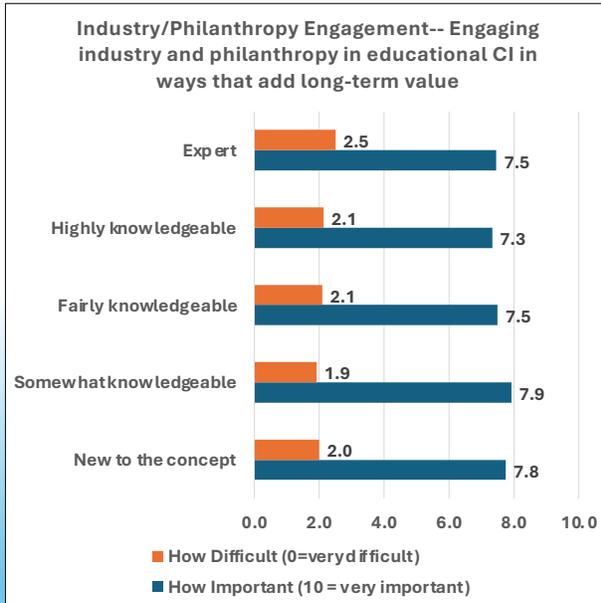
**79% 7-10**  
**Difficulty**



**82% 7-10**  
**Importance**

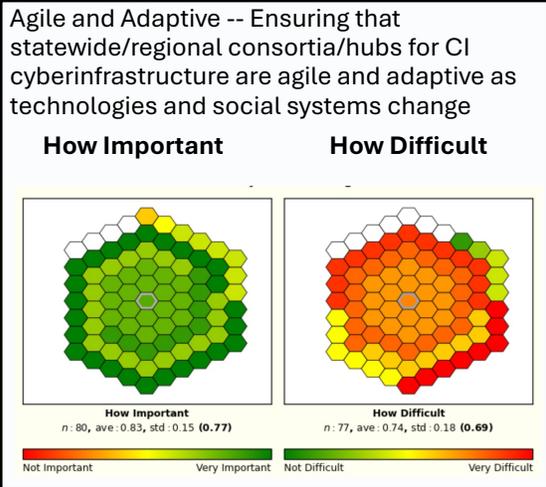
**78% 7-10**  
**Difficulty**

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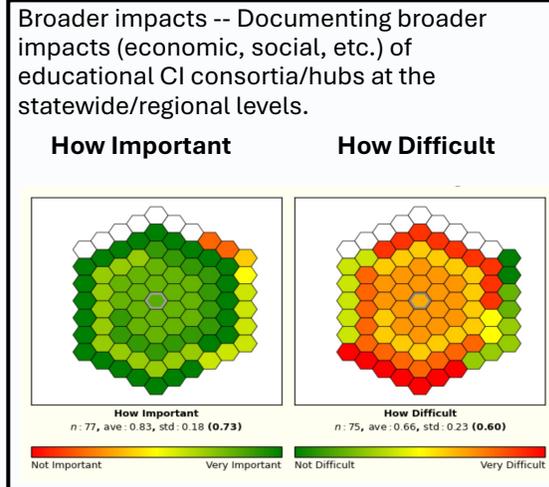
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# Agile and Adaptive / Broader Impacts



**87% 7-10**  
**Importance**

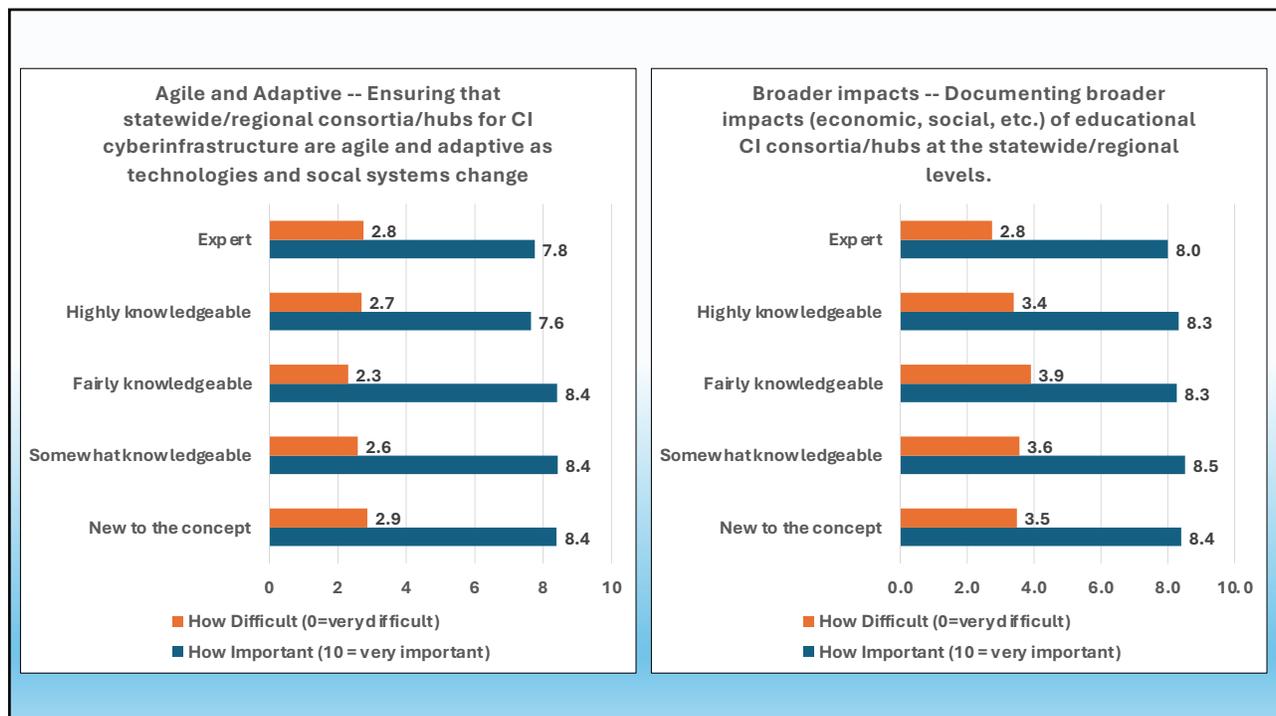
**76% 7-10**  
**Difficulty**



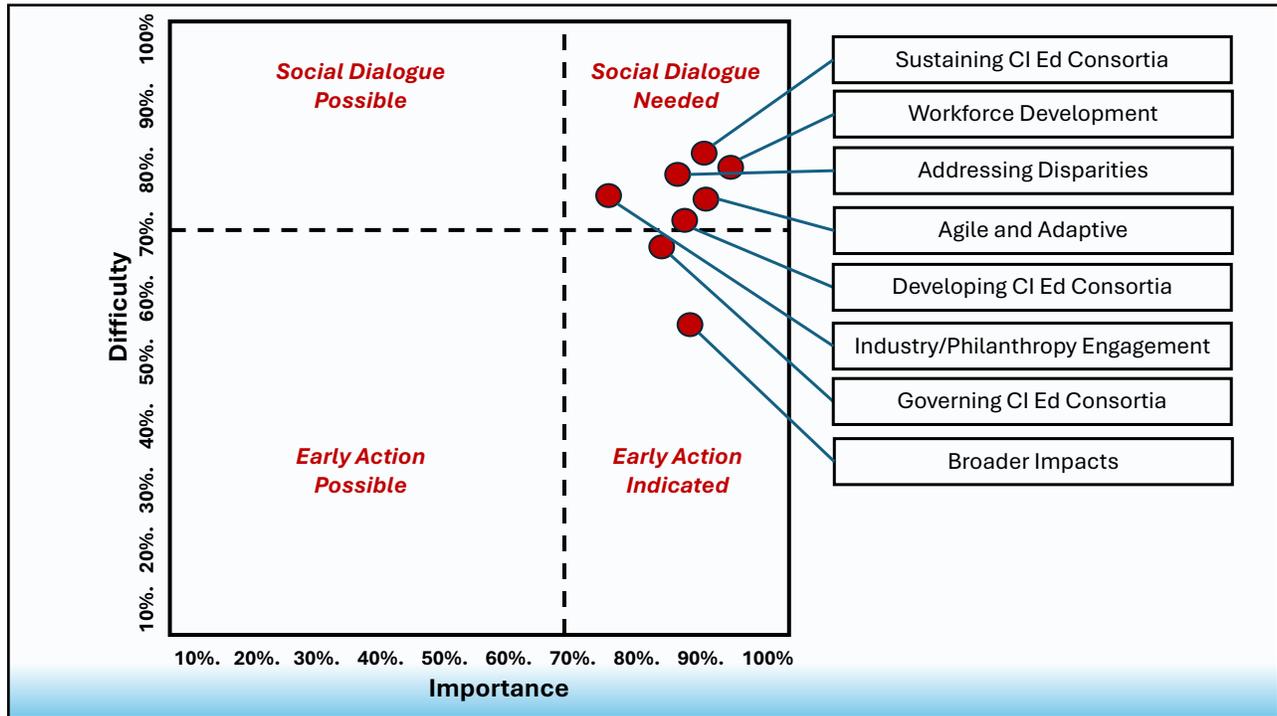
**89% 7-10**  
**Importance**

**56% 7-10**  
**Difficulty**

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### “Must Have” – Statewide/Regional Education CI Consortia/Hubs (sorted with selected responses)

**Funding and Resources (29%, n=27)**  
**Summary:** *Sustainable funding, staffing*

- “Funding to encourage and support **broader buy-in.**” (Statewide/System-Level Higher Education Leader)
- **“Sufficient and sustainable funding models, support from leadership.”** (Faculty/Academic Leader)
- “From a mountain west perspective, basic items such as **funding connectivity, paying contracts, and paying people** are our biggest challenges.” (Cyberinfrastructure Leader)
- “Protected leadership time and sustained operating funding **beyond short-term grants.**” (Faculty/Academic Leader)
- “**Shared, sustainable funding** and governance across partners.” (Faculty/Academic Leader)

**Vision, Strategy, and Leadership (27%, n=25)**  
**Summary:** *Shared vision, common goals, alignment across levels*

- “A collective vision and driven leadership.” (Faculty/Academic Leader)
- “A clear, common, **uniting vision.**” (Cyberinfrastructure Leader)
- “Agreement on **common goals** and use cases.” (Faculty/Academic Leader)
- **“Alignment across all levels** of academia, (vocational, community colleges, universities).” (Industry or Philanthropic Leader)
- “**Invested partners** with a shared vision of success.” (Statewide/System-Level Higher Education Leader)

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## “Must Have” – Statewide/Regional Education CI Consortia/Hubs (cont.)

### Governance and Collaboration (11%, n=10)

**Summary:** *Trusted, equitable governance*

- “A trusted, sustained **multi-institutional governance** and partnership framework.” (Statewide/Regional REN Leader)
- “Sustainable, shared governance with dedicated funding and interoperable infrastructure that enables **trust, equity, and long-term collaboration.**” (Cyberinfrastructure Leader)
- “Governance and **clear expectations** of all partners involved.” (Statewide/Regional REN Leader)
- “**A public-private body** that has **room to experiment** while also being accountable to real outcomes.” (Statewide/System-Level Higher Education Leader)
- “**Equitable sharing of resources:** Compute, Data, Networking, Staffing.” (Cyberinfrastructure Leader)

### Access to Technology/Standards (17%, n=16)

**Summary:** *Reliable, secure, current, compliant technologies*

- “**Reliable end to end CI**, comprehensive training, and a community that reduces access barriers.” (Cyberinfrastructure Leader)
- “Equitable statewide access to **secure, shared computing and data services** with clear governance and sustainability.” (Statewide/System-Level Higher Education Leader)
- “**Latest CPUs/GPUs**, Software tools.” (Faculty/Academic Leader)
- “Reliable, performant **data storage** that allows sharing & collaboration.” (Cyberinfrastructure Leader)
- “**Agreed upon standards aligned to industry standards** (NIST, CIS, etc.), equitable resources to implement.” (Statewide/Regional REN Leader)

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## “Must Have” – Statewide/Regional Education CI Consortia/Hubs (cont.)

### Workforce Development (7%, n=6)

**Summary:** *Facilitation, training, development, continuous improvement – all levels and domains*

- “We need to **consider the people** who make the use of advanced CI possible.” (Statewide/ System-Level Higher Education Leader)
- “**Facilitation and training.**” (Statewide/Regional REN Leader)
- “**Workforce development and continuous improvement.**” (Cyberinfrastructure Leader)
- “Developing workforce and expertise at all levels and segments - **compute, storage, networking, security.**” (Statewide/Regional REN Leader)
- “Research, workforce development, **energy adherence.**” (Statewide/System-Level Higher Education Leader)

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## Barriers to the “Must Have” – Statewide/Regional Education CI Consortia/Hubs (sorted with selected responses)

<p><b>Funding &amp; Financial Sustainability (48%, n=41)</b>  <b>Summary:</b> <i>Lack of stable, long-term financial support for infrastructure, staffing, and operations.</i></p> <ul style="list-style-type: none"> <li>• “<b>Growing cost</b> and lack of support” — (Cyberinfrastructure Leader)</li> <li>• “<b>Personnel costs</b>” — (Statewide/Regional REN Leader)</li> <li>• “<b>Unstable budgets and funding landscape, inequitable allocations, shifting priorities</b>” — (Faculty/Academic Leader)</li> <li>• “Cost, there is a <b>mismatch between the desired work and the cost of resources</b> people and hardware” — (Cyberinfrastructure Leader)</li> <li>• “<b>Short-term grant cycles</b> and lack of protected institutional capacity.” — (Faculty/Academic Leader)</li> </ul>	<p><b>Collaboration, Trust &amp; Institutional Competition (16%, n=15)</b>  <b>Summary:</b> <i>Collaboration is difficult when institutions compete for funding, prestige, and resources.</i></p> <ul style="list-style-type: none"> <li>• “<b>Gaining consensus</b> when you are working with those whom you compete for existential funding.” — (Cyberinfrastructure Leader)</li> <li>• “People think of <b>their own institution first</b>, instead of putting the collaboration first.” — (Cyberinfrastructure Leader)</li> <li>• “Lack of <b>sustained commitment</b> across partners. Individual institutional/ departmental silos preventing moving regional initiatives forward.” — (Statewide/Regional REN Leader)</li> <li>• “Getting all of the participants to <b>effectively communicate</b> with each other.” — (Cyberinfrastructure Leader)</li> </ul>
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## Barriers to the “Must Have” – Statewide/Regional Education CI Consortia/Hubs (cont.)

<p><b>Governance, Leadership &amp; Institutional Alignment (15%, n=13)</b>  <b>Summary:</b> <i>Fragmented leadership structures and difficulty aligning priorities across institutions.</i></p> <ul style="list-style-type: none"> <li>• “<b>Mission alignment.</b>” — (Statewide/System-Level Higher Education Leader)</li> <li>• “<b>Institutional fragmentation, lack of shared intent, weak policy alignment, and unstable funding.</b>” — (Faculty/Academic Leader)</li> <li>• “Fragmented leadership, unstable funding, <b>misaligned institutional priorities, data governance concerns.</b>” — (Cyberinfrastructure Leader)</li> <li>• “Getting diverse institutions to <b>align on a vision.</b>” — (Industry or Philanthropy Leader)</li> </ul>	<p><b>Bureaucracy, Politics &amp; Policy Barriers (12%, n=10)</b>  <b>Summary:</b> <i>Political dynamics, administrative structures, and regulatory constraints slow progress.</i></p> <ul style="list-style-type: none"> <li>• “<b>Politics, at all levels.</b>” — (Cyberinfrastructure Leader)</li> <li>• “<b>Federal and State bureaucracy</b> preventing intuitive infrastructure design and reasonable program models.” — (Industry or Philanthropy Leader)</li> <li>• “Getting backing requires <b>lobbying</b>, which requires resources.” — (Industry or Philanthropy Leader)</li> </ul>
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## Barriers to the “Must Have” – Statewide/Regional Education CI Consortia/Hubs (cont.)

### Workforce, Skills & Human Capacity (9%, n=8)

**Summary:** *Shortage of skilled personnel and challenges recruiting or retaining talent.*

- “**Workforce development** to the point where institutional ownership translates into widespread adoption and impact.” — *(Cyberinfrastructure Leader)*
- “**Lack of skilled personnel** resources to properly manage and monitor implemented CI.” — *(Statewide/Regional REN Leader)*
- “Workforce pipeline and funding, **competing wages from industry.**” — *(Statewide/Regional REN Leader)*

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## Elements of a Vision of Success (sorted with selected responses)

### Equitable Access and Broad Participation (22%, n=18)

**Summary:** *Making cyberinfrastructure (CI) accessible to all institutions, researchers, and students regardless of size or resources.*

- “Anyone within the relevant **geographic domain** can access CI resources.” *(Cyberinfrastructure Leader)*
- “Every institution, **regardless of size or classification**, has access to a CI facilitator and hub to connect educators to resources they need.” *(Cyberinfrastructure Leader)*
- “**Teachers and learners** from all higher ed institutions using the resources.” *(Statewide/Regional REN Leader)*
- “Participation from R1s to community colleges, regional resources **freely available** to all academia in the state.” *(Cyberinfrastructure Leader)*
- “Adoption of use of advanced CI at **under resourced institutions.**” *(Cyberinfrastructure Leader)*

### Collaboration and Shared Community (19%, n=15)

**Summary:** *Multi-institutional collaboration, shared ownership, and community-building across institutions and sectors.*

- “**Shared incentives** across institutions that encourage collaboration in and across institutions and regions.” *(Statewide/System-Level Higher Education Leader)*
- “CI central hub collaboration and **not a competition.**” *(Statewide/System-Level Higher Education Leader)*
- “**Coordinating multi-institutional efforts** to advance research, practice, and education in computational & data science.” *(Cyberinfrastructure Leader)*
- “The hub is functioning in a way that **all partners feel ownership and shared vision.**” *(Statewide/Regional REN Leader)*
- “Diverse partners that are working together to pursue a set of **common goals.**” *(Cyberinfrastructure Leader)*

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## Elements of a Vision of Success (cont.)

### Sustainability, Funding, and Governance (17%, n=14)

- **Summary:** *Long-term viability, governance structures, institutional buy-in, and funding models.*

- “An organization with a clear mission, committed partners, and a **sustainable funding model.**” *(Cyberinfrastructure Leader)*
- **“Governance body in place** with business models for sustainability. Buy in from academic institutions, the state, industry, and philanthropists.” *(Cyberinfrastructure Leader)*
- **“Self sustaining** funding model.” *(Cyberinfrastructure Leader)*
- “A statewide representation of stakeholders that is **purpose aligned** and a sustainably funded effort.” *(Cyberinfrastructure Leader)*
- “Sustainable, equitable consortia embedded in institutional structures, not dependent on grants.” *(Faculty/Academic Leader)*

### Infrastructure, Platforms, and Services (12%, n=10)

- **Summary:** *The technical backbone—compute resources, networks, platforms, services, and operational capabilities.*

- “Reliable services. True collaborative research. Teaching and internship opportunities.” *(Cyberinfrastructure Leader)*
- “Shared resources in establishing and implementing standards, mitigating risks, and incident response.” *(Statewide/Regional REN Leader)*
- **“Statewide research facilitation teams delivering accessible high-performance compute and connectivity to all researchers.”** *(Statewide/Regional REN Leader)*
- “A common platform (hardware + environment) supported by experts that can lead onboarding and training.” *(Cyberinfrastructure Leader)*
- “Advanced state-based infrastructure with multi-cloud integration and dedicated storage for open data.” *(Industry or Philanthropy Leader)*

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## Elements of a Vision of Success (cont.)

### Research Advancement and Scientific Output (11%, n=9)

- **Summary:** *Enabling more and better research, including new collaborations and research productivity.*

- **“More science,** in both quantity and diversity of research supported.” *(Cyberinfrastructure Leader)*
- **“More research engagement** across the board.” *(Statewide/Regional REN Leader)*
- **“Researchers collaborating on data/compute intensive projects without undue burden.”** *(Cyberinfrastructure Leader)*
- “Researchers are able to **access infrastructure at scale** and engage in collaborative research across institutions.” *(Cyberinfrastructure Leader)*
- **“A large number of participants** using the resources effectively.” *(Faculty/Academic Leader)*

### Education, Workforce, and Skills Development (11%, n=9)

- **Summary:** *Developing talent, training students and researchers, and building workforce capacity.*

- **“Foundational skills development** for research computing.” *(Cyberinfrastructure Leader)*
- **“Improved Computer Science literacy.”** *(Cyberinfrastructure Leader)*
- “Have a presence across all CCC and CSU with **1,000 students a year enrolled** in classes that use the hub.” *(Cyberinfrastructure Leader)*
- “Unified, sustainable, **workforce-driven innovation ecosystem.**” *(Faculty/Academic Leader)*
- **“AI Education and access to research computing infrastructure for every student!”** *(Industry or Philanthropy Leader)*

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## Elements of a Vision of Success (cont.)

### Economic and Regional Impact (7%, n=6)

- **Summary:** *Broader economic development, innovation ecosystems, and regional prosperity.*
- **“Economic impact.”** (Statewide/Regional REN Leader)
- “Joint research, public private partnership, **economic development/innovation.**” (Statewide/System-Level Higher Education Leader)
- **“Technological prosperity** for Oregon that enhances education, research, workforce, and the economy.” (Statewide/Regional REN Leader)
- “Transitioning the state into a **thriving digital economy** with robust tech entrepreneurship and well-paying jobs.” (Industry or Philanthropy Leader)
- “Some things that **deliver value** to the region and state.” (Cyberinfrastructure Leader)

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## Anything Else? (sorted with selected responses)

### Opportunities, Call for Collaboration, Access, Funding (31%, n=15)

- **“Cross-institution collaboration,** shared infrastructure, sustained funding, coordinated workforce development, active industry engagement, policy alignment, equitable access to resources, and measurable research impact benefiting the entire region.” (Faculty/Academic Leader)
- **“Leveraging our cooler climate for** sustainable operations while utilizing a hub-and-spoke model to ensure equitable rural access is critical for regional resilience.” (Industry or Philanthropy Leader)
- “The CASC NSF workshop is excellently timed to **capitalize on the increasing number of state- and regional-level conversations** about this.” (Cyberinfrastructure Leader)
- “If we do not change the model now, we will only further the **digital divide.** This is a once in a lifetime technology transformation.” (Industry or Philanthropy Leader)
- “It is necessary for the regional hubs to have **equitable access, workforce pipelines, cybersecurity resilience, data governance, and long-term financial sustainability.**” (Statewide/Regional REN Leader)
- “Much of the sustained **funding for this will need to come from the public sector,** therefore, it’s essential that findings are shared persistently and bi-partisanly.” (Cyberinfrastructure Leader)

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## Anything Else? (cont.)

### Challenges (20%, n=10)

- “We must be clear that statewide/regional CI consortia take a long time to develop. **It's as much as developing trust as it is about technology.**” (Cyberinfrastructure Leader)
- “I feel like **each state / region has different goals** and thus, needs, and we need to respect that.” (Cyberinfrastructure Leader)
- “There are many factors that keep **co-located regional institutions each following their own path** - public vs private, research-intensive vs instruction-intensive, on-premise vs cloud, who “owns” shared CI etc. The value, once established, is clear - see OSC, MHPCC etc.” (Faculty/Academic Leader)
- “Creating new networks is not the issue. **Assuring the funding and workforce for sustainable networks** with the latest innovation, technology, and workforce is.” (Statewide/Regional REN Leader)
- “I’m very **concerned about getting industry partners to agree on plans** for these types of consortia - there seems to be a lack of mutual understanding and very different time scales over which success is defined.” (Cyberinfrastructure Leader)
- “There is recognition that a successful statewide hub would have value, **but it is unclear if it is worth the effort and political capital** that would be needed to initiate and sustain it.” (Cyberinfrastructure Leader)

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## Anything Else? (cont.)

### Existing Models (10%, n=5)

- “There are **great models across the country to learn from**, and there are several national organizations that can help catalyze these state and regional hubs. (The Quilt, CaRCC, BRICCs, Campus Champions, etc.)” (Cyberinfrastructure Leader)
- “At last count, we operated AI hardware at 64 colleges and 13 RENs. Out of these colleges, 28 were non-R1. So, I think we have a viable model, but **the big challenge is scaling out such that many educators at each of the colleges are comfortable using what they own.** We run this under CENIC AIR in CA, and nationally under National Research Platform. We operate hardware in 126 data centers, a total of close to 1,500 GPUs, and more than 20PB storage and more than 30,000 CPU cores.” (Cyberinfrastructure Leader)
- “There are **some efforts at the state level** (e.g., NC Share), but we need a broader solution.” (Faculty/Academic Leader)
- “Christy Long in **Oregon is doing phenomenal work.** We have the advantage of being small enough to get major players together, but just large enough to have some interesting research and resources. We are lacking unifying vision.” (Statewide/Regional REN Leader)
- “Look back to find our way forward - **draw on past successes** across CI and elsewhere.” (Cyberinfrastructure Leader)

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### Anything Else? (cont.)

**Non-R1 Campuses (6%, n=3)**

- “Real need for **local installations at non-R1s** for teaching, campus pride, development, and faculty recruitment.” *(Cyberinfrastructure Leader)*
- “**Design for rural campuses first:** shared services, onboarding support, and measurable workforce outcomes. Sustainability and governance should be funded and staffed, not assumed.” *(Statewide/System-Level Higher Education Leader)*

**Needed Clarification (8%, n=4)**

- “I’m not sure you have “statewide/regional educational CI consortia/hubs” even **vaguely defined**. Is your regional educational network org in this category? Is your AI-in-curriculum group? What do those two have in common?” *(Cyberinfrastructure Leader)*
- “**Value prop and ROI** need to be better articulated for different audiences - C suite, president/chancellor, and state agencies. Need is clear and evident.” *(Cyberinfrastructure Leader)*
- “**How decisions about resources are made.** Where the consortia will be based. Sustainability plan workforce.” *(Cyberinfrastructure Leader)*

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### Anything Else? (cont.)

**Process Guidance, Options, and Questions (24%, n=12)**

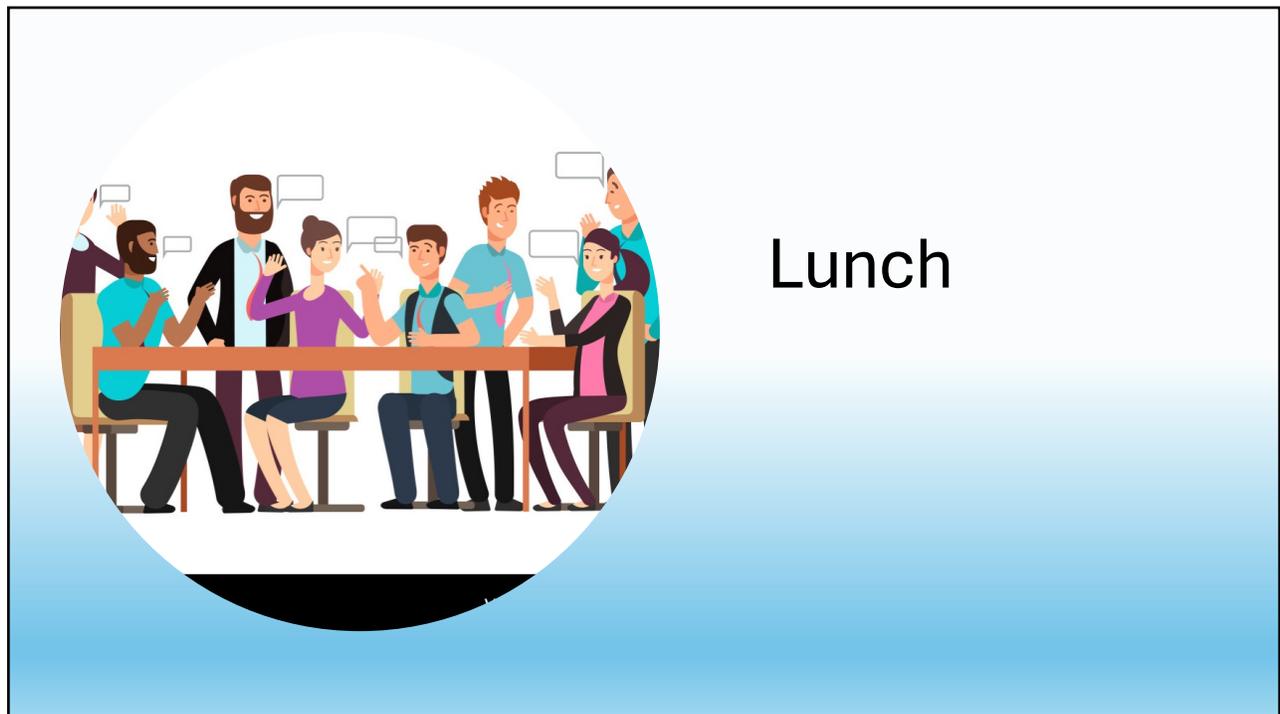
- “Successful consortia require executive **sponsorship**, clear **accountability**, sustainable **funding** models, and continuous **alignment** with institutional missions, **student success**, and regional **economic development** goals.” *(Cyberinfrastructure Leader)*
- “**Shared governance** across major CI interests (government agencies, education, legislating bodies, etc.) *(Statewide/Regional REN Leader)*
- **Start small, with a simple goal.** That builds trust. Then you can add and grow.” *(Cyberinfrastructure Leader)*
- “Statewide consortia and hubs are a response to changes in federal funding, but we would be wise to consider methods to **create avenues for information sharing across these consortia.**” *(Faculty/Academic Leader)*
- “**User support and engagement** are essential to success. Infrastructure should evolve around user needs, with an ongoing cycle of feedback, improvement, and refinement.” *(Cyberinfrastructure Leader)*
- “Creating regional resources is a great effort with many moving parts due to how different participating institutions are. There should be **several options and 'freedom' to choose** the most convenient option.” *(Cyberinfrastructure Leader)*
- “Would be great to establish a **National EPSCoR CI consortia/hub.**” *(Cyberinfrastructure Leader)*

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## Elements of a charter

- Preamble
  - Shared Vision
  - Mission
  - Membership
    - Criteria
    - Roles and Responsibilities
  - Legal Status, Finances, Facilities
  - Metrics, Milestones
- Executive Committee/ Leadership
    - Selection, Terms, Deselection
    - Roles and Responsibilities
  - Operating Committees
    - Selection, Terms, Deselection
    - Roles and Responsibilities
  - Conflict Resolution

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## Lunch

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# Strategies for Upper-Administration Alignment

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New York State is first in the nation to establish a consortium of public and private research institutions advancing AI research for the public good at this scale

**EMPIRE AI**

- 9 consortium members benefit from the resources and contribute to operations
- Enormous commitment from the state for infrastructure (computers and a datacenter)
- Help from philanthropy

**GPU Hours Delivered**

Institution	Percentage
Columbia	22%
Cornell	19%
SUNY	12%
Rochester	15%
RIT	9%
NYU	17%
CUNY	4%
RPI	11%
RR	0%

Operations began in Oct of 2024

- Currently ~225 modern GPUs, 20PB of high-performance storage, growing operations team. 4 NVL-72 expected by late spring
  - More than 800 user accounts, 900k SLURM submissions, 1.1M GPU hours delivered
- Research focused, but launching teaching resources this week

*Ian Fisk, Director, Scientific Computing Core, Flatiron Institute; Chief Technology Officer, Simons Foundation*

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Strategies for Upper-Administration Alignment

## Multi-Institutional Collaboration

Institutional Leaderships  
State Government  
Legislature

Researchers  
Educators  
Innovators

**State-wide  
RCD  
Resource(s)**

RCD Professionals  
& Facilitators

Institutional RCD  
Leaders  
CIOs, CTOs

**Recipe**

- Surface and address the unique needs of each institution
- Convene institutional RCD leaders
- Nurture the collective user base
- Ensure upper leaderships and state stakeholders are well-informed.

SCIENTIFIC COMPUTING  
AND IMAGING INSTITUTE  
THE UNIVERSITY OF UTAH

Bill Miller, Sr. Director for Research  
Computing & Data, U Utah

NSF-CASC Workshop  
Workshop, March 9, 2026

CENTER FOR HIGH  
PERFORMANCE COMPUTING  
THE UNIVERSITY OF UTAH

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## CA Master Plan for Social Mobility

- **California Community College (CCC) system dominates college student population in CA**
  - 2.2 Million students across 116 community colleges => 2-year colleges
  - 0.48 Million students across 23 CSUs => 4-year colleges
  - 0.44 Million students across 10 UCs => PhD granting research universities
- **3M students enrolled in public colleges in CA => 15% of all US college students**
- **CCC transfer students to CSU & UC drive social mobility in CA**
  - 30% of UC incoming class are transfer students from CCC
  - 50% of CSU incoming class are transfer students from CCC
- **California has strong path from K-12 to CCC to UC/CSU**
  - Public high schools in CA often offer advanced courses with their local CCC

**As CSUs and UCs deploy digital assets in the classroom  
 CCCs must have the same capabilities to prepare transfer students**

*Frank Würthwein, Professor  
and Director, San Diego  
Supercomputer Center*

SDSC SAN DIEGO  
SUPERCOMPUTER CENTER

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# Status at UCSD, CA, and Nationwide

Frank Würthwein, Professor and Director, San Diego Supercomputer Center

AI inference (LLM & agentic AI), JupyterHub (148 hubs across 82 institutions), K8S, HTCondor, community of educators to learn from 1,500 GPUs, 30,000++ CPU cores, 20++PB of storage

## UC San Diego use of digital assets in the classroom

- 18,963 students enrolled in AY25
- ¼ of all undergraduates
- 1/3 of all graduate students
- 132 GPUs and 500TB of disk space

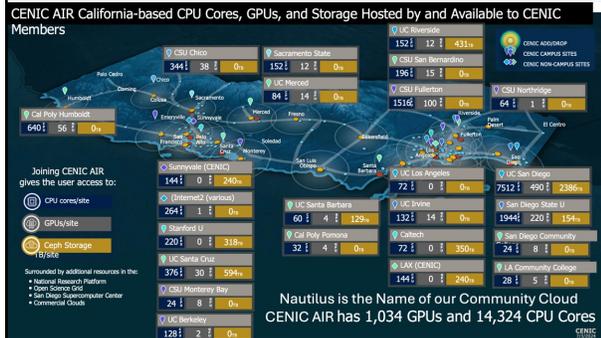
## CENIC AIR (CA)

- 15 CCCs
- 8 CSUs
- 8 UCs
- Stanford, Caltech, CENIC

## National Research Platform: 82 institutions with 126 data centers

- 36 R1 colleges
- 28 non-R1 colleges
- 13 Research & Education Networks
- Some National and State labs and a Museum

NRP Locations Overlayed on the National Research and Education Internet Backbone



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## Faculty Engagement and Curriculum Innovation: Roses, Buds, Thorns

**Roses**

- 

**Buds**

- 

**Thorns**

- 

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# Faculty Engagement and Curriculum Innovation

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## Structured Engagement to Drive NAIRR Adoption at CAHSI Institutions

Nayda G. Santiago, NSF OAC Award #2449071, University of Puerto Rico, Mayaguez



CAHSI is a national alliance that strengthens institutional capacity in workforce development, computing research, and doctoral pathways.

### The Structural Gap at HSIs

- Structurally Heterogeneous: from community colleges, ERI, R1.
- Some with Limited local AI/HPC compute pathways.
- Fragmented cross-disciplinary collaboration

### Intervention

- AI Ideation Lab & NAIRR Integrated Accelerator to promote cross-disciplinary AI research
- Structured NAIRR onboarding embedded in research design
- Interdisciplinary AI team formation
- Domain Experts worked on competitiveness review for proposal development

### Outcomes

- AI Ideation from Sept to Oct 2025: 2 online, 1 in person session
- 9 Cross-disciplinary AI teams (40 participants), 9 prototypes in the Areas of Health, Energy, Supply Chain, Agriculture, Education and Cybersecurity + AI
- Ability to find research collaborators: 3.33/4
- Feedback from Domain Experts at Ideation Session: 3.78/4
- Participants requested check-ins, writing clinics, proposal reviews, and coaching.

### Replicable NAIRR Hub Model

NAIRR Access → Structured Engagement → AI Elevator Pitches → Proposal-Ready Concepts → Proposal mentoring → Proposal → Funding → Research → Doctoral Pathways → Workforce Impact

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**KANSAS STATE**  
Carl R. Ice  
College of Engineering

# Case study: Bioinformatics course

Daniel Andresen, dan@ksu.edu, Kansas State University



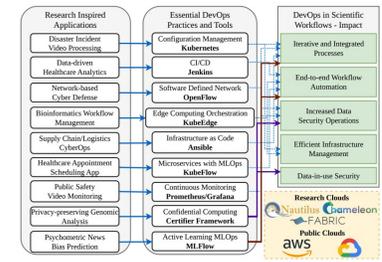



- Bioinformatics course collaboration between Biology and Computer Science
- Pre-course Carpentries course (summer) to teach data analysis basics
- In-class introduction to local CI resources by local CI support staff
- Use of Open Science Grid (now group is using NRF) for extended demands, including Great Plains Network machines (NSF-CC\* GP-ENGINE grant)
- Continuous support by local CI professionals

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## Curriculum Innovation at University of Missouri-Columbia (MU)

- **Resources**
  1. **HellBender, MU's HPC Cluster in 2023**
    - Supports Open OnDemand to provide a web-based interface and prepared tools like Python and Jupyter notebooks.
  2. **Leveraging State and National NSF Computing Resources**
    - **Nautilus HyperCluster (PRP/NRP):** Students interact with production-grade Kubernetes clusters and GPU-accelerated nodes.
    - **FABRIC/GENI:** Used for Software-Defined Networking (SDN) and cyber defense simulations.
    - **Chameleon:** Used for MLOps and reproducible artifacts.
    - **Public Clouds (AWS/GCP):** For hybrid-cloud DevOps practices.
- **Courses:** End to End ML Design, Cloud Computing, Industrial Engineering
- **Needed Incentives:** Course editor UI, Telemetry dashboard, Instructional materials that are step-by-step




Tanu Mallk



University of Missouri

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**Sample Innovation Investments in  
Education Cyberinfrastructure**

*Research Experiences for Undergraduates (REUs),  
Industry Internships for Undergraduate and Graduate Students,  
New Faculty Hires (with funding for a defined time),  
Training for Existing Faculty,  
Investments on Curriculum Development,  
Computing Equipment/Software Discounts and Donations,  
Industry Visits/Secondments for Faculty,  
Campus Visiting Appointments for Industry,  
“Speed-Dating” Workshops for Faculty and Industry,  
Seed Funding for Faculty Entrepreneurial Business Ideas,  
Audacious Goal Competitions*

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**Faculty Engagement and Curriculum Innovation:  
Roses, Buds, Thorns**

<b>Roses</b>	<b>Buds</b>	<b>Thorns</b>
<ul style="list-style-type: none"><li>•</li></ul>	<ul style="list-style-type: none"><li>•</li></ul>	<ul style="list-style-type: none"><li>•</li></ul>

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# It Takes a Village

National Community Infrastructure for CI Workforce Development



## Campus Research Computing Consortium

**2,200+**

RCD professionals nationwide

500+ institutions

Workforce Development Interest Group

Peer mentorship & experience sharing across states

## State & Regional Engagement

### Nevada NV-DICE

Statewide CI strategic planning across all NSHE institutions

### Regional CI Workshops

Free workshops with The Quilt, state RENs & other consortia

Madison • New Orleans • more planned

Lauren Michael, Internet2  
lmichael@internet2.edu

## Plug In, Don't Start from Scratch

Your consortium can leverage:

- ✓ National community ready to help
- ✓ Workforce tools & frameworks
- ✓ Cross-state experience sharing
- ✓ Workshop & facilitation support
- ✓ CI strategy consulting

carcc.org • internet2.edu

**Dana Brunson** | Executive Director, Research Engagement | Internet2 | CaRCC Transitional Board Chair  
dbrunson@internet2.edu

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OneOklahoma Cyberinfrastructure Initiative

Henry Neeman, Executive Director of Research Computing, University of Oklahoma

### Secret Sauce: COOPETITION

- **5 CI Resource Provider Sites**, available to all non-commercial research and education in Oklahoma: OU, OSU, U Tulsa, U Central Oklahoma, Langston U
- **Weekly Calls**: General CI, CI Technical
- **Open Discussion**: OU's HPC center makes our weekly internal team meetings available to other institutions and also to other teams within OU IT.
- **Proposals**: We help each other write them, even when we're competing for the same pot of money
- **Training**: Institutions that provide CI training make it available statewide (and often regionally).

### A Statewide Culture of CI Grant Proposal Writing

- **Total 2008-25**: \$23.6M in 29 CI grants to 35 OK institutions; average of ~\$1.4M per year in new CI grants to OK institutions – 13 times more per year than before OneOCII!
- We help Oklahoma CI leaders to learn to write CI grant proposals!
- **8 NSF MRI CI grants** from 5 institutions (OU, OSU, U Tulsa, U Central Oklahoma, Langston U).
- **OneOklahoma Friction Free Network**: 12 OFFN NSF CC\* grants (OU led the first 2 and the latest) covering 30 campuses, many led by OneNet (Oklahoma's research, education & govt network).

### National Impact

#### We build things to last!

- **National Workforce Development Programs**
- CI Facilitator Virtual Residency (2015-present): 2000+ CI Professionals from 550+ institutions in every US state + 4 US territories
- Becoming an Institution-level CI Leader (2025-present)
- Cyberinfrastructure Leadership Academy (2019-present)
- Certified CI Facilitator Training & Development (CCIFTD)
- Apprenticeships: Grant Proposal Writing, Paper Writing, Grant Running
- **Supercomputing in Plain English workshops** (2001-18)
- **Oklahoma CI Leaders become national CI leaders:**
- Dana Brunson, was OSU HPC Director, now Internet2 Exec Dir
- James Deaton, was OneNet CTO, now Internet2 VP

### NEW! OneOCII AI Consultants Program

- **AI Consultants**: 3 professionals, 2 students.
- **Available Statewide**: 94 projects at 9 institutions across OK.
- **Training**: Teach each research team how to apply AI to their research, or to improve their current use of AI, by leveraging materials created for coursework and workshops.
- **Workforce Development**: Establish a program to train AI Consultants, using the Virtual Residency model.
- **Pipeline**: CI Facilitators identify projects that need AI consulting; AI Consultants identify projects that need deep AI expertise and matchmake them with AI experts.

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# Regional Hubs Serve as Multipliers and Connectors

## NAIRR Pilot – User Engagement by State



### Launch Your Career in HPC Administration

- One training pipeline supports multiple campuses and infrastructures
- ~150 applications each across US
- Connecting communities

Shelley L. Knuth, University of Colorado Boulder, [knuths@colorado.edu](mailto:knuths@colorado.edu)  
 NSF OAC 2138286; NSF 2322260



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## Developing a Statewide CI Workforce: Challenges Large and Small States

### Large-State Challenges

- 

### Small-State Challenges

- 

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# Industry Partnerships and Philanthropy Collaboration

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Helen Wright, Manager, Computing Research Association (CRA)

**CRA**  
Computing Research Association

**NSF**

**CRA-I**  
Computing Research Association Industry

**Event Goal**  
Bring together industry, philanthropy, and government to shape a national agenda for computing/AI infrastructure and workforce/education development.

**INDUSTRY PHILANTHROPY SUMMIT**  
on Potential NAIRR State Hubs for Educational Transformation

**40 Participants**  
- CEOs and other leaders  
- 24 different companies  
- 10 different philanthropies

**Event Outcomes**

February 17, 2026 | Santa Clara, CA

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Xiao Zhu, Associate Vice President for Research Computing, University of Washington; Microsoft Cloud

## Bringing cloud resources to the UW campus

- Expanded UW-Microsoft Partnership to Accelerate AI Discovery (Feb. 2026)
  - Provide faculty and students with access to advanced computing capabilities on Azure, supporting modern AI model development, experimentation, research, and instruction.
- Cloud Credit Programs to Faculty & Students
  - >\$1M in Azure cloud credits since 2020 across ~100 projects
  - >\$200K in AWS cloud credits since 2024 across ~ 40 projects
  - Credits available for research and teaching (informal & formal)
  - Faculty awardees span 3 campuses, 8 schools and colleges
  - Student access to clouds via the Research Computing Club
- Events
  - AWS GameDay 2025 coding competition
  - Trainings, Hackathons, Office Hours



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## Achieving Depth + Breadth

**Realization:** A traditionally architected supercomputing system is only half of what we need for generative AI, even if globally ranked.

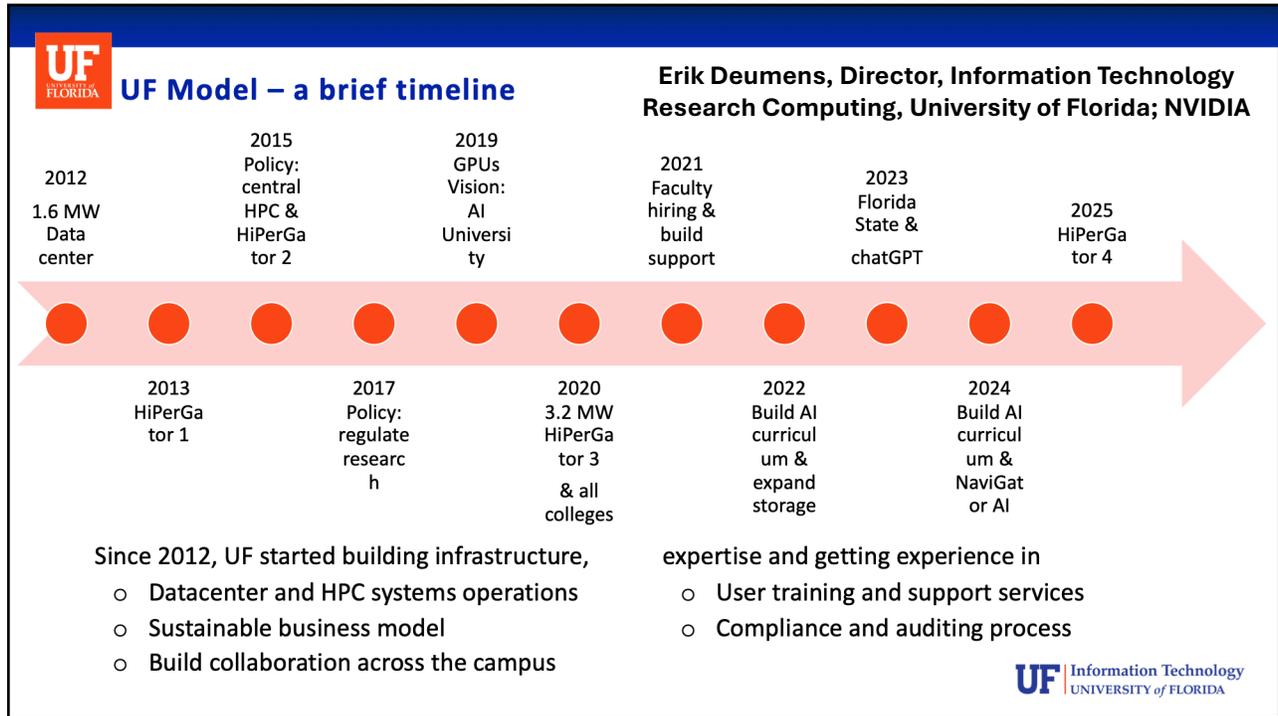
Industry partnerships afforded **\$20M in new broad-access capacity** implemented at **below-market costs** with a third industry partner.

Energy and impact considerations for AI **remained central** and **enabled partnership growth**.



Sean Dudley, Associate Vice President, ASU Knowledge Enterprise, Arizona State University; Intel

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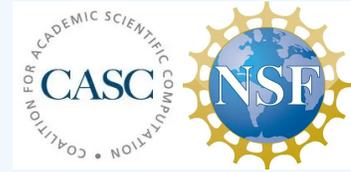


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# Summing Up Lessons Learned and Action Implications

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## Next steps for...



- Defining concepts and generating options
- Advancing statewide and regional CI Plans
- Attracting national and statewide public resources
- Engaging Industry and philanthropic resources
- Ensuring stakeholder outreach, engagement, and alignment
- Tracking broader impacts
- Additional action implications...