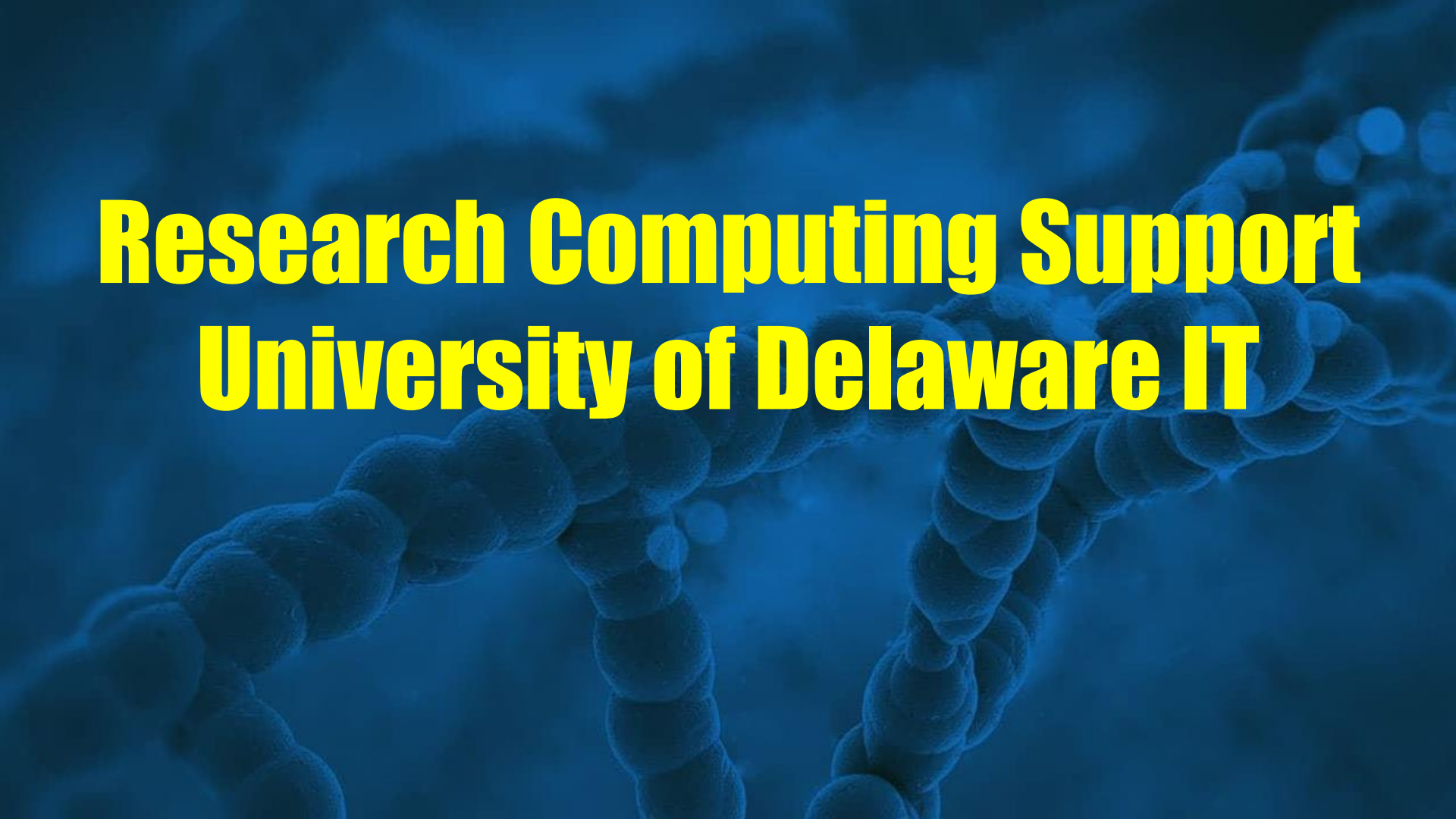

Research Computing Support
University of Delaware IT

UD IT Research Computing History

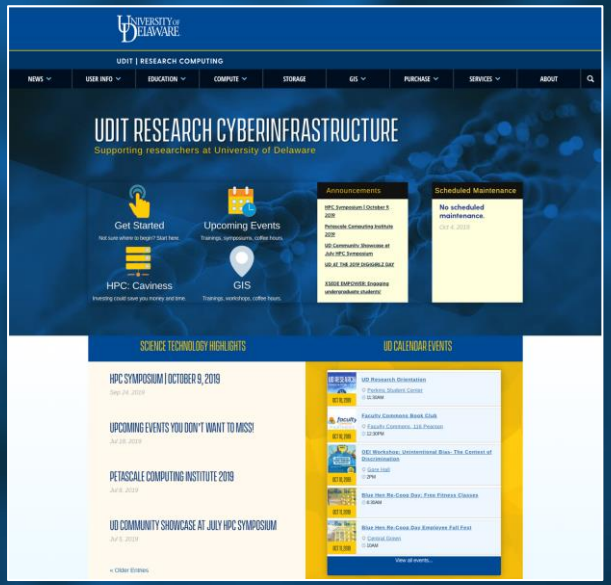
- In response to the recommendations of the University's Research Computing Task Force (2009-2011), IT built a jointly funded, HPC cluster based on the "community cluster" model from Purdue.

- IT Research Computing support consisted of staff across the IT organization in Client Support & Services and Network & System Services providing support to all researchers across campus including statistics, mathematics, graphics/visualization, data management, gis, programming, scientific applications, surveys, testing, scholarly publications, and HPC.

- Adding HPC and the retirement of long term staff that were not replaced, shifted support to building UD's HPC community locally and nationally.

Establishing the CyberInfrastructure Group

- Creation of the new CyberInfrastructure group within Central IT, unifying the support staff and providing resources focused on RC support (IT-RCI)
- Create an identity and point of contact for research computing within IT
- Establish stronger ties within UD research community, broaden collaboration across groups



UDIT - Research CyberInfrastructure (IT-RCI)

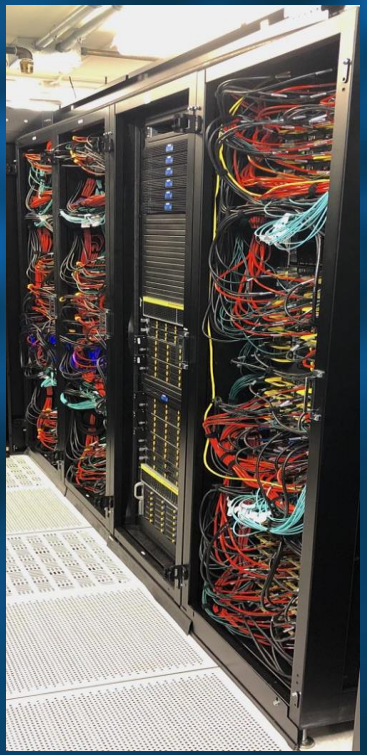
Provide ACI (Advance CyberInfrastructure) hardware, software and people infrastructure needed to advance research in all disciplines at the University of Delaware.

- Network
- HPC locally and nationally
- Storage
- Cloud computing and storage
- Software
- Support
- Training and outreach

Current IT-RCI Resources

HPC (High Performance Computing) Clusters*

- Farber
  - 50% faculty and 50% IT funded
  - Shared, community cluster; “condo” workgroups with specific node(s)
  - 3,800 cores, 14.9 TB memory
  - Still heavily utilized; no upgrade or buy-in “condo” option
- Caviness
  - 50% faculty and 50% IT funded
  - Shared, community cluster; “condo” workgroups with specific node-like resource(s)
  - 2 racks originally (4536 cores, 24.6 TB memory)
  - 3rd rack added in October 2019 (7336 cores, 46 TB memory)
- DARWIN (Delaware Advanced Research Workforce and Innovation Network)
  - Grant funded; Rudi Eigenmann (DSI) PI, Bill Totten (IT) CoPI
  - Allocation based system, no “condo” buy-in option
  - XSEDE national resource - primarily available to Delaware institutions



* All HPC clusters provide permanent (NFS), local node scratch, and large scratch (Lustre) storage.

Current IT-RCI Staffing

- 1 Director
- 1.5 HPC Systems programmer/administrator
  - 1 systems programmer/admin shared with Eng.
  - 1 open position
- 3 application support
  - 1 GIS specialist

Draw from other staff in IT: Enterprise Systems, Enterprise Architect, Communications, Project Management Office and Client Support and Services

Support

Support = Research Facilitation*

ACI-REF (Advanced CyberInfrastructure - Research and Education Facilitators) is our philosophical approach to provide support to all researchers on campus.

Activities of a research facilitator are best represented by

- Promoting awareness and usefulness of resources
- Matchmaking of researchers and their needs with ACI resources
- Training and assisting researchers
- Researching and understanding new ACI resources and capabilities
- Consulting with researchers on the integration of ACI resources
- Identifying and matchmaking potential collaborations between researchers
- Representing the user perspective to ACI service providers for changes and improvements to ACI resources
- Partnering with staff at other institutions and organizations
- Understanding the evolving ACI needs of the research community
- Helping researchers to select from various analytical methods and third-party tools

*ACI-REF Leading Practices of Facilitation (https://aci-ref.github.io/facilitation_leading_practices/)

Support

Many research facilitators may spend time on additional activities that are not necessarily part of research facilitation, but are necessary in order to support ACI resources

- building/configuring cyberinfrastructure systems, managing software or middleware installations across systems, etc.
- performing computational research work for specific groups, including running computation work on ACI resources for research groups, outside of testing/validating recommendations
- development of software for specific groups
- managing the roles of other staff at ACI resource-providing organizations
- managing special projects within ACI resource-providing organizations

This means we are challenged every day to be able to meet all of these activities. Our team of 5.5 (actual 4.5) staff are not only supporting researchers on using ACI resources to help them maximize their time available for their research, but we also are supporting the actual ACI resources themselves.

We need to collaborate and communicate on and off campus to leverage and promote the sharing of expertise.

Collaboration and Communication

Building relationships and partnerships on and off campus is key to leveraging all resources (ACI hardware, software and people):

- Central IT, IT-Pros Colleges & Centers, DSI, DBI, Library and Research Office

Locally

- Other educational institutions in DE like Delaware State University, Delaware Technical Community College
- Industry

Nationally

- XSEDE, NRP, ERN, XSEDE Campus Champions, CaRCC, Xpert, SC, PEARC

Growing IT-RCI Services and Support

- Continue to grow IT-RCI staff to expand the services and support provided:
  - GIS + advanced visualization
  - Cloud support
  - Parallelization and optimization of scientific code
  - Domain specific consulting
- Join regional and national CyberInfrastructure resource provider efforts:
  - XSEDE
  - ERN/NRP
  - FABRIC
- Provide new IT infrastructure and services:
  - Expand HPC capabilities (Expand Caviness, explore new compute opportunities, re. Hadoop)
  - Centralized data storage solutions
  - Secure storage and compute for high risk data