CI USER SUPPORT

Chris Reidy
Research Facilitation Manager
University of Arizona

Virtual Residency 2025, Monday June 23, 2025

Discussion Topics

Cyber Infrastructure Community
CI Expectations
Classifying Users
HPC Support Teams
Teaching
Conflicts
Resources
Stories

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Arizona High Performance Computing Research Technologies

Virtual Residency 2025, Monday June 23, 2025

University of Arizona

Research Technologies

- Central IT (UITS)

Teams

- Systems team (3)
- Facilitators (5)
- Secure research (2)

3 clusters – 45,000 cores

HIPAA and CUI clusters

What is CyberInfrastructure (CI) Anyway?

Components

- Computing systems
- Data storage
- Advanced instruments and repositories
- Visualizations environments
- High speed networks
- People

Purpose

Enable scholarly innovation and discoveries not otherwise possible

Differences Between CI and Enterprise IT

Enterprise

- Standard functions like finance, payroll
- Standard applications – CRM, RDB
- Not university specific
- Cloud optimized

CI

- Focus on users
- Non-standard software and uses
- Funding structure

When is CI Valuable

- Shared environment for research teams
- Avoid closet clusters
- Multiply value of funding
- Scaling up and scaling out
- Reducing the time to science

The Value of CI User Support

A study done in 2019 by University of Colorado Boulder determines CI User Support is critical to the operations of any CI Center. (Knuth et al., 2019)

Improvements in the User Support operations (documentation, trainings, automation & request handling) during 2018 resulted in a 31% increase in allocation requests on systems in 2019

Expectations – Stakeholders

Typical Roles

CIO, VPR, Provost, President, Governance Committee, Faculty Senate

Expectations

- They want value for what they support
- Faculty recruitment
- Bring in more funding – R1, prestige
- Publications
- Graduations

Expectations – Faculty / PI

Typical Roles

Knows about CI but may or may not use it personally

- Researcher
- Instructor

Expectations

- Reasonable costs
- Technology
- Immediate access
- Available support

Expectations – Users

Typical Roles

"hands-on"

- Researcher or research team member (student, post-doc)
- Instructor or learner

Expectations

- Reasonable allocations
- Technology
- 24 x 7 support ? highly knowledgeable ?

Categorizing Users

Three broad categories:

- Novice
- Intermediate
- Advanced

How do you identify them?

- History
- Rookie mistakes
- Their responses
- The language used

Category 1: Novice Users

Characteristics

- Little experience with Linux or the command line
- May already use Matlab, R or Python
- Rarely understand parallelism

Generate 40-50% of requests

- Account setup and resources available
- Navigating the node types (bastion, login, compute)
- Access issues (ssh keys, OnDemand)
- Understanding errors
- File permissions

Support for Novice Users

- Good documentation with plenty of “Getting Started”
- Introductory workshops, in person and online
- Office Hours
- “Face-to-face” support – Zoom or in-person
- Ease of use. Open OnDemand
- Ease of use for CLI – modules, scheduler, samples
- Software installation assistance

hpcdocs.hpc.arizona.edu

UArizona HPC Documentation | Search | GitHub ☆11 ⑂3

Welcome to the UArizona HPC Documentation Site

Introduction

The University of Arizona offers High Performance Computing (HPC) resources in the Research Data Center (RDC), a state-of-the-art facility that hosts our large computer clusters. HPC services are available at no cost to researchers. Each faculty member is eligible for a free standard allocation of CPU time and storage space.

This documentation site provides technical details relevant to using our HPC system. Whether you are just starting your journey into computational sciences or are a seasoned programmer, we hope you will find something useful in these pages. This site is managed by the HPC Consult team. Please contact us if you have questions or comments about the content of this site.

Featured Links

Account Creation

If you are an active UArizona affiliate (e.g. student, post-doc, faculty), you can register an account. If you are not affiliated with UArizona but are working with collaborators here, you can register as a Designated Campus Colleague (DCC).

HPC Quick Start

If you are new to the UArizona HPC, or to HPC in general, our self-guided quick start tutorial will provide a solid foundation

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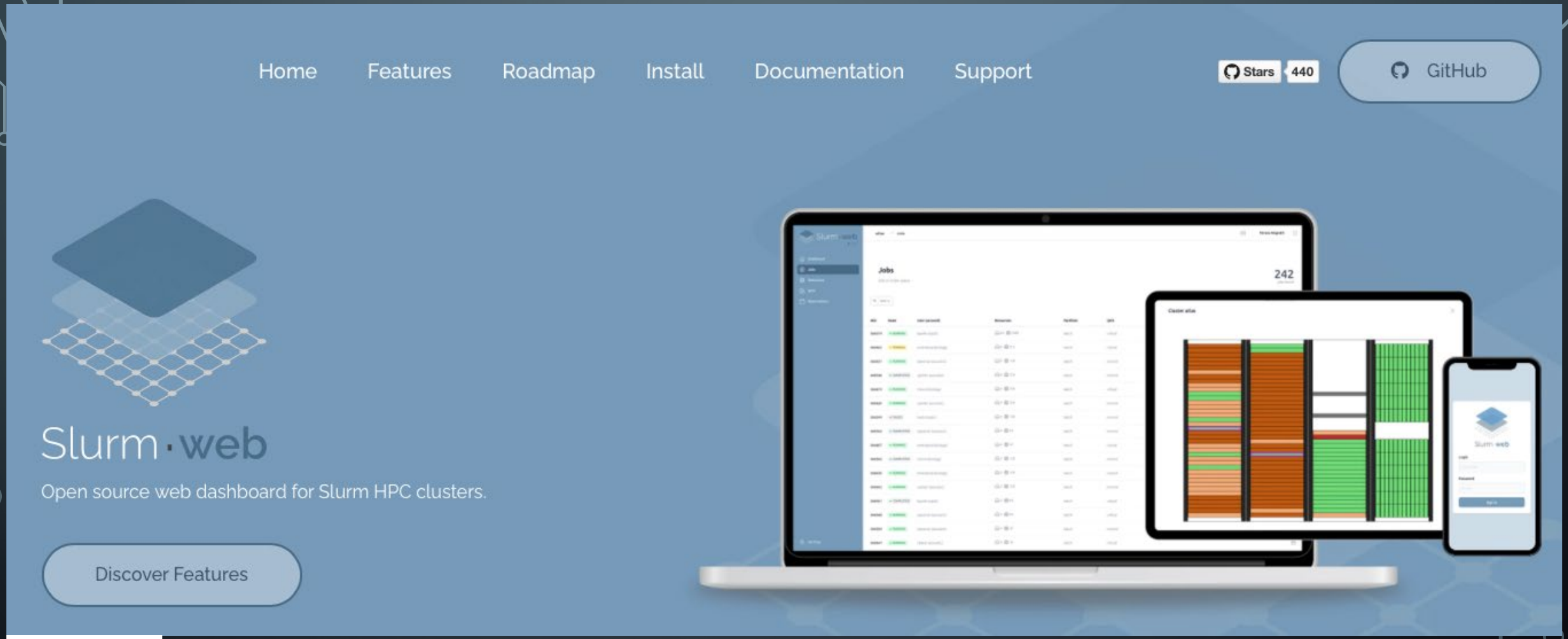
slurm-web.com



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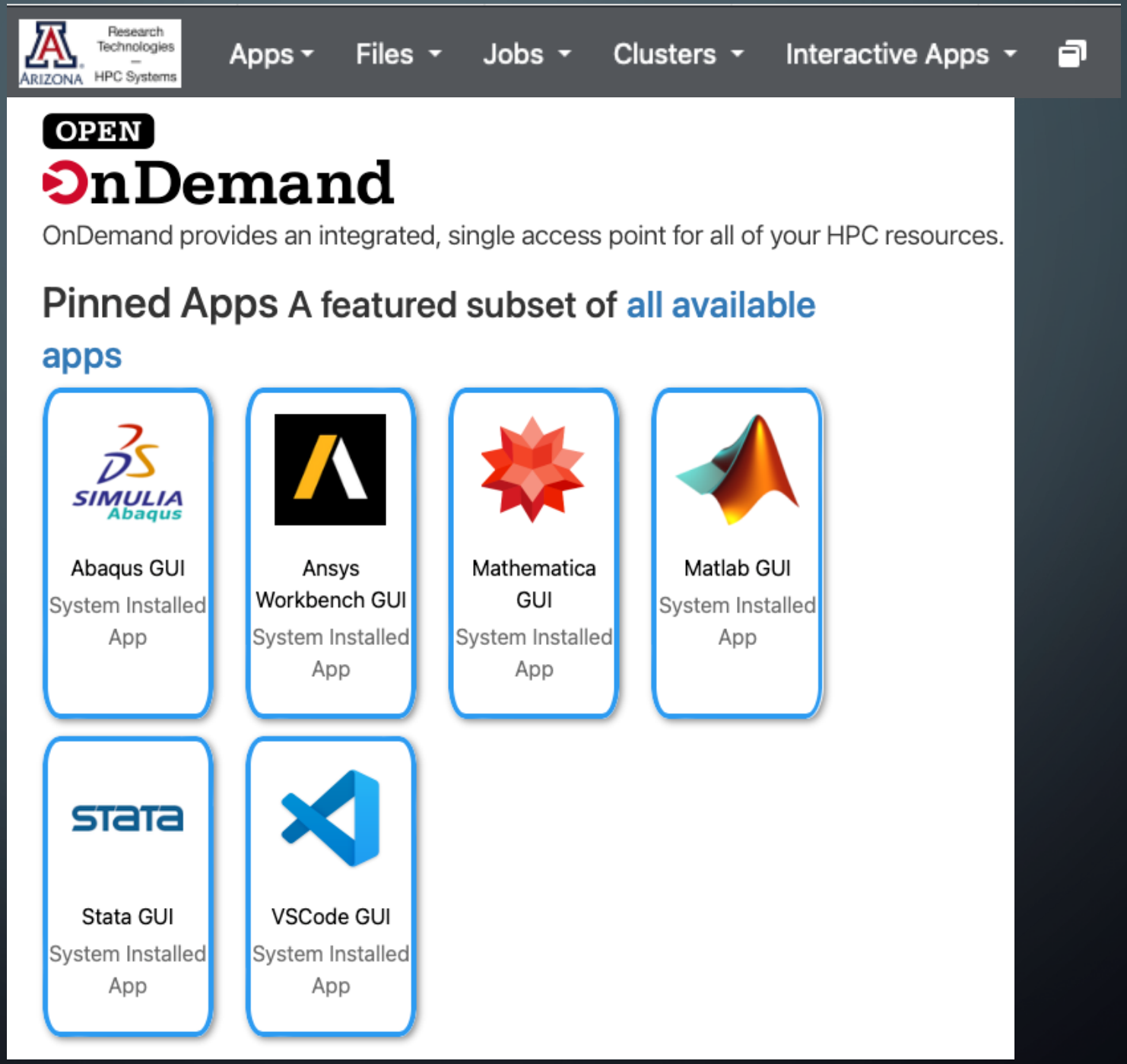
openondemand.org



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Category 2: Intermediate Users

Characteristics

- Have some experience to run jobs (CLI or OnDemand)
- Can often manage file permissions
- Problem determination skills
- Understand virtual environments for Python, R

Generate 30-40% of requests

- Assistance with complex software and environments
- Assistance with performance issues
- Assistance with migration / versioning
- Special requests

Support for Intermediate Users

- Teach them to fish
- More complex examples in documentation
- Domain specific training or software specific training
- Thorough answers
- Build enduring relationships
- Admit when you don't know
- Support for complex software installations

Category 3: Advanced Users

Characteristics

- May be hands on faculty, research staff postdocs or advanced students
- Technically proficient, parallelism and performance
- Develop complex workflows and software upgrades
- Organizing data repositories

Generate 10-15% of requests

- Assistance with complex software and environments
- Assistance with complex or system problems
- Special requests

Support for Advanced Users

- Intermediate user support applies also
- Treat them as peers
- Try to meet regularly
- Use them as stakeholder advocates
- Ask for pilot project support
- Involve them in hardware acquisitions
- ‘White glove support’
- Be flexible. Make small judicious rule exceptions

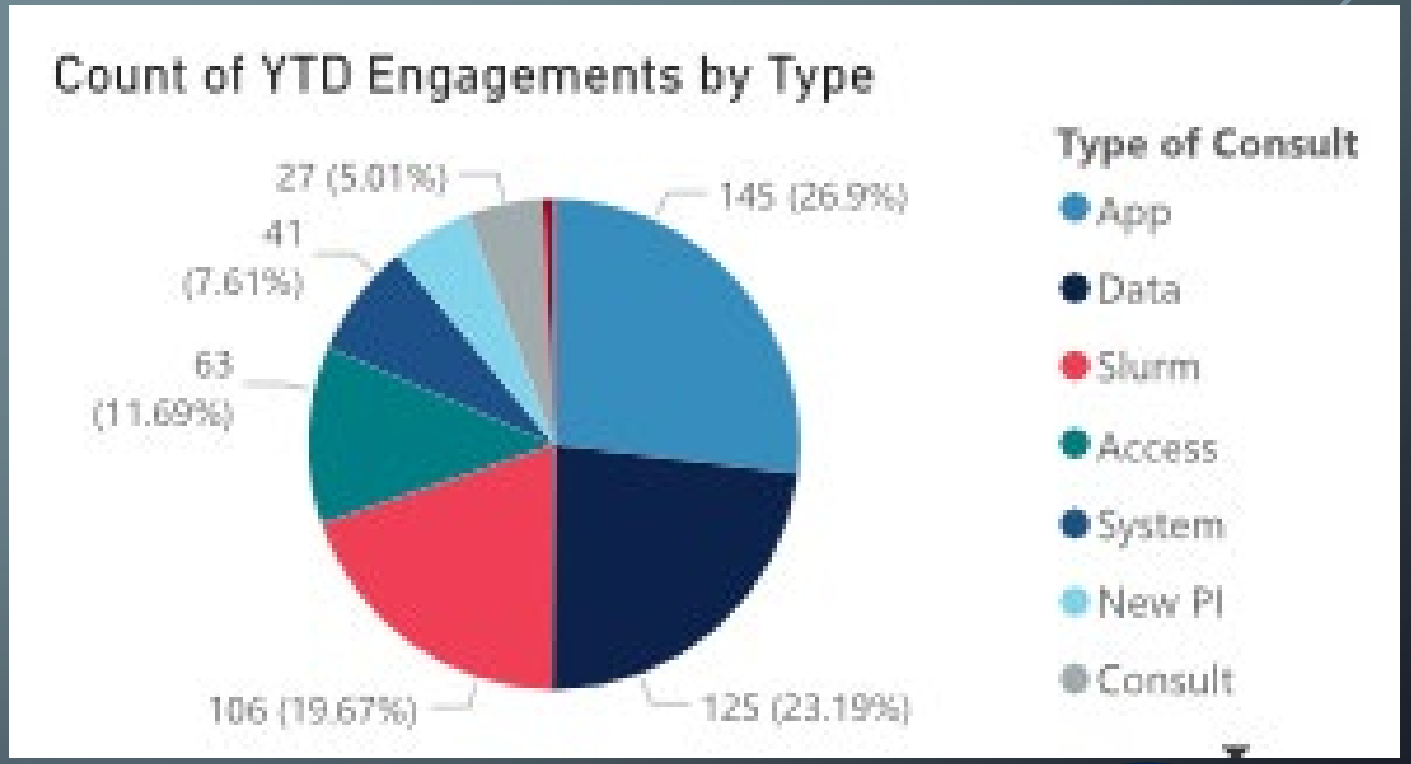
HPC Support Teams

My team has 5 FTE (one position vacant)

HPC Support Teams

Typical engagements include:

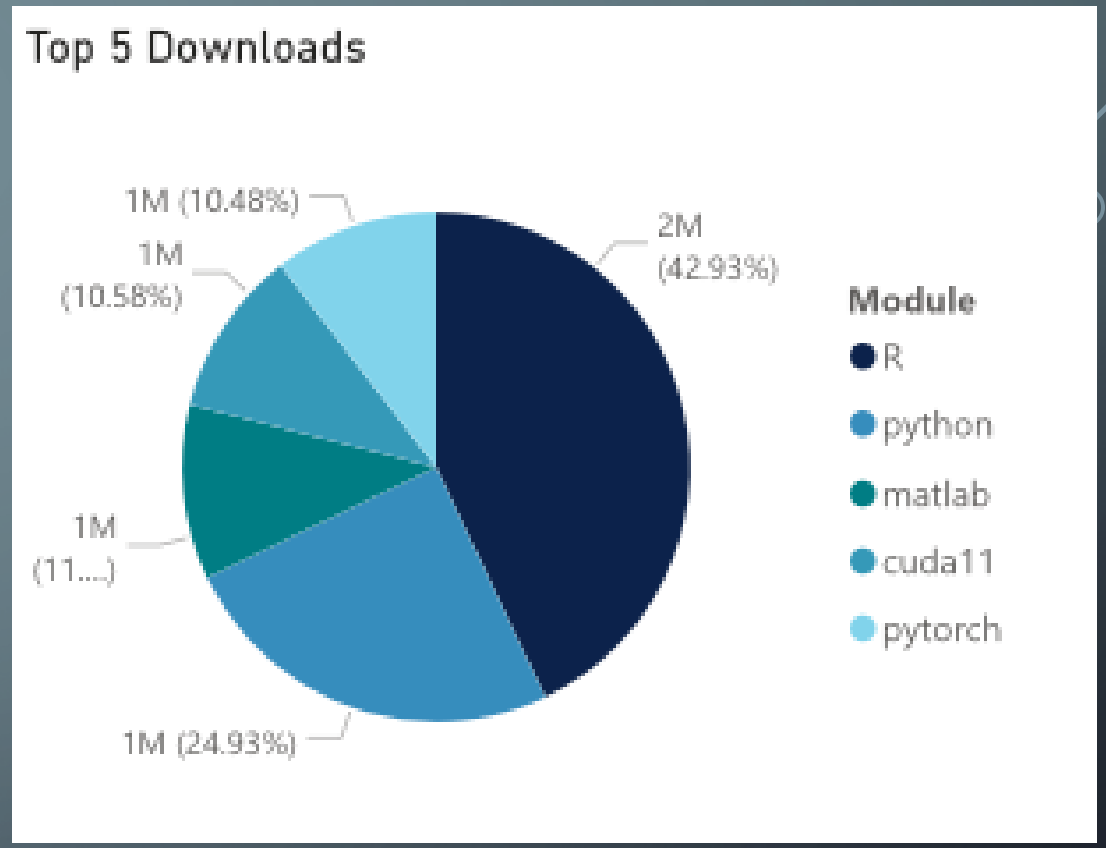
- Building software
- Onboarding
- Training
- Problem determination
- Data storage

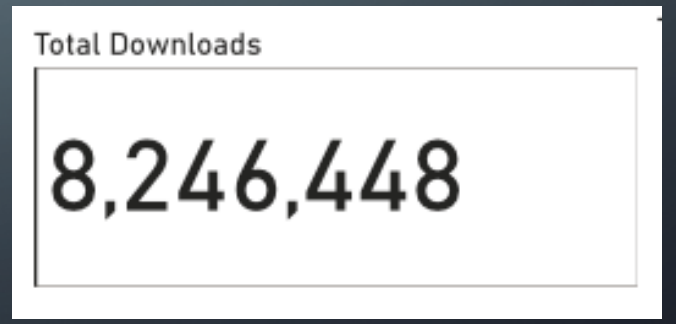


HPC Support Teams

Software engagements:

- R and Python
- Workflows
- GPUs
- OS Migration



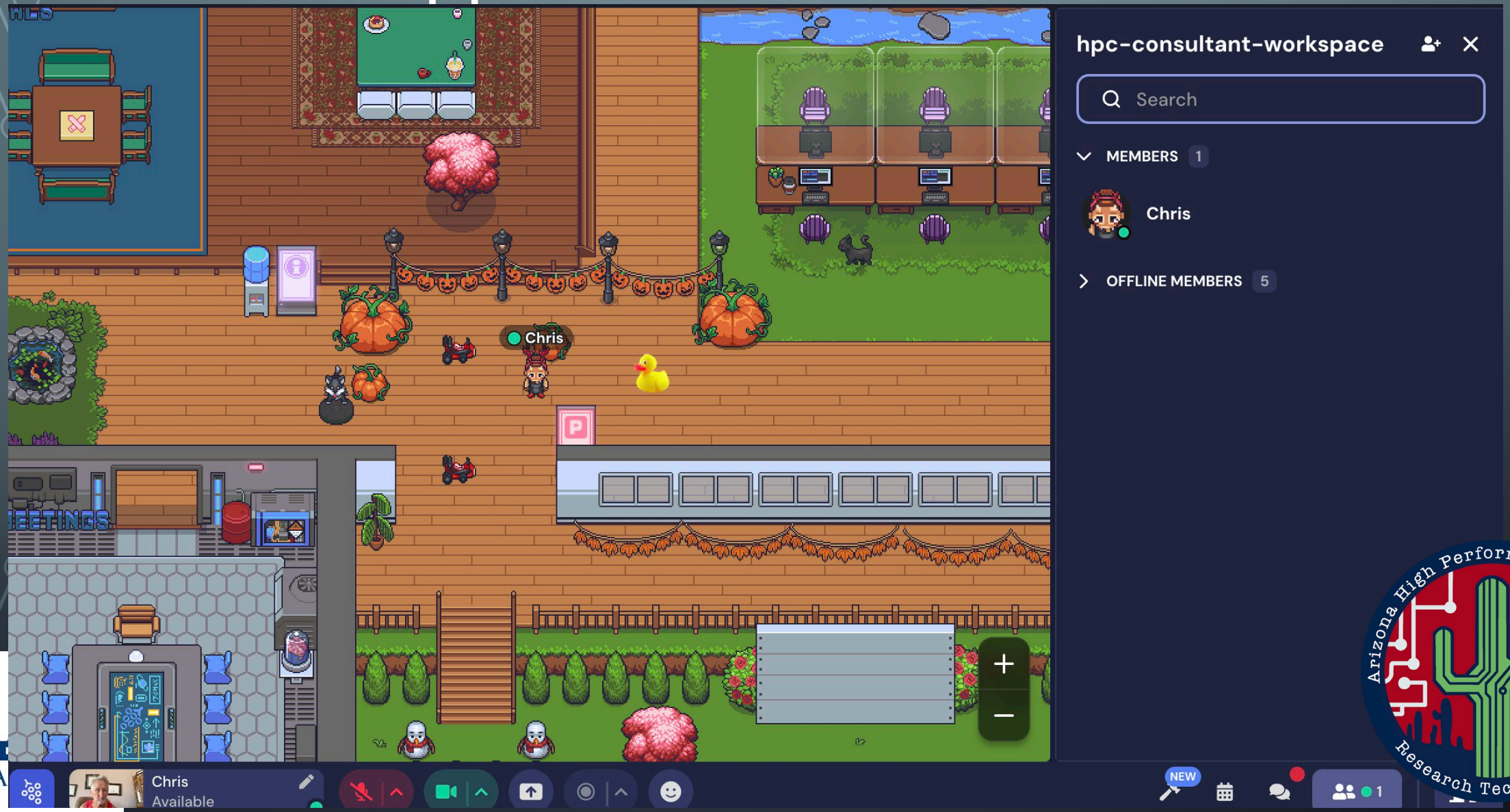


HPC Support Teams

My team has 5 FTE (one position vacant)

We meet daily from 9AM to whenever (lunch) on GatherTown

HPC Support Teams



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We also use it for weekly Office Hours

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Chris - Reidy
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A S D
WASD, arrows or
double click to move


Arizona High Performance Computing
Research Technologies

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We use ServiceNow for ticketing

HPC Support Teams

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My ITIL Homepage

Open HPC Tickets

Number	Opened	Priority	State	Assigned to	Short description	Task type	Blocked [Story]	Blocked reason [Story]
SCTASK0070826	2025-06-20 10:18:31	4 - Low	Open	Ethan Jahn	HPC Support and Consulting Request: lothrop	Catalog Task		
SCTASK0070814	2025-06-19 17:50:47	4 - Low	Open	(empty)	HPC Support and Consulting Request: bttran	Catalog Task		
SCTASK0070790	2025-06-18 14:50:17	4 - Low	Work in Progress	Sara Marie Willis	HPC Support and Consulting Request: rikagawa	Catalog Task		
SCTASK0070789	2025-06-18 14:45:26	4 - Low	Open	(empty)	HPC Support and Consulting Request: dshahi	Catalog Task		
SCTASK0070758	2025-06-18 11:56:33	4 - Low	Work in Progress	Ethan Jahn	HPC Support and Consulting Request: sreevani	Catalog Task		
SCTASK0070714	2025-06-17 17:54:08	4 - Low	Work in Progress	Ethan Jahn	HPC Support and Consulting Request: cassiezhang	Catalog Task		
SCTASK0070640	2025-06-17 08:08:52	4 - Low	Work in Progress	Sara Marie Willis	HPC Support and Consulting Request: jjdavis	Catalog Task		

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Our newish Documentation site is proving very effective

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site is managed by the HPC Cc
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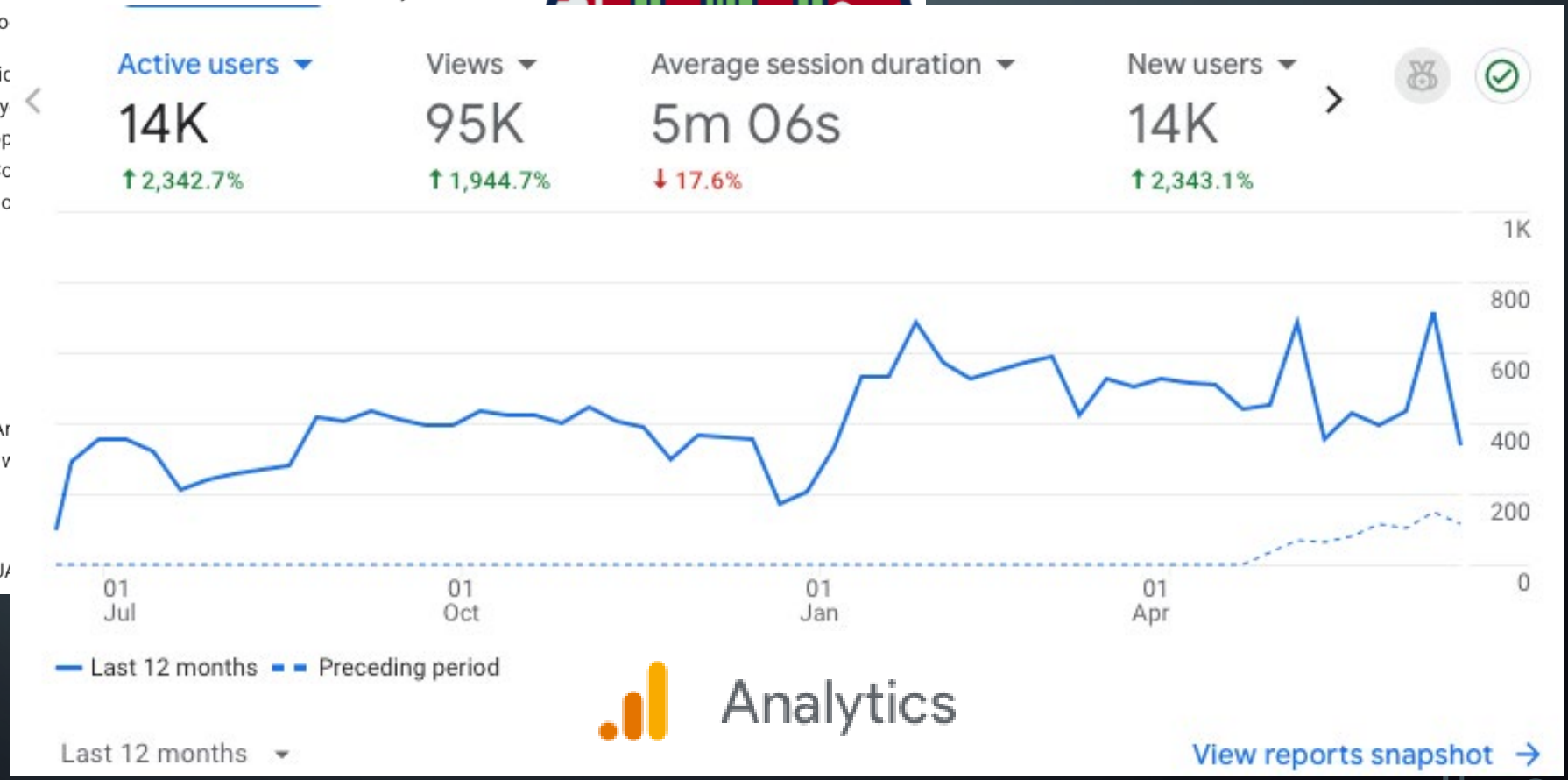
HPC Quick Start

If you are new to the UA



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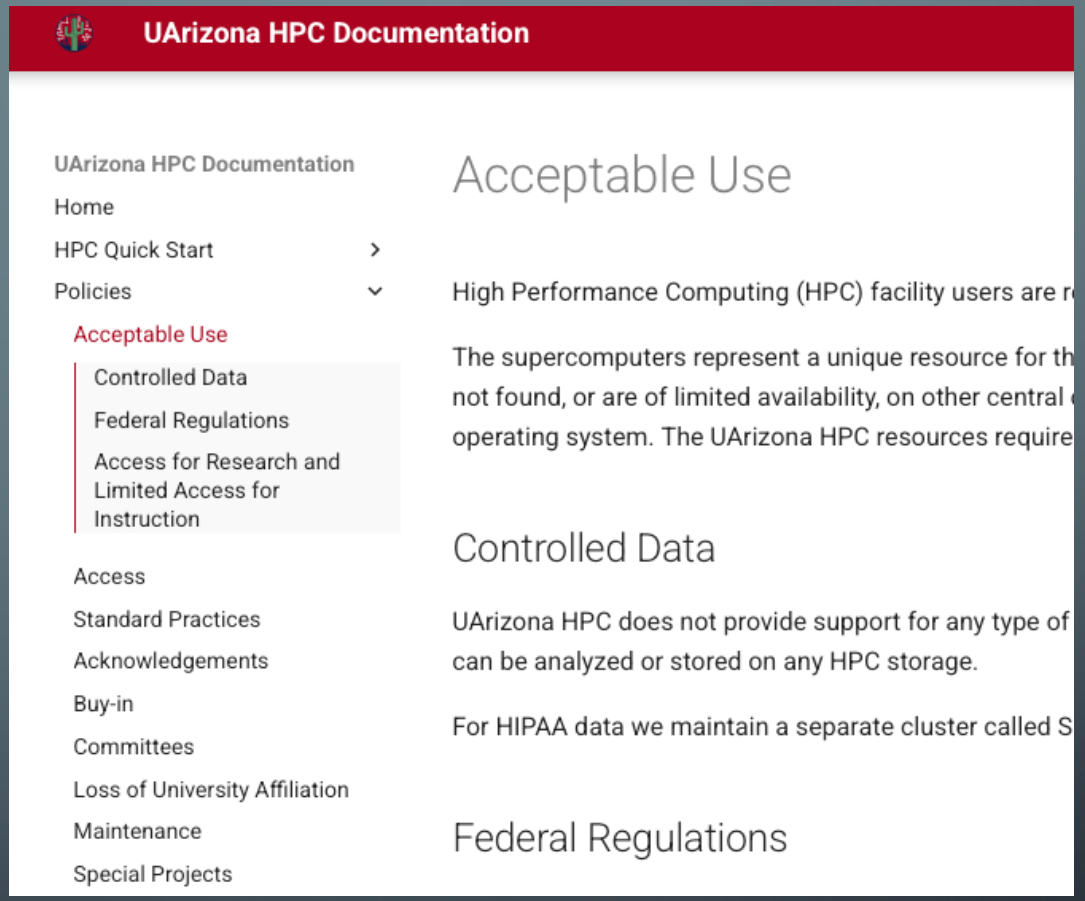
We document our policies

HPC Support Teams

Policies



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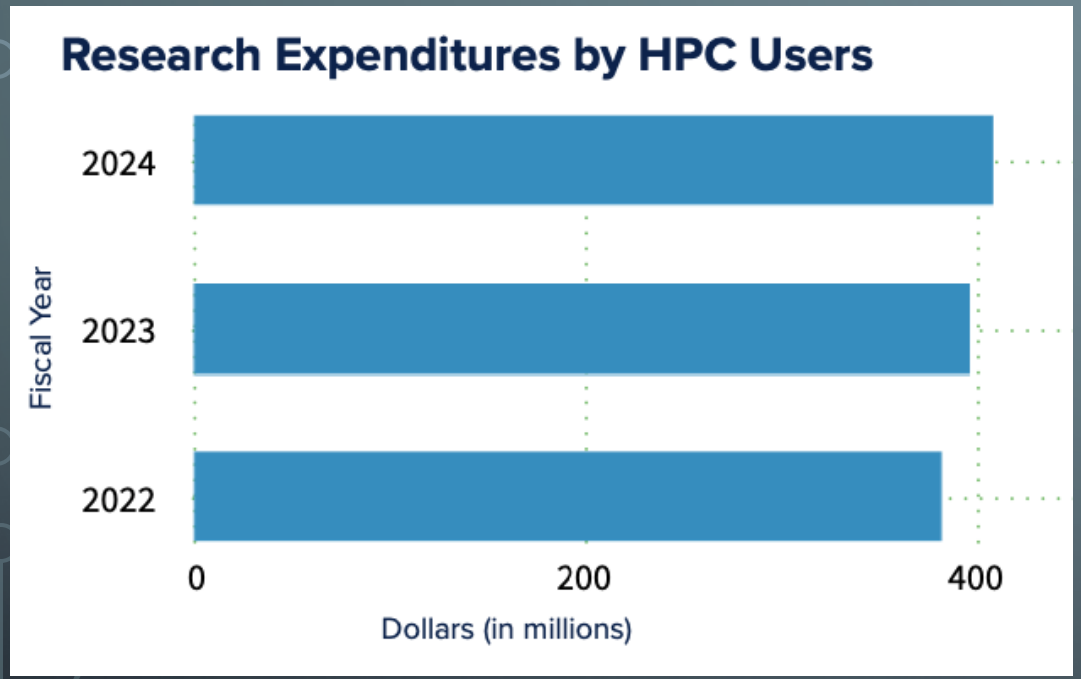
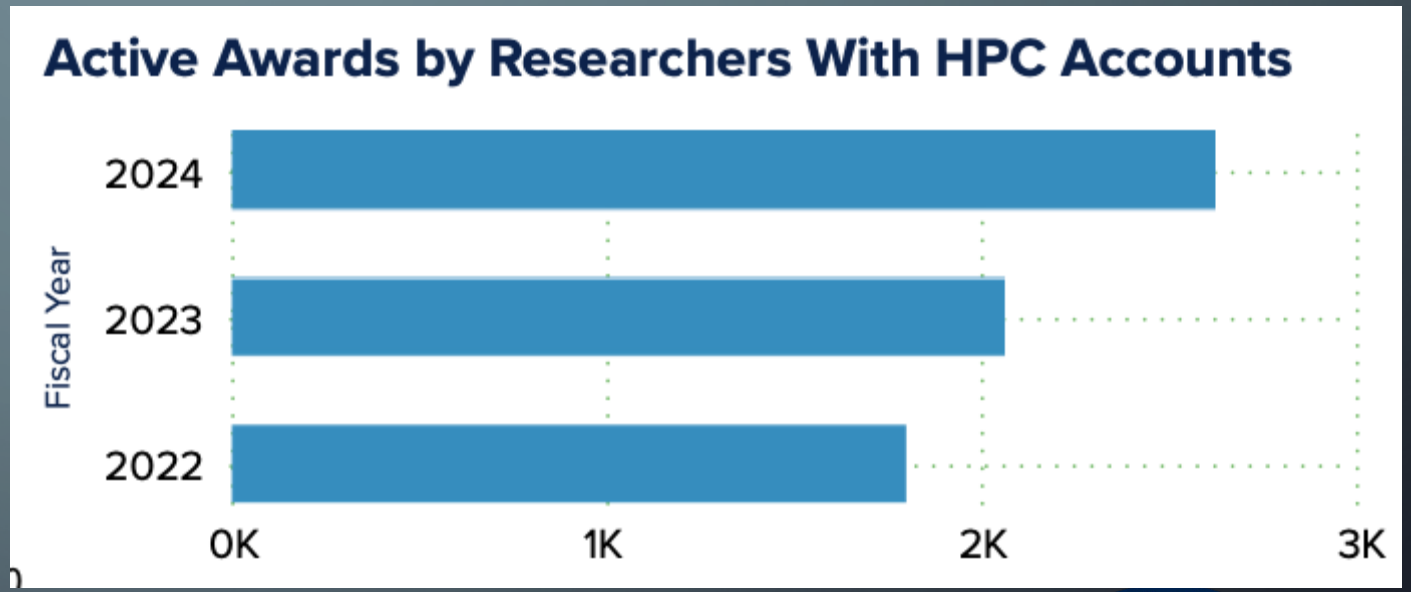
Metrics justify your existence to stakeholders

HPC Support Teams

Metrics





https://hpcdocs.hpc.arizona.edu/assets/pdfs/HPC%20FY24%20Metrics.pdf

Number of HPC PI Patents 2021-2023

28

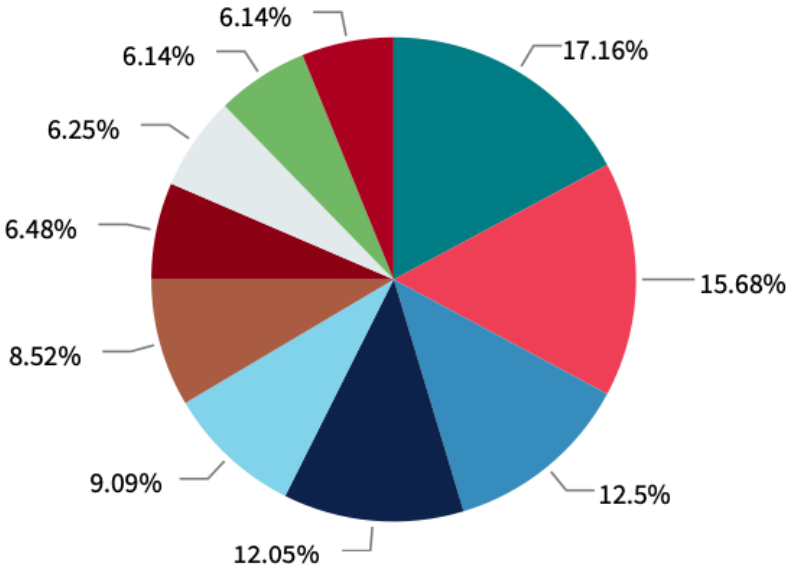
Number of HPC PI Publications 2021-2023

3173

Citation of HPC PIs 2021-2023

91K

Top Publication Topics 2021-2023



Publication Topic

- machine learning
- space exploration
- astrophysics
- astronomy
- planetary science
- data analysis
- materials science
- remote sensing
- fluid dynamics
- neuroscience

Publication Topic	Publications
machine learning	151
space exploration	138
astrophysics	110
astronomy	106
planetary science	80
data analysis	75
materials science	57
remote sensing	55
fluid dynamics	54
neuroscience	54

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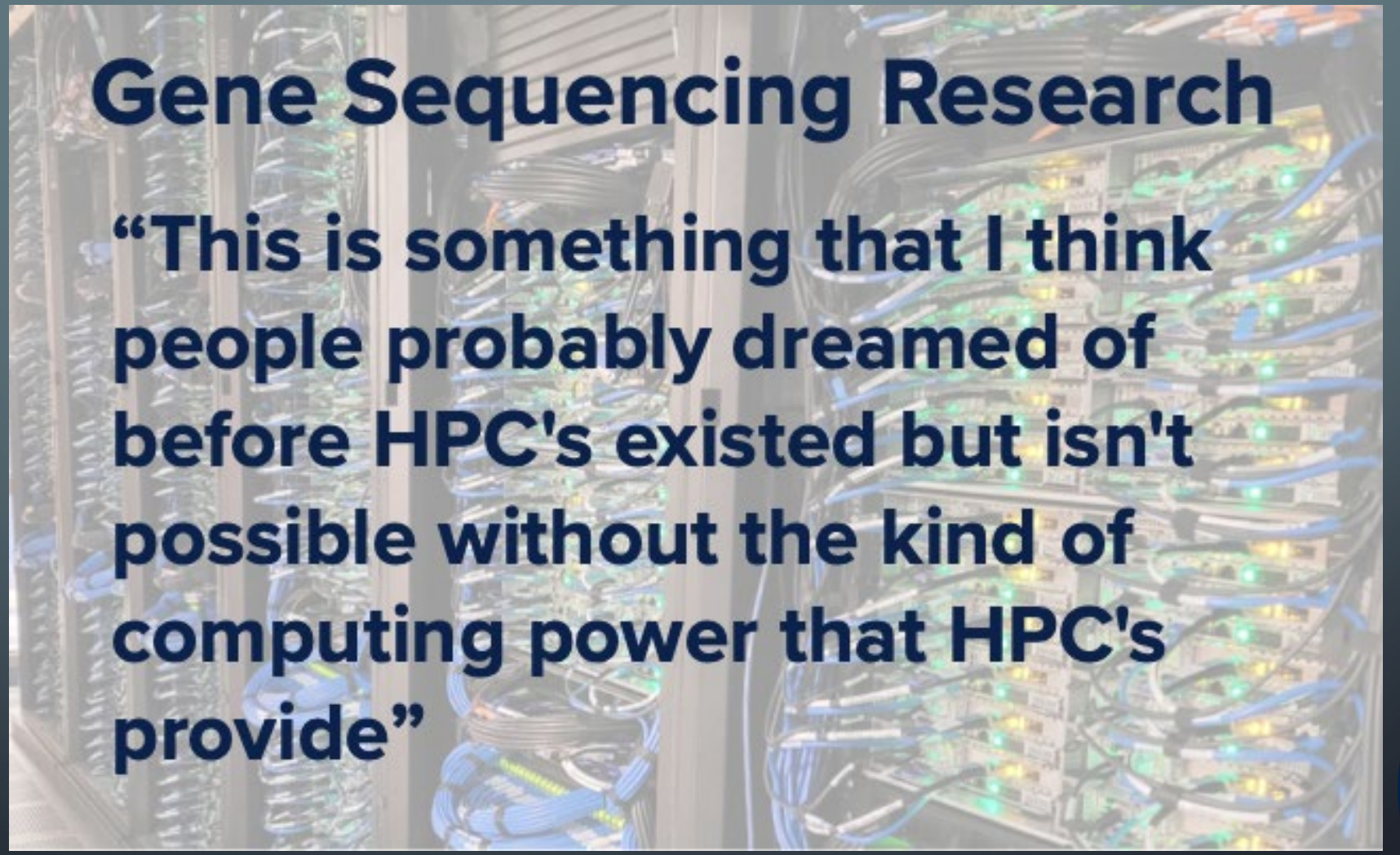
HPC Support Teams

Metrics



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Hard Skills and Soft Skills

HPC Support Teams

TEAM CHARTER :: RESEARCH TECHNOLOGIES CONSULTING		
Date Created: Oct 18 2022		Date Updated: 3/12/25
VISION		
We are a team of professionals dedicated to advancing campus research computing at the		
University of Arizona		
TEAM PURPOSE		
We support researchers who use the HPC facilities including data services, visualization and statistics to furt		
their scientific research as they publish papers, obtain grants, and teach students		
Team Members		**Working Agreements**
Chris		We communicate with integrity, transparency and purpose
Devin		We value everyone's time, commitments, priorities and contributions
Derrick		We foster a community of inclusion and support
Ethan		We share lessons to make the team stronger
Sara		We commit to doing our best work
open		We hold ourselves accountable
		We treat each other professionally and with respect
		We encourage a growth mindset
		We value all of our engagements and seek to to respond completely
2024 Goals		**Scope of Services**
1. Improve services		Engage with support requests in usage of HPC resources

Planning Team Charter

HPC Support Teams

2025 Goals		
1. Hire HPC Consultants		
2. Improve services		
3. Support RFP Process		
4. Job analytics		
5. Promote professional development		
6. increase visibility of vis services		
7. increase vis capabilities		
8. External activities		
2025 Activities		
1. Create justification document		DONE
1. Hire student for HPC		
1. Hire AI consultant		
1. Hire Data consultant		
1. Hire CRRSP consultant		
2. Onboarding new PI's		
2. Develop storage services		
2. Develop new storage policies		
2. Develop new SLURM policies		

Planning.
Team
Charter

Teaching

Typical compute experience for new users

Teaching

The Challenges

- Motivation – why is it worth it?
- Format – what is the best delivery
- Effectiveness – was the gal achieved
- Improvement – what could be improved
- Skills

Teaching

Motivations - they must match.

For the facilitator:

- Onboarding made easier
- Reduce ongoing support
- Build relationships

For the user:

- Reduce barriers to HPC
- Self sufficiency

Teaching

Formats

- HPC workshops
- Recordings on YouTube
- Consultations
- Modality: Zoom or in-person
- Guest presentations – Nvidia, Matlab

Teaching

Effectiveness

- Are the user expectations met?
- What knowledge do they already have?

Practical

- Is there engagement?
- Was the pacing adequate?
- Was there user feedback?
- Was there a check for understanding?
- Was time allowed for questions?

Teaching

Improvement

There is always room for improvement in anythingwe do.

- Self assessment
- Feedback
- Peer review

Teaching

Skills

- Communication
- Listening
- Collaboration
- Adaptability
- Engagement
- Empathy
- Patience

Teaching - in person workshops

HPC Calendar

Topic	Date	Time	Room	Instructor
Intro to HPC: Overview and Access	Feb 14th 2025	10:00am	Main Library 112	Ethan Jahn
Intro to HPC: Storage and Software	Feb 14th 2025	11:15am	Main Library 112	Ethan Jahn
Shared Memory Programming Using OpenMP	Feb 19th 2025	9am - 3pm	Main Library 201 (morning) and 112 (afternoon)	Pittsburgh Supercomputing Center
Fundamentals of Accelerated Data Science with RAPIDS pt.1	Feb 20th 2025	9am - 12pm	Weaver SciEng Library 212	Devin Bayly

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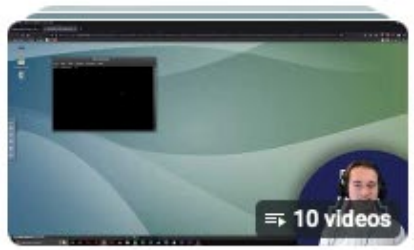

Training

View full playlist

Stories

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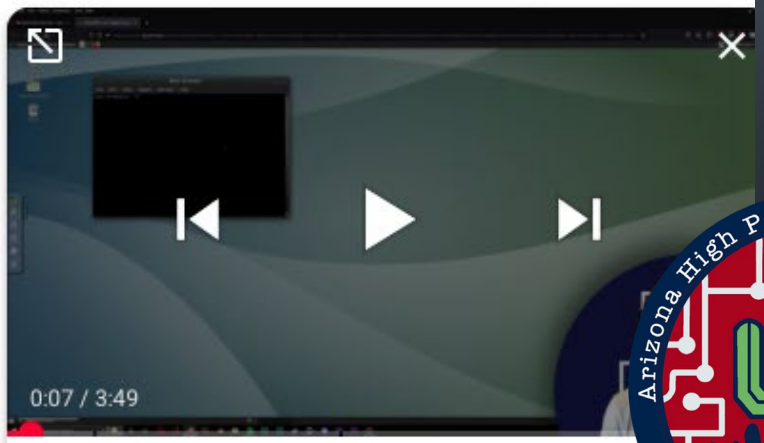


Visualization on HPC

Teaching - partnerships

Conflict

Conflicts can occur within the team or with users.

- Remain professional
- Invoke policies
- Preserve relationships
- Consult

Conflict scenarios

1. A user complains that they cannot get their work done because someone else is “hogging” the queues.

2. A user reports a system problem. When forwarded to the sysadmins, they say it is a user problem.

3. A user bypasses the support processes to management or the systems team.

Conflict scenario 1

Someone is “hogging” the nodes.

Thoughts:

- Are they “hogging” or just very productive?
- Is the first user under some pressure?
- Are they a ‘busybody’ or a ‘rules monitor’?
- Is there a SLURM policy issue?

Conflict scenario 2

Whose problem is it?

Thoughts:

- Do we have systems knowledge?
- Why do sysadmins think there is no problem
- How to respond to users?
- Is there a SLURM policy issue?

Conflict scenario 3

Bypassing process

Thoughts:

- Is there a trust issue?
- Are the support policies clear and easy to use?
- How to respond?

External Resources

ACCESS

https://access-ci.org

NAIRR

https://nairrpilot.org

Campus Champions

https://campuschampions.cyberinfrastructure.org

CaRCC

https://carcc.org

Stories

Using stories to demonstrate value

Stories from the frontlines:

- The policy abuser
- The endless support requester
- The epitome of value

Stories

Using stories to demonstrate value - YouTube

- The first-generation student

Stories

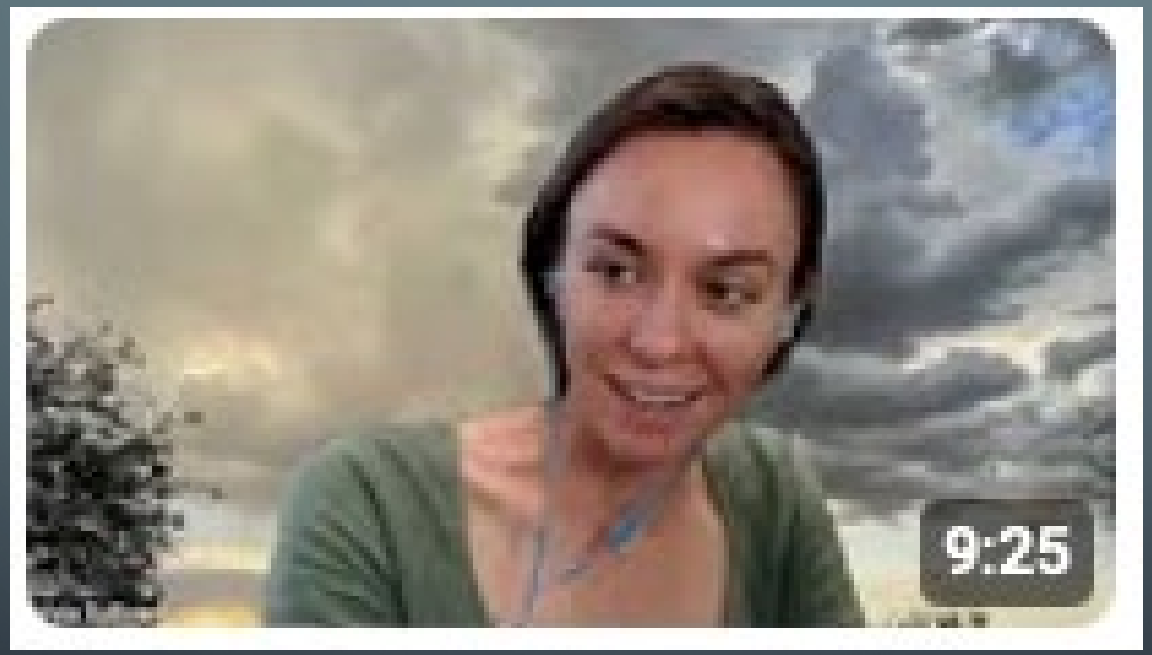
Using stories to demonstrate value - YouTube

- The new graduate student

Stories

Using stories to demonstrate value - YouTube

- Recruited faculty – cloud researcher

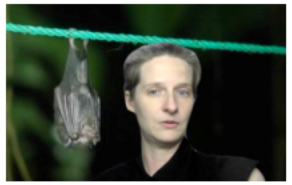


Stories - publishing

Newsletter

UNIVERSITY INFORMATION TECHNOLOGY SERVICES
Research Computing

In her postdoctoral work, Elise shifted her focus to studying bats, particularly the *Myotis* genus, and their adaptations to viral exposures. She highlights two major research projects that utilize HPC. The first involves developing reference genomes for *Myotis* bats to study evolutionary patterns and viral adaptations. This includes sequencing over 100 bats to analyze genetic variations and environmental factors influencing their virus resistance. The HPC plays a crucial role in this project, enabling parallel processing and speeding up data analysis that would otherwise be impossible with local computing resources.



The second project expands this approach to a broader scope, examining viral adaptation across various mammal species. Elise uses Bayesian models to explore how climate and environmental factors, such as temperature and rainfall, influence viral exposure over millions of years. HPC is essential for running these complex models at a speed and scale that smaller systems can't handle.

"I know that one of the things that people have liked in my new position was this work I've done using computing and developing computational methods. And so, I think I would not have this position, or it would be very different if I hadn't had access to the HPC."

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Stories - publishing

Central IT Web Site

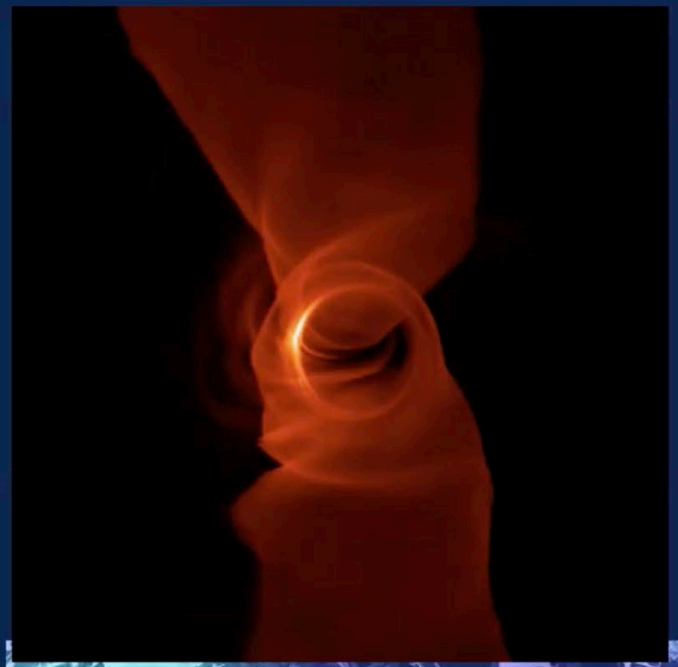
Defending Earth: How HPC Elevates Planetary Security

July 25, 2023

NEO Surveyor Mission Leverages Puma's Formidable Power to Safeguard Our World

Read more

Researchers at Steward Observatory routinely utilize UArizo facilities to generate and analyze cutting edge simulatio



- > $20 million in grants from Astronomy < 5 yr
- These grants are awarded relying on the existence of UArizona HPC facilities ***and*** long-term data storage offered for analysis.

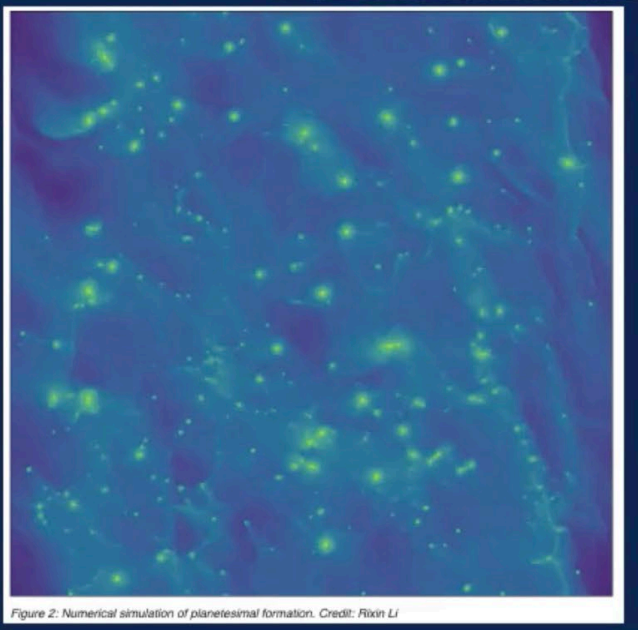
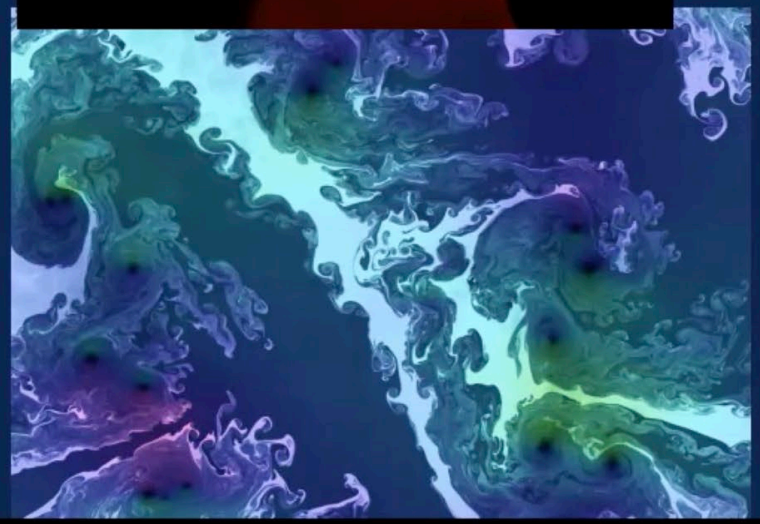


Figure 2: Numerical simulation of planetesimal formation. Credit: Rixin Li



IT SUMMIT
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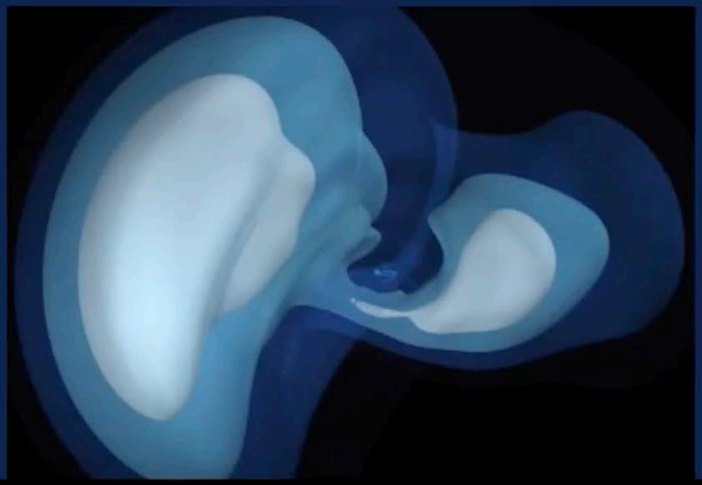

Gurtina Besla (Astronomy)

The End Fin Ainahaya Owari

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