



# Affinity Group Annual Report

## Scientific Cloud

**Reporting Period:**

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# Group Goals

The **Scientific Cloud Affinity Group** fosters collaboration among research computing professionals and scientific cloud adopters across institutions. The group's goals are to:

- Facilitate a collaborative environment that enables **cross-institutional knowledge transfer**.
- Support **comparative analysis of cloud and infrastructure architectures**.
- Promote **joint debugging and problem-solving** of technical issues encountered in deploying and maintaining scientific cloud platforms.

## Topics of Interest:

- Hybrid and multi-cloud strategies for research computing
- GPU virtualization and resource sharing (NVIDIA MIG, SR-IOV)
- OpenStack adoption, upgrades, and architecture comparisons
- Container orchestration with Kubernetes and OpenStack Magnum
- Sustainability and cost models for academic clouds
- Security, compliance, and access control in hybrid environments
- Automation, monitoring, and observability tools
- AI/data-intensive research workflows on scientific clouds
- Federated cloud access and cross-institutional collaboration
- Cloud-native research software and science gateways

## Group Members

- Aaron Wells, Indiana University
- Ben Sperry, National Center for Supercomputing Applications
- Benjamin Lynch, University of Minnesota Twin Cities
- Brad Battey, University of Michigan
- Chris Layton - National Renewable Energy Lab
- Chris Martin, Indiana University
- Corrinne Adams, University of Michigan
- Esen Gokpinar-Shelton, Indiana University
- Jeremy Fischer, Indiana University
- Jessica Haney, National Center for Supercomputing Applications
- John-Paul Robinson, University of Alabama at Birmingham
- Julian Pistorius, Indiana University
- Kevin Luu, Northwestern University

- Laura Pettit, Indiana University
- Mehmed Kerem Uludag, University of Michigan
- Mike Collins, University of Wisconsin–Madison
- Mike Lowe, Indiana University
- Nik Sultana, Illinois Institute of Technology
- Robert Ping, Indiana University
- Stephen Bird, University of Notre Dame
- Timothy Middelkoop, Internet2
- Todd Shechter, University of Wisconsin–Madison
- Wanda Marsolek, University of Minnesota Twin Cities
- Winona Snapp-Childs, Indiana University
- Zekai Otles, University of Wisconsin–Madison

## Major Activities (FY25)

In FY25, the Scientific Cloud group organized and participated in several key community-building and technical knowledge-sharing initiatives:

- **Forum at OpenInfra North America 2024** – hosted at Indiana University, featuring discussions on open infrastructure advancements and best practices.  
[Event details](#)  
[IU event site](#)
- **Biweekly OpenStack Roundtable Meetings** – recurring sessions among Indiana University (IU), the National Center for Supercomputing Applications (NCSA), and the University of Alabama at Birmingham (UAB), focused on technical discussions and live demonstrations.
  - Highlights included UAB’s walkthrough of their **Charmed OpenStack infrastructure** in May.
- **OpenStack Operators Panel: “Life with OpenStack”** – presented at the CaRCC Systems-Facing Call, introducing OpenStack to new audiences and comparing it with VMware in terms of performance, licensing, and sustainability.
- **Planned Activity: Upcoming StackHPC-led OpenStack Training** (September/October 2025), designed to expand community expertise and technical proficiency.

## Significant Results

The group’s collaborative activities produced meaningful technical and organizational outcomes:

- **Shared Operational Insights:**  
Through UAB’s Charmed OpenStack demonstration, NCSA gained a clear understanding of the operational model, benefits, and challenges of adopting this approach. The

exchange reduced uncertainty in NCSA's evaluation process and helped inform their adoption roadmap.

- **Actionable Technical Recommendations:**

Technical discussions on container orchestration and GPU utilization led to the formulation of actionable recommendations regarding **NVIDIA MIG usage, Kubernetes integration**, and the role of **OpenStack Magnum**. Several participating institutions implemented these practices, achieving improved GPU partitioning, more efficient container management, and informed architectural decisions.

- **Broader Community Understanding of OpenStack:**

The "*Life with OpenStack*" panel enabled participants to evaluate OpenStack as a **viable alternative to VMware**, especially amid rising licensing costs. Attendees gained a nuanced understanding of operational trade-offs, community support structures, and long-term sustainability considerations—empowering them to make more informed decisions for their institutions.

## Products and Insights

This year, the group strengthened inter-institutional connections and fostered collaboration through ongoing technical discussions, presentations, and shared learning opportunities.

Key outcomes include:

- A sustainable **biweekly meeting structure** that encourages active participation and open exchange among member institutions.
- **In-group technical presentations** highlighting innovative implementations and lessons learned.
- **Enhanced regional collaboration** among universities exploring OpenStack and related technologies for research computing environments.

## Planned Activities (FY26)

In the coming year, the Scientific Cloud affinity group aims to broaden its reach and deepen technical collaboration by:

- **Extending Knowledge-Sharing Efforts:** Hosting a Birds of a Feather (BoF) session or presentation at **PEARC26** to engage a wider research computing audience.
- **Continuing Biweekly Roundtables:** Maintaining the momentum of collaborative technical discussions across participating institutions.
- **Expanding Training Opportunities:** Supporting participation in the upcoming StackHPC OpenStack training and exploring additional hands-on learning sessions.