The INTERNATIONAL CONFERENCE for HIGH PERFORMANCE COMPUTING NOV 15–20
CHICAGO, IL NETWORKING, STORAGE, & ANALYSIS

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SC26
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SC26 Research Goals

18 February 2026

Brenna Meade - SC26 Research Director
NRE, Xnet, Cluster, and INDIS
Internet2 (former Indiana University)

Jeronimo Bezerra - NRE Lead
Florida International University

Outline

- What is the Supercomputing Conference?
- What is SCinet?
- The SCinet Research team
  - What is the role of the SCinet Research team?
  - The SCinet Research Agenda/Plans
- The SCinet NRE team
  - What is the role of the SCinet NRE team?
  - Remembering SC25 NRE efforts and outcomes
  - Plans for SC26

What is the Supercomputing conference?

The ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis.

SC brings together the top minds in high performance computing, network, storage, and analysis to share ideas, contributions, and advancements in HPC.

The first ACM/IEEE Conference on Supercomputing was organized in 1988, in Orlando, FL.

Always challenging:

- SC22 (Dallas): 11,830 attendees (return to in-person meeting)
- SC23 (Denver): 14,000 attendees
- SC24 (Atlanta): 18,104 attendees and 494 exhibitors
- **SC25 (St. Louis): 16,499 attendees and 559 exhibitors**

What is SCinet?

Started in 1991 as a team of approximately 10 people.

SCinet provides wired and wireless network connectivity to all conference attendees while in the convention center.

SCinet is possible due to the support from the volunteers' home institutions, as well as through the generous contributions from committed contributors who donate software, equipment, and services valued in the tens of millions.

Since its inception, SCinet has grown to be one of the world’s fastest temporary networks.

1 year to design, 1 month to build, 1 week to operate, 1 day to teardown

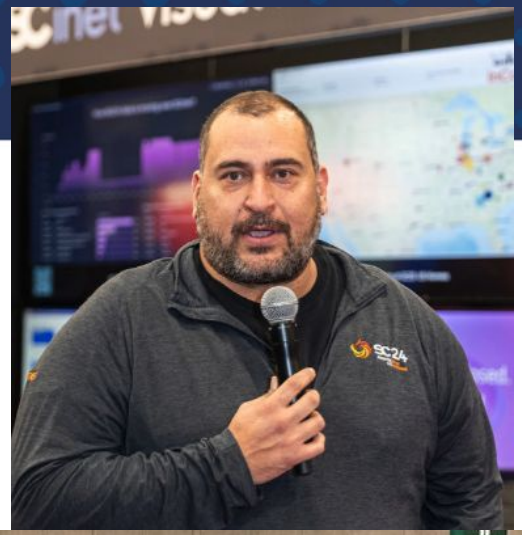
Always challenging:

- SC22 (Dallas): 175 volunteers (80 institutions), WAN capacity of **5.01 Tbps**, and 37 miles of fiber.
- SC23 (Denver): 200 volunteers (113 institutions), WAN capacity of **6.71 Tbps**, 421 access points, and 12.65 miles of fiber.
- SC24 (Atlanta): 200 volunteers (114 institutions), WAN capacity of **8.41 Tbps**, 450 access points, and 38.5 miles of fiber.
- SC25 (St. Louis): 215 volunteers (129 institutions), WAN capacity of **13.72 Tbps**, 450+ access points, and 17 miles of fiber.

SCinet Teams

- Architecture
- Automation
- Cluster
- Communications
- Contributor Relations
- DevOps
- Edge Network
- Experimental Networks
- Fiber
- Help Desk
- Logistics
- **Management**
- **Network Research Exhibition (NRE)**
- Network Security
- Power
- Routing
- Volunteer Services
- WAN Transport

The SC25 SCinet Team



← **SCinet Chair**
Nathaniel Mendoza, Texas Advanced Computing Center (TACC)

SCinet Vice Chairs:
Matt Zekauskas, Internet2
Brenna Meade, International Networks at Indiana University

What is the role of the SCinet Research team?

Coordinate the efforts of the NRE, XNet, and Cluster teams to align with the SC26 theme HPC UNITES!

Network Research Exhibition (NRE)

- Increase new NRE participants
- Build on the successes of previous SC NRE results

Cluster

- Continue partnership with NRP
- Educate and train SCinet on HPC technologies

Xnet

- Showcase bleeding-edge, pre-commercial, prototype and research networking technologies

SCinet Theater

- Boost visibility of SCinet, NRE, INDIS, Cluster and XNet to SC26 attendees

Network Research Exhibition (NRE) - Goals

*Goal: To advance academic research by offering access to a **temporary** extreme-scale, next-generation infrastructure for high-impact experimentation.*

Why consider submitting a NRE?

- Access to extreme, state-of-the-art infrastructure at scale
- Opportunities for real-world, end-to-end experimentation
- Acceleration of collaboration and innovation
- Validation for next-generation science drivers

How does the NRE Team operate?

NRE works in 4 phases:

Phase 1: Collecting Requirements via two solicitations:

- Network Research Infrastructure (NRI)
- Network Research Exhibition (NRE)

Phase 2: Discussing NREs with SCinet Teams

- Routing, WAN, Management, Fiber, Cluster, Automation

Phase 3: Deep dive with each NRE proposer to collect specific requests

- VLAN ranges, IP addresses, number of drops

Phase 4: Supporting NREs during Setup and Show

- Acting as an interface between NREs and SCinet NOC during deployment and troubleshooting

The SC25 NRE Team

The 2025 NRE Team:

- Cody Rotermund - NRE Chair (Network Engineer @ ESnet/LBNL)
- Deshon Miguel - NRE Deputy Chair (IT Specialist @ Tohono O'odham Nation)
- Hervey Allen - NRE Deputy Chair (Assistant Director @ Network Startup Resource Center)

Friends of NRE:

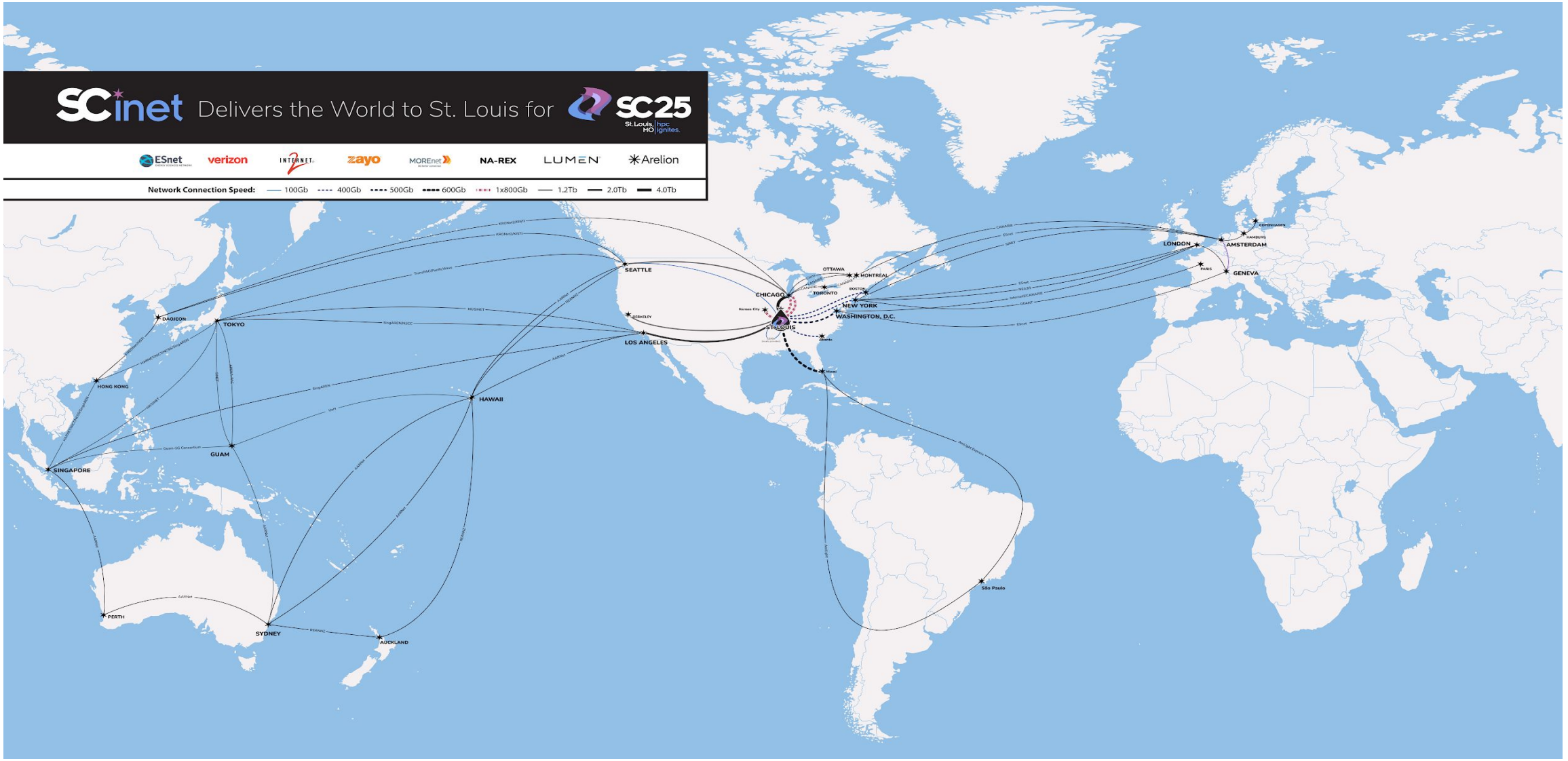
- Nathaniel Mendoza - SCinet Chair (Network Manager @ Texas Advanced Computing Center - TACC)
- Kurt Ferreira - SCinet Research Manager (Scalable System Software Scientist @ Sandia National Labs)
- Alisson Ferreira - Project Manager (Project Manager @ Internet2)

SC25 NRE Fun Numbers!

- SC25 NRE in numbers:
  - 31 NRE demos accepted
  - Over 22 Institutions
  - 7 Countries
  - 167 VLANS

https://sc25.supercomputing.org/scinet/network-research-exhibition/accepted-nre-demos/

SC25 NRE Network



SC25 WAN Capacity / Bandwidth to support NREs

- Total Bandwidth: **13.72** Tbps
- 32 circuits supporting Network Research Exhibitions (NREs)
  - Most were 400G
- Coherent optics supporting 400G and 600G circuits
- 800G Coherent circuit
  - Ciena successfully testing an 800G ZR+ across 1,050 km!

Integrating with External Academic Resources

21 NREs leverage global collaborations/multi-continent integrations

- Global Research Platform - iCAIR, EVL, UCSD, and many others
- KAUST Global Exchange - King Abdullah University of Science and Technology
- Multiple demonstrations with Rednesp/Caltech/AmLight/FIU/RNP
- FABRIC - NSF

17 NREs demonstrate integrated workflow for orchestration and automation

- Software-defined network for End-to-end Networked Science at Exascale (SENSE) - ESnet
- AIDTN-as-a-Service - StarLight
- Software Defined Exchange (SDX) - iCAIR

NRE Plans for 2026




Management Team:

- Dylan Jacob - SCinet Chair (Energy Sciences Network/ESnet)
- Corey Eichelberger - SCinet Vice Chair (Texas Advanced Computing Center (TACC)
- Brenna Meade - SCinet Research Director (Internet2)
- Cody Rotermund - SCinet Technical Director (ESnet)

NRE Team:

- Jeronimo Bezerra - NRE Lead (Florida International University/FIU)
- Marcos Schwarz - NRE Deputy Lead (Rede Nacional de Ensino e Pesquisa - RNP)
- Hervey Allen - NRE Deputy Lead (Network Startup Resource Center/NSRC)
- David Martin - NRE Deputy Lead (ESnet)
- Chris Wilkinson - NRE Deputy Lead (Internet2)





NRE Plans for 2026

For 2026, SCinet aims to extend the SC's **research thrusts** to NREs:

- FinTech & Low-Latency Networking
  - Real-time analytics, HFT, deterministic networking
- Healthcare (Cancer Research)
  - Secure data movement, AI workflows, large-scale imaging, remote surgery
- Quantum + HPC Integration
  - Hybrid workflows, dedicated demo infrastructure, coordinated collaboration between Quantum researchers
- Regional Engagement
  - Partner with Chicago Quantum Exchange as a flagship collaborator
  - Recruit Illinois/Chicago researchers; lower barriers for first-time presenters
  - Explore engagement with The Quilt to expand regional R&E participation

NRI and NREs Solicitation to by end of February!!

- **Be ready to submit your requirements and NRE by end of March!**
- SC26 NREs are encouraged to describe how the scope of work and outcomes would be supporting the SC26 research thrusts!

Coming Next

Two SC25 NREs will share their outcomes:

John Graham - System Integration Engineer - UCSD / San Diego Supercomputer Center

- NRE 119: The National Research Platform and SCinet: Enabling Live, Multi-Institutional Scientific AI/ML and HPC Workflows
- NRE 120: Live High-Precision Per-Packet Kubernetes Data Telemetry from NRP to StarLight via ESnet SENSE
- NRE 112: Real-Time In-Network Machine Learning and P4 Testbed Deployment on FPGA SmartNICs, DPUs, and Switches
- NRE 122: Agentic AI with Qualcomm Cloud AI 100 Ultra Cards for HPC Cluster Management and Resource Provisioning

Justas Balcas - Software Engineer at ES.net

- NRE 106: Multi-Resource Cyberinfrastructure Services for Science Domain Workflows via SENSE
- NRE 116: IRI Compute Job Portability

Full list of NREs and abstracts: https://sc25.supercomputing.org/scinet/network-research-exhibition/accepted-nre-demos/

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