# The Oklahoma-Arkansas-Kansas (OAK) Consortium for Regional Supercomputing



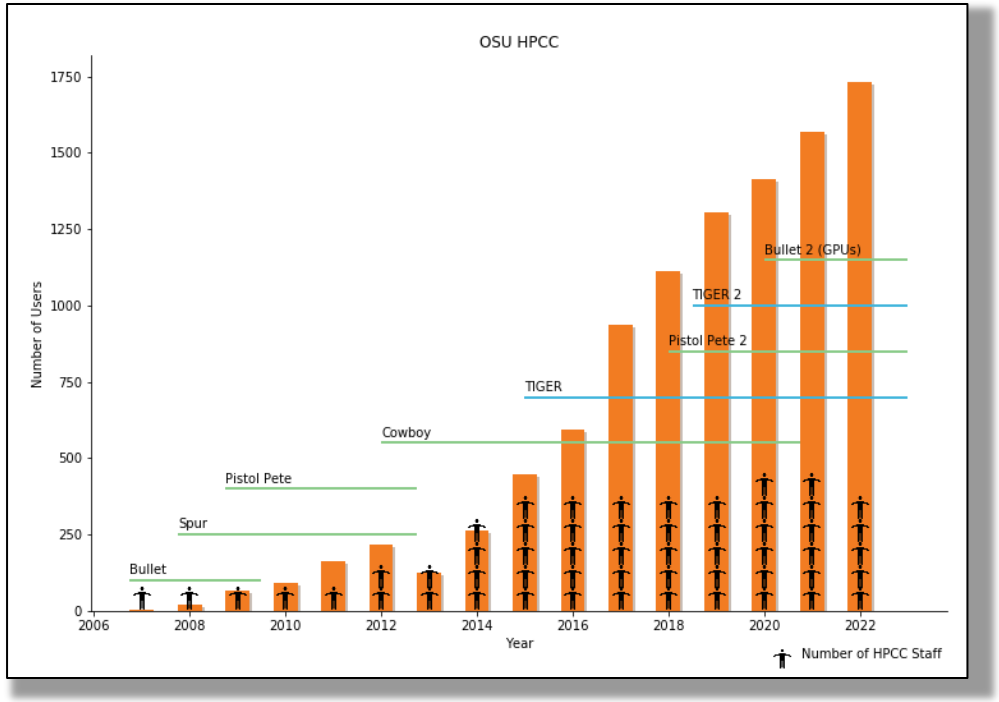
**Pratul K. Agarwal, Ph. D.**
*Associate Vice President of Research (Cyber-Infrastructure) and*
*Director of High-Performance Computing Center*
*Oklahoma State University, Stillwater OK*

# High-Performance Computing Center (HPCC)

Oklahoma Arkansas Kansas

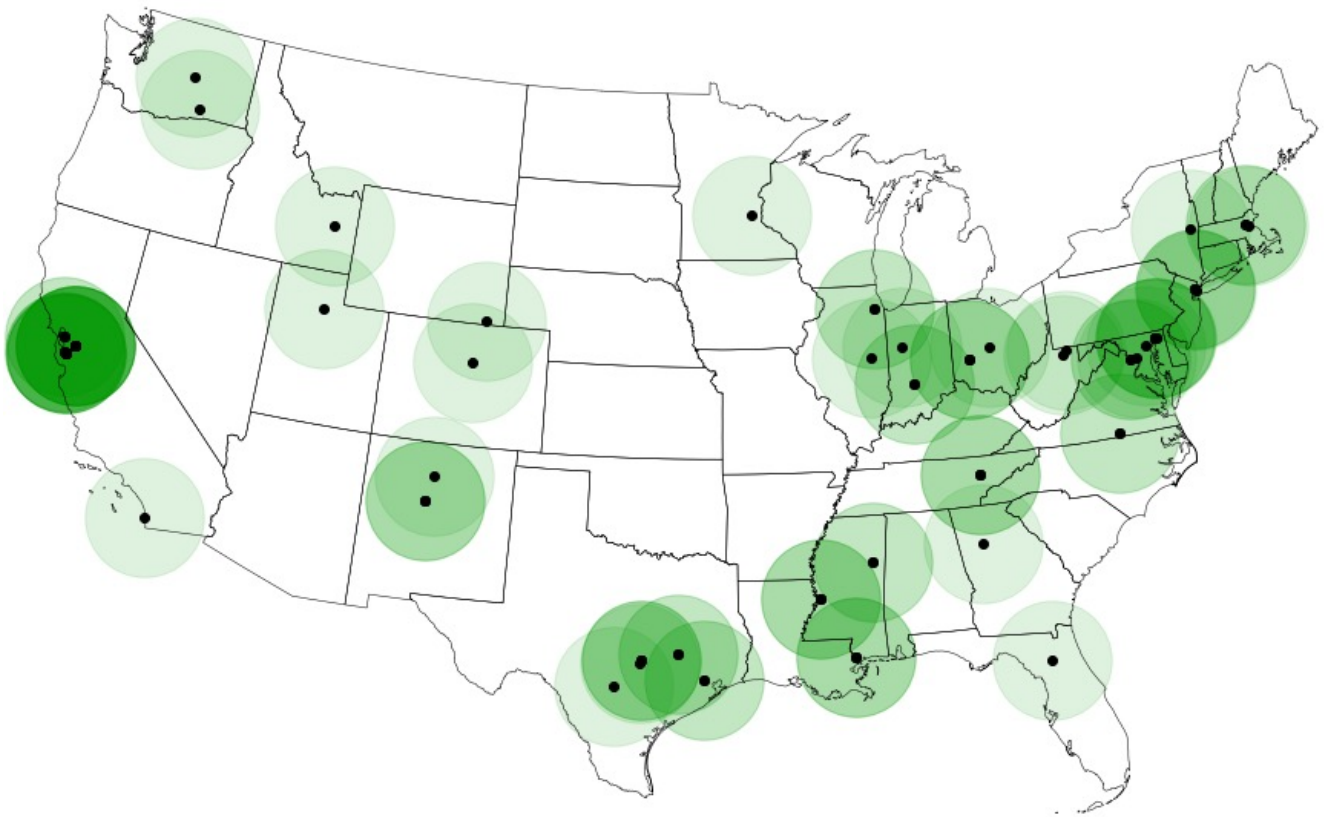
- Located in Stillwater OK
  - Oklahoma State University main campus
  - Over 1,800 users
- Internal and externally funded
  - Pete: Traditional Linux cluster
  - Bullet2: GPU-enabled Linux cluster
  - High-performance storage
  - MRI: “New Supercomputer” *Under development*
- Dedicated Staff
  - 6 Fully funded positions
    - Vice President of Research
  - Operations and Science Projects

https://hpcc.okstate.edu/

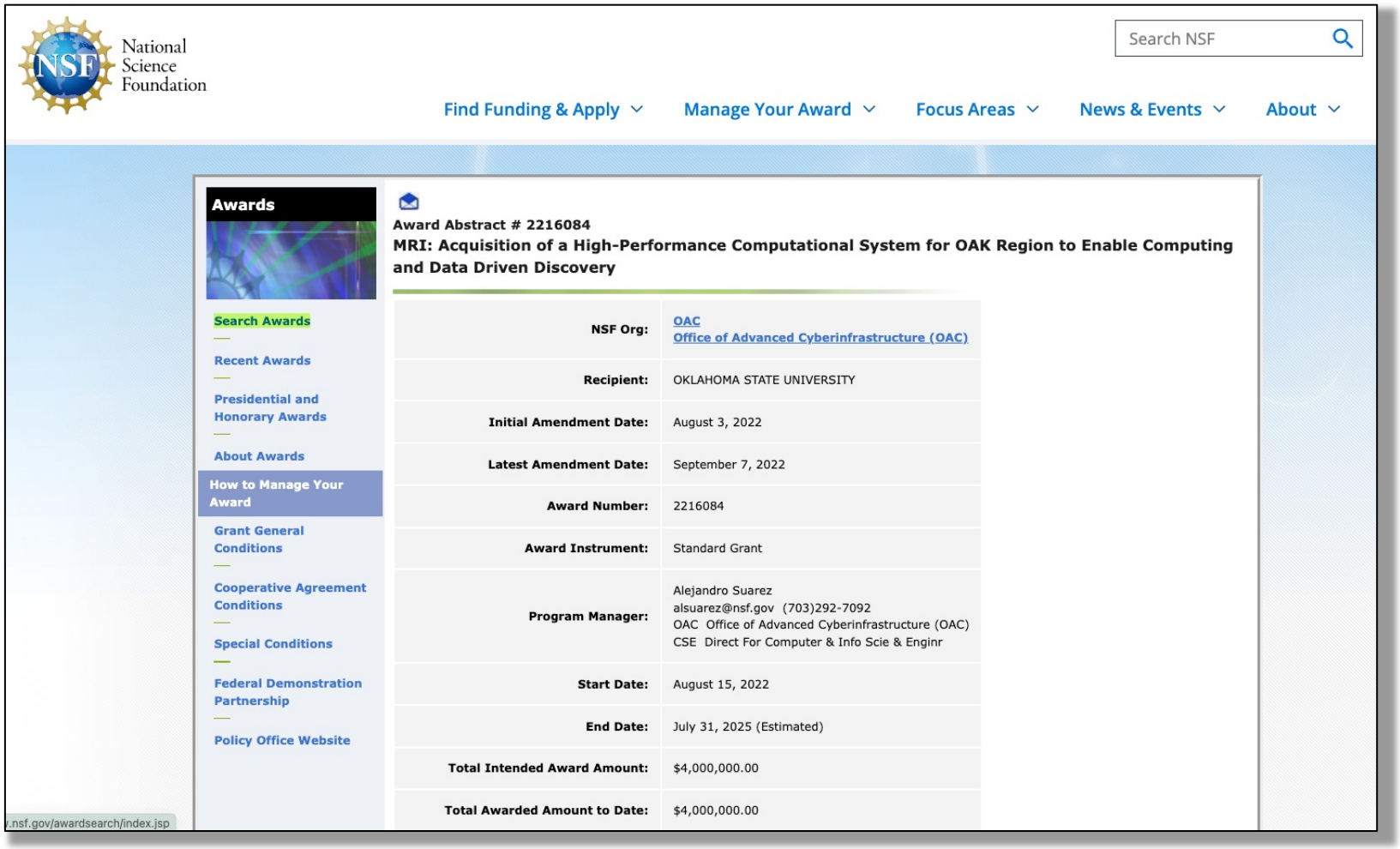


# Where are the supercomputers located?

- Top500.org
  - List of the fastest supercomputers around the world



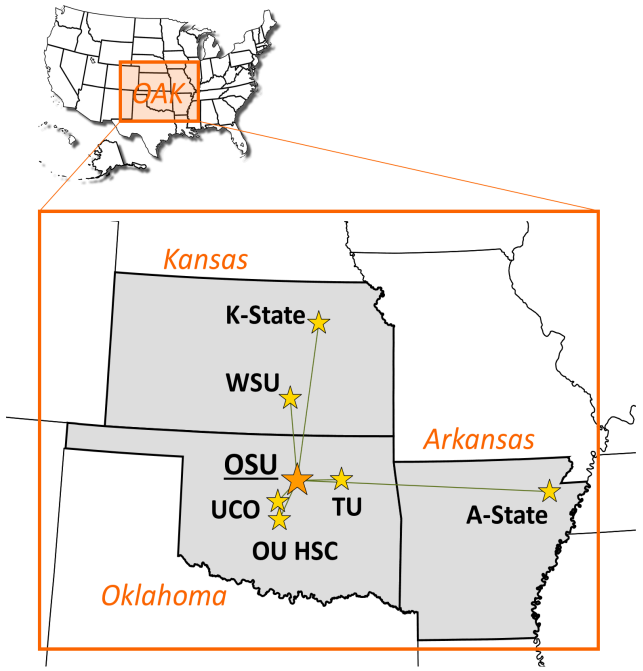
# Oklahoma-Arkansas-Kansas “Supercomputer”



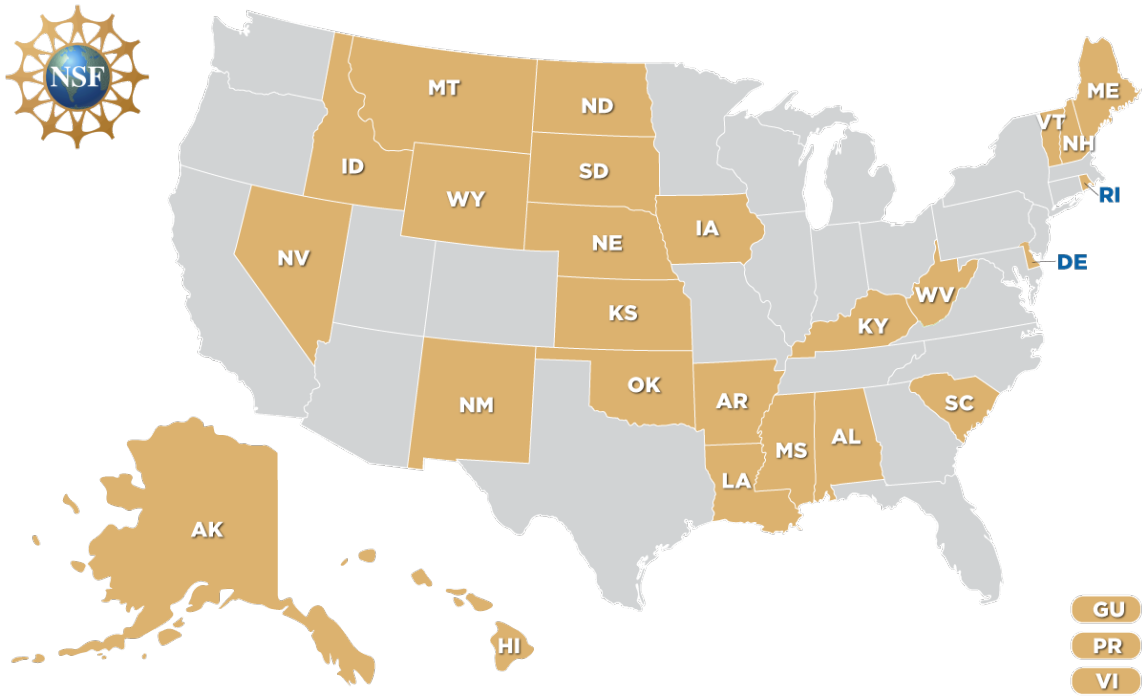
# OAK Supercomputer

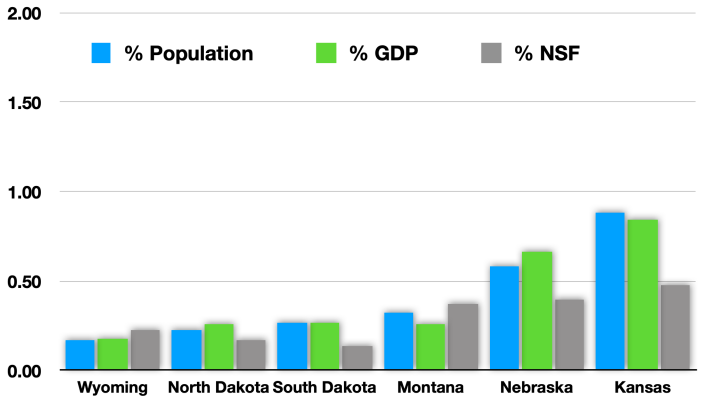
NSF MRI Award: *"Acquisition of a High-Performance Computational System for OAK Region to Enable Computing and Data Driven Discovery"*

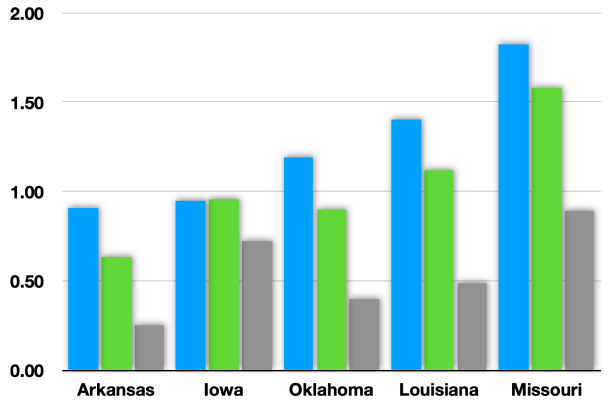
- 2nd largest investment made by NSF's MRI program
- Original Partners
  - OSU, Central Oklahoma, University of Tulsa, University of Oklahoma Health Sciences Center
  - Arkansas State
  - Kansas State, Wichita State
- Open to ALL educational/non-profit institutions
- Heterogenous: CPUs and GPUs



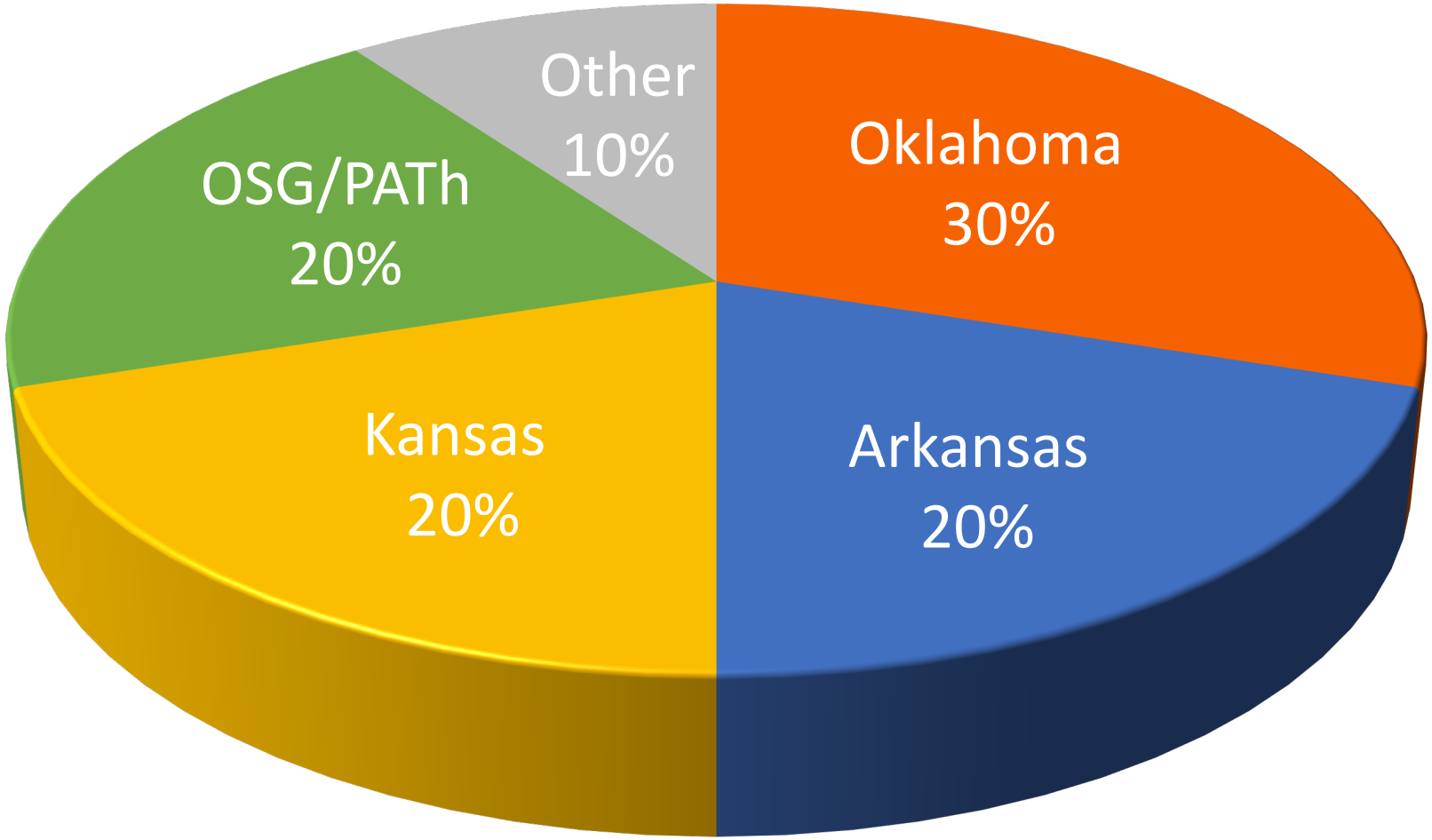
# OAK region is part of EPSCoR states



# OAK Supercomputer Commitment

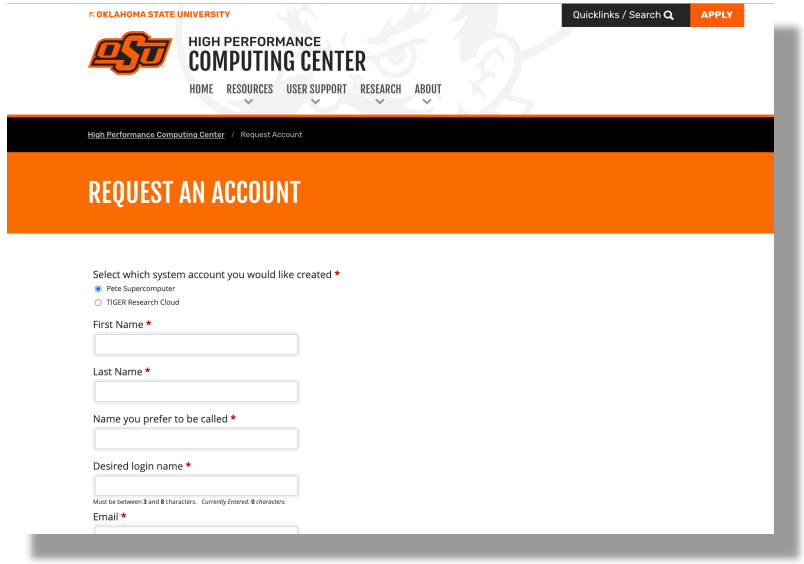


# Accounts to OAK members

- High-Performance Computing Center
  - Pete: 200 node supercomputer
  - New Machine: 5-10X faster, coming 23/Q4-24/Q1
- Eligibility
  - All Faculty, Researchers, Students are eligible
  - **Oklahoma, Arkansas and Kansas**
    - Educational or non-profit institutions
  - Post-docs, Graduate/Undergraduate students: Approved by a faculty
- Funded and non-funded projects
  - No amount charged for computing (only for large-scale storage)
  - Funding is not a requirement

https://hpcc.okstate.edu/

https://hpcc.okstate.edu/account-request.html




*Getting an account is straight-forward*

# Supercomputer: Pete

- "Pete" (Pistol Pete 2)
  - 164 original nodes dual Intel *Skylake* 6130 CPUs
  - 96 GB RAM (up to 768 GB)
  - 2018, NSF funded
  - *36 nodes added in 2022, total to 200 nodes*
  - Omni-Path network
- Storage allocations
  - Small allocations – free
  - Large allocations - paid
- Available immediately
  - All OAK researchers
  - *No cost - Computing is completely free*
  - Apply on the website: Non-OSU approved by campus coordinator

Award # 1531128

# MRI Supercomputer: “OAK”


- Currently being designed
  - 5X cores than Pete
  - CPU-only, mid-range and high-end nodes
  - InfiniBand Interconnect
- Free: Regular priority
  - Elevated priority can be purchased at a cost
  - Large projects or individual groups



Award #
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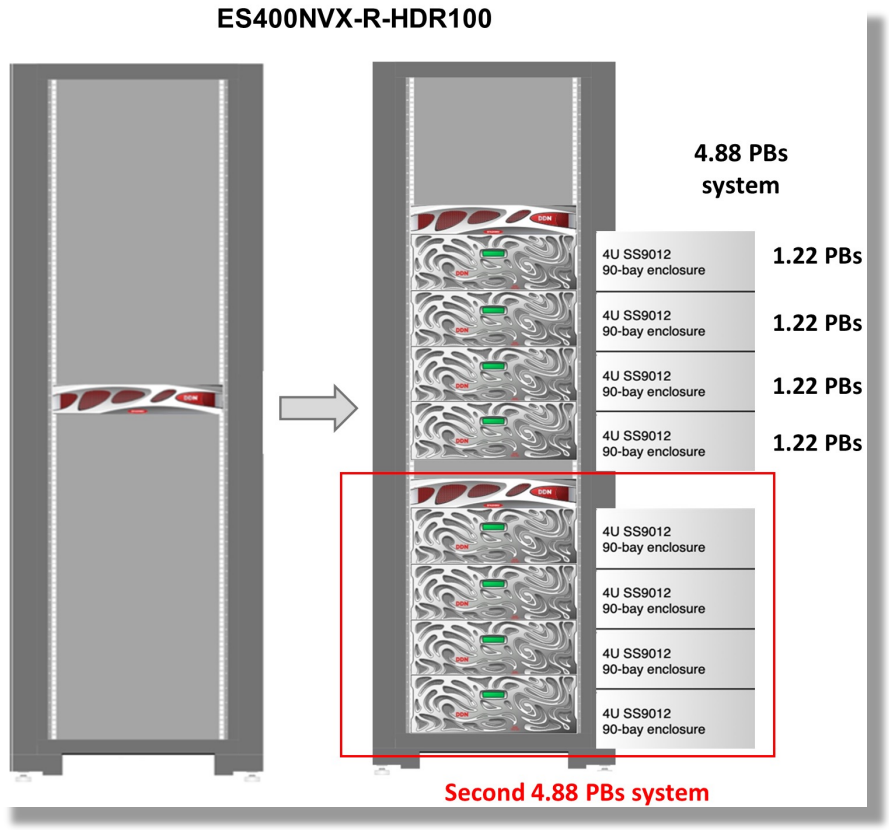
# Supercomputers: Bullet

- Bullet 2
  - GPU-enabled 10 nodes: 2 x NVIDIA Quadro RTX6000
  - 2020, Funded by VPR's Core Facilities
  - Suitable for dense computing simulations
  - Optimal for ML/AI (machine learning, artificial intelligence, data analysis)

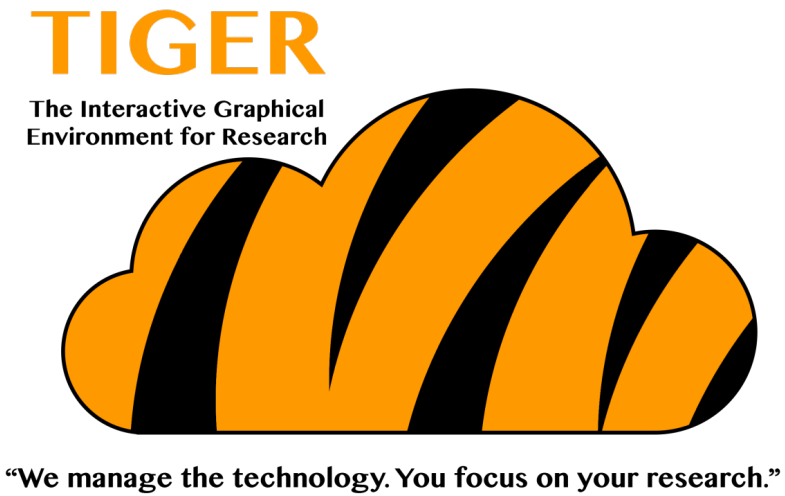

# High-Performance Storage

- DDN lustre storage
  - Exascalar ES400NVX
  - High-performance storage
  - 30 GB/s read and 20 GB/s write, sustained
  - Support large number of users simultaneously
- 4.88 PBs at present, expandable
  - Future proofing
  - Takes away the pain associated with data migration
  - One place for project storage
- Large allocation available at cost
  - $1800 for 10 TBs
  - One-time fee: 5 years



# Supercomputers: TIGER

- TIGER/TIGER2 research cloud
  - Windows or Linux environment
  - Access to various software applications: ArcGIS, MATLAB, SAS and more
  - Programming platforms: Python, R, git and more
  - Multi TB shared storage
  - Customized configurations to meet researcher needs when a desktop platform is not quite enough
- Good match for Project Needs
  - Project Page or Wiki
  - Collaborative environment: Shared data
  - Computing through web-page



# OAK Mission and Plan

To leverage critical computing and data infrastructure and expertise in the OAK region and bring together experts from different domains, for long-term research and training opportunities.

*Semi-annual meeting for all OAK region members*

- 1st Stillwater OK, OSU — April 5-7th 2023
- 2nd Arkansas, A-State — *October 17-19th 2023*
- 3rd Kansas, Wichita — Spring 2024
- 4th Oklahoma — Fall 2024

https://hpcc.okstate.edu/oak-conference-spring-2023.html

https://www.astate.edu/a/abi/oakhpc/