Cornell University
Center for Advanced Computing

# Welcome!

# High-Performance Computing on Stampede
# Introductory and Advanced Topics

January 14-15, 2015

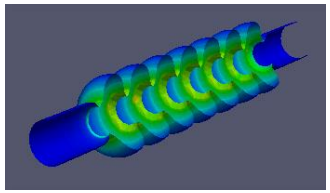
# Cornell Center for Advanced Computing (CAC)

- Mission:
  - To Enable the Success of Cornell Researchers, Collaborators, and Supporters whose Work Demands Advanced-Computing Solutions
- Organization:
  - Cornell core facility
  - Staff of expert consultants, systems administrators & programmers
  - CAC Director reports to the Office of the Vice Provost for Research
- National Cyberinfrastructure Partnerships:
  - NSF XSEDE – *Extreme Science and Engineering Discovery Environment*
  - NSF TACC Stampede – *Petascale Computing*
  - NSF Jetstream – *A cloud for science and engineering research*

# Cornell CAC: Focused on Service

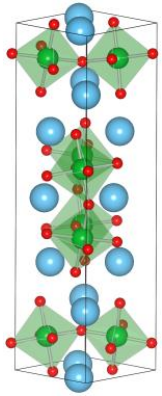
## Consulting

- Assist with new faculty start-up packages
- Benchmarking & performance analysis
- Proposal development & participation
- Custom programming, debugging, parallelization & optimization
- Development and support for scientific workflows
- Custom training > live & web-based
- Strategic partnerships > vendors, national CI, researchers



## Computing

- High-performance computing
- Cloud computing



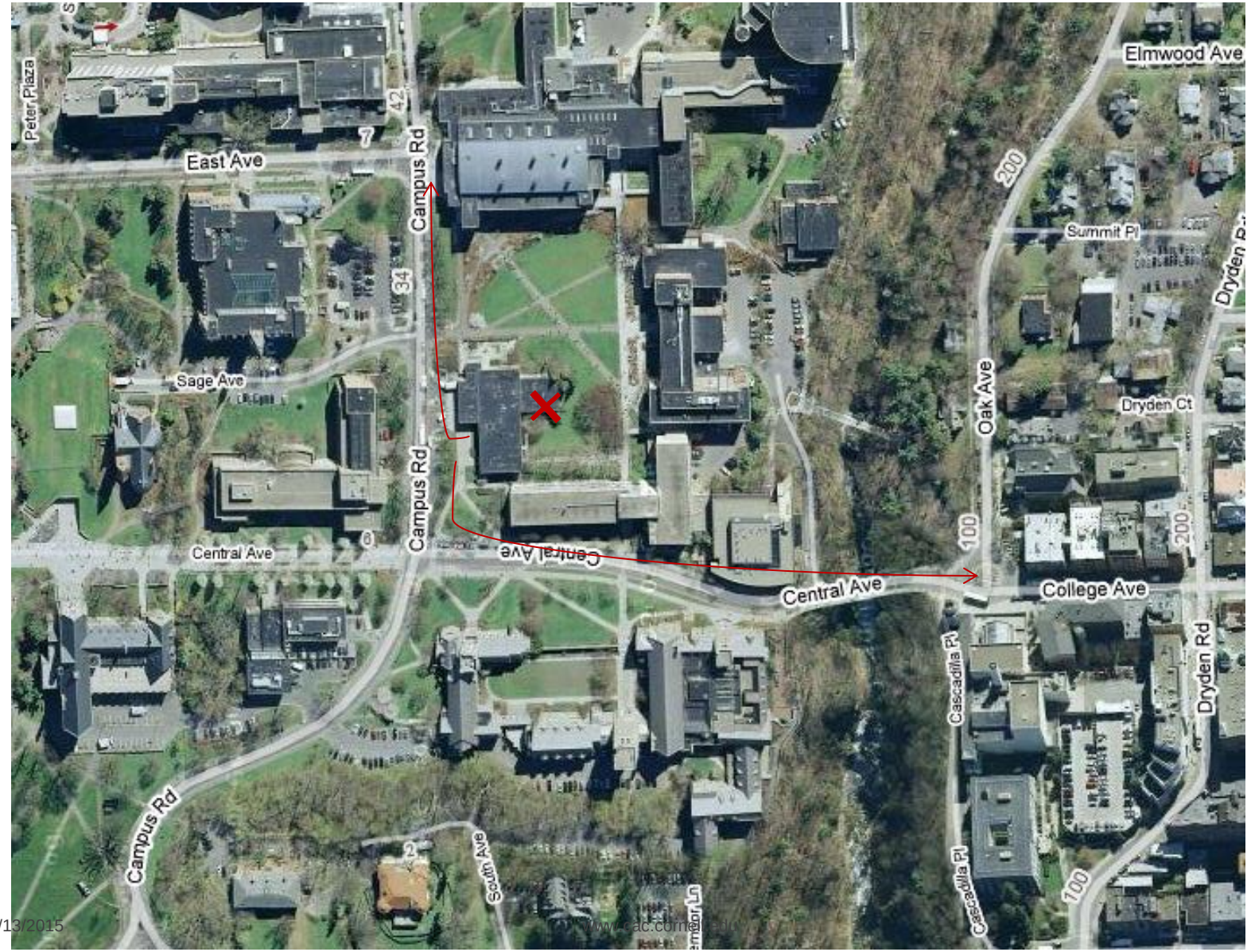
## Data storage and management

- Scalable disk storage & archival storage
- Database resources

red cloud

# Workshop Logistics

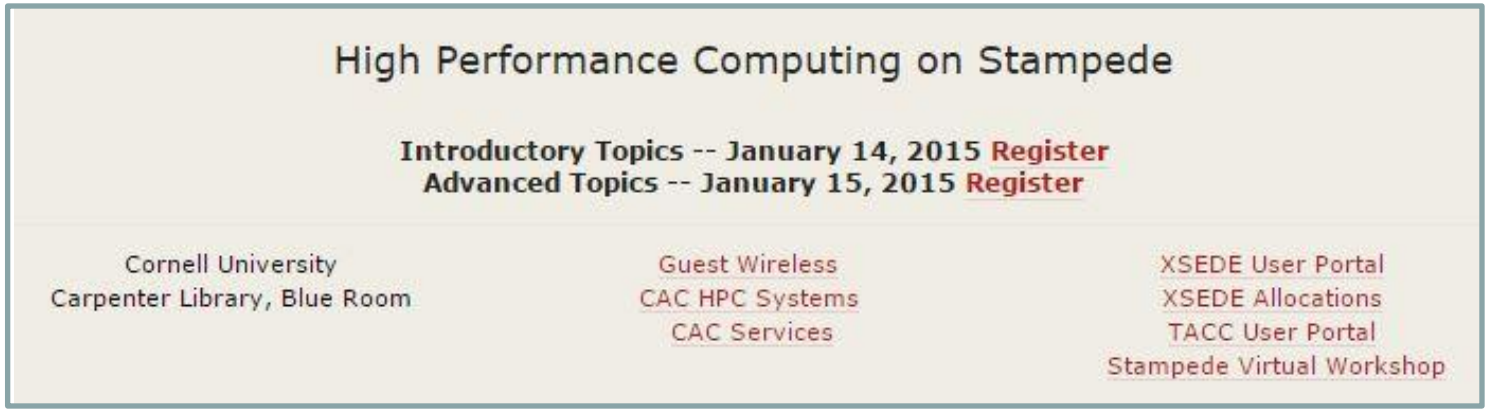
- Refreshments
  - Morning and afternoon breaks provided
  - No food or beverages permitted in training room
  - Lunch on your own
- Room access
- Restrooms


Peter Plaza
East Ave
Campus Rd
Elmwood Ave
Summit Pl
Dryden Rd
Sage Ave
Oak Ave
Dryden Ct
Central Ave
College Ave
Cascadilla Pl
South Ave

# Workshop Web Page

http://www.cac.cornell.edu/education/training/StampedeJan2015.aspx

- Agenda
- Lecture slides
- Links
- Evaluation survey will come from XSEDE

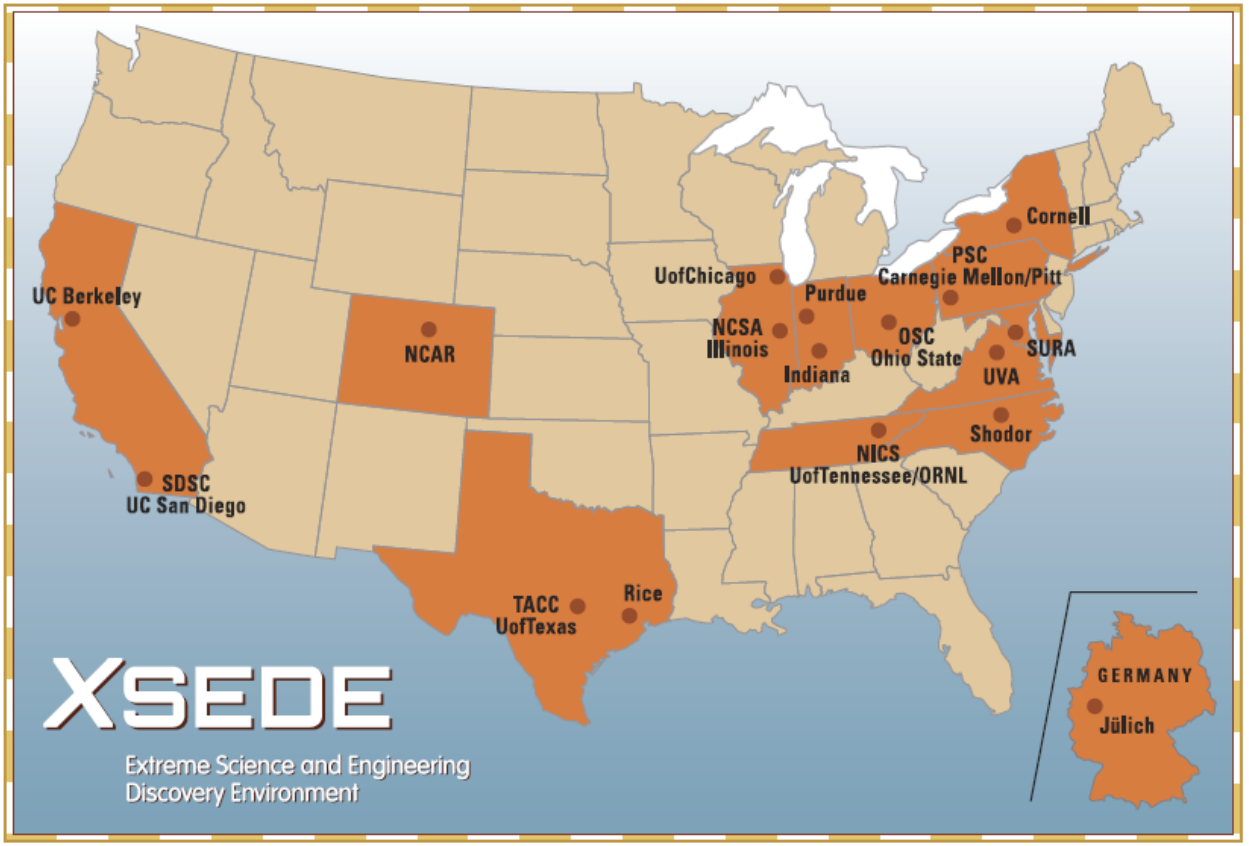


# 1. Orientation

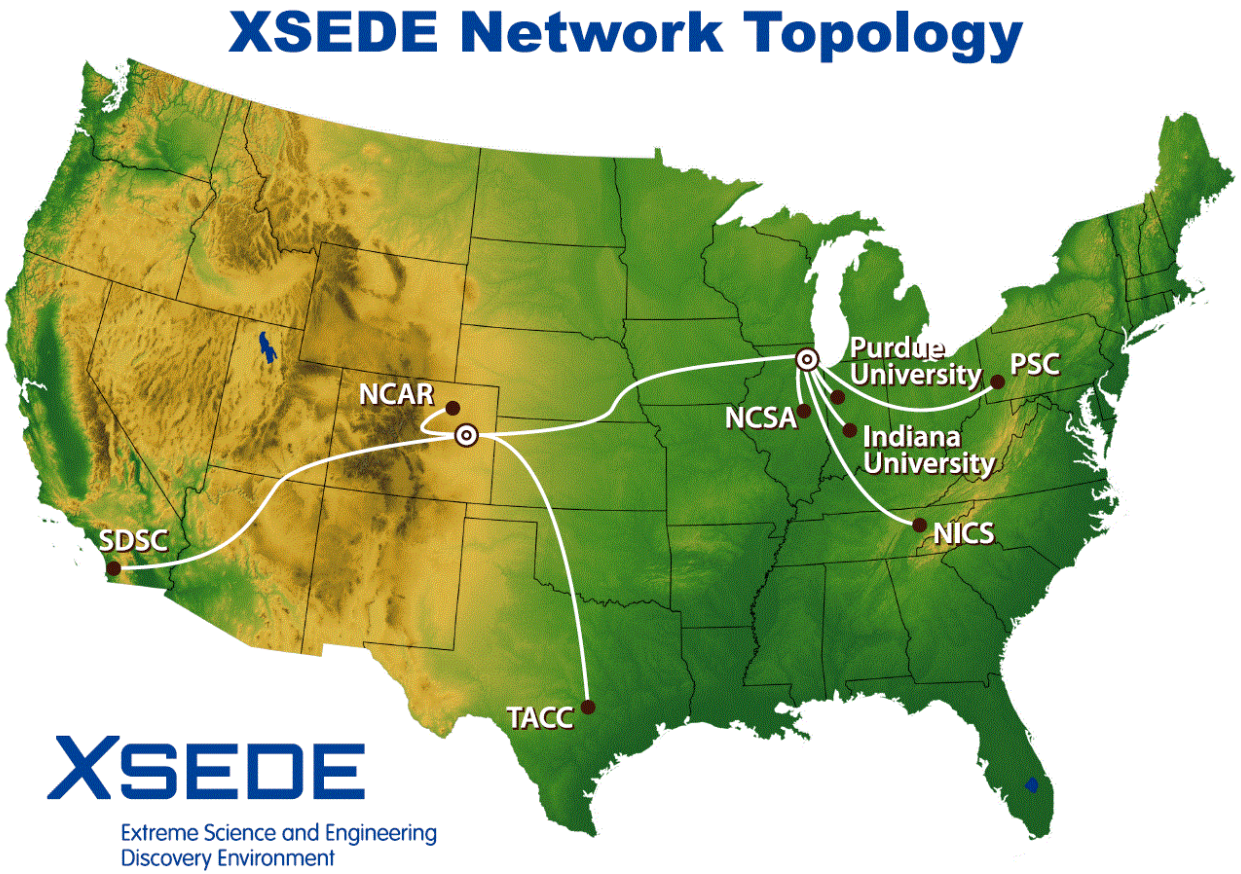
# Orientation

- XSEDE – Extreme Science and Engineering Discovery Environment
  - Cyber infrastructure funded by NSF; a single virtual system
  - ~15 supercomputers & high-end visualization and data analysis resources.
    17 partner institutions
- TACC – Texas Advanced Computing Center
  - Stampede – Dell Linux cluster
  - Wrangler – Data Analytics System (coming soon)
  - Maverick – HP/NVIDIA Interactive Visualization and Data Analytics System
- CAC – Cornell Center for Advanced Computing
  - HPC Systems – general use and private clusters
  - Red Cloud – on-demand research computing service

# XSEDE Partner Institutions

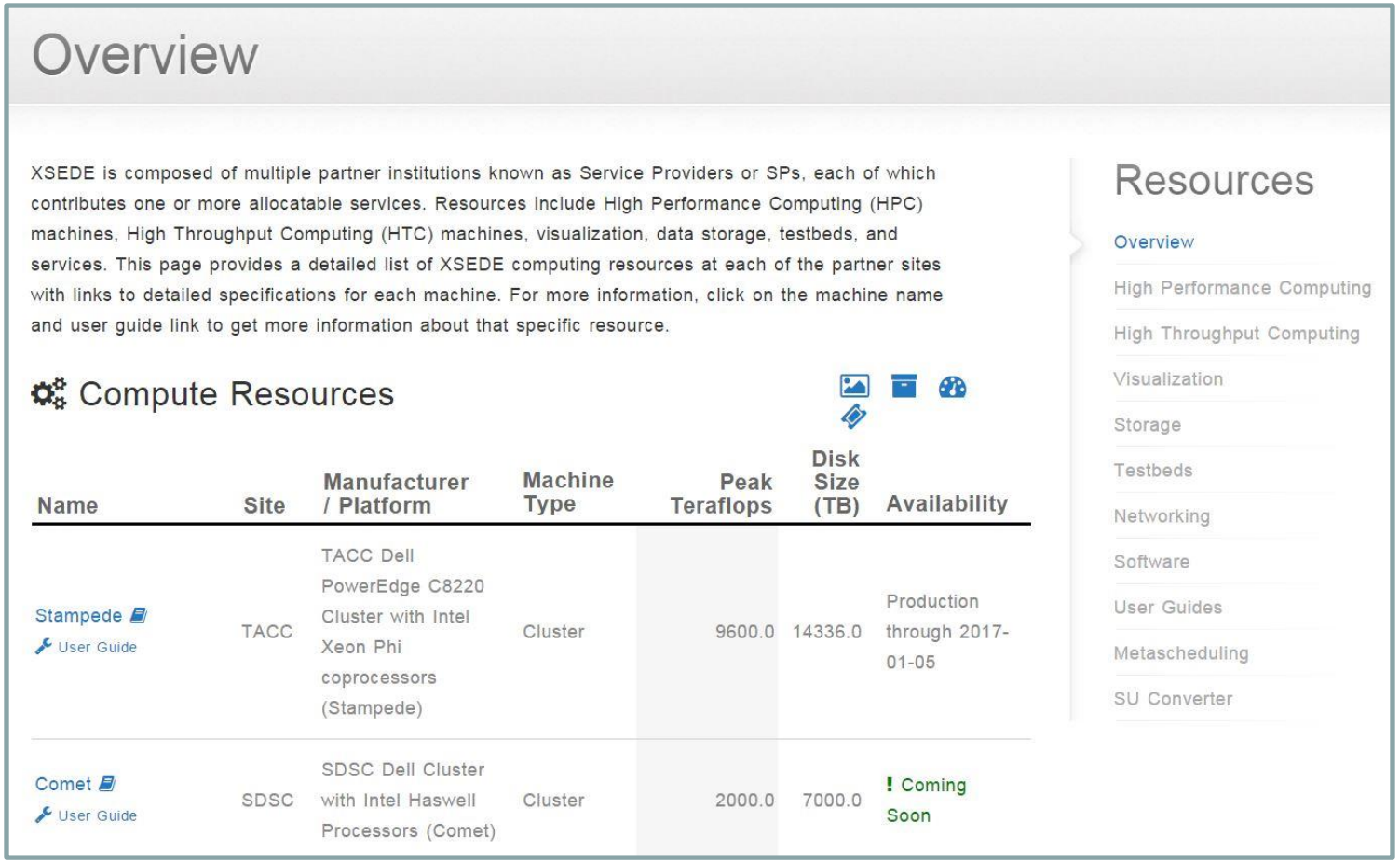


# XSEDE Network Topology



# XSEDE Resources

www.xsede.org/resources/overview



## Overview

XSEDE is composed of multiple partner institutions known as Service Providers or SPs, each of which contributes one or more allocatable services. Resources include High Performance Computing (HPC) machines, High Throughput Computing (HTC) machines, visualization, data storage, testbeds, and services. This page provides a detailed list of XSEDE computing resources at each of the partner sites with links to detailed specifications for each machine. For more information, click on the machine name and user guide link to get more information about that specific resource.

### Compute Resources

| Name | Site | Manufacturer / Platform | Machine Type | Peak Teraflops | Disk Size (TB) | Availability |
|---|---|---|---|---|---|---|
| Stampede<br>User Guide | TACC | TACC Dell PowerEdge C8220 Cluster with Intel Xeon Phi coprocessors (Stampede) | Cluster | 9600.0 | 14336.0 | Production through 2017-01-05 |
| Comet<br>User Guide | SDSC | SDSC Dell Cluster with Intel Haswell Processors (Comet) | Cluster | 2000.0 | 7000.0 | ! Coming Soon |

### Resources

- Overview
- High Performance Computing
- High Throughput Computing
- Visualization
- Storage
- Testbeds
- Networking
- Software
- User Guides
- Metascheduling
- SU Converter

# 2. Accounts and Allocations

# Computing Accounts

- Workshop/training accounts
  - Access to stampede.tacc.utexas.edu
  - ssh required
  - Account will be deleted after one week

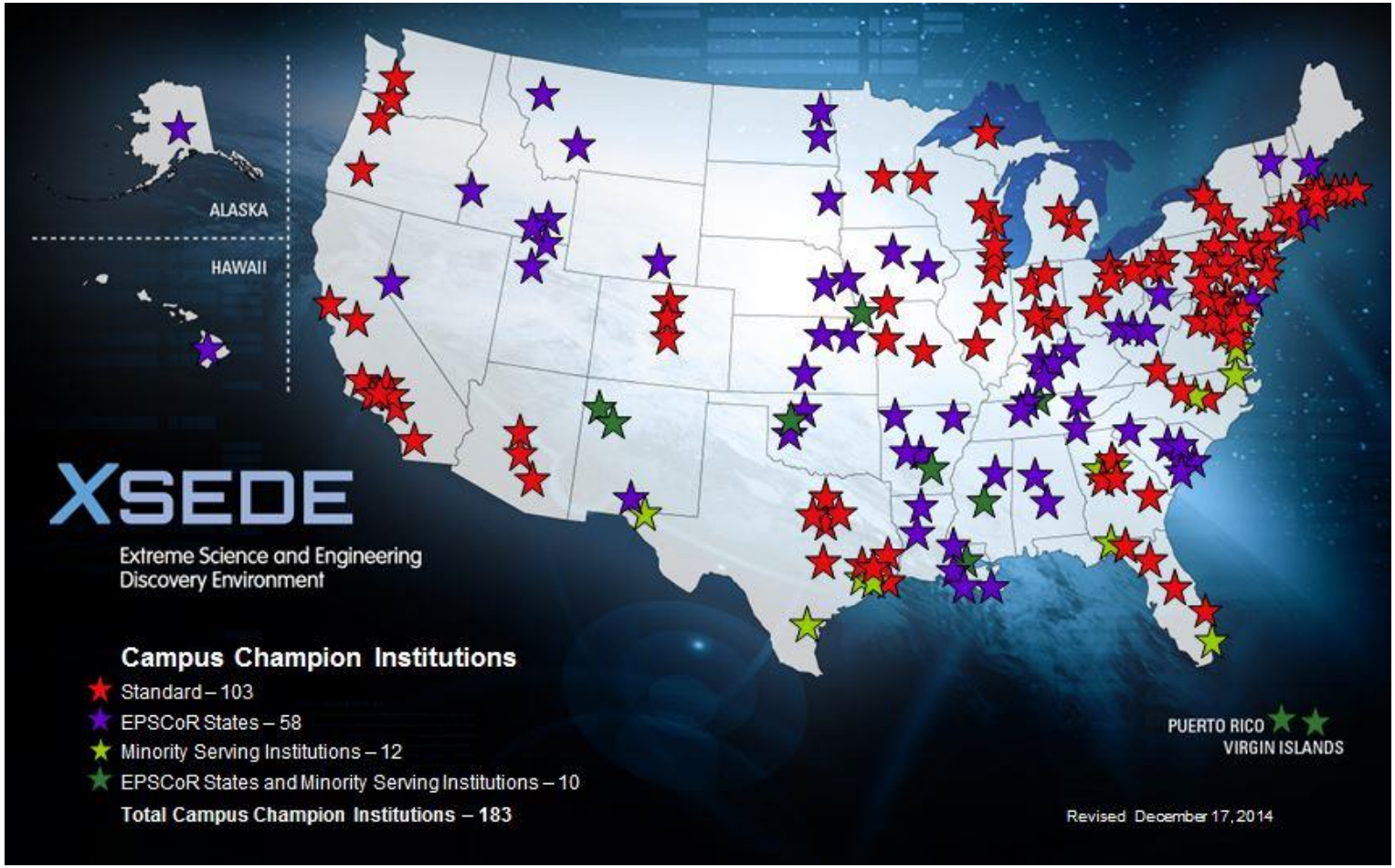
- CAC Services
  - PI may set up projects for
    - compute time
    - consulting time
    - Maintenance
    - Storage
    - Red Cloud
  - http://www.cac.cornell.edu/services/

# Campus Champions

- The Campus Champions program supports campus representatives as a local source of knowledge on XSEDE resources.
- Contact your Campus Champion for
  - Trial allocation
  - Information on XSEDE and cyberinfrastructure resources
- Cornell's Champion: Susan Mehringer shm7@cornell.edu

https://www.xsede.org/campus-champions

# Campus Champions



# XSEDE Allocations

Allocations provide computing, storage, and support services.
https://portal.xsede.org/web/guest/allocations

- Startup – for testing and preparing allocation request
  - Up to 200,000 core-hours, for 1 year
  - Submit Abstract, Awarded every 2 weeks
- Research – usually for funded research project
  - No specific limit of core-hours you can request, for 1 year
  - 10 page Request, Awarded quarterly
  - Form only available during open submission period
- Education – for classroom instruction and training sessions
  - Up to 200,000 core-hours, for 1 year
  - Submit CV and abstract, Awarded/2 weeks