# XSEDE Overview
## January 2019

XSEDE
Extreme Science and Engineering Discovery Environment

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Manager, XSEDE Broadening Participation Program

# Code of Conduct

- XSEDE has an external code of conduct for XSEDE sponsored events which represents XSEDE's commitment to providing an inclusive and harassment-free environment in all interactions regardless of gender, sexual orientation, disability, physical appearance, race, or religion. The code of conduct extends to all XSEDE-sponsored events, services, and interactions.
- **Code of Conduct:** https://www.xsede.org/codeofconduct
- Contact:
  - Event organizer: XSEDE Community Engagement & Enrichment
  - XSEDE ombudspersons:
    - Linda Akli, Southeastern Universitites Research Association, (akli@sura.org)
    - Lizanne Destefano, Georgia Tech (lizanne.destefano@ceismc.gatech.edu)
    - Ken Hackworth, Pittsburgh Supercomputing Center, (hackworth@psc.edu)

# What is XSEDE?


## Foundation for a National CI Ecosystem

- Comprehensive suite of advanced digital services that federates with other high-end facilities and campus-based resources

## Unprecedented Integration of Diverse Advanced Computing Resources

- Innovative, open architecture making possible the continuous addition of new technology capabilities and services

# XSEDE Leadership

Partnership led by

NCSA PSC TACC SDSC

Partners who strongly complement these CI centers with expertise in science, engineering, technology and education

| | | | | |
|---|---|---|---|---|
| SURA Southeastern Universities Research Association | The Shodor Education Foundation, Inc. | NICS | OU | Oklahoma State University |
| Ohio Supercomputer Center An OH·TECH Consortium Member | Purdue University | University of Arkansas | USC University of Southern California | NCAR |
| The University of Chicago | Indiana University | Cornell University | Georgia Tech | The University of Georgia |

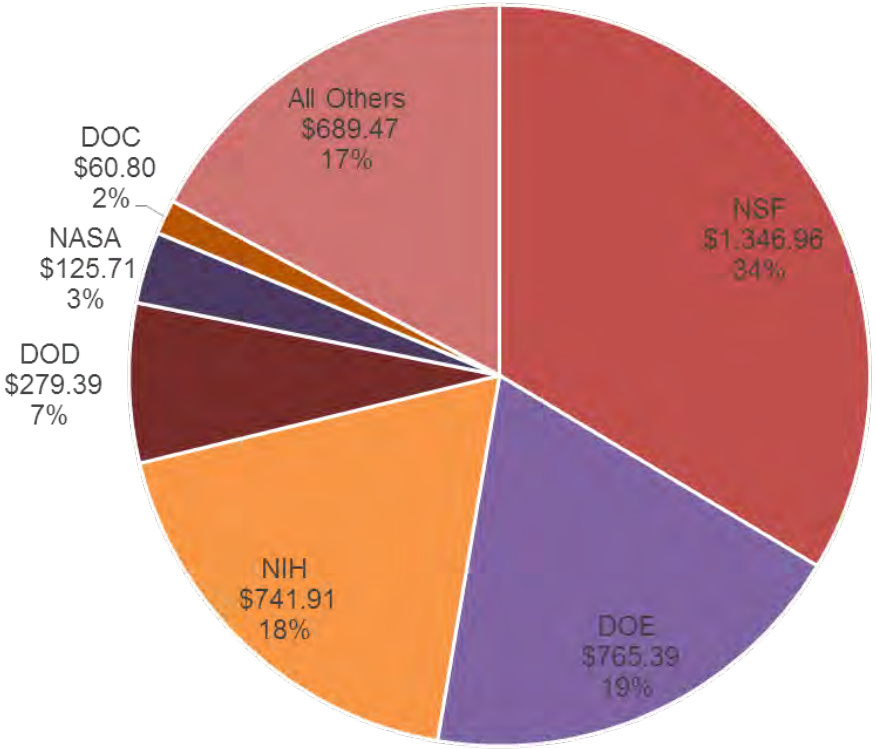
# Mission and Goals

Mission: Accelerate scientific discovery

Strategic Goals:

- **Deepen and Extend Use**
  - Raise the general awareness of the value
  - Deepen the use and extend use to new communities
  - Contribute to the preparation of current and next generation scholars, researchers, and engineers
- **Advance the Ecosystem**
- **Sustain the Ecosystem**

# Research Funding Supported by XSEDE, 2011-2018 ($M)

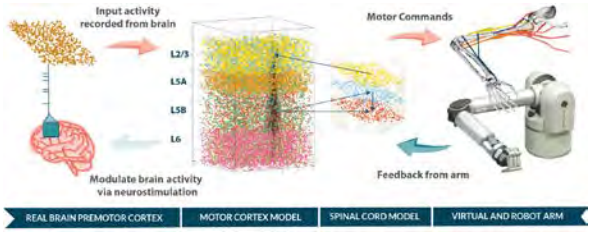


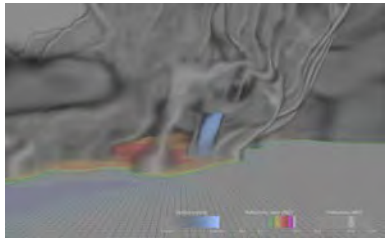

- The chart shows the total user-reported supporting grant funding, by agency, on XSEDE-allocated projects with resource activity.
- Where possible, grant information for NSF awards is taken from NSF Award Search.
- Supporting grants listed by multiple projects are counted ONCE using the average of the dollar values provided.

# XSEDE Supports a Breadth of Research

- Earthquake Science
- Molecular Dynamics
- Nanotechnology
- Plant Science
- Storm Modeling
- Epidemiology
- Particle Physics
- Economic Analysis of Phone Network Patterns
- Large Scale Video Analytics (LSVA)
- Library Collection Analysis

Replicating Brain Circuitry to Direct a Realistic Prosthetic Arm



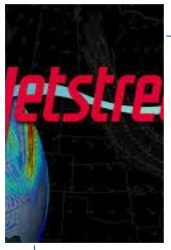



XSEDE researchers visualize massive Joplin, Missouri tornado

# Compute and Analytics Resources


Bridges: Featuring interactive on-demand access, tools for gateway building, and virtualization.

Comet: hosting  a variety of tools including Amber, GAUSSIAN, GROMACS, Lammps, NAMD, and VisIt.



Jetstream: A self-provisioned, scalable science and engineering cloud environment


Stampede-2:  Intel's new innovative MIC technology on a massive scale

Super Mic: Equipped with Intel's Xeon Phi technology. Cluster consists of 380 compute nodes.

Wrangler: Data Analytics System combines database services, flash storage and long-term replicated storage, and an analytics server. IRODS Data Management, HADOOP Service Reservations, and Database instances.

# XSEDE Visualization and Data Resources

## Remote Visualization

### TACC Visualization Portal

- Remote, interactive, web-based visualization
- iPython / Jupyter Notebook integration
- R Studio Integration


## Storage

- **Resource file system storage**:

  All compute/visualization allocations include access to limited disk and scratch space on the compute/visualization resource file systems to accomplish project goals

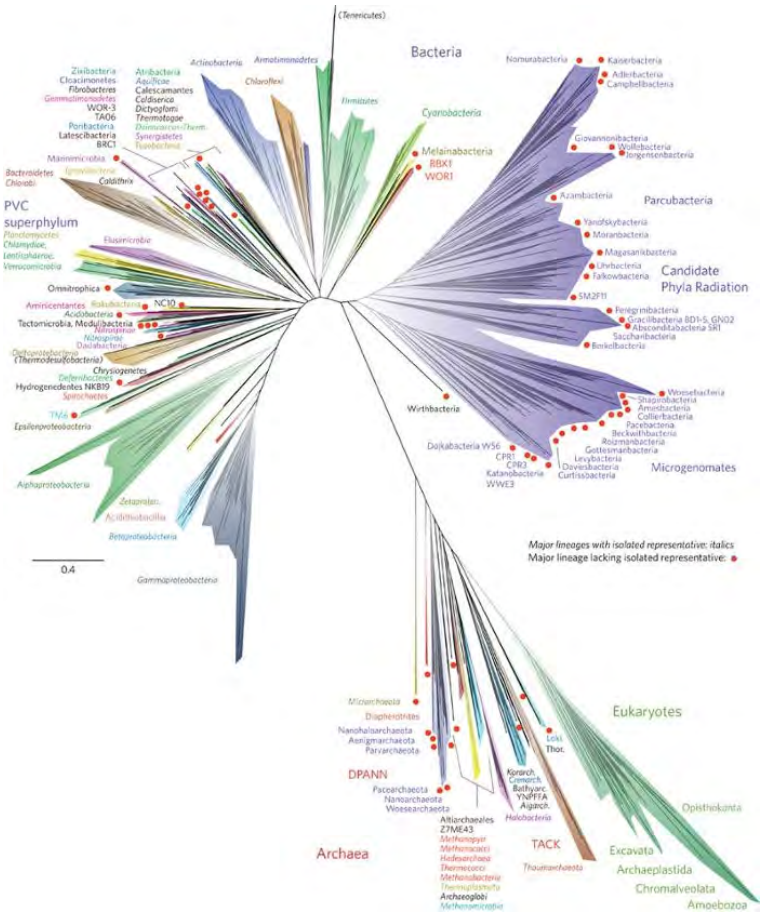
- **Archival Storage**:

  Archival storage on XSEDE systems is used for large-scale persistent storage requested in conjunction with compute and visualization resources.

- **Stand-alone Storage**:

  Stand-alone storage allows storage allocations independent of a compute allocation.

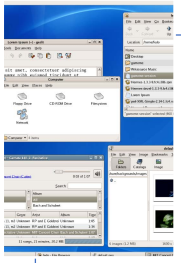
# Science Gateways




The CIPRES science gateway: A NSF investment launching thousands of scientific publications with no sign of slowing down.

https://sciencenode.org/feature/cipres-one-facet-in-bold-nsf-vision.php?clicked=title

# XSEDE User Support Resources



Technical information

Training


Help Desk/Consultants

Extended Collaborative Support Service

# Community Engagement & Enrichment (CEE)




XSEDE

# XSEDE Broadening Participation


- Campus Visits
- Community Listserv
- Conference Exhibiting
- Consulting
- Travel Support
- Training Events



XSEDE

# Workforce Development: Education Program

Develop, identify, & maintain computational science program competencies

Promote computational science

Provide consulting for program development and plans

Facilitate Collaborative Online Courses

# Workforce Development: Student Programs

Advanced Computing for Social Change and Compute4Change

Empower (Expert Mentoring Producing Opportunities for Work, Education, and Research)

Student Champions

# EMPOWER

- **PROJECTS:** Computational, Data Analytics, Visualization, Networking and System Maintenance
- **MENTORS** are XSEDE staff, researchers, and educators who recruit and mentor students.
- **STUDENTS** are undergraduates who participate as a learner, apprentice or intern
- **COMPENSATION:** Ranges from $750 to $3,000 (based on student level and duration)
- **Project proposals** from mentors must contain a training plan for the student.

# Workforce Development: Training

- XSEDE Training Course Catalog with all materials in a single location
- Course Calendar for viewing a listing of and registering for upcoming training events and a registration
- Online Training on materials relevant to XSEDE users
- Badges available for completing selected training
- Some events provide participation documentation
- Training Roadmaps


# PEARC19

pearc19.pearc.org

## Rise of the Machines (Learning)

July 28 - Aug 1, 2019 Chicago, IL

# Faculty Opportunities

- Use XSEDE Resources for research or teaching
- Attend a webinar or in-person training
- Use online training materials (XSEDE and HPC University)
- Participate in a faculty development workshop
- Attend PEARC19, July 28th – Aug 1st, https://www.pearc19.pearc.org/

# Student Opportunities

- Attend a training event – webinar or in-person
- Present a Poster or Visualization at PEARC19
- Apply to XSEDE's Empower Student Internship Program
- Participate in the Advanced Computing for Social Change @PEARC19
- Participate in Compute4Change @SC19, Denver, Nov 17th – 22nd
- Visit HPC University for more student opportunities. www.hpcuniversity.org

# Workshop Agenda

| | |
|---|---|
| Today | Computational Thinking for Educators, Kate Cahill |
| | Lunch w/ Science Talks and Consulting |
| | XSEDE New User Training, Jay Alameda |
| | Introduction to Python, Je'Aime Powell |
| Tuesday | XSEDE New User Training, Jay Alameda |
| | Introduction to Linux/Unix, Je'Aime Powell |
| | Lunch w/Science Talks and Consulting |
| | Computational Thinking for Educators, Kate Cahill |
| | Low Cost Cluster Administration, Eric Coulter |
| | Consulting |

# More Information

Linda Akli, akli@sura.org

Dr. Tandabany, CAU Campus Champion, Tandabany, dtandabany@cau.edu

Dr. Tekle, Spelman Campus Champion, ytekle@spelman.edu

XSEDE Website – http://xsede.org

Workshop materials - http://hpcuniversity.org/trainingMaterials/244/

XSEDE

Extreme Science and Engineering Discovery Environment

# Welcome to XSEDE!