XSEDE Training: Courses and Materials

SIGHPC Education Chapter Webinar
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XSEDE Overview
XSEDE Overview

XSEDE:
• Is an NSF-funded virtual organization
• Integrates and coordinates the sharing of advanced digital services (e.g. supercomputers, visualization, data analysis resources)
• Serves researchers nationally to support science
• Provides users with seamless integration to NSF's high-performance computing and data resources

https://www.xsede.org/about/what-we-do
XSEDE Resources

Resources include
• Multi-core high performance computing (HPC)
• Many-core HPC
• Distributed high-throughput computing (HTC)
• Visualization
• Data analysis
• Large-memory
• Data storage
• Cloud

https://www.xsede.org/ecosystem/resources
Software on XSEDE Resources

Software

Find software available on XSEDE Service Provider sites. You can view by Resource, Site or Software type and then search for name, version, URL and more. To view details about a software package, click on the software name to see available versions. For more details click on the version to find out more about the software including how to access the software package.

Are you looking for software that is accessible via a science gateway? Visit the Science Gateways Application List

Help us gauge interest in potential future installations: If there's a software package you'd find useful, submit a ticket to let us know.
XSEDE Training: Big Picture
# XSEDE Training: Big Picture

<table>
<thead>
<tr>
<th>This group</th>
<th>Offers</th>
<th>On</th>
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<th>Approx</th>
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<tbody>
<tr>
<td>Training</td>
<td>Async online modules</td>
<td>Many HPC topics</td>
<td>Everyone</td>
<td>Ongoing</td>
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<tr>
<td>Training, SP</td>
<td>Webcast</td>
<td>Getting started</td>
<td>Everyone</td>
<td>Quarterly</td>
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<tr>
<td>Training</td>
<td>Multicast live training</td>
<td>HPC Topics</td>
<td>Satellite sites</td>
<td>Monthly</td>
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<tr>
<td>Broadening Participation</td>
<td>On-site training</td>
<td>HPC and XSEDE</td>
<td>Extended community</td>
<td>Quarterly (academic year focus)</td>
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<tr>
<td>ECSS ESTEO</td>
<td>Webcast and live training</td>
<td>New resources, new capabilities</td>
<td>XSEDE Staff</td>
<td>Annual series</td>
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<tr>
<td>ECSS ESTEO</td>
<td>All formats</td>
<td>Many HPC topics</td>
<td>Everyone</td>
<td>Ongoing</td>
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<tr>
<td>Service Providers</td>
<td>On-site and webcast</td>
<td>Local resource</td>
<td>Everyone</td>
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<tr>
<td>ECSS, SPs</td>
<td>Webcast</td>
<td>Varied</td>
<td>Campus Champions</td>
<td>Quarterly</td>
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Events and registrations: [https://portal.xsede.org/course-calendar](https://portal.xsede.org/course-calendar)
ESTEO

- Mentor Campus Champion Fellows
- Deliver live training events especially in collaboration with CEE Broadening Participation
- Orchestrate ECSS internal staff training seminars
- Respond to requests for service
  http://www.calendar.gatech.edu/event/595496
- Review training modules
- Support Meetings and BOFS
- Mentoring
- Review Education Allocation Proposals
- Support Campus Champions
- Manage US Participation in International HPC Summer School

Acknowledgement: Jay Alameda
Curriculum and Educator Programs

XSEDE pursues innovation and collaboration in computational science education.

Campus Visits

XSEDE campus visits emphasize the need for education and offer guidance concerning courses. Campus visits bring together faculty, students, and administrators to discuss the importance of having a workforce skilled in computational science.

Participating in Collaborative Online Courses

The XSEDE courses consist of recorded lectures that can be watched by students independently or in their own local classrooms. Each lecture comes with built-in quizzes that are used as part of the grading for the course. In addition, several computer exercises are typically available that students can run on XSEDE computational resources to gain practical experience and have credit for the work recorded in their class grade.

The capstone assignment for a course often is a final project supervised by the local faculty members.

The first of these courses is Applications of Parallel Computers, taught by Jim Demmel at the University of California, Berkeley. View the course content.

How Faculty Can Participate

If you are a faculty member interested in collaborating with XSEDE in this program, you will need to create a course in your own academic schedule that your local students can register for and receive credit. You and your students will then use the online materials and XSEDE resources to complete the course.

Local faculty who participate in the program meet periodically with the XSEDE instructors and staff to discuss schedules, suggestions for course improvement, and any questions related to operations. The local faculties are responsible for assigning final grades to all of their students.

XSEDE sponsors full-semester online courses taught through collaborations with faculty at participating institutions.

https://www.xsede.org/community-engagement/educator-programs
CEE: Broadening Participation Program

Expand awareness of XSEDE
- Campus Visits
- Conference Exhibiting
- Papers
- News

Identify programs and researchers who can benefit from XSEDE services
- Conference Exhibiting
- Campus Visits
- Training Events
- Consulting

Enable institutions and faculty to use advanced computing to increase their research productivity
- Build and Maintain a Thriving Peer Support Community
- Deliver training mapped to needs
- Connect researchers with XSEDE services and expertise

Create scalable and sustainable models and best practices
- Enhance curriculum
- Foster productive campus champions
- Create connections to the CI Ecosystem

Acknowledgement: Linda Akli
Cyberinfrastructure Resource Integration

• Software toolkits, consulting services, provider coordination
  • Cluster distribution, scientific software, XSEDE-like environment
  • Site visits to help install
  • Information and support for joining the XSEDE federation

• Impacts
  • 7 clusters and more than 700 TeraFLOPS of computing on CRI software
  • New data analytics program supported at Bentley University, short video at http://bit.ly/xsede-ba

Acknowledgement: Rich Knepper
The Campus Champions Program is a group of 400+ Champions at 200+ US colleges, universities, and other research-focused institutions, whose role is to help researchers at their institutions to use research computing, especially (but not exclusively) large scale and high end computing.

The Campus Champions started as a way to drive users to XSEDE TeraGrid machines, but over time we've become a national community of practice in research computing facilitation.

**What is a Campus Champion?**
A Campus Champion is an employee of, or affiliated with, a college or university (or other institution engaged in research), whose role includes helping their institution's researchers, educators and scholars (faculty, postdocs, graduate students, undergraduates, and professionals) with their computing-intensive and data-intensive research, education, scholarship and/or creative activity, including but not limited to helping them to use advanced digital capabilities to improve, grow and/or accelerate these achievements.

**Who are the Campus Champions?**

[https://www.hpc.msstate.edu/publications/docs/2017/01/1517907816979.pdf](https://www.hpc.msstate.edu/publications/docs/2017/01/1517907816979.pdf)
XSEDE Training
XSEDE Training

Training is available in a variety of formats, including multicast, webinars, online training, and in person workshops. Suggestions for new topics are encouraged via the feedback form. For more information, see:

- **XSEDE Training Overview** for a summary guide of materials available
- **XSEDE Training Course Catalog** including listings across formats and sites
- **Course Calendar** with registration for upcoming training courses
- **Online Training** on materials relevant to XSEDE users
- Badges are available
- Roadmaps are in development

Training materials focus on systems and software supported by the XSEDE Service Providers, covering programming principles and techniques for using resources and services. Training classes are offered in high performance computing, visualization, data management, distributed and grid computing, science gateways, and more.
XSEDE Monthly Workshop Series

• Rotating (Nuts and Bolts) Topics
  • MPI, OpenMP, OpenACC, Big Data, Summer Boot Camp
• Up to 25 satellite sites per session
  • Sites are spread geographically and include MSIs and National Labs
• Register VIA XSEDE Portal:
  • https://portal.xsede.org/course-calendar
• To Become a Satellite Site or Questions Contact:
  • Tom Maiden – tmaiden@psc.edu
## XSEDE Monthly Workshop: Big Data

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<th>Day 1</th>
<th>Day 2</th>
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<tbody>
<tr>
<td>11:00 Welcome</td>
<td>Machine Learning: Recommender System with Spark</td>
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<tr>
<td>11:25 Intro to Big Data</td>
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<td>12:00 Hadoop</td>
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<tr>
<td>12:30 Intro to Spark</td>
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<td>1:00 Lunch</td>
<td>Lunch</td>
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<tr>
<td>2:00 Spark</td>
<td>Deep Learning with Tensorflow</td>
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<td>3:30 Spark Exercises</td>
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<tr>
<td>4:30 Spark</td>
<td>Bridges: A Big Data Platform</td>
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<td>5:00 Adjourn</td>
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Acknowledgement: Tom Maiden
XSEDE Asynchronous Training

- Asynchronous Training
  - https://portal.xsede.org/online-training
- CI-Tutor
- Cornell Virtual Workshop
XSEDE Webinars

• Course Calendar
  • [https://portal.xsede.org/course-calendar](https://portal.xsede.org/course-calendar)
  • Quarterly New User Training
  • Writing a Successful XSEDE Allocation
XSEDE Training Activities
Badges

• Test yourself on what you learn from a workshop and earn a digital badge!
• Go to: http://www.hpc-training.org/xsede/moodle/
• Look under ‘Available Courses’ to find the course for the badge you want to earn
• Currently available: OpenACC, Data Viz, Big Data
• OpenMP coming soon
Roadmaps

https://portal.xsede.org/
=> Training
=> Overview
Roadmaps

Try this Roadmap to navigate through topics on starting to use XSEDE resources. Click "Getting Started" button below and hover over buttons for descriptions. Let us know if you need help by contacting us at help@xsede.org.

This document on Data Management is a good place to get an overview. Depending on your needs, you may want to follow up with a tutorial on data transfer methods. If Globus is the best tool for your needs, the user guide or slides from a presentation on Globus One may be useful. Using globus with XSEDE resources is covered in an online module.
Ongoing Improvement

CEE/WD/Training and ECSS/ESTEO work together to **identify needed topics** by:

- User survey input
- Request for user input here: https://www.xsede.org/for-users/training
- Help ticket input
- Quarterly email for input to
  - XSEDE User News
  - Campus Champions
  - SP Forum
  - XSEDE Staff

XSEDE staff conduct **formal, anonymous peer reviews** of XSEDE-sponsored training resources, as well as key training resources developed by XSEDE service providers. These reviews help inform roadmaps and other XSEDE-level training initiatives, and provide valuable feedback to authors to help them improve their training materials.

XSEDE Training **works with the larger community** to improve and compliment, not duplicate, effort. E.g. the XUP training pages are adding links to select materials from the community and participate in training activities with other organizations, e.g. SIGHPC Edu activities.
Questions?

www.xsede.org

portal.xsede.org

shm7@cornell.edu