XSEDE

Extreme Science and Engineering Discovery Environment

What is XSEDE?

The Extreme Science and Engineering Discovery Environment (XSEDE) is the most advanced, powerful, and robust collection of integrated digital resources and services in the world. It is a single virtual computing system that scientists can use to interactively share resources, data and expertise.

Scientists, engineers, social scientists, and humanities experts around the world — many of them at colleges and universities — use advanced digital resources and services every day. Supercomputers, collections of data, and new tools are critical to the success of those researchers, who use them to make our lives healthier, safer, and better.

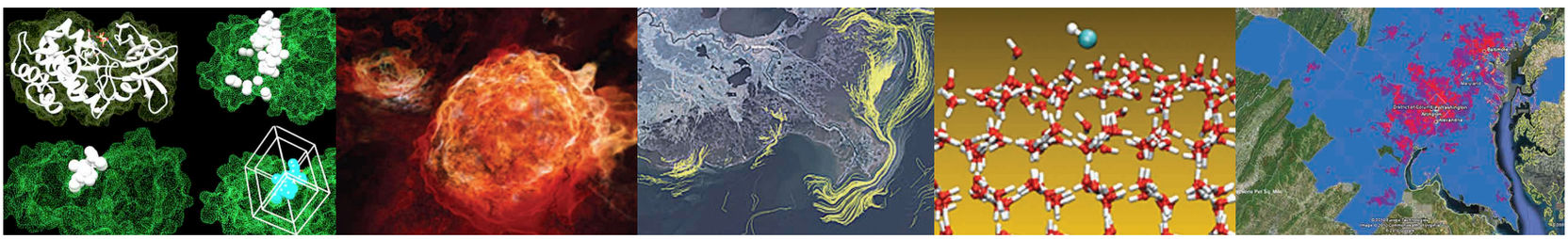
XSEDE integrates these resources and services, makes them easier to use, and helps more people use them.

Currently XSEDE supports more than a dozen supercomputers and high-end visualization and data analysis resources. XSEDE's integrated, comprehensive suite of services connects with other high-end facilities and campus-based resources, serving as the foundation for a national computing ecosystem. Among XSEDE's advanced digital services are common authentication and security mechanisms, global namespace and filesystems, remote job submission and monitoring, and file transfer services. XSEDE's architecture is based on a judicious use of standards and allows open development for future digital services and enhancements.

The five-year, $121 million project is supported by the National Science Foundation.

XSEDE is led by the University of Illinois' National Center for Supercomputing Applications. The partnership includes: the Cornell University Center for Advanced Computing, Indiana University, Jülich Supercomputing Centre, National Center for Atmospheric Research, National Center for Supercomputing Applications - University of Illinois at Urbana-Champaign, National Institute for Computational Sciences - University of Tennessee Knoxville/Oak Ridge National Laboratory, Ohio Supercomputer Center - The Ohio State University, Pittsburgh Supercomputing Center - Carnegie Mellon University/University of Pittsburgh, Purdue University, Rice University, San Diego Supercomputer Center - University of California San Diego, Shodor Education Foundation, Southeastern Universities Research Association, Texas Advanced Computing Center - The University of Texas at Austin, University of California Berkeley, University of Chicago, and the University of Virginia.

- **XSEDE website: www.xsede.org**
- **How to get time on XSEDE computing resources: www.xsede.org/allocations**
- **Education and Outreach, Campus Champions: outreach-info@xsede.org**
- **General questions: info@xsede.org**
- **Find on Facebook and Twitter @XSEDEscience**



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The XSEDE project also provides the expertise to ensure that researchers can make the most of the supercomputers and tools such as:

- Extended Collaborative Support Service (ECSS) that includes assigning experts from XSEDE partner sites to work closely with users over long periods of time, as well as working with entire research communities to extend their capabilities.
- An advanced distributed systems architecture, rooted in user requirements and hardened by systems engineering, that allows for individualized user experiences, consistent and enduring software interfaces, improved data management, and ways for campus resources to be transparently integrated into the overall XSEDE infrastructure.
- The XSEDE user portal, a web interface that allows users to monitor and access XSEDE resources, manage jobs on those resources, report issues, and analyze and visualize results.
- Coordinated allocations of NSF's high-end resources and digital services.
- Internet2 and the XSEDEnet networking group work together to configure a private network between XSEDE service provider sites across a shared backbone. A majority of sites connect to the nearest Internet2 Advanced Layer 2 Service node at 10G and share bandwidth across a 100G backbone with other participants. The upgrade, which came in 2013, eliminated potential bottlenecks between Denver and Chicago associated with the prior XSEDE backbone architecture.
- Specialized community-provided services that serve a particular function and allow for rapid innovation and experimentation.
- Advanced cybersecurity to ensure that XSEDE resources and services are easily accessible to users but protected against attack.
- Training, education, and outreach that expand participation in XSEDE-based projects, curriculum development, and more traditional training opportunities.
- Advanced support for novel and innovative projects.
- A fellowship program that brings Campus Champions to work closely with extended collaborative support staff at XSEDE service providers.
- The XSEDE user portal has recently launched two mobile apps to provide powerful features to help researchers better use XSEDE resources and services. The XSEDE User Portal apps are free and available now in Google Play and the Apple App store.

Campus Champions

XSEDE supports the Campus Champions program, which includes volunteers from 200 institutions in all 50 states who provide information about high-performance and high-throughput computing and other XSEDE digital services, opportunities and resources. Champions provide their campuses with direct access to XSEDE and input to its staff, as well as startup resource allocations for use by campus researchers, and assistance in using those resources. Champions serve the scientific community on their own campuses and provide regional and national assistance. They also provide valuable feedback, helping XSEDE leaders understand the impact of resources and challenges at participating campuses.

To gain additional experience with XSEDE, Champions may apply to the Campus Champions Fellows Program, which offers expanded professional development opportunities. Fellows help connect the broader scientific community with the cyberinfrastructure expertise that is inherent in high-end application support staff. Each Fellow is paired with a member of XSEDE's Extended Collaborative Support Services team for up to one year, during which the Fellows gain greater knowledge of and exposure to XSEDE and how the data, tools, and resources are and can be used.

- **How to become a Campus Champion: www.xsede.org/campus-champions**
- **Extended Collaborative Support Service: www.xsede.org/ecss**

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