Mission and Vision

The mission of Research Computing is to design, build, and manage a group of heterogeneous high performance computing resources for use by Texas State students, faculty, and staff. Information Technology is committed to providing seamless access to advanced HPC resources in the pursuit of research and instructional goals.

In support of the computational research initiative, it is our mission to enable research activities and the education of students in all disciplines who depend on advanced computing technologies. We strive to promote future growth in research and creative activity across all disciplines.

Educational Goals

★ Provide opportunities for undergraduate and graduate students to learn about cutting-edge technology to access and interpret scientific information.

★ Assist students in graduate research by enhancing their ability to obtain advanced graduate degrees.

★ Prepare students with current knowledge of the technological and scientific methods demonstrated in HPC.

★ Allow students to work in the field of advanced data structures.

Research Objectives

Computational support fosters cooperative, multi-disciplinary research relationships and assists Texas State researchers in obtaining external funding support for research projects in several ways.

★ The availability of on-campus computational resources, hardware, software, education, and consulting is a strong indicator to proposal reviewers that Texas State’s HPC-intensive research plans can be carried out effectively and efficiently.

★ Computationally oriented academic members participate in externally funded research projects and, therefore, assist in developing grant proposals that reflect the level of HPC expertise in Texas State’s research community.

★ Successful executions of research projects that employ computationally intensive and enhanced resources cultivate a track record of scientific excellence that enhances Texas State’s reputation among funding agencies.

 ★ The research climate at Texas State attracts highly qualified students, faculty, and staff. This increases opportunities for external funding proposals as well as rates of successful funding.

Vice President for Information Technology

The Vice President for Information Technology provides the Division of Information Technology, including Technology Resources (TR), secure, robust, and cost-effective information technologies at Texas State. TR supports critical technological functions such as academic instruction, administration, student services, research activities, human resources, and financial services.

TR delivers secure telephone, computing, and network access, as well as customer-focused technical support and training to assure optimal use of information technology. In short, TR keeps the university community connected to itself and the world.

Office of the Associate Vice President for Research

The Office of the Associate Vice President for Research (AVPR) supports and promotes the research and scholarship needs of faculty and staff. In addition, the AVPR encourages shared responsibility, compliance, and scholarly integrity. To that end, the AVPR assists faculty members in their research endeavors, encourages interdisciplinary activities across campus, and provides matching funds to support new programs and initiatives.

This office provides administrative support for research activities through the Office of Sponsored Programs, the Office of Research Compliance, and the Office of Electronic Research Administration. Six multidisciplinary centers and institutes report to the AVPR.

Electronic charge density in Lead Telluride, a material used in thermoelectric applications.

The rising STAR of Texas
High Performance Computing

Information Technology and the Office of the Associate VP for Research (AVPR) have developed high performance computing (HPC) platforms for educators and researchers who have intensive computational tasks.

This collection of servers and storage provides students, educators, and researchers a safe and secure environment for data and computing functions. Operating within the Division of Information Technology, Technology Resources provides housing and systems administration for all HPC equipment.

HPC at Texas State

The Texas State HPC facility consists of three platforms. Star ★ Schrödinger ★ Xiphos

The Texas State HPC team is instrumental in defining the third party tools needed to run its individual jobs. Under the supervision of the Vice President for Information Technology office, the HPC technical team is responsible for the acquisition, configuration, and deployment of HPC platforms. Highly technical individuals interested in active participation should contact the technical group for more information and inclusion.

In addition, Information Technology and the Office of AVPR partner with researchers, combining financial support and expertise. This creates more buying power and extends research grants and dollars.

Currently, the configuration and use of HPC resources are self-governing. Exclusive access to these services are reviewed and approved by a simple majority of the HPC team on a case-by-case basis.

HPC Platforms

Star is a research cluster that is designed to accommodate a wide range of research topics. The parallel computing part is a 32 node, 512 core machine. SMP processing is accomplished with two boxes, each containing 40 cores and one TB (Terabyte) of RAM. Tesla GPU development is made up of two boxes for a total of 896 cores. This cluster is served by 96 TB of solid state, high speed disks.

Schrödinger is a research cluster that is dedicated to material science research. The parallel code development and material science simulation are performed on this 30 node (240 core) cluster. Two nodes have Nvidia GPUs with cuda support.

Xiphos is a single, special-purpose server with 32 cores (four CPUs times eight cores). It also has one TB of main memory. With Xiphos, chemistry and biochemistry departments research genetic model systems in relation to DNA damage, DNA repair, and transcriptional regulation.

Texas State Researchers

Dr. Luisa Scolfaro, performs computational simulation on the electronic structure of semiconductors and oxides, including the presence of impurities and defects, interfaces, etc., using state-of-art first-principles DFT methods.

Dr. Thomas Hardy, chief science officer at the Meadows Center for Water and Environment uses HPC to analyze fish habitat and geomorphic channel adjustments as related to proposed river restoration alternatives.

Dr. Young Ju Lee, professor in the Department of Mathematics, focuses on modeling the generation and destruction of gelation or the shear induced structures in micellar fluids.

Dr. Shuying Sun, assistant professor in the Department of Mathematics, has been working on statistical genetics and bioinformatics with a focus on methylation microarray and sequencing data analysis, mutation age estimation, haplotype inference, and genetic variation identification.

Dr. Ray Treinen, assistant professor in the Department of Mathematics, works with students to design and run large-scale simulations of physical phenomenon from fluids mechanics and other areas of mathematical physics.

Dr. Jennifer Jensen, assistant professor in the Department of Geography, engages in research including Big Data mining and analysis, spatially-explicit predictive modeling, and multi-scale land cover/land use change.

XSEDE

Texas State is a member of the Extreme Science and Engineering Discovery Environment (XSEDE). This is an open scientific discovery infrastructure combining leadership class resources at 11 partner sites. It creates an integrated, persistent computational resource and provides greater processing power.

Through provisional testing access and available allocations, users have the ability to run jobs for their analysis using hundreds of cores.

Using high-performance network connections, XSEDE integrates high-performance computers, data resources and tools, and high-end experimental facilities around the country. Currently, XSEDE resources include more than two petatflops of computing capability and more than 50 petabytes of online and archival data storage with rapid access and retrieval over high-performance networks.

Researchers can also access more than 100 discipline-specific databases. With this combination of resources, XSEDE is the world’s largest, most comprehensive, distributed cyber infrastructure for open scientific research.

Learn more about XSEDE at www.xsede.org.

HPC Support

Our HPC Support Team can help get your project up and running! Contact us for questions or assistance.

- Dr. Marty Bylander - db63@txstate.edu
- Mr. Bill Rampy - wr15@txstate.edu