High Performance Computing

Swarthmore ITS provides access to high performance computing systems for computationally intensive projects. There are several different types of systems that are available for faculty, staff, and students. Academic Technologists from ITS will work with you to figure out what resource would best match your project.

- Strelka Computer Cluster
  - Technical Specifications
- Supercomputing Resources
- High Throughput Computing Resources
- Local Resources
- Image and Video Processing

Strelka Computer Cluster

Campus researchers have access to Strelka, Swarthmore's computer cluster. Learn more about the system on the Strelka Computer Cluster page.

Technical Specifications

The cluster consists of 7 nodes, each with two 20-core CPUs with an additional head node to handle user logins and job scheduling.

- 3 mid-memory nodes (384GB RAM)
- 2 high-memory nodes (768GB RAM)
- 2 GPU nodes, each with 4x NVIDIA 2080 Ti GPUs
- High speed Infiniband networking

Jobs are submitted through the Slurm job scheduling system.

Supercomputing Resources

The Xtreme Science and Engineering Discovery Environment (XSEDE) is an NSF-funded consortium which supports a network of shared supercomputing resources housed at major U.S. research institutions. Through XSEDE, member institutions gain access to flexible pools of time on large supercomputers. Using these systems, researchers are able to complete computational processes in one hour that would take a single desktop computer decades to complete. Since joining in 2010, Swarthmore faculty and students from biology, chemistry, computer science, physics, and statistics made use of over a million processor-hours on supercomputing facilities around the United States. Swarthmore is one of only a handful of liberal arts colleges among more than 150 universities participating in the XSEDE Campus Champions program. Our support of faculty and research was acknowledged as a model in the 2011 XSEDE Highlights publication.

From XSEDE's web site:

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

Among systems available on XSEDE are:

- Stampede2, a supercomputer at the Texas Advanced Computing Center with over 350,000 processor cores and 700TB of compute memory.
- The Open Science Grid, consisting of a network of more than 60,000 computers available to run serial jobs with a short queue time.
- Comet GPU, a system at the San Diego Supercomputing Center designed for working on problems requiring graphical processing units for accelerated computing.

Swarthmore faculty and students have used XSEDE for calculations of chemical structures, plasma physics simulations, and development of new computer science algorithms.

To learn more about XSEDE or get a XSEDE account, contact Andrew Ruether (x8254, aruethe2) in ITS.

High Throughput Computing Resources

If you have a large job that can be broken down into small, independent pieces, high throughput computing (HTC) may be a way to reduce the time needed for your calculation. Instead of running a program on one large computer, you can create hundreds or thousands of small jobs that are sent to Open Science Grid (OSG), a set of thousands of computers across the country. Anyone can create an account at OSG Connect and start submitting jobs using the HTCondor system.

To learn more about Open Science Grid contact Andrew Ruether (x8254, aruethe2) in ITS.

Local Resources
For special projects, Swarthmore ITS may be able to provide access to the spare computer time in ITS classroom computers, servers, or on cloud-based services.

Image and Video Processing

The ITS Media Center has a set of high-end computers that can be used for video editing, image processing, and other computationally-intensive processes.