The Cornell Theory Center provides high-performance computing resources to advance and facilitate research in a broad spectrum of scientific and engineering fields at Cornell. Part of CTC's mission is to create and support cross-university research alliances that rely on high-performance computing to achieve major advances. Examples of these are the Computational Biology Service Unit and a new initiative in computational finance.

**SUPPORT & SERVICES:**

**eScience Service Unit (eSU):** The eScience Unit provides a breadth of services to researchers with data-intensive applications – database systems and data storage management, database programming and consulting, data curation, and data mining. eSU also conducts leading-edge research in related data management and data-mining topics. CTC has significant expertise in SQL Server, as well as experience running data-driven simulations across heterogeneous (Linux and Windows) HPC platforms.

**Computational Agriculture:** The Computational Agriculture initiative with the Cornell Theory Center (CTC) incorporates high-performance computing resources with the process of solving agricultural problems. Specifically, the joint venture between CTC and the College of Agriculture and Life Sciences (CALS) will advance research on data-intensive agricultural problems with applications to HPC and develop and advance management tools and databases that require HPC facilities in support of services to the agricultural community.

**The Computational Biology Service Unit:** provides research, software and hardware support for computational biology applications. Assistance in the design and implementation of computational solutions is also provided. CBSU responsibilities cover a wide variety of topics and tasks, including: Computational Resources, Research, & Software Development
**Computational Materials Institute:** Experts within the Computational Materials Institute use the tools of computational science to understand behavior of a wide range of materials on the way to predicting performance and life of natural and engineered structures, at length scales ranging from submicron to kilometers. CMI recently implemented the Adaptive Software Project, a multi-institutional, multi-disciplinary computational science project, which is studying adaptivity in such computational science applications.

**Computational & Statistical Genomics:** This focus area promotes computational, mathematical and statistical research, and education associated with the development of highly advanced tools for data acquisition and analysis. The goal is to further the understanding of the origins of life and the molecular processes that underlie both the unity and the diversity of life.

**Data-Driven Science:** Scientific instruments that transform phenomena in the physical world into digital data and computer simulations of scientific experiments have created a data-driven revolution in the sciences. Scientists have moved from data-starved environments to conditions where research communities are overwhelmed with data. The Cornell Theory Center (CTC) has considerable expertise in data-intensive and high-performance computing to develop, implement and maintain cyberinfrastructure to support researchers. With its focus on cyberinfrastructure, CTC is facilitating new forms of distributed research collaboration allowing scientists to concentrate on their area of expertise rather than the underlying infrastructure. CTC creates solutions that incorporate powerful development tools, standard open interfaces, interoperability, code reduction, scalability, reliability, and security.

**Visualization Center:** provides consulting and technical media production services. CTC also provides a CAVE Immersive Visualization Environment, which is available to Cornell researchers and educators.
ART, in collaboration with institutional and industrial technology development groups, is tasked with creating and maintaining the large scale technology architecture on the Georgia Tech Campus, facilitating campus and external partnerships and pilots consistent with the future development of Georgia Tech's architectural concepts and principles, and partnering in the pursuit of funding for projects in education technologies, networking, high performance computing, video, and security.

SUPPORT & SERVICES:

Scientific Visualization Laboratory

The focus of the Scientific Visualization Laboratory within Academic and Research Technologies is interdisciplinary and open to all researchers and educators at Georgia Tech. The SciVis lab provides cutting-edge tools and techniques for analyzing and visualizing complex scientific data. With powerful graphics workstations in the SciVis lab and personal desktop PCs, researchers are able to view results using high resolution, true color graphics, three-dimensional solid modeling, even animation.

With all these means of displaying information, researchers have the capability to comprehend visual patterns and dynamical relationships of great complexity, providing them with profoundly useful tools for analyzing and understanding scientific data. We expect that in developing their methods of scientific visualization, users will not only employ currently available modeling, design, and display software, but will also forge new types of visualization methods that will be especially suited to their data.

High Performance Computing

The High Performance Computing (HPC) Center provides the effective use of high performance parallel and distributed architectures for large scale applications using SGI equipment. The HPC center facilitates account acquisition by accepting applications from faculty for research done on Georgia Tech systems and promotes efficient use of these systems through training, consulting, and policy formulation.
There are two main goals for PICSciE. One is directed towards the science of computation itself. PICSciE aims to become an institute for computational science and engineering of high international research reputation. The other goal is to be a center for computational science and engineering on campus. The institute aims at raising the level of computational activities in research and education of different departments and programs.

**SUPPORT & SERVICES:**

Innovative programs in research, education and service are aimed at achieving vision.

Interdisciplinary research groups with participants from different fields of applications together with computer scientists and applied mathematicians are working on a variety of applications and on developing new computational technology. The Institute aims at being a natural meeting place for faculty, postdocs, students and visitors. The PICSciE seminars will cover both applications and techniques of computational science.

*Graduate student-oriented* seminars provide a forum to present and learn about computationally-oriented research occurring in many different disciplines. Interaction is encouraged with an emphasis on sharing ideas and obtaining feedback regarding issues arising at any stage of the computational pipeline, from applications through models and methods to scalable parallel and distributed computing, storage and visualization. To make these talks accessible to a multi-disciplinary audience of researchers, *no prior knowledge of the specific discipline area will be assumed* by the speakers.

The Institute also initiates and coordinates applications of management of research grants and work for attracting funding from different sources.

In education PICSciE will give interdisciplinary courses fitting into many undergraduate and graduate programs. This means partly coordination and cross listing but also whenever necessary the development of new courses. The Program in Integrated
Computer and Application Science (PICASSO) is a graduate training program funded by an IGERT grant from the National Science Foundation connected to PICSciE.

The service activities support computational science on campus. They facilitate scientific computing in different Departments by hosting or servicing computational clusters for different groups at Princeton. Experts at the Institute provide a help and may also engage in larger development projects.

**Seminar Examples:**

- Visualization and Matching for Networks of People and Data
- Multicore Meets Petascale: The Catalyst for a Software Revolution
- Computational and Mathematical Models of Decision Making and Cognitive Control
- Why computing climate is hard (it's the science)
- DNA Hash Pooling and its Applications
- Graphical Models for Social Networks
- Contextual Biomedical Image Learning

NOTE: Seminars utilize a combination of Educational, Government, and Corporate speakers.

**Support Units:**

OIT Academic Services supports the University community in the use of information technology in teaching, learning and research.

The **Computational Science and Engineering Support Group (CSES)** supports the University's research and academic activities by providing services for High Performance Computing, programming, and third-party software.

In particular, CSES maintains the TIGRESS High Performance Computing Center at Princeton University. TIGRESS is a collaborative facility that brings together funding, support, and participation from the Princeton Institute for Computational Science and Engineering (PICSciE), the Office of Information Technology (OIT), the School of Engineering and Applied Science (SEAS), the Lewis Sigler Institute for Integrative Genomics (Genomics), the Princeton Plasma Physics Laboratory (PPPL), and a number of academic departments and faculty members. The facility is designed to create a well balanced set of High Performance Computing (HPC) resources meeting the broad computational requirements of the Princeton University research community.

The **Educational Technologies Center (ETC)** helps Princeton faculty use technology in teaching. ETC's designers also collaborate with faculty members to share their
scholarship with the University community and beyond. The ETC also supports research and scholarship in the humanities and humanities computing.
Research (Computing) Centers
Information Technology & Communication (ITC)
University of Virginia
http://www.itc.virginia.edu/researchers/

There are three research centers at Virginia, two of which are supported by the ITC’s Research Computing Support Group: The Scholars Lab & the Research Computing Lab.

The Academic Computing for Health Sciences was established and funded by Information Technology and Communication (ITC) and the School of Medicine.

SUPPORT & SERVICES:

The Research Computing Support Group of the Computing Support Division of ITC provides technologically advanced computing support to facilitate research at the University of Virginia. This support encompasses in-depth consulting services as well as targeted training programs in response to research and instructional needs.

Scholars Lab:

The Scholars' Lab is a place where faculty and students in the humanities and social sciences can explore digital resources, get expert help, and collaborate in innovative research projects. Hosts exciting events, such as workshops, talks, and roundtables, and we sponsor a graduate student fellowship in digital humanities.

http://www.lib.virginia.edu/scholarslab/

Research Computing Lab:

The Research Computing Lab is a collaborative partnership between ITC's Research Computing Support Group and the Brown Science and Engineering Library. The purpose of this partnership is to provide a convenient space for faculty and students to work on innovative projects with specialists and get support for instruction and research in the science and engineering disciplines.
Academic Computing for Health Sciences:

ACHS provides specialized computer resources and support to the medical research community. We support specialized biomedical research applications in health informatics, bio statistics, data visualization, molecular modeling, molecular biology and image processing

http://www.itc.virginia.edu/achs/
The Initiative in Innovative Computing (IIC) is an interdisciplinary research and development center at Harvard dedicated to using innovative computing tools to accelerate discovery across all of the scientific disciplines. The IIC's researchers work in close collaboration with scientists and engineers in other fields, fostering a two-way collaborative flow of ideas and inventions between basic science and computer science, academia and industry, professional staff and faculty, teachers and students. The IIC trains the next generation of creative and computationally capable scientists, and communicates with the public at large about the value of computing in science and the science it enables.

The IIC is about progress in a realm of scholarship that often falls between the cracks at today's academic institutions: the intersection between computer and other sciences. While research problems increasingly require computational solutions, a tradition of peer-to-peer collaborations amongst discipline-based and computer scientists has yet to be established. By filling the gap between "science" and "computer science" research, IIC projects focus on solving scientific problems that require innovative computational solutions.

SUPPORT & SERVICES:

The IIC enables science that would not be possible today without the innovative use of computational technology. The IIC takes a project-focused approach, addressing problems that are insoluble in the near term without direct collaboration between researchers in computation and researchers in domain science disciplines. IIC projects address challenges raised by the need to handle and understand data sets that are literally billions of times larger than scientists are used to now, and by the need to run computer simulations of processes as complex as blood flow in the human body or the formation and evolution of structure in the Universe.

The IIC is intended to produce a large body of discipline-transformative research and inventions: applied, interdisciplinary research in which computational science is
developed to enable other research domains, which in turn drive applications and developments in computational science. What we are attempting to create is a new kind of information ecology at Harvard, based upon communities of practice that cut across traditional boundaries and intersect within a space of shared problems in computation. This effort requires strong support in IIC’s organizational culture, which will emphasize collaborative practice and invention.

More information may be found in:

http://iic.harvard.edu/downloads/IIC_whitepaper.v10_11.22.04

Example Projects:

• Astronomical Medicine
• Scientific Collaboration Framework
• Neuroinformatics
• Genepattern and the Dataverse Network
• Multiscale Hemodynamics