Overview
The SIParCS Program at the National Center for Atmospheric Research (NCAR) offers graduate students and undergraduate students (who have completed their sophomore year by summer ‘09) significant hands-on R&D opportunities in high performance computing (HPC) and related fields that use HPC for scientific discovery and modeling. This program embeds students as summer interns in the Computational and Information Systems Laboratory (CISL), an organization within NCAR charged with provisioning supercomputing and data systems to the geosciences research community, as well as conducting research and development in computational science, data analysis, scientific visualization and numerical modeling. These twin roles of service and research in CISL support NCAR’s broad scientific mission of discovery in the atmospheric and related sciences.

NCAR scientists run models on supercomputers to study the Earth system, including the oceans, atmosphere, land processes, ice and solid earth. The phenomena studied by computational geoscience, including solar flares, tornadoes, hurricanes, earthquakes, tsunamis, ocean circulation patterns, climate change, drought and wildfires, have tremendous economic and societal importance. Moreover, the use of massively parallel computer architectures and complex networking and data storage systems in this enterprise has become a critical factor for scientific progress. Also critical is the need for a trained cadre of scientists and engineers capable of maintaining and using these high-end systems to achieve the goals of 21st century computational geoscience research. Progress on modeling the Earth system also requires sophisticated numerical algorithms and results in large and complex data sets. These areas are also in need of a new generation of mathematical and statistical scientists who are able to work on a multi-disciplinary team and in an HPC environment.

The program is aimed at university students who are interested in pursuing a career in computational science, applied mathematics, statistics, computer science, or the computational geosciences. SIParCS goal is to make a long-term, positive impact on the quality and diversity of the workforce needed to use and operate 21st century supercomputers. To this end, the SIParCS program can offer exceptional students a wide variety of experiences with a diverse collection of HPC equipment, software development projects, parallel computational science problems, and analysis of data and numerical methods. All these projects are tied to the HPC systems and activities that support NCAR’s scientific mission.

Examples of SIParCS 2008 Intern Projects:

www.cisl.ucar.edu/siparcs
Summer Internships in Parallel Computational Science

SIParCS Program Description
The summer internships are 10 weeks in duration, typically June through August. Program requirements, beyond working on projects, include keeping a research journal, attending appropriate technical seminars, attending skills-enhancing workshops, and giving an oral presentation of results at the end of the summer.

There are two tracks in SIParCS, one for computer science and one for parallel application research and development, described as follows:

Applied Computer Science, Mathematics and Statistics
Students interested in HPC operations/applied computer science activities or working with geophysical modeling and data analysis are matched with a specific project proposed by CISL staff, and are assigned a SIParCS mentor to work with the student during the coming summer.

Parallel Application Research and Development
Students with geoscience-related applied mathematics research or application development plans may submit their own summer research proposal. CISL will attempt to match these with interested mentors at NCAR.

Project Opportunities
SIParCS mentors have submitted ideas for summer intern projects. The program will attempt to match the interests of qualified students to this list of activities as circumstances permit.

Application Window

SIParCS Contacts
The SIParCS Director is Dr. Richard Loft, loft@ucar.edu. For administrative and logistical information, contact Renee Ray, rray@ucar.edu.

UCAR values diversity and encourages those in underrepresented groups to apply. AA/EOE

Examples of SIParCS 2008 Intern Projects:

www.cisl.ucar.edu/siparcs