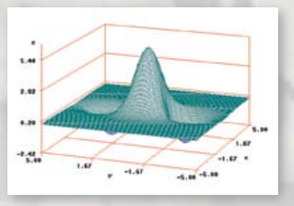
projects centered on their interests. Students are encouraged to present their research project(s) at the annual SCSU Student Research Colloquium or at local, regional or national public professional meetings.

For more information regarding the college, please visit the COSE web site at http://www.stcloudstate.edu/cose/. Additional information concerning COSE majors and minors, suggested four-year schedules/degree maps, career opportunities, department research facilities/equipment, and faculty/student research activities is available at COSE departmental web sites.

COLLEGE ATTRIBUTES

- Student-faculty collaborative research for undergraduate and graduate students.
- Student access to state-of-the-art laboratory/research equipment.
- Funding for student research through the Student Research Fund, COSE Professional Development Fund and other sources. Information regarding the Student Research Fund is available at http://www.stcloudstate.edu/src/.
- Student research appointments (local, regional, national and federal), internships, and field trips.
- Low student-to-faculty ratios for upper level courses.
- Eleven of the twelve COSE departments offer at least one major that is either accredited or approved by an external agency.
- Over 21 COSE student organizations. A list of COSE as well as SCSU student organizations is available at http://www.stcloudstate.edu/csold/.
- The Applied Research and Development Center, http://www.stcloudstate.edu/ardc/, publicizes and supports the research and activities of COSE students, faculty, staff, and alumni.



PREPARING FOR A CAREER IN SCIENCE AND ENGINEERING

High school graduates who wish to pursue a scientific or engineering career should complete three to four years of science courses including one year of: biology, chemistry, and physics. Students also need to complete four years of mathematics through pre-calculus.

Community college transfer students should communicate with a COSE department regarding their intended major prior to graduation. They are also encouraged to complete the MN Transfer Curriculum or an Associate of Arts degree or equivalent. These include completion of the first two years of basic science and mathematics courses appropriate for the intended COSE major. Additionally, as each COSE department has specific requirements for transferred classes, transfer students should contact the department or visit the department web site for supplementary information.

EMPLOYMENT

According to the 2006-2007 issue of the *Occupational Outlook Handbook,* a majority of the employment opportunities for graduates of our college will grow as fast as or faster than the national average over the next decade.

CAREER OPPORTUNITIES

Examples of career opportunities are listed below.

- actuary
- acute care nursing in a variety of specialty areas
- airline operations
- airport manager
- analytical chemist
- applications engineer
- astronomer
- biochemist
- biostatistician
- college/university professor
- community college instructor
- community/public health nursing
- computer network administrator
- computer network analyst and designer
- computer programmer
- construction manager
- cytogeneticist
- cytotechnician
- database administrator
- design engineer
- development engineer
- earth and space secondary school science teacher
- environmental scientist
- environmental specialist
- forensic specialist
- health care professions
- home care and hospice nursing
- hydrologist
- information security professional
- life science teacher
- long-term care nursing
- material handling/specialist
- mathematics teacher
- medical physicist
- national weather service forecaster
- natural resource agencies (local, state and federal)
- petroleum or natural resources geologist
- physicist
- physics and mathematics teacher
- pollution control manager
- process and tool design
- professional pilot
- project engineer
- quality control
- quantitative research analyst
- radiologic or nuclear medicine technologist
- research data analyst
- software engineer
- soil and water conservation specialist
- synthetic (inorganic/organic) chemist
- systems analyst
- systems engineer
- technical sales
- technology education teacher
- veterinarian

ADDITIONAL INFORMATION

If you would like additional information, please contact:

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Dean's Office
145 Robert H. Wick Science Building
720 Fourth Avenue South
St. Cloud, MN 56301-4498

Telephone: (320) 308-2192
E-mail: cose@stcloudstate.edu
Web site: http://www.stcloudstate.edu/cose/
Fax: (320) 308-4262
TTY: 1-800-627-3529

St. Cloud State University values diversity of all kinds, including but not limited to race, religion and ethnicity. (full statement at bulletin.stcloudstate.edu/ugb/generalinfo/nondiscrimination.html).

SCSU is an affirmative action/equal opportunity educator and employer. This material can be made available in an alternative format. Contact the department/agency listed above.

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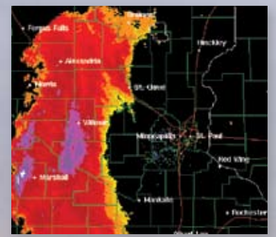
A MEMBER OF THE MINNESOTA STATE COLLEGES AND UNIVERSITIES SYSTEM

COLLEGE OF SCIENCE AND ENGINEERING

ST. CLOUD STATE UNIVERSITY
A tradition of excellence and opportunity

THE UNIVERSITY

St. Cloud State University (SCSU) was founded in 1869 and is located 70 miles northwest of Minneapolis. SCSU is Minnesota's second-largest university and the first choice of more than 16,000 students from across the nation and 84 foreign countries. SCSU is the state's most highly accredited undergraduate university and one of a few universities in the Upper Midwest to offer programs in fields such as Aviation, Computer Networking and Applications, Geographic Information Science (GIS) and Meteorology. The university offers 175 majors, minors and pre-professional programs in the colleges of Business, Education, Fine Arts and Humanities, Science and Engineering, and Social Sciences, and 50 master's degrees through the School of Graduate Studies. Over 200 student organizations reflect the diversity of student life on campus. Additional information regarding the university is available at http://www.stcloudstate.edu/.



THE COLLEGE

The College of Science and Engineering (COSE) offers 46 undergraduate majors, over 30 undergraduate minors and 10 graduate programs. The college comprises 12 departments which are listed below.

College Departments

- **Aviation**
  http://www.stcloudstate.edu/aviation/
- **Biological Sciences**
  http://www.stcloudstate.edu/biology/
- **Chemistry**
  http://www.stcloudstate.edu/chemistry/
- **Computer Science**
  http://www.stcloudstate.edu/computerscience/
- **Earth and Atmospheric Sciences**
  http://www.stcloudstate.edu/eas/
- **Electrical and Computer Engineering**
  http://www.stcloudstate.edu/ece/
- **Environmental and Technological Studies**
  http://www.stcloudstate.edu/ets/
- **Mathematics**
  http://www.stcloudstate.edu/math/
- **Mechanical and Manufacturing Engineering**
  http://www.stcloudstate.edu/mme/
- **Nursing Science**
  http://www.stcloudstate.edu/nursing/
- **Physics, Astronomy and Engineering Science**
  http://www.stcloudstate.edu/physics/
- **Statistics and Computer Networking**
  http://www.stcloudstate.edu/statistics/ and
  http://www.stcloudstate.edu/cna/

RESEARCH ACTIVITIES

Faculty conduct research individually, with other faculty members and students or within interdisciplinary research groups. Faculty members also participate in collaborative research with local, regional, national and international faculty.

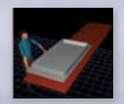
During the previous five fiscal years, COSE faculty have averaged nearly $1 million annually in externally funded research proposals and collaborations. Examples of these activities are listed below by their funding source.

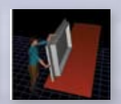
Health Resources and Services Administration
Nursing Education Consortium at CentraCare Health Foundation; Dr. Susan Johnson Warner, Professor of Nursing Science, Principle Investigator (PI), $317,170

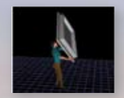
The Nursing Science Program is the newest baccalaureate program within the Minnesota State Colleges and Universities (MnSCU) system. The nursing classes of 2004 and 2005 earned a 90% and 93% passing rate, respectively, for the NCLEX licensing examination. These passing rates are higher than the national average at the baccalaureate level and also the highest rates of the baccalaureate nursing programs within the MnSCU system.

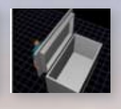
Minnesota Department of Transportation (MnDOT)
Dr. Kenneth Miller, Associate Professor, Mechanical and Manufacturing Engineering (MME)

Miller is conducting theoretical and field research on portable weigh-in-motion equipment that provides data on the number, type, and weight of vehicles using a roadway. As the equipment is expensive, the project will research the feasibility and accuracy of various vendor's equipment prior to MnDOT completing purchasing decisions. Once the equipment has been purchased and utilized, MnDOT will use the equipment's data in maintenance and planning of future roadways.









Minnesota Job Skills Partnership (MJSP) Program
TriVirix-SCSU Minnesota Job Skills Partnership MJSP Project; Dr. Ben Baliga, Professor of MME, PI, $60,407
MJSP Proposal with Electrolux, St. Cloud, MN; Dr. Ben Baliga, Professor of MME, PI, $100,000
With grant funding, the MME Department, St. Cloud Technical College, and Ridgewater College will provide training to employees of Electrolux and TriVirix International, Inc.

National Institutes of Health and GE Medical
Dr. Yi Zheng, Professor of Electrical and Computer Engineering

Zheng and Dr. James Greenleaf of the Ultrasound Research Lab of the Mayo Clinic have been collaborating on research projects since 1991. Their current research project is to non-invasively and quantitatively characterize human tissue. The project is based on a new image modality that induces vibration using ultrasound radiation force and measures the shear wave propagation in tissue using Doppler ultrasound and Kalman filter. The non-invasive measurement has a resolution as small as a few nanometers, which is comparable to that of a laser vibrometer. The technique has great potential in clinical applications.

National Science Foundation
Acquisition of Instrumentation for a DNA Sequencing Core Facility at SCSU; Dr. Christopher Kvaal, Assistant Professor of Biological Sciences, PI; Dr. Jorge Arriagada, Professor of Biological Sciences, Co-Pi, $105,445

North Dakota Game and Fish Department
Swainsons and Ferruginous Hawks in North Dakota; Dr. Marco Restani, Assistant Professor of Biological Sciences, PI, $48,000

Society of Manufacturing Engineers
Minnesota Center for Advanced Manufacturing Automation; Dr. Ken Ryan, Alexandria Technical College, Center for Automation and Motion Control, Project Director; Dr. Anthony Schwaller, Professor of Environmental and Technological Studies (ETS), Co-Project Director, $207,536

With grant funding, the ETS Department and its collaborators will provide new and updated automation and motion control training to technology teachers throughout the State of Minnesota.

U.S. Naval Research Laboratory, University of Wisconsin, National Aeronautics and Space Administration (NASA), and the National Science Foundation (NSF)
Dr. John Harlander, Professor of Physics, Astronomy and Engineering Science

In 1991, Harlander and a research collaborator developed a new and novel optical technique called Spatial Heterodyne Spectroscopy (SHS). Since that time, and with the assistance of his research collaborators, Harlander has developed a family of SHS instruments collectively called SHIMMER (Spatial Heterodyne IMager for MEsospheric Radicals). SHIMMER is a space borne ultraviolet (UV) spectrometer designed for the investigation of photochemistry and dynamics in the middle atmosphere. The first generation proof-of-concept SHIMMER instrument successfully flew aboard Space Shuttle Atlantis in October, 2002. The second generation SHIMMER instrument, scheduled for launch on October 13, 2006, will measure hydroxyl (OH) emissions over the tropics and subtropics for at least one year.

RESEARCH EQUIPMENT

External grants have also been utilized for acquisition of research equipment such as a Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometer and a Stratasys DFM 3000 Rapid Prototyping System. Recently, the college purchased a JOEL Scanning Electron Microscope (SEM) with funds provided by a college alumnus. The university has committed additional funds to purchase a Scanning Probe Microscope (SPM) to augment the SEM and the development of a Materials Imaging/Analysis laboratory facility. The donation and institutional investment in the project will exceed $300,000. Over the past two years, SCSU has invested approximately $750,000 in basic equipment infrastructure to modernize and update our laboratories.

STUDENT RESEARCH

Most COSE majors require undergraduates to participate in student-faculty collaborative research projects such as a senior design project, capstone experience or undergraduate thesis. Students are also advised to participate in faculty sponsored research projects outside of their major requirements or interdisciplinary research