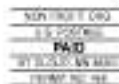


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## The Dean's Perspective:

### Science, Math & Engineering Technology Education:

### Making the K12 Teacher Visible in the College.



There is some consolation to the current shortage of good teachers. For a long time, educators have been trying to inform communities of impending shortages. Complaints were deflected and centered on the caliber of K12 teachers. They "cannot write English better than Daniel Boone," "grossly deficient in Science, Math & Engineering Technology (SM&ET) Education and should not be teaching our kids" and a host of other unflattering comments were hurled at K12 teachers. But as long as there were bodies in the classrooms, it was sufficient to throw money at the problem and completely ignore it. The axiom being, "Just give them some money to shut them up." Well, the prophecy has come true. There are no teachers. We are not talking about choosing between good and bad teachers; we just want to have teachers. Under this condition, it is very easy to guess what will happen to the quality of SM&ET education in K12.

For a long time, colleges of sciences and engineering technology simply whined and complained about how the kids came to college under prepared in SM&ET. Then as a group, we blamed the students for not being prepared--considering the present day high school student works almost 15 hours a week, or we placed blame on the high school teacher implying that they were not adequately trained in content to teach the required K12 SM&ET curriculum. It may be, but the news is we train the teacher. We should have an interest in their success because the products of their teaching endeavors will eventually show up on our doorstep as our college students.

Perhaps this is a good time to think of new paradigms. I have had the occasion to be involved in the Scientific Discovery Program at SCSU. The program includes a two-week SM&ET session involving K12 science teachers, College of Science and Engineering (COSE) faculty members, COSE students, and a cohort of high school students. After one such occasion, a K12 SM&ET teacher remarked, "I have learned more science in these two weeks than I have since I graduated from SCSU. Is it possible for me to borrow your equipment and some of your students to help me in class? It was

fun. It was a great learning experience." Herein lies a possible solution. My scientific discovery experiences suggest that we have to bring the K12 SM&ET teacher back to campus.

We, as a college involved with SM&ET teacher preparation, have our favorite "little war" with the College of Education (COE), namely the "pedagogy versus content saga." Irrespective of that, faculty in both colleges will have to abandon the notion of trying to teach K12 SM&ET teachers the way we were taught. We have to distinguish what is essentially scientific knowledge. If we forge a better working relation between the colleges, we then can begin to discuss a pedagogical need for inquiry into science instruction, and develop SM&ET in-service training and development for K12 science teachers. Above all, our relationship with COE will help us to begin a process to focus the pre-service SM&ET teacher preparation towards an inquiry-based model. The reason for this is simple--kids have an intrinsic scientific curiosity. As the students grow older or become more technology competent, simple experiments are inadequate to meet or even maintain this curiosity. Science at any level is taught by doing science not by talking about it.

The unsatisfactory performance of high school students in science, math and engineering goes beyond the preparation of teachers. The simple fact is that the need for resources and the knowledge to design and sustain the interests of high school students is enormous. Just as COSE faculty face resource shortages, K12 teachers also face these same shortages especially in the area of supplies and equipment. Also, we as SM&ET teachers no longer have the monopoly on knowledge. The content of science is exploding. A constant renewal is necessary. We have to invite K12 science teachers back to our college and they need to be made highly visible on campus. They must feel welcome and not like intruders. The college has to work to be more inviting to the K12 teacher. The College of Science and Engineering and the College of Education at SCSU are lucky to have excellent faculty who are truly devoted to the student body and to our alumni. The College of Education has an excellent network and working relationship with many schools. We ought to team with the schools to develop means of involving the K12 SM&ET teachers in our college. As part of the COSE strategic planning process, we may restructure the faculty involved in SM&ET teacher preparation into a division within the college to help foster this dialogue so that when K12 teachers come to SCSU, they may go directly to one central location.

We could do all the things I just mention; however, to have a lasting solution, we must provide a means for constant dialogue with K12 science teachers. Making the K12 teacher visible on campus is the essential ingredient. We promised our students that we would provide them with the environment to learn life-long learning skills. We assured our alums that we would share in their joys and tribulations--when they succeed, we would be there to toast to their successes and to cheer them on. We have to deliver on these promises for the students are "our first, our last and our everything."

Let us make it possible for them to come. Remember, "If the mountain cannot come to Mohammed, then Mohammed must go to the mountain."

Professor A. I. Musah, Dean

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# Dimensions

## Features

### The Little Prairie by the Math & Science Building

The cover of this issue of **Dimensions** illustrates how a student with initiative can turn a patch of lawn into a research and teaching tool. Paul Jackson, a graduate student in Biology working with Professor David DeGroot, used part of the grounds near the Math & Science building to produce a miniature prairie containing over 100 different species of grasses and wildflowers. This window into Minnesota's past helps students learn to identify native plants, just as the nearby greenhouse helps them study more exotic species.

"This is now similar to what the settlers found when they came to



Paul Jackson in the Math & Science prairie soon after planting

Minnesota in the 1700s," David DeGroot explains. Surveys by explorers made when the state was first mapped between 1800 and 1825 provide a record of the vegetation growing in the St. Cloud area before the arrival of large-scale agriculture and settlement. We also know about native plants from remnant prairies, areas that have not been turned or touched by

settlement. They provide seeds for prairie restoration projects like the one at SCSU.

The project started four years ago when Paul Jackson came to David DeGroot with the idea of a small planting of native species on campus. A small patch of grass roughly 100' square between a sidewalk and the greenhouse attached to the Math & Science Building was selected for the project. Prior to the restoration, the lawn grass on the parcel was killed off with a herbicide. Paul Jackson then planted native seeds and seedlings that were donated by Prairie Restorations, Inc., in Princeton, MN.

Today, the re-established prairie plants maintain control of the land as they did millions of years ago. Their close quarters keep out foreign intruders without any outside help. The project demonstrates that special soil conditions are not required to restore an area to native plants. " It's interesting," says David DeGroot, "because most of the time when you are doing a restoration, you are in some native location that has been turned into a cornfield or bean field or something like that. What we learned here is that we could take practically any miserable piece of ground and do the same thing. Last year we checked for survival of the species that were brought in and learned that they've all survived; not only that, but they are maintaining themselves too."

SCSU students at all levels visit the site to examine what is there and how the different species interact. It provides a limited but convenient resource for students studying ecology and taxonomy. The Sand Prairie Preserve several miles to the east of SCSU near Highway 10 provides a larger scale laboratory for students once they have learned the basics at the on-campus facility.

The restored SCSU prairie has been useful, not only for college students, but for high school and grade school students who have also visited the site. Observing it stimulates questions about the history, ecology, fire and weather of the St. Cloud area.

Paul Jackson has decided to go into prairie restoration full-time. He has started a company, Minnesota Native Landscapes in Princeton, MN, which specializes in plant restoration projects for companies and homeowners. "Some people who have hobby farms would rather have the feel of the way things were 150 years ago rather than just mowing grass," he says. "There is definitely a market for it."

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## Features

### Optics Research Reaches New Heights

This past August Associate Prof. John Harlander watched as five years of work with SCSU students and collaborators at the University of Wisconsin-Madison was shot 170 miles into space on top of a NASA rocket. "It was more like watching a bottle rocket than the slow liftoff of the space shuttle," he recalls. The whole flight lasted about 15 minutes. The years of work and minutes of flight paid off in unique data on the interstellar medium, the space between the stars that holds clues to their birth and death.



John Harlander (back row center), with personnel from NASA and U. W.-Madison during a break in the shake test of the rocket payload at NASA Wallops.

The project began five years ago when Professor Harlander and his UW-Madison collaborators asked NASA to use their rocket technology to send their Spatial Heterodyne Spectrometer (SHS) into space so it could measure ultraviolet light from the interstellar medium. The interstellar medium is the gas found in the space between the stars, which appears dark and empty but contains the raw materials from which stars form.

John Harlander developed the SHS, which analyzes how light is distributed in color and position, while completing his doctorate at UW-Madison. The SHS is a new class of spectrometer that excels at studying diffuse sources like the interstellar medium. It took five years from when NASA agreed to support the project to modify the SHS so it could analyze ultraviolet light and withstand the rigors of rocket flight. John Harlander made several trips to NASA's testing facility on Wallops Island in Maryland, where the scientific payload, which weighed about 1,000 lbs., was violently shaken to simulate the rocket launch.

In fact, the researchers' desire to study ultraviolet light was responsible for sending their instrument into outer space. They wanted to aim the SHS at a large expanding bubble of gas in the constellation Cygnus, which they expected to have a temperature of nearly 500,000 K. Gas this hot gives off only ultraviolet light, which cannot be studied on Earth because it is absorbed by our atmosphere. UV light is also absorbed by conventional lenses, so a lot of work went into designing and testing an SHS made from special materials that work with UV light.

The source of the gas bubble was a supernova explosion occurring approximately 20,000 years ago. According to John Harlander, "It's of interest because when stars form, they get their raw materials from this low density gas. When some stars reach the end of their lives they explode and deposit material back into the interstellar medium. We are trying to learn more about how stars are born and die. By analyzing the spectrum, we can measure temperature and bulk motions of the gas."

Several SCSU students played active roles in preparing the SHS for its flight. John Harlander credits them as "major contributors to the success of the project." One of these students, Huan Tran, continues to study astronomy at Princeton University, where he is earning a doctorate in astrophysics. Huan Tran gained fame from his research experience when a picture of him in John Harlander's lab was used for a billboard advertising SCSU last year. Dan Hooper, another SCSU student researcher, enjoyed his work at Madison enough to enroll in the graduate physics program there. Marcel Goldschen, currently a student at SCSU, traveled to Madison last summer to help prepare for the launch. Now he is helping John Harlander analyze the data gathered from the flight.

The SHS has more trips into space in its future. The payload that flew in August was slightly damaged when it landed about 50 miles from the launch site but will be repaired and launched twice more over the next three years, if

a pending proposal is funded. Another version of the instrument, designed to study the chemistry of the ozone layer, is scheduled to fly on the Space Shuttle in December of 2000.

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## Features

### Looking into Stearns County Lake Water Quality



Neal Voelz, Sharon Doucette, and Chuck Rose at the lake with the Secchi disk

Researchers from St. Cloud State University are helping Stearns County Environmental Services look into the quality of an important Central Minnesota resource: the water of Stearns County lakes. Considering its vital role in tourism, recreation, health and environmental quality, there is surprisingly little known about the water in area lakes and how it affects the plants and animals found there.

Sharon Doucette, a graduate student in Biology, Dr. Neal Voelz, Associate Professor of Biology, and Dr. Chuck Rose, Assistant Professor of Environmental and Technological Studies, are working to change that by studying how water quality relates to the growth of plants in several lakes. An annual grant of \$13,500 from Stearns County Environmental Services is providing support for their studies, with the goal of collecting data on the current status of the lakes so they can evaluate the effectiveness of water management and remediation efforts.

The project grew out of collaborations between Stearns County Environmental Services and Neal Voelz. Sharon Doucette started working on the project as part of her Master's thesis in the fall of 1999. When Chuck

Rose joined the project as a co- principal investigator he brought extensive experience in water quality studies and expertise in water chemistry measurements. The collaborative effort continues to spread, with Sharon Doucette planning to use the Geographical Information Systems resources available through the SCSU Geography Department to analyze and present her data.

Sharon Doucette's first job was to review what was already known about Stearns County lakes. She found most of the work concentrated on the Horseshoe chain of lakes near Cold Spring. The water quality of these lakes is of particular concern because of their importance for sport fishing and recreation and the significant surrounding population. Much less is known about smaller lakes and less populated areas.

The goal of this study is to gather data on thirty area lakes of varying size and local environment. This year six lakes were studied: Big Fish, Big Watab, Eden, North Brown's, Maria, and Sand Lake. These lakes provide a range of water quality and size so the researchers can study how nutrients, sunlight, and plants interact in different systems.

During the summer of 1999, measurements of the water clarity were taken at each lake and water samples were analyzed for their phosphorous and chlorophyll content. Water clarity is measured using a Secchi disk, a 20 cm diameter black and white disk. The disk is lowered into the water on a chain or rope marked for measuring depth until it disappears. The clearer the water, the deeper the disk can be seen. This is a relatively simple measurement that anyone living near a lake can do to help county officials monitor water clarity. Water clarity is related to the ability of the lake to support plant growth, or its trophic state, but by itself is not enough to evaluate the quality of the water.

The Carlson Trophic Index was developed at the University of Minnesota as a way to measure the ability of water to support plant growth. This index requires measurement of the phosphorous and chlorophyll content of the water in addition to its clarity. Chuck Rose trained Sharon Doucette to use the sophisticated equipment in his water quality laboratory at SCSU to analyze the water samples and determine the trophic state of the lakes. Sharon is still a bit surprised at having access to these powerful research tools, which is one benefit of research collaborations at SCSU.

Sharon Doucette also collected samples of plants found in the lakes, using a large rake to dredge up material from the lake bottom at different depths. The

different plant species found in the samples were inventoried, dried, and weighed to determine the amount and variety of plant life found in each lake. While the Carlson Trophic Index gives a good measure of the overall plant productivity of the lakes, its connection to the abundance of complex plants, as opposed to algae, has not been fully explored.

The data analysis is not finished, but it is already clear that the relationship between water quality and the presence of complex plants is more complicated than expected. Clean lakes lack nutrients, while lakes with a lot of algae don't allow sunlight to reach the lake bottom, so it was expected that plants would thrive only in lakes of intermediate water quality. Surprisingly, a large number of complex plants were found in the lake with the highest algae content.

The presence of these plants is important for aesthetic reasons clear to people who enjoy a sandy beach, as well as their role in providing habitat for insects and fish. Sharon Doucette will make presentations in December to the Stearns County Water Planning Board and the County Board of Commissioners on her findings. This study will help them evaluate programs regulating septic systems on lakeshore property and fertilizer runoff from farms and feedlot.

Sharon Doucette plans to complete her thesis in the spring of 2000, when she hopes to translate her experience into a research position with the National Park Service. Neal Voelz and Chuck Rose expect other students will carry on this research in the future. Students will have a diversity of topics to choose from, including examining emerging technologies used to improve water quality, characterizing the phytoplankton, zooplankton or fish communities, and studying land uses around lakes.

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## Features

### SCSU Professor Puts the Universe on the World Wide Web

SCSU Astronomy Professor Arnold Lesikar has captured the night sky and brought it to cyberspace. The Dome of the Sky is a virtual, online planetarium that guides SCSU students and astronomers around the world in their exploration of the universe. There are signposts for ancient myths and modern science associated with the constellations.

To access the Dome, type in <http://einstein.stcloudstate.edu/Dome/> in your web browser.



Arnold Lesikar says that when he started this project three years ago, "nobody else was doing this, and some people might have thought I was crazy, but I thought the future was going to be on the web, so I spent a lot of time creating it. It's turned out to be of some usage."

Arnold Lesikar helps SCSU students use the Dome of the Sky

That's an understatement: the Dome currently gets over two million "hits" or visits each year from people all over the world.

The project started as a way for Arnold Lesikar's astronomy classes to learn about the bright stars that make up the constellations. The Dome contains charts of over 2,500 stars, with more than 100 of the brighter stars described.

One part of the web site opens with a view of the night sky as it appears from 17 different places around the world and at eight different times of year, which helps students connect the appearance of the sky with the motion of

the Earth around the Sun.

Within this reproduction of the night sky is a storehouse of information about the constellations and the stars that they contain. Clicking on a star brings up a page describing the constellation that it is a member of, the mythological story associated with the constellation, and a host of information about the size, luminosity, temperature and scientific significance of the star.

The Dome of the Sky won the Planetarium.Net Cool Nite Site Award and is an Editor's Pick for Stargazers at the Old Farmer's Almanac web site. Arnold Lesikar isn't resting on his laurels, however. He continues to expand the scope of the Dome of the Sky, including daily current news stories involving space exploration, discoveries and various phenomena such as solar eclipses. The stories take advantage of the power of the World Wide Web by including links that take the visitor to other sites for more in-depth details of stories.

For example, a recent story discussed results from the Lunar Prospector crash on the moon's surface. There are links to a NASA press release and a New York Times story on the subject.

A dedicated enthusiast, Arnold Lesikar takes about two hours, between 6 and 8 a.m. each workday, to update the site, and even works on it from his home on Saturdays and Sundays. "I've kind of gotten myself into this thing and it has become somewhat consuming," he said.

Other features of the Dome of the Sky include information on the phase of the moon, how many sunspots there are today, meteor showers, and eclipses of the sun. There are always extensive links to other resources so visitors can learn more.

With the Dome of the Sky, Arnold Lesikar has brought the universe to the World Wide Web, and in doing so has brought the world to St. Cloud State University.

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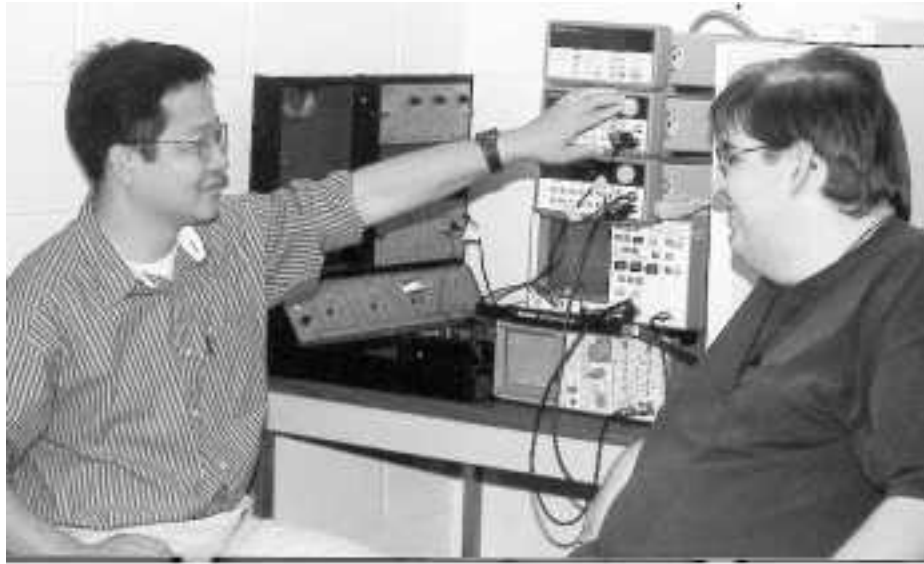
### Communications Students Practice Their Art in On-Line Laboratory

The notion of connecting computers together to share information is becoming commonplace with the spread of the Internet, and many college courses take advantage of this technology to give their students access to materials. Two professors in the COSE Electrical Engineering (EE) Department, Yi Zheng and Michael Heneghan, are taking this idea further and connecting computers with laboratory equipment so their students can do real experiments by remote control. The professors, together with electrical engineering students, have built a Remote Communications Laboratory that has the potential of making sophisticated electronic measurement equipment available to students anywhere there is an Internet connection. Their work is supported by a grant of \$220,000 from the Minnesota State Colleges and Universities' Electronic Academy Program.

The Remote Communications Laboratory is designed to serve students in the Analog and Digital Communication courses, EE 431 and 432. These classes teach students the basic concepts of electronic communication, including spectral analysis, sampling theory, and information representation.

To allow the students to perform experiments on-line, laboratory equipment is reproduced on the computer in the form of an outline that duplicates their functions. This includes complex instruments, such as signal generators and oscilloscopes, as well as simple switches and meters. The actual equipment

that the students see represented on-line is in a room in the Engineering and Computing Center. Yi Zheng and his students wrote the programs that control



the equipment using Java and C programming languages. The equipment is accessible by either PC or Macintosh computers.

Yi Zheng and EE student John Oberly operate equipment in the Remote Communications Laboratory C

Because the Remote Communications Laboratory controls real equipment, access is restricted to students in the class. These are not simulations of lab equipment, but the real thing, which means the students can make the same mistakes and run into the same problems they do when they are in the same room as the equipment. Resolving those problems is how students learn. The professors are available on-line as well, to help students work through the experiments and solve their problems. Students still meet with the professors during lecture and lab periods, but their remote access to the equipment gives them more opportunities to work through the wonders of modern communication theory and practice.

Yi Zheng sees great potential for this technology, but is careful to say that it should be used only where appropriate. "Many other computer and electrical engineering courses could utilize similar technology for improved student learning," he says. "Some classes can be taught on the web, but I wouldn't say most of them."

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## Features

### SCSU Student Explores Connections Between Biology and Computer Science

Hong Ziang, a SCSU graduate student in Computer Science, is studying the application of genetic algorithms to finding the shape of proteins, an important problem in biochemistry. Prof. Bryant Julstrom, Computer Science, is supervising Hong Ziang's survey of the literature for a starred paper, which she hopes to complete in the spring of 2000.

Genetic algorithms are search procedures inspired by the mechanisms of biological evolution. A genetic algorithm maintains a population of character strings that encode candidate solutions to the target problem. These strings are analogous to the chromosomes that control the development of life forms.

Attached to each string is its fitness, a number that indicates the quality of the solution it represents. Just as in evolution, the fittest strings survive to become the parents of the next generation. Genetic recombination and mutation inspire the operations by which new strings are built from parents. As the algorithm's generations succeed each other, the average fitness of the strings increases and better solutions are identified.

Computer scientists are repaying biology for inspiring the genetic algorithm technique by using it to determine the shape of biologically important proteins. The properties of proteins are determined by their chemical composition and their physical shape. Chemical analysis reveals a protein's chemical makeup, but not the folded, convoluted shape it assumes in water. This shape depends on a multitude of variables, including the energies associated with bonds within the protein molecule and whether its constituent amino acids have aversion to or an affinity for water.

Identifying the shape of proteins is of fundamental importance in understanding how they behave in biological systems and in designing new proteins that might have therapeutic properties. Hong Ziang plans to assess the promise of genetic algorithms and related evolutionary techniques on this biologically significant problem.

Hong Ziang is a graduate of Tianjin University of Technology in China. She also holds a graduate degree in organic chemistry from Michigan Technological University. Bryant Julstrom feels that her chemistry background provides a good foundation on which to build this new project.

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## Student Notes

### Student Notes

#### COSE Student Internships and Activities

**Jonathan Kauhane's** Electrical Engineering internship was with **Honeywell, Inc.**, Commercial Aviation Systems - Sensor Products Operation (CAS-SPO) in Coon Rapids, MN. He was hired by the Supply Management Division to work on Honeywell's part obsolescence problem. Integrated circuits, discrete components such as diodes and transistors, and application specific integrated circuits or ASICs become obsolete and must be replaced. Jonathan worked on data management for CAS-SPO's three different component databases, which provide part information and where they are used in all Honeywell sites. The databases can also search for a specific part and release new components into the parts library. In addition, Jonathan Kauhane created a test for a coupled, optoelectric component.

**Pat Krekelberg** completed his second summer Electrical Engineering internship with CAS-SPO at **Honeywell, Inc.**, in Coon Rapids, MN. Pat worked for the Software Group, which is part of the Development Organization Team. He developed embedded code and UNIX tool applications and shell scripts, which were used by CAS-SPO for command streamlining, file parsing, data acquisition and process improvement. Pat also became known for his extensive PERL (Practical Extraction and Report Language) experience, so that fellow employees often approached him with interesting and challenging script ideas.

For her Electrical Engineering internship with **Micron Technologies, Inc.**, (MTI) of Roseville, MN, **Bridget Bethke** worked in the Logic Products ASIC Development Division. She performed system simulation of their Core Logic products, such as memory controllers and I/O bus controllers, to verify that they functioned correctly and to evaluate their performance. Bridget also learned many aspects of the Logic Products Group environment at MTI including the specifications and behavior of various buses used in their chips, the software and tools used for design and simulation, and debugging of tests for each chip.

**Chun-Fan Lung** completed an Electrical Engineering internship at the **Seagate Technology** Product Assurance Department in Minneapolis, MN, working on automating a noise and ripple test. The test verifies the performance of a computer hard drive when the voltage from the power supply fluctuates. Chun-Fan became familiar with the test by running it manually, and then studied the General Purpose Interface Bus, which electronic devices use to communicate with each other. He also reviewed new equipment for the test, including function generators, high frequency and high power multiplexers, and relays.

For his Electrical Engineering internship, **Brandon Bartz** worked with **Infrared Solutions**, Minneapolis, MN, whose main product is the Infrared Snapshot camera. He worked on automating test procedures and debugging the analog and digital boards used in the camera, and assisted with the repair of cameras returned to the company. To help solve a problem with the camera batteries, Brandon Bartz ran a series of tests on the battery charger and discussed the results with a representative of Alexander Batteries, the company that provided the battery chargers.

**Kristen Paclik** completed her Electrical Engineering internship at the Systems Assurance Department of **Digi International**, in Minnetonka, MN, working with software developers and test engineers to test and debug the AccelePort line of products. Most of her work involved the Remote Access Service, an option for most of the AccelePort products that leads to complications with other installations and port sharing. Kristen also composed an essay titled, "Engineering Ethics," which covered the common moral, factual and conceptual ideas that need to be considered to make ethical decisions in a corporate setting.

**Josh Svoboda's** Electrical Engineering internship with **911 Emergency Products** in St. Cloud, MN, involved writing code to control their products. With the introduction of the Hewlett Packard Barracuda LEDs (Liquid Emitting Diode), Josh Svoboda started writing code that used varying duty cycles to eliminate resistors and control current. He also worked on circuit board design, and assembled all of the prototypes and test boards used in product development.

Ten students from the **SCSU Meteorology program** staffed the **WCCO-TV** Travel Line during the 1998 Thanksgiving and Christmas breaks. **DTN-Kavouras**, WCCO-TV, and SCSU's Earth Sciences Department have teamed up the last nine years to provide this service. Last year's Travel Line fielded over 10,000 calls, including 3,500 during the New Year's weekend blizzard that dropped over 20 inches of snow, paralyzing Chicago, Milwaukee and

Detroit.

**Blaine Thomas** was one of 15 students chosen nationwide for the Research Experience for Undergraduates (REU) program at the **National Severe Storms Laboratory**, in Norman, OK. The REU program is funded by the National Science Foundation, and selects undergraduate students with strong potential for post-baccalaureate study and an interest in research. Blaine Thomas worked on remotely-sensing of cloud-to-ground lightning using the National Lightning Detection Network. The nearest detectors to St. Cloud are in Morris and Spooner, WI.

**David Novak** was one of three people chosen in a national search to help issue weather forecasts related to the kindling and spread of forest fires in Alaska's forests. Forest fires are a serious problem for inland Alaska during the summer and early fall, due to a paradoxical combination of lightning from thunderstorms and dry conditions. David Novak worked at the **National Weather Service** in Fairbanks, AK, which specializes in issuing forecasts related to fires, including their temperature, wind speed and direction.

Two SCSU Meteorology students, **Ryan Gore** and **Eric Green**, completed internships with television weather departments, where they assisted meteorologists with weather graphics for their regular news programs and severe weather cut-ins. Eric Green worked alongside Paul Douglas and other meteorologists at **WCCO-TV** in Minneapolis, MN, while Ryan Gore worked with the meteorologist at **WAAF-TV** in Austin, MN.

As part of their Meteorology internship with the **Minnesota Department of Transportation** (MnDOT), **Jesse McCann** and **Kendra Sprague** took turns getting up at 3:00 a.m. to prepare daily 5:00 a.m. Minnesota Department of Transportation (MnDOT) snow and rain forecasts based on weather information available on the Internet. MnDOT used these forecasts to schedule sanding, plowing, and road repairs and to chose road treatments. Jesse McCann and Kendra Sprague also wrote a forecast update for 2:00 p.m. based on data collected at the SCSU Meteorology Weather Lab.

**Thomas Lloyd** carried out quality checks of automated weather instruments used for official reports during his Meteorology internship with the **National Weather Service** in Marquette, MI. He also helped with forecasts and compiled severe storm reports and daily rainfall observations.

**Eric Green, David Novak, and Jason Otkin** alternated writing the weekly "Weather Watch" column for the **St. Cloud Times**. Column topics included

the forces behind lightning and thunder and attempting to track the path of a hurricane.

**Susan Bibeau** worked in biomedical science at **Community BioResources** in St. Cloud, MN.

**Stacy Bot** worked as a naturalist at **Blue Mound State Park** in Luverne, MN.

**Brandy Christensen** finished an internship in radiologic technology at **Monticello Hospital**.

**Darrin Franco** specialized in ecology at the **U.S. Fish & Wildlife Service** in Middle River, MN.

**Karla Holtz** worked on quality assurance at the **Protein Design Lab** in Plymouth, MN.

**Shane Korn** completed a biology internship specializing in aquatic/marine organisms at **St. Cloud State University**.

**David Lockwood** worked as an aquatic biologist at the **MN Department of Natural Resources**.

**Jason Neuman** worked on water quality for his biology internship at **Prairie County Resource** in Willmar, MN.

**Kimberly Peltonen** studied tropical birds and **Stacey Westerf** studied aquariums at the **Minnesota Zoo** in Apple Valley, MN.

Other internships in biology include:

**Rebecca Berscheid** and **Kelly Sullivan** at the **Como Park Conservatory** in St. Paul, MN;

**Shawn Brown** at **Boise Cascade** in International Falls, MN;

**Aaron Jacobs** at **Mille Lacs State Park** in Onamia, MN;

**Derek Johnson** at the **Metropolitan Council** in St. Paul, MN;

**Julie Kustermann** at the **St. Joseph's Veterinary Clinic** in St. Joseph, MN;

**Tracy Noval** at the **St. Cloud Water Treatment Facility**;

**Amy Seegmiller** at the **Minnesota Zoo** in Apple Valley, MN;

**Erin Slattery** at the **Alaska Sea Life Center** in Seward, AK;

**Nicolle Trifilette** at the **MN Pollution Control Agency**, St. Paul, MN; and

**Laura Traff** at **St. Cloud Parks and Recreation**.

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## Alumni & External

### Aviation Students on the Fast Track to Fly

The reputation and rigor of the Aviation program at SCSU has led to a partnership with Mesaba Airlines that will get students into the cockpit of commercial aircraft faster. Professors Steve Anderson and Ken Raiber approached Mesaba with the idea that since SCSU graduate pilots go through a very complete training program, including several advanced systems courses, perhaps Mesaba would consider taking them with fewer air hours. One thousand hours of air time are normally required for flight officer and pilot positions. Under the agreement, SCSU students will be able to start with Mesaba after 800 hours in the air. "It will give our students a chance to get into the commuter line of work a little earlier, maybe six months sooner than they normally would," Professor Raiber said. SCSU pilots will now take flight instructor work for one and one half to three years, after which they can apply to Mesaba.

Mesaba flies between regional and international airports, carrying passengers between smaller cities or connecting them with flights around the world. Based in Minneapolis, they have more than 900 daily departures from 101 cities in the U.S. and Canada daily. They are the primary regional affiliate of Northwest Airlines. Over the years they've hired numerous Bachelor of Science graduates of the SCSU Aviation program. The placement of SCSU Aviation graduates into their field is virtually 100 percent, a testament to the strength of the program.

Aviation has been at SCSU for over 50 years, beginning with the formation of the Arrow Aviation Club back in 1948. In 1994, the College of Science and Engineering was the first college in Minnesota to receive accreditation by the National Council of Aviation. Currently, the college has over 300 students involved in the Aviation program.

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## Alumni & External

### Fall 1999 College of Science & Engineering Day

As part of the Fall 1999 Convocation, COSE faculty and staff were invited to attend the COSE College Day and Forum on September 2, 1999. College Day began with an address from COSE Dean A. I. Musah welcoming faculty and staff to the 1999 - 2000 academic year. Department chairs introduced new faculty members and commended their department staff for their essential contributions. Similar recognition was given to the work of the Dean's office and COSE Applied Research Center staff. Applied Research Director Richard Brundage presented the COSE Faculty Research Award to Prof. Yi Zheng of the Electrical Engineering Department, and Dean A. I. Musah presented the first COSE Faculty & Staff Collegiality Award to Bernie Frie, Office Manager for the Chemistry Department.

The second half of the COSE Day offered a forum, "Taking the next step: Community-Interest-Based Research." The forum opened with a welcoming address from Shawn Teal, SCSU Vice-President for University Advancement. Cheryl Lightle, President of Creative Memories, delivered the keynote address, which was followed by a panel discussion. Prof. Denise McGuire, Biology, served as moderator for the panel, which included Hattie Homan-Syrud, an SCSU alumna currently employed by SCIMED Boston Scientific; Associate Prof. Patrick Mattson, chair of the Aviation Department; Brian Schoenborn, currently practicing law with the firm of Hall & Byers, P.A. of St. Cloud, and President of the SCSU Alumni Association; and David Borgert, who is involved with government relations for the St. Cloud Hospital of St. Cloud, MN.

Each panelist described their perspective on Community-Interest-Based Research. Hattie Homan-Syrud, a graduate of the SCSU Manufacturing Engineering program, spoke about the value of her internship at Creative Memories to her and the company. Brian Schoenborn talked about the need for communication between community businesses and COSE faculty so they can identify areas of common interest. Patrick Mattson discussed how research funding is distributed at SCSU. David Borgert offered advice on how faculty can connect with businesses in the community.

The session was then opened up for questions and discussion with the

audience. The participants explored how COSE faculty and community members can connect to share their resources and needs, while staying true to their educational mission. Dean Musah closed the forum and COSE Day with a call for continued and expanded cooperation between the college and the community.

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## Alumni & External

### College of Science & Engineering Establishes Advisory Board

The College of Science and Engineering (COSE) Advisory Board held its first meeting on September 2, 1999, during the Fall 1999 Convocation. The Advisory Board was created as part of ongoing efforts to strengthen interactions between COSE and the community, to insure our educational programs are relevant to the needs of the community. Board members represent a variety of institutions and businesses, including the State of Minnesota, local educational institutions, and companies large and small. Board members are invited by COSE Dean A. I. Musah to serve for two years at a time. The Advisory Board will meet twice a year.

The first meeting began at 10:00 a.m. with a tour of COSE facilities. Prof. Alan Anderson, Earth Sciences, demonstrated the capabilities of the Meteorology Lab, and Prof. Mark Nook, Physics, Astronomy & Engineering Science (PAES), led a tour of the Planetarium. Prof. Standley Lewis, Biology, described activities in the Paleontology Laboratory, and Prof. Alfred Grewe, Biology, provided information about the Minnesota Natural History Laboratory. Associate Professors Richard Brundage and John Harlander, PAES, presented demonstrations in the Optics Laboratory, and Associate Prof. Maria Womack, PAES, showed board members the telescopes and equipment available in the Observatory. Prof. Steven Covey, Manufacturing Engineering, led a tour of the Manufacturing Engineering Laboratory, and the morning's events concluded at the St. Cloud Regional Airport where Associate Prof. Ken Raiber, Aviation, discussed collaborations between the airport and SCSU.

After their tour, the board members were introduced at a luncheon to the seven COSE program directors and the members of the Science and Engineering Council (SEC), which is comprised of the eleven COSE department chairs. Advisory Board members were invited to attend the afternoon keynote address and panel discussion on community-interest-based research, which were held as part of the COSE College Day.

#### 1999-2000 COSE Advisory Board Members

Bruce Adams, Metrology Supervisor, Weights & Measures  
MN Dept. Public Services  
Roseville, MN

Charles Agbor, Systems & Planning Manager  
Antioch Company  
St. Cloud, MN

John Bodette, Managing Editor  
St. Cloud Times  
St. Cloud MN

Bahman Anvary, Owner  
Mexican Village Restaurant  
St. Cloud, MN

David Folsom, Vice President & Chief Technology Officer  
Cyntegra  
Arden Hills, MN

Gayle Melberg, Dean Health & Human Services & General Education  
St. Cloud Technical College  
St. Cloud, MN

Ruth Meyer, Interim Dean College of Business  
St. Cloud State University  
St. Cloud, MN

Sandy Voight, Regional Director  
MN Technology, Inc.  
St. Cloud, MN

Wendy Sullivan, Director of Workforce Development  
St. Cloud Area Chamber of Commerce  
St. Cloud, MN

Robyn Wells, General Manager  
Central Minnesota Ethanol Coop  
Little Falls, MN

Roxanne Wilson, Director Education & Professional Development  
Department

St. Cloud Hospital  
St. Cloud, MN

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## Alumni & External

### COSE Department Advisory Boards

Several departments in the College of Science and Engineering have advisory boards with representatives from industry, educational institutions, and government agencies, to insure that the academic programs meet the needs of the community. Below are brief descriptions of the history, composition, and activities of some of these boards.

The **Manufacturing Engineering Industry Advisory Council (MfgE-IAC)** was established in April of 1992 and its mission statement was revised in April of 1999. MfgE-IAC provides a forum for industrial input on SCSU's **Manufacturing Engineering (MfgE)** Department; advises, assists, and supports SCSU in identifying the manufacturing engineering needs of Minnesota businesses and industry, professional citizens, and society as a whole; evaluates and criticizes the efforts of the MfgE Department and SCSU; provides a mechanism for industrial support of the department and greater public awareness; and works towards greater cooperation between SCSU and industry, including equipment donations, student internships and employment, faculty consulting, joint research projects, continuing education, scholarships, endowments, and adjunct faculty positions.

Council members are drawn from companies that have a strong commitment to the existing programs and depend on quality manufacturing engineering programs. There are currently 14 companies represented on the council, including Columbia Gear Division of Avon, MN, and W. F. Scarince, Inc., of Sauk Rapids, MN.

Ex-officio members of MfgE-IAC include all full-time tenure track MfgE faculty, the SCSU President, the COSE Dean, the EE Chair, a representative from Career Planning and Placement, and MfgE student representatives. MfgE-IAC members meet at least three times per year with the time, place and agenda of the meetings being determined by the MfgE-IAC Chair and MfgE Chair. Summaries of regular meetings of MfgE-IAC are prepared and distributed to members.

The **Computing Advisory Council (CAC)** for the **Computer Science (CSCI)** and the **Business Computer Information Systems (BCIS)**

Departments was established in June of 1997. CAC is a partnership between SCSU computing programs and the business community, and serves to inform SCSU of business needs and trends in computing; enhance the stature of SCSU's computing programs in the business community; maintain the quality of program graduates; and ensure a pool of graduates for the business community.

The council consists of representatives from industry and government; faculty from the Departments of Business Computer Information Systems (BCIS), and Computer Science (CSCI); representatives from high schools, technical colleges and community colleges; and students in the BCIS and CSCI programs. Companies represented on the board include the Antioch Company, Champion International, GMAC/RFC, and Legato Systems, Inc. As of October 1999, CPAC consisted of 48 representatives.

CAC is led by a steering committee, which is composed of five industry representatives, the chairs of BCIS and CSCI, and two students, one each from the BCIS and CSCI student organizations. Responsibilities of the committee include preparing strategic and action plans; coordinating activities to ensure goals are met; and reporting to the council.

The council meets three times annually. CAC held its fall meeting on October 13, 1999. The meeting agenda included curriculum review; incorporation of industry trends into SCSU computing programs; revision of the CAC Charter to include Microcomputer Studies in CAC; and a panel discussion, "Information Technology Professionals Discuss Day-To-Day Activities".

The **Electrical Engineering Industrial Advisory Committee** (EE-IAC) of the Department of **Electrical Engineering** has been recently re-established under the leadership of Associate Professor Peter K. George, who serves as Industrial Coordinator. The committee provides a forum for input regarding industrial needs, curriculum, internships and employment, joint research projects, equipment donations, continuing education, scholarships and endowments, and industrial support through public awareness.

The committee members are drawn from the local industrial community, and include representatives from IBM, 3M, Seagate and Honeywell. Smaller companies involved in high technology are also represented for balance. SCSU representatives include the Industrial Coordinator, COSE Dean, EE Chair, and other faculty members who wish to participate.

Meetings of the IAC are held annually at one of the industrial participant sites, and often includes tours of the facilities. The Department Chairperson and Industrial Coordinator determine the meeting agenda. Summaries of the meeting minutes are prepared and distributed to the committee.

The SCSU **Meteorology Program** established the **Meteorology Advisory Board (MAB)** in the summer of 1998. MAB advises the SCSU Meteorology Program on needs and opportunities in Minnesota industries concerned with meteorology.

Members of the board include representatives from Braun Intertec Corporation, North Central River Forecast Center, the National Weather Service, and the Department of Soil, Water, and Climate. The last meeting of the advisory board was in the fall of 1998, with the next meeting scheduled for the fall of 2000.

The **Technology Advisory Committee (TAC)**, established in the fall of 1998, provides the **Environmental & Technological Studies (ETS)** Department with recommendations and advice on topics including curriculum, facilities, technologies, assignments, outcome expectations, competency levels, and employment skills, expectations and projections of employability.

There are fifteen members of TAC, selected based on recommendations from the ETS faculty. The first meetings of TAC is planned for the spring of 2000.

In the fall of 1999 faculty from the Department of **Physics, Astronomy, & Engineering Science** established the **Optics Advisory Board (OAB)**. The goal of OAB is to improve communication with local industries involved in optical technology in order to guide program development, place students, lobby for program resources, and explore collaborative projects with industry.

Current board members include representatives from Honeywell, CyberOptics, and Aura Lens Products, Inc. Additional board members will be added in the future. The first meeting of the advisory board will be February 24, 2000, at the Biannual Optics in Medicine and Industry Conference at SCSU.

The **Chemistry Department** is establishing a **Chemistry Advisory Board (CAB)** to better prepare their graduates for the future. The advisory board will focus on communication between board members and the Chemistry Department to recommend future program initiatives.

The advisory board will meet semiannually and have eight to ten members from industry and academia. The first meeting will determine the board's charter, protocols, and schedules.

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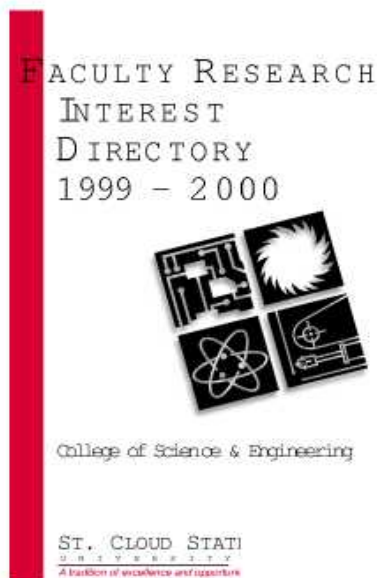
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Alumni & External

## Applied Research Center Publishes Faculty Research Interest Directory

There's a new tool available for people looking for help in science and engineering: the 1999-2000 COSE Faculty Research Interest Directory. The directory was the brain child of COSE Dean A. I. Musah, who was looking for a way to publicize the wide array of talent and knowledge available in the college. He asked COSE Applied Research Center (ARC) Director Richard Brundage to collect research interest keywords from COSE faculty and assemble them into a directory.



Data were collected by sending surveys to faculty members. About two-thirds of the college faculty responded with up to five keywords or short phrases that describe their research interests. ARC graduate assistant Paula Nix, administrative assistant Jenny Kolden, and undergraduate assistant Joe Tischler entered the faculty responses into a database so that indices could be generated by keyword and department. Richard Brundage collected the database reports and formatted them

for the directory. Information on the mission and how to contact COSE programs is also included in the directory. Photos illustrating research activities in COSE were selected from collections at the COSE Applied Research Center and SCSU University Communications.

The Faculty Research Interest Directory was distributed to all COSE faculty and staff in late November, and copies will be sent to offices within SCSU and throughout Minnesota.

The directory is available on-line at the ARC website at

<http://www.stcloudstate.edu/~arc/research.html>

The on-line version will be periodically updated to reflect the changing interests of college faculty and to include new faculty members.

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## Faculty & Staff



### COSE Faculty & Staff Collegiality Award 1998- 1999

Bernie Frie, Chemistry Department office manager, has been named as the first recipient of the COSE Faculty & Staff Collegiality Award.

In making the presentation COSE Dean A. I. Musah commended Bernie Frie on the exemplary way she carries out her normal duties. She consistently maintains a pleasant attitude and is courteous to her colleagues and visitors.

The award recognizes and promotes collegial behavior. Bernie Frie embodies the very essence of collegial relationships. She rises above service in her own department to help people in other departments as well.

"She's a person who is extremely efficient at what she does," said Prof. Mehroo Cooper, Chemistry Department Chair and a member of the department for 17 years. "She is always willing to drop her work temporarily and help others, whether they're students, faculty or visitors." Assistant Prof. Tamera Stobb, who has been both a student and faculty member at the college, said "It's not in her job description, but if someone needs help getting their computer working or has other needs, she's there. She's helped me personally and I've seen her help numerous others, no matter what their problems, or their status."

"Bernie Frie is one of those people who recognizes that consideration and kindness serve to soften the daily workload, which makes our environment more enjoyable," Dean Musah said. "It's her friendly nature and helpful deeds that have earned this award. She truly serves as a model for the type of behavior and actions we want to promote."

Dean Musah presented a plaque to Bernie Frie at the COSE Day this fall. Her response in receiving it was, "It is both an honor and a surprise. I'm not sure what I'm doing that's so special, so I guess I'll just continue at my job as always."

Bernie Frie started working in the Chemistry Department in 1972 and was named office manager two years later. Her duties include maintaining the office, ordering supplies and overseeing paperwork for the 14 faculty members and over 2,000 students that are involved with the department annually.

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## Faculty & Staff



### COSE Faculty Research Award 1998-1999

For Yi Zheng, chair and professor of Electrical Engineering at St. Cloud State University, and winner of the 1998-99 Faculty Research Award, "number one is the joint research with students." This dedication to his students and to research is evident in his outstanding contributions to the field of Electrical Engineering. A member of the SCSU Department of Electrical Engineering staff since 1987, he has published about fifty research papers in the fields of:

Neural networks and their medical applications

Pulse-echo ultrasound Doppler signal processing

Signal processing for synthetic aperture antenna arrays.

Image processing for radio astronomy and non destructive testing.

High-speed signal and image processing systems.

Some of these papers include student design projects, which have earned students national awards. He was the major advisor for seven students who won awards at the Institute of Electrical and Electronics Engineers (IEEE) Region 4 and State Student Paper competitions. One of these projects was a high-speed digital signal processor that is used in automated photo processing to provide instant proofs for photo studios.

Medicine is another area of interest for Yi Zheng. He developed a portable EKG heart monitor, and is working with researchers at the Mayo Clinic in Rochester to improve the ability of ultra-sound devices to detect breast

cancer. Over the years he has received research grants totaling over \$1.6 million dollars from the National Science Foundation, Texas Instruments, IBM and the Minnesota State Colleges and Universities.

Research and engineering are rooted in Yi Zheng's family. His father was a mechanical engineer who helped develop an early jet engine, while his mother is president of Sichuan University, a major research center. Yi Zheng graduated from Chongqing University with a major in computer engineering, and then moved to the U.S. in 1982 and attended Iowa State University, where he earned his M.S. and Ph.D. degrees.

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## Faculty & Staff

### New Faculty and Staff for 1999-2000 Academic Year

Associate Professor **Jorge Arriagada** is a new probationary faculty member in the Biological Sciences Department. He studies the systematics of vascular plants, floristics, conservation, tropical biology, and is particularly interested in phylogenetic studies (using cladistic analysis) of Compositae (the sunflower family). Jorge Arriagada's early interest in natural sciences was motivated by good teachers and love of outdoor activities. He is currently working on biosystematic research on a group of tropical plants used as a fish poison by native people, participating in the Generic Flora of the Southeastern United States Project, a long-term project funded by the National Science Foundation in collaboration with the University of Florida, Harvard University, and the New York Museum, and short term projects on regional flora involving local organizations and especially student participation. Jorge Arriagada enjoys opportunities to travel, learning about people and cultures, understanding biological interactions, and helping people to enjoy nature. He has worked at the Department of Botany at the University of Concepcion, Chile (1979-87), the Department of Plant Biology at Ohio State University, Newark Campus (1991-95), and the New York State Museum (1995-99). Jorge Arriagada received his Ph.D. in plant systematics from Ohio State University in 1993.



Assistant Professor **Emory Bunn** is a new probationary faculty member in the Physics, Astronomy, and Engineering Science Department. His main areas of research are data analysis and cosmological theory, which involves theories and models of the universe. He uses observations of the cosmic microwave background radiation to set constraints on cosmological models. He became interested in physics during his sophomore year in college, but didn't choose cosmology until his second year in graduate school. Emory Bunn enjoys working on big questions, and there's nothing bigger than the universe! He has taught a wide range of courses in undergraduate physics and astronomy. Emory Bunn has worked at the University of California-Berkeley (Fall 1995), the San Francisco



Conservatory of Music (Spring 1996), and as an assistant professor at Bates College (1996-99). He received his Ph.D. from the University of California-Berkeley in 1995.



Assistant Professor **Jeff Chen** is a new probationary faculty member in the Mathematics Department. He studies number theory, coding theory, and graph theory. He became interested in this field because numbers have always fascinated him. Currently Jeff is working on the history of Ancient Chinese Mathematics. The best thing about number theory is you can always find a way to memorize a person's phone number. Before coming to St. Cloud State, Jeff

was an assistant professor and Mathematics Chair at Waldorf College in Iowa. Jeff Chen received his Ph.D. in mathematics from Yale University in 1996.

Assistant Professor **Dan Gregory** is a new probationary faculty member in the Chemistry Department. He is interested in chemical education of university students and the community, and photochemical and computational research. Dan Gregory became interested in chemistry when he took general chemistry from Dr. Edward Carberry, an excellent teacher who got his students excited about chemistry. Some of Dan Gregory's current projects include incorporating computational chemistry into the organic chemistry curriculum, collaborative research in computational chemistry with Iowa State University, and exploring the photochemistry of organic isocyanates. Both computational chemistry and organic photochemistry are relatively young fields, which makes them very dynamic and exciting. Prior to working at St. Cloud State, Dan Gregory was an Assistant Professor at the University of Minnesota-Morris from 1998-99. Dan Gregory received his Ph.D. in organic chemistry from Iowa State University.





Associate Professor **Tony Hansen** is a new probationary faculty member in the Earth Sciences Department. His professional interests include large-scale dynamic meteorology, gravity waves and turbulence, problems related to medium range forecasting, and predictability and chaos in nonlinear systems. He is currently working on two projects. One is a collaboration with Prof. Greg Nastrom of the SCSU Earth Sciences Department to study gravity waves and turbulence as measured by radar. The other is a collaboration with the Science Museum of Minnesota to develop interactive exhibits on weather and climate for the new Science Museum in St. Paul. Meteorology is fascinating to Tony Hansen because nature is presenting real-time examples of physical phenomena everyday, and no two days are exactly the same. Before coming to St. Cloud State, Tony Hansen worked at Control Data Corporation for six years and at Augsburg College for nine years. He received his Ph.D. in meteorology from Iowa State University.

Assistant Professor **Kurt Helgeson** is a new probationary faculty member in the Environmental and Technological Studies Department. He studies affordable housing, alternative energy, and process improvement in manufacturing. He started in construction and woodworking with his father and has continued with it to this day. Kurt is currently working on several research projects with area businesses, including testing septic tanks and designing self-guided golf carts. He has also been awarded two assessment grants from the SCSU Assessment Office. The development of technology in our society makes it imperative that students develop an understanding of technology, and Kurt Helgeson is working to meet that need. Before coming to St. Cloud State, he worked as a design and quality assurance manager at Hoffco, Inc., from 1993-98. Kurt Helgeson received his Ed.D. in 1993 from West Virginia University.



Assistant Professor **Joseph Marks** is a new probationary faculty member in the Electrical Engineering Department. He studies computer architecture, logic hardware design, coding theory, digital signal processing (DSP), and software engineering of all types. He is interested in the mathematics of waveforms, so electrical engineering was a natural major for him. Joseph Marks is currently creating labs for EE 422, Microcontrollers, and EE 221, Logic Design. Computer architecture is changing rapidly,

so there are abundant opportunities to learn and test new things. Before coming to St. Cloud State, he worked as a DSP research engineer at Timewave Technology (1994-95), DSP and software engineer at EF Johnson Co. (1996), and as a senior DSP and software engineer at TELEX Communications (1997-99). Joseph Marks received his Ph.D. from the University of Minnesota in 1993.

Assistant Professor **JoAnn Meerschaert** is a new probationary faculty member in the Biological Sciences Department. She studies cell adhesion and migration. She decided she wanted to be a scientist when she was six while watching a lot of public television. She is examining molecules involved in adhesion, such as integrins. These molecules mediate interactions of cells with other cells and with surrounding tissues. Some of what she learns may help someone with an immune or developmental disorder, or cancer, through the development of a pharmacologic therapy. Before coming to St. Cloud State, JoAnn Meerschaert had a Postdoctoral Fellowship in the Department of Medicine at the University of Wisconsin (1995-99) and taught at the University of Wisconsin (1997). She received her Ph.D. from the State University of New York at Stony Brook in 1994.



Assistant Professor **Stephen Walk** is a new probationary faculty member in the Mathematics Department. He is interested in mathematical logic and computability theory. He became interested in mathematics because good math teachers seemed to be in short supply and the subject just came naturally to him. Currently, Stephen Walk is working on research with his former advisor at Notre Dame and a computability theorist in New Zealand. The three of them are investigating automorphisms, which is a way to match up different levels of information. He likes the philosophical aspects of computability theory, and in contrast to other natural sciences, you can do math without safety goggles. Stephen Walk received his Ph.D. in mathematics in 1999 from the University of Notre Dame.

Associate Professor **James Wilmesmeier** is a new probationary faculty member in the Mathematics Department. His main areas of interest are in developmental mathematics and education, which helps students prepare for college level mathematics and develop their study habits. He became interested in math education five years ago while working at the SCSU Math Skills Center. He is working on improving and expanding the program in developmental mathematics to meet the needs of an increasingly diverse population of students. This work provides the opportunity to work with a wide variety of students and to have an impact on their academic success. Prior to coming to St. Cloud State, James was employed at St. John's University (1970-73, 1985-90), the University of Iowa (1975-76), and the University of Northern Iowa (1976-85). James Wilmesmeier received his Ph.D. in statistics and probability theory from the University of Iowa.



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## COSE Development Office

ST. CLOUD STATE  
UNIVERSITY

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# Dimensions

## Viewpoint

### How can we encourage research?

As we've put together this issue of Dimensions, and throughout my tenure as Applied Research Director, I've been struck by the variety of research projects in our college. In these pages you can read about projects requiring hundreds of thousands of dollars to complete and projects completed with donated supplies and labor; projects involving students and faculty from around the country and projects initiated by a single student. Despite their variety these projects have some themes in common that help them grow and thrive that I'd like to share with you with the goal of encouraging the growth of research opportunities for COSE students. Here are some common themes for successful research.



**Openness** Research cannot thrive in the dark. Spreading the word about current research will inspire others to dream about their own projects. Sharing strategies for fitting research into our lives will help make those dreams come true.

**Respect** Research is a lot of work, and people aren't as likely to do it if it isn't valued. Many students already value research opportunities, and as the word gets out more students will seek them out. The word will get out if we respect quality research in all disciplines.

**Assessment** It is hard to evaluate ourselves or be evaluated by others. It can be frustrating and scary to write proposals and papers, in part because we know our work will be assessed in a competitive atmosphere, but it gives valuable feedback on the quality and value of our ideas. Tracking student participants who have moved on demonstrates the positive impact of their research experiences. Assessment provides the data that leads to respect for the value of research.

**Flexibility** We explore new ideas and approaches when we do research. This requires flexibility in how we allocate time for people to try something

different, money to support new projects, and space to give those projects homes. These are the most precious commodities in any organization, but when they are exhausted on existing programs, research cannot flourish. Successful research requires we find the flexibility to allocate some of our resources towards something new.

**Dedication** Research takes a single-mindedness that is hard to achieve, what with everything else that competes for our attention. Some people will never be able to devote themselves to research; others may be able to for a limited period of time, very few of us will maintain an active research program during our entire career. Along with the flexibility to change our focus, we need the dedication to seize research opportunities and make the most of them when we can.

As we develop a strategic plan for our college I hope we can find ways to include these themes, so that research continues to grow and thrive in our college and university.

Richard Brundage  
Associate Professor  
Physics, Astronomy & Engineering Science

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