

Protégés work together to become leaders

Each summer UCAR president Rick Anthes offers a challenge to incoming SOARS protégés. "I fully expect that among you right now are the future leaders in our field," he said at this year's welcome reception. To help them meet this challenge, the protégés begin the 10-week SOARS program by participating in a multi-day leadership orientation. This training gives protégés a head start on building the learning community that will be an essential part of their summer experience. Getting to know fellow protégés, developing peer mentoring matches, and planning special seminars and events for the summer are all parts of this process.

Leadership training varies considerably from year to year, in part because returning protégés play an important role in shaping the activities and presentations. While the training has always been offered to returning protégés, all program participants, including first-year protégés, have been invited since 2004. Fourth-year protégé Casey Thornbrugh views the recent expansion as very beneficial. "It puts everyone on the same level," he says. "New protégés now have the same opportunity to develop relationships, and it's an opportunity for all of us to talk about challenges and learn how to work as a part of a team."



(Clockwise from bottom) Luna Rodriguez, Casey Thornbrugh, Bret Harper, Julien Wang, Amber Reynolds, and Stephen Hernandez plan a strategy to locate SOARS treasures during the geocaching activity at Chautauqua Park.

The four-day leadership orientation offers protégés the opportunity to establish both personal and program goals for the summer. Returning protégés often reflect on their previous experiences to offer insight toward accomplishing various goals. In this year's sessions, Clarence Mann gave an inspirational presentation on achieving success. "I've learned a lot about the importance of a good work ethic," he told the protégés. "When you plan ahead and set goals, there's a big payoff: it helps things come easier."

This summer's leadership training included a one-day geocaching activity at Chautauqua Park. Geocaching involves using

portable Global Positioning System (GPS) receivers to locate a cache, or concealed set of items. Each team of seven protégés had to locate treasure boxes filled with activities related to SOARS, an assignment that provided a great opportunity for team building with fellow participants. Shanna Forbes explains that the

process was much more complicated than just locating the treasures. In one exercise, some of the team members were blindfolded and then led by other protégés. "It modified your expectations and the way you look at things—we had to put ourselves in someone else's shoes," says Shanna. She described the experience as somewhat analogous to the mentor-mentee relationship: "You have to put yourself in their place and understand that it's important to go to them when you need them. On the other side, they have to remember what it's like to be us, and know that we might need guidance in different areas."

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COMING EVENTS...

2006 Application deadline:
 February 1, 2006

2006 SOARS summer program:
 May 30-August 11, 2006

IT'S A FACT

Thirty-three protégés and alumni attended the SOARS 10-year reunion, traveling to Boulder from both coasts and from as far away as Puerto Rico. More than 30 past and current mentors and other guests joined the attendees at the reunion kick-off reception on June 17.

Visit the SOARS Web site at:
www.ucar.edu/soars

HIGHLIGHTS

Christopher Castro completed his PhD in atmospheric science at Colorado State University in June.

D. Matthew Coleman successfully defended his master's thesis, "Reducing financial impacts on the reinsurance industry: Economic valuation of seasonal hurricane forecasts." He received an MS in meteorology from Pennsylvania State University in May and has accepted a position with Citadel Investment Group in Chicago.

Theresa Johnson received an MS in forest science from Oregon State University in June.

Erick Adame completed a BS in meteorology with a mathematics minor at the State University of New York at Oneonta. He graduated with all-college honors and received the Philo Wilson Most Outstanding Senior Award, given by the Department of Earth Sciences to one graduating senior. He begins graduate study at the State University of New York at Albany this fall.

Melissa Burt graduated from Millersville University with a BS in meteorology and is starting work on a master's degree in atmospheric science at Colorado State University.

Bret Harper completed a BS in environmental engineering at the University of Colorado at Boulder. This fall he joins the Energy and Resources Group at the University of California, Berkeley, to begin graduate study in the renewable energy field.

Damian Mattis graduated magna cum laude with a BS in environmental science from Medgar Evers College of the City University of New York. He has been accepted into the New York City Teaching Fellowship and began work this summer to earn a master's degree in education with a concentration in middle school mathematics.

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Protégé investigates energy alternatives

Bret Harper spent his high school years surfing in the Pacific Ocean near Honolulu. Today, he is passionate about alternative energy, and about ocean energy in particular. “There’s so much power and potential in the ocean, and it doesn’t have a lot of the disadvantages that terrestrial forms of renewable energy might have,” he says.

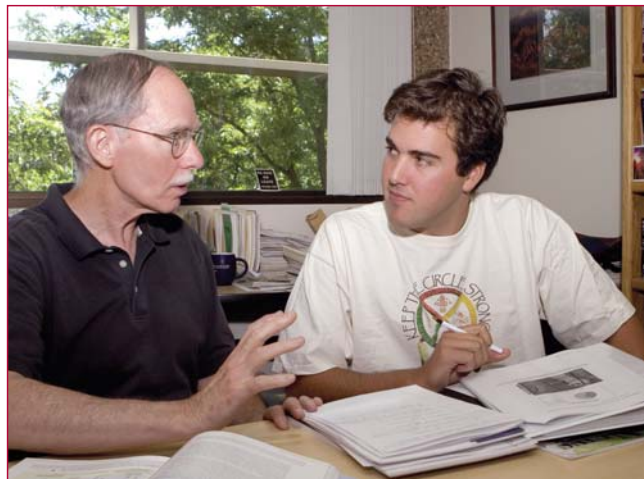
After graduation, Bret was accepted to the engineering program at the University of Colorado at Boulder. Initially, three engineering disciplines—aerospace, environmental, and electrical—attracted his interest, but he ultimately chose environmental engineering because it was a smaller department and because the projects had, in his view, a larger purpose. “It wasn’t just about making money. They seemed to have a focus on helping the world we live in, and I liked that,” he says.

Bret, whose Native American heritage includes Coast Miwok and Pomo, has been very involved in the American Indian Science and Engineering Society (AISES). Although there were only a couple of members at the University of Colorado when Bret was a freshman, participation has steadily grown. By the time Bret served as president of the university’s chapter during his senior year, the membership had risen to around 30 people.

It was at an AISES conference that Bret found out about SOARS, and in 2004 he participated in his first SOARS summer. He says that his project, which focused on drift velocities in the upper atmosphere, taught him

a lot about doing research, from developing a research question to figuring out how to address it. “After you’re done with that final talk and you’ve fielded questions from top scientists on a topic you really knew nothing about ten weeks ago, you realize how much you’ve learned. It’s such an experience coming to the end of summer and looking back at what you’ve accomplished.”

The summer allowed him to discuss projects with other protégés and provided the opportunity to learn more about a range of topics. Bret found he was most drawn to projects that looked at societal impacts of various environmental phenomena or issues. This interest led him to NCAR’s Institute for the Study of Society and the Environment (ISSE) and to Bob Harriss, an ISSE scientist who served as his science research mentor in 2005. Bret’s summer project examined the correlation between the El Niño Southern Oscillation (ENSO) and winds in the Northern Plains. “By examining links between ENSO and average wind speed over key areas, we can better understand the effects of climate on wind energy production and evaluate optimal energy options,” he explains.



Bret Harper (right) discusses his summer project with science research mentor Bob Harriss.

This fall, Bret begins graduate studies in the Energy and Resources Group at the University of California, Berkeley, a program he found out about through Bob. “It’s possible that my thesis work will build off my summer research,” says Bret. He plans to complete a master’s degree in energy and resources, and he hopes to have the opportunity to learn more about ocean energy as well. “If I’m not able to address that as part of my master’s work, I think I’d like to get a PhD in the ocean energy field and become one of the real experts in that area, especially as it’s just emerging now,” he says. **S**

Leaders... (continued from page 1)

SOARS director Raj Pandya says that the geocaching activity provided a laboratory for each group to experiment with becoming an effective team. First-year protégé Luna Rodriguez concurs, saying she anticipates that some of the strategies for working well with her teammates can be applied to working well with her mentors and in future collaborations. “I consider those good skills for my career, because in the scientific community, no one does research on his or her own,” she explains. Clarence also says the activity provided valuable lessons: “Being a leader requires knowing how to follow as well. Good leaders take other people’s ideas into consideration and are able to listen and work well with others.”

Overall, this year’s leadership training was beneficial for the protégés and inspiring for the SOARS staff. “I was very impressed at how the protégés drove the whole process,” Raj says. “The returning protégés who led the discussions and activities demonstrated tremendous insight and seem well on their way to fulfilling the challenge of SOARS—that they will become science’s next leaders.”

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SOARS staff and protégés work together on a team-building activity.

Protégés gain global perspective through experience in Taiwan

Prior to arriving in Boulder for this year's SOARS summer, four protégés—Erick Adame, Melissa Burt, Rebecca Chan, and Anthony Didlake—traveled to Taiwan to participate in a special summer science camp and colloquium. The week-long immersion program at Taiwan's Central Weather Bureau was sponsored by the International Programs Division of the National Science Foundation and introduced the students to the science and technology involved in developing the Constellation Observing System for Meteorology, Ionosphere and Climate (COSMIC).

COSMIC, known in Taiwan as FORMOSAT-3, will use instruments aboard six satellites to obtain vertical profiles of atmospheric temperature and moisture. The data are obtained based on Global Positioning System (GPS) radio occultation, which uses satellites in low-Earth orbit to measure the change in frequency of GPS radio signals in Earth's upper and lower atmosphere. The resulting estimates can be applied to a range of research areas, including climate monitoring.

The protégés, along with other U.S. and Taiwanese students and scientists, participated in four days of talks by leading GPS radio occultation scientists from around the world. Melissa reports that the large number of scientific applications of radio occultation data surprised her. Some of the lectures that she found most interesting focused on the use of the data in numerical weather prediction models. "I think that if GPS radio occultation data were used in numerical weather prediction models, the accuracy of forecasts would improve and the products given to the public would be more reliable," she says.

Rebecca was unsure whether the workshop would be relevant to her current research exploring East African climate variability, but says she decided to apply after receiving encouragement from her advisors and mentors. "I knew it could be a valuable opportunity to learn about the possibility of using these new data for my thesis research, as well as to broaden my research interests and learn more about this relatively new, yet promising technology."




SOARS protégés Rebecca Chan, Melissa Burt, Erick Adame (left to right) and Anthony Didlake (far right) take a moment for a picture with Gary Lee and Elizabeth Poli at the summer camp poster session.

She says that the experience also demonstrated the importance of international collaboration, explaining, "It's really beneficial when different teams can bring forth their knowledge and specialties and work with one another to minimize gaps and limitations."

The students presented posters of their own research projects, increasing their opportunities to interact directly with the scientists and with each other. The group also toured several different sites and facilities. While they were in Taipei, the area experienced a magnitude 6.2 earthquake and the students visited the Seismological Center to read the seismograph and view the quake's intensity. The camp participants also visited the National Space Organization (NSPO) facility where the COSMIC satellites are being prepared for launch, and the radar and observatory station at Hua-lien on the east coast of Taiwan.

A key component of the workshop involved giving U.S. and Taiwanese students the chance to interact and learn more about each other's cultures, resulting in some memorable experiences and opportunities for developing relationships. "There was no way I could pass up such an excellent opportunity

to network with colleagues from all over the planet," explains Erick. "Science does not contain itself within our borders, so it is critical that we allow ourselves to be able to work with and understand people from other cultures." Anthony was also enthusiastic about the chance to partake in so many aspects of life in Taiwan. He reports that the camp was the first time he had been immersed in a foreign environment, and that his eyes were opened to the world. "I cannot explain the awe that I felt as I saw, smelled, and heard completely new things," he explains. "For the first time, I could experience the differences between American culture and another country's culture."

UCAR's Bill Kuo, who directs the COSMIC program and played an important role in setting up the summer camp, says the program was a success. "By introducing students from different fields to GPS radio occultation in meteorology, we invest in the future sustainment and advancement of the technology," he explains. "We also increase the competitiveness of our future scientists in global workforce. The students who participated now know so much more about how things are done on the other side of the Pacific." 

PhD recipients begin postgraduate careers



This 10th year of the SOARS program is a time for reflecting on accomplishments, particularly those of the protégés and alumni. Two former SOARS protégés, Rachel Vincent-Finley and Naressa Cofield, completed PhDs in the past year. They recently took time out of their busy schedules to provide an update on their careers.


Rachel received her PhD in computational and applied mathematics from Rice University in August 2004. She is currently working as a postdoctoral fellow in the chemistry department at the University of Houston. Her research with B. Montgomery Pettitt, who was a co-advisor on her PhD dissertation, focuses on improving scientists' ability to understand and predict protein function. "Examining protein behavior requires approximately one million snapshots per second because the timescales involved are so small—on the order of femtoseconds," explains Rachel. "That can take a lot of

computer time and storage, so we are exploring ways of doing the computer simulations more efficiently, as well as looking more closely at what the mathematics can help us predict."

Rachel's postdoctoral position will continue for another year and a half. She then plans to look for a faculty research position, most likely in an applied mathematics department. "I'd like to continue my work in this area or in other applications of mathematics, and also to be able to work with students," she says.

Naressa Cofield completed her PhD in environmental engineering at Purdue University this spring. She recently accepted an Engineering Leadership Development Program (ELDP) fellow position at Johnson & Johnson. The ELDP is a two-year rotational program providing leadership and development experience in different business units of the company. As an environmental engineer, Naressa will do her first rotation with corporate environmental affairs in New Brunswick, New Jersey. She will support the development of Johnson & Johnson's environmental compliance goals, and also collaborate with the company's worldwide environmental affairs office. Her second rotation will be with ALZA, a leader in developing drug delivery pharmaceuticals in Mountain View, California.

Naressa says that her long-term goal is to work in a position that allows her to outline environmental regulations and develop sustainable practices. "The Johnson & Johnson program is directly aligned with this goal," she explains. "It's a once-in-a-lifetime opportunity to experience working in various operating groups in corporate America. By working with corporate environmental affairs and then going to a manufacturing company, I can merge regulatory design with real-time production and come up with the best practices that protect the environment while maximizing productivity."

Rachel worked with science research mentor Peter Hess in 1997 and with Mark Taylor in 1998. Naressa participated in SOARS in 1998, working with Roger Pielke, Jr. The two SOARS alumni were the first program participants to complete doctoral degrees. 

SOARS MENTORS RECOGNIZED



At the June 6 welcome reception, SOARS director Raj Pandya recognized six mentors who have each contributed five years of service to the program. This year's five-year service awardees were Tim Barnes and Laura Curtis, both at UCAR, who have each served as writing as well as community mentors; Joanie Kleypas (NCAR), who has served as both a writing mentor and a science research mentor; and Wen-Chau Lee

(NCAR), Jay Miller (now retired from NCAR), and Roger Pielke, Jr. (formerly at NCAR, now at CU), who have served as science research mentors. Raj commended the mentors for their ongoing contributions to SOARS, emphasizing that mentors are an integral part of the program's success. In the program's 10 years, 31 mentors and steering committee members have contributed five or more years of service.

New partnerships increase diversity and scope of SOARS research

SOARS protégés have always tackled research projects focused on a variety of atmospheric science topics. Thanks to new partnerships and emerging programs, this summer's protégés also pursued research addressing topics in the broader geosciences. These projects included questions about geology and geodesy, as well as studies of the connections between oceans and human health.

First-year protégés Julien Wang and Nicole Ngo worked on projects through NOAA's Oceans and Human Health Initiative, which brings together scientists with expertise in climate, oceans, health impacts, and vector-borne diseases. Nicole studied the summer's unusually large outbreak of harmful algae blooms off the coast of Massachusetts, while Julien explored the links between variations in climate parameters and Dengue Fever in Puerto Rico.

Stephen Hernandez, also a first-year protégé, worked with geologists at the University of Colorado and UNAVCO, a Boulder-based facility focusing on Earth science. Stephen's project explored ways to improve the process of recording continental plate motions. He is the first protégé in UNAVCO's Research and Education in

Solid Earth Science for Students (RESESS) program, which is being developed in collaboration with SOARS. Susan Eriksson, director of education at UNAVCO, explains, "Our goal is to increase the number of individuals from under-represented communities who complete master's and PhD degrees in the solid Earth geosciences. It's a pilot project that will continue to grow over the next three summers, and the collaboration will also help answer important questions about whether the SOARS model is transferable."

During the RESESS program's first years, its protégés will be integrated into the SOARS community and participate in SOARS writing workshops and other activities. The students are therefore able to experience the strong learning community that is a key element of the SOARS model. This summer, Stephen was a protégé of both programs and lived with other SOARS protégés at the student apartments. He appreciated the collaboration between the two programs, stating, "It was nice to have that interaction with peers and to know you were in the same boat as everyone else."

NCAR's Earth Observing Laboratory provided specialized opportunities for protégés



SOARS/RESESS protégé Stephen Hernandez and science research mentor Kristine Larson at the University of Colorado examine the solid Earth data used in his summer research.

interested in engineering careers. Two returning protégés, Olusegun Goyea and Clarence Mann, and first-year protégé Keith Goodman, spent their summers working on engineering projects and exploring the synergy between engineering and scientific research.

These new partnerships help SOARS protégés build on their already strong commitments to helping science better serve diverse of communities. For instance, Bret Harper, a SOARS protégé of Native American heritage, analyzed wind energy production in South Dakota, where the Rosebud Indian Reservation operates a large wind turbine. Casey Thornbrugh, another protégé with a Native American background, worked with U.S. Geological Survey researchers to study winds and dune formation in the Navajo Nation.

According to SOARS director Raj Pandya, all of these efforts contribute to the same goal of building a more inclusive science. "We don't need to be only geologists, oceanographers, and meteorologists—we can also work together as scientists who study the Earth," he says. "We can do better at involving diverse communities and collaborating across the subdisciplines. SOARS protégés seem headed this way already, as you can see by many of their projects."

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(Left to right) Nicole Ngo, science research mentors Linda Mearns and Mary Hayden, and Julien Wang explore climate connections to human health and other socio-economic concerns.

HIGHLIGHTS

Melanie Zauscher is beginning graduate studies in mechanical engineering at the University of California at San Diego. Her research will involve linking atmospheric science and alternative energy.

Sarah Tessendorf co-authored a recent paper resulting from her 1999-2000 SOARS research (Trapp, R.J., S.A. Tessendorf, E.S. Godfrey, and H.E. Brooks: "Tornadoes from squall lines and bow echoes. Part I: Climatological distribution," *Weather and Forecasting*, 20, 23-34, 2005). She was awarded the 2004 Peter B. Wagner Award for Women in Atmospheric Sciences at a ceremony at the Desert Research Institute in Reno, Nevada, in February. She presented a poster "Lightning and radar observations of two storms observed during STEPS" at the 22nd American Meteorological Society (AMS) Conference on Severe Local Storms in Hyannis, Massachusetts, and won an award for Best Student Poster. She also presented a poster titled "Cloud-to-ground lightning behavior of convective cells observed during STEPS" at the First AMS Conference on Meteorological Applications of Lightning Data in San Diego, California, and has been selected to serve as a student member on the AMS Severe Local Storms Scientific and Technological Activities Commission.

(continued from page 1)


Erik Noble was selected as an American Indian Science and Engineering Society (AISES) intern to work in the Office of the Science and Technology Advisor to Secretary of State Condeleeza Rice. Erik has helped initiate the beginning stages of a K-12 science program for Native Americans in Alaskan villages through the sponsorship of several government agencies. He is currently completing a master's degree in environmental studies at the University of Colorado.

Rynda Hudman was one of the members of the Intercontinental Chemical Transport Experiment-North America (INTEX-NA) Science Team, which was selected to receive a NASA Group Achievement Award. She gave a presentation titled "A multi-platform analysis of the North American reactive nitrogen budget during the ICARTT summer intensive," at the INTEX-NA Data Meeting in Virginia Beach, Virginia in March and at the Intercontinental Transport and Chemical Transformation 2004 (ITCT-2K4) Data Meeting in Boulder in April. Rynda also participated in the Science, Engineering and Technology Congressional Visits Day as an NCAR representative, speaking with science and legislative staffers in the congressional offices of Sen. John Kerry, Sen. John Edwards, and Rep. Michael Capuano about the importance of funding basic science research.

Tamara Singleton was awarded a NASA Harriet Jenkins Predoctoral Fellowship and an NCAR HAO Newirk Fellowship. She accepted the NASA Harriet Jenkins Predoctoral Fellowship to continue her PhD work in applied mathematics.

Tanya Craft received a fellowship from the Computational Mathematics Research Group at North Carolina Agricultural & Technical State University and gave a presentation on her thesis topic, HIV pathogenesis, at their Math Awareness Day. She received a professional award from Winston-Salem State University, and has been selected as a member of the Pi Mu Epsilon Mathematics Honor Society.

Braxton Edwards presented a poster "A flood risk assessment of the Colorado Front Range region using GIS" at the GIS in Weather, Climate and Impacts Workshop in Boulder in July.

Deanna Henc has been invited to travel to Miami in mid-August through September to participate in the Terrain Induced Rotor Experiment (RAINEX) with her graduate advisor, Bob Houze, and her SOARS mentor, Wen-Chau Lee. 

SOARS PARTICIPATING UNIVERSITIES: Colorado State University, Cornell University, Dartmouth College, Drexel University, Florida State University, Georgia Institute of Technology, Iowa State University, Michigan Technological University, New Mexico Tech, North Carolina State University, Old Dominion University, Oregon State University, Pennsylvania State University, Purdue University, Rutgers, the State University of New Jersey, Stanford University, University of Alabama at Huntsville, University of Alaska at Fairbanks, University of Arizona, University of California/Irvine, University of California/Los Angeles, University of California/San Diego (Scripps Institution of Oceanography), University of Colorado/Boulder, University of Hawaii, University of Illinois/Urbana-Champaign, University of Iowa, University of Miami, University of Michigan, University of Missouri/Columbia, University of Nebraska/Lincoln, University of Nevada/Reno, University of Oklahoma, University of Rhode Island, University of Texas, University of Utah, University of Washington, University of Wisconsin/Madison, University of Wyoming, Washington State University, Woods Hole Oceanographic Institution.



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