

SOARS receives presidential award

SOARS program director Thomas Windham traveled to Washington in December 2001 to receive a Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. SOARS was one of ten institutions and ten individuals to receive the sixth annual award, which is administered and funded through the National Science Foundation (NSF). President Bush announced the 2001 recipients in early December.

The award recognizes institutions and individuals for promoting participation among women, minorities, and persons with disabilities in scientific and engineering careers. SOARS was honored "for embodying excellence in mentoring underrepresented students and encouraging their significant achievement in science, mathematics, and engineering."

"The president views these programs as essential to our nation's future," said NSF director Rita Colwell at the time the awards were announced. "All barriers must be removed because



NSF director Rita Colwell (left), SOARS program director Thomas Windham, and White House Office of Science and Technology Policy director John Marburger at the awards ceremony in Washington.

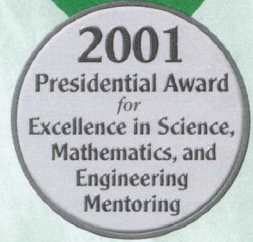
research is enriched when the broadest possible range of people participate. Especially in times of national crisis, we need all of our best minds working together to bring science and technology to bear on urgent issues."

Rick Anthes, president of UCAR, praised Thomas and the UCAR staff who, by volunteering as science research, writing and communication, and community mentors, have made SOARS so successful. However, Rick pointed out that the job is far

from over. "The issue of diversity in the geosciences remains a formidable one," he said. "SOARS and programs like it will be necessary for many years to come. I am very pleased to see it recognized so prominently after only six years."

Christopher Castro and Stephanie Rivale, protégés from the first SOARS summer in 1996, nominated the program for the award. Since that first summer, both have completed master's degrees. Christopher is a Ph.D.

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COMING EVENTS...

SOARS summer program:
May 31–August 9, 2002

Protégé colloquium:
August 2–7, 2002, NCAR

2003 application deadline:
February 7, 2003

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

HIGHLIGHTS

Chris Castro is the first author of the following published paper: Castro, C.L., T.B. McKee, and R.A., Pielke, Sr. 2001: The relationship of the North American monsoon to tropical and North Pacific sea surface temperatures as revealed by observational analyses. *Journal of Climate*, 14, 4449-4473. Chris also presented a talk on "Simulation of the North American monsoon in different Pacific SST regimes using RAMS" at the 26th Climate Diagnostics and Prediction Workshop, October 2001, La Jolla, California. He presented a poster on the same topic at the

13th Symposium on Global Climate Change Studies at the 82nd American Meteorological Society (AMS) Annual Meeting, January 2002, Orlando, Florida.

Shanna T.L. Pitter presented a talk on "Improving western United States snow water equivalent (SWE) estimates from passive microwave sensors" at the 16th Conference on Hydrology; Thomas Windham and the protégés presented a talk on "Significant opportunities in atmospheric research and science: A model diversity program" at the 11th Symposium on

Education; and six protégés presented posters at the First AMS Student Conference, all at the AMS annual meeting. (See "SOARS posters at the AMS student conference" and "Protégés present research at AMS" on page 4.)

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SOARS publications in the NCAR libraries

SOARS Protégé Research Papers, Summer 2001, is available in the NCAR Mesa Lab and Foothills Lab libraries. *Earth, Wind, Sea, and Sky: Protégé Abstracts, Summer 2001* is also in both libraries.

An interview with Marie Boyko

Marie Boyko has coordinated the Protégés' Communication Workshop since SOARS began in 1996. Her last year in that role was 2001. Here are her thoughts on the importance of scientific writing and oral presentation skills and the evolution of the workshop as a strategy for developing those skills.

Why is a scientific communications workshop part of the SOARS summer science research program?

The goal of the SOARS summer program is for these young scientists—the protégés—to have an authentic real-world working experience. Since scientists write papers and present talks, it's important that the protégés experience how research and communications fit together. With each protégé doing a different research project, the common requirement of a paper and talk is a unifying element in the SOARS summer. The workshop exists to support protégés in completing both the paper and the talk. The workshop also gives the protégés a forum for making collective sense of their experiences.

How has the workshop changed?

In the early years the workshop operated more like a class with me as the teacher. I presented things that I thought would be of use to the protégés in preparing their papers and talks.

From the protégés...

"The workshops really helped me develop my thoughts and objectives in the process of presenting my research as clearly and concisely as possible."

— Pauline Datulayta

"The SOARS workshops gave me an edge in writing my thesis for graduate school. I knew what to expect and I knew the general rules for organizing scientific work."

— Lacey Holland

"When I showed Marie my drafts, she always focused on the bigger picture: what research questions I was trying to answer, did I actually accomplish what I set out to do, what was missing."

— Rynda Hudman

The way the workshop has evolved illustrates one of my favorite things about SOARS—under Tom's leadership, the program emphasizes continual evaluation by the whole SOARS community. There's a wonderful creative freedom in knowing that the philosophy is "We'll work hard, we know we won't get it perfect, but we'll keep learning from our experience, and together we'll make things better every year." Being part of such a positive and creative process has been one of the highlights of my professional life.

The workshop has evolved toward being much more of a hands-on writers' working group, in which the agenda follows the needs the protégés express. Particularly in the last couple of years, the protégés have devoted a lot of the workshop time to helping each other with their writing and speaking projects, working in small groups. I've acted as a resource person and facilitator.

What's an example of the protégés setting the workshop agenda?

During a planning session at the beginning of last summer, a returning protégé said she wanted to understand the difference between revising her own paper or reading a colleague's paper, and participating in a formal review for a peer-reviewed journal. To address this issue, the protégés asked their mentors for either a review they had done or review comments they had received on a paper of their own.

The mentors provided wonderful case-study packets, which covered the entire range. One paper had sailed through the peer-review process and had been accepted with only minor revisions; another paper went through numerous rounds of review, including some heated discussions about the requested changes. In small groups the protégés analyzed the packets, then reported back to the whole group about the lessons they had learned. I think seeing these papers and the spectrum of review comments helped protégés develop a frame of reference for hearing comments on their own drafts.

Why are there two practice oral presentations?

The practice talks develop both content and presentation techniques. Having to talk




Marie Boyko (Photo by Carlye Calvin.)

about their summer projects—and hearing what questions people have—are excellent ways for protégés to realize the state of their own understanding. Informally, one of the most valuable roles all mentors play during the summer is offering protégés opportunities to explain their research.

During the past two summers, more science research, writing and communications, and community mentors have come to both practice talks. This is a great example of two other important evolutions of SOARS, toward better integration between the research and communications components, and toward more collaboration within mentoring teams. Both of these developments strengthen the protégés' learning experience.

What's next for you?

I'm looking forward to having some time during the summers for my own learning and writing. During the academic year, I'll continue to teach upper- and lower-division courses in scientific writing in the Department of Kinesiology and Applied Physiology at the University of Colorado here in Boulder. I really love teaching. This spring I'm also finishing up a master's degree in nonprofit management and may do some volunteer work in that area. Sometime in the future, I may volunteer as a SOARS writing and communication mentor. Even from the sidelines, though, I'll always be cheering for the SOARS family. 

Introducing Pat Weis-Taylor

Pat Weis-Taylor will be the SOARS Protégé Communication Coordinator for the 2002 summer. Pat comes to SOARS with more than 20 years of experience teaching writing and public speaking to scientists and engineers. During the academic year, she teaches writing in physics, both as an upper division course and as a graduate seminar, in the Physics Department of the University of Colorado at Boulder. Her courses draw in students majoring in engineering, mathematics, geology, chemistry, and physics. Pat has also taught a writing and speaking course for visiting scientists for whom English is a second language at the Forecast Systems Laboratory of the National Oceanic and Atmospheric Administration.

During the winter and spring of 2002, Pat took the "SOARS introductory short course." She read some protégé research papers and back issues of the newsletter, met with outgoing workshop coordinator Marie Boyko and program director Thomas Windham, and participated in planning meetings for the 2002 summer.

"I'm looking forward to knowing students over a longer period of time than just one semester," Pat said. "I'm also looking forward to working with the mentors. I'm interested in the mentoring process and how it supports students."

Returning protégés help shape program

Even before its inception, the SOARS program content and direction was being shaped by students. Undergraduates participating in a summer research program at NCAR in 1995 were asked how the program could be improved. They made three recommendations: the program should allow students to come back for multiple summers, extend financial support through graduate school, and pay competitive summer wages. The initial SOARS proposal for funding to the National Science Foundation included these points; the first SOARS program took place in 1996.

Thomas Windham, SOARS program director from the beginning, cites the multiyear approach as a key ingredient in the success of SOARS. Besides allowing the protégés time for more in-depth research, the multiyear approach also provides leadership opportunities, he said.



Rynda Hudman (standing, right) discusses programming with Michael Ray Johnson and Shanna Pitter during the 2001 computer workshop. In the background are (left to right) Yarice Rodriguez and Pauline Datulayta. (Photo by Wendy K. Pagel.)

"Returning protégés have the responsibility and opportunity to shape the program," he said. "For example, it's the protégés who turned the more traditional writing class into an ongoing workshop of peers, supporting and critiquing each other as they work on similar scientific writing and oral presentation tasks. The protégés didn't make the change by themselves, but it couldn't have happened without them." (See "An interview with Marie Boyko" on page 2.)

"When the protégés come back for another summer and see how their evaluations and suggestions have made a difference in the program, that's empowering. They share that with the new protégés. The group attitude is, if you don't like something, let's talk about it and propose a change. The message is that your opinion counts."

The assumption of leadership also provides an opportunity to learn things again or in more depth, he said. "If you're not comfortable with your competency in Fortran, and part of your job is to help a first-year protégé with Fortran, you have a strong motivator to get after it yourself," said Thomas.

The returning protégés for the summer of 2001 "got after it" themselves by adding two workshop sessions of their own design, one on computer skills and one on the graduate school application process. Both workshops were in response to the mid-summer program evaluation done by the protégés the previous summer.

"Summer after summer, people struggled initially with computer skills. It's a steep learning curve," said returning protégé Andrew Church. After discussions by e-mail and over dinner with Thomas at the 2001 American Meteorological Society annual meeting, Rynda Hudman, Sarah Tessendorf, and Andrew volunteered to plan and run a half-day computer skills workshop.

The hands-on workshop took place during the first week of the summer 2001 program. Andrew, Rynda, and Sarah covered the basics of using e-mail, UNIX, and the vi editor. They introduced programming by providing sample programs in Fortran and Interactive Data Language (IDL).

"We covered common programming tasks, such as opening and reading a file, performing DO loops and IF-THEN statements, and writing the results to a file," said Rynda. "We had the protégés create a Fortran program that changed temperatures from Fahrenheit to Celsius to demonstrate the tasks."

For the graduate school applications workshop, all the protégés who were already in graduate school or had been accepted for the fall were in on the planning. They brainstormed what topics to include and chose which sections they would each present.

During the workshop, protégés expressed concern about how long it would realistically

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SOARS

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Protégés present research at AMS

SOARS protégé Shanna Pitter presented a paper on “Improving western United States snow water equivalent (SWE) estimates from passive microwave sensors” at the 16th Conference on Hydrology, held during the 82nd American Meteorological Society (AMS) Annual Meeting in January in Orlando, Florida. Shanna began researching the topic in 2000 with Anne Nolin (Cooperative Institute for Research in Environmental Sciences), as part of Summer Multicultural Access to Research Training, a program at the University of Colorado at Boulder. In 2001, Shanna continued her research as a SOARS protégé; Anne was her science research mentor. Shanna researched the topic further for her senior thesis at Iowa State University.

“Last summer I used a regression technique to analyze the data,” Shanna said. “As a result of a suggestion a scientist made at my SOARS presentation, I went back to school and analyzed the same data by using a distribution-swapping technique, which produced better correlations.”

SOARS alumnus Chris Castro presented a poster on “Simulation of the North American monsoon in different Pacific SST regimes using RAMS” at the 13th Symposium on Global Climate Change Studies at the AMS meeting. Roger A. Pielke Sr. and Glen E. Liston (both Colorado State University) were coauthors.

Six other SOARS protégés presented posters at the First AMS Student Conference, held on the weekend prior to the annual meeting. (See sidebar for a list of topics.) Asha Tribble, a graduate student in meteorology at the University of Oklahoma, and SOARS program director Thomas Windham cochaired the poster session.

Protégé Sarah Tessendorf presented a poster about SOARS. “After talking with people, I

referred them to the other protégés’ posters so they could get a feel for the range of research,” she said.

“One man who stopped to see my poster teaches school near me in Texas,” reported Maribel Martinez. “He asked me to come speak to his junior high class. Also, someone from a radar company was interested in my work, so I’m going to send them my paper.”

Kate Dollen said that an operational meteorologist from Jacksonville stopped by her poster and was very interested in her research on background errors. “He introduced me to people from Florida State University, and they invited me to visit their graduate program as a prospective student.”

Ernesto Muñoz-Acevedo also made graduate school connections during his poster session. “I met and talked with a meteorologist from Puerto Rico [Ernesto’s home] who completed her master’s degree at Florida State University. Her thesis adviser is one of the professors I’m interested in working with.”

Segayle Walford presented a poster on modifications to the historical view of the West African monsoon based on satellite data, a topic she has been researching for the past two years as part of her senior thesis. “Because of my research topic, I really enjoyed attending the Special Conference on African Climate and Environment Sunday morning,” she said.

During the annual meeting, Andrew Church attended the talks in the Richard Reed Symposium, which covered the impact of half a century of Reed’s research. The talks focused on synoptic meteorology and included such topics as stratospheric dynamics and numerical prediction in tropical studies.

Yarice Rodriguez attended several sessions in the Global Change and Climate Variations

SOARS posters at the AMS student conference

Kate Dollen	Using ensemble forecasting to estimate the background error covariance for data assimilation
Maribel Martinez	The relationship between radar reflectivity and lightning activity at initial stages of convective storms
Ernesto Muñoz-Acevedo	Daily cycles of low-level winds over the island of Nauru in the equatorial western Pacific
Erik U. Noble	Ozone and water vapor: Analyzing their relationship within the mesosphere
Sarah Tessendorf	Strategies for diversity: SOARS—A case study; and Thomas Windham, SOARS
Segayle C. Walford	Challenging and modifying the historical view of the West African monsoon using TRMM satellite data; and Gregory Jenkins, Pennsylvania State University

Symposium. “My SOARS research is about estimating snowfall rates, so I was particularly interested in a talk about new methods to estimate evaporation rates,” she said.

Two other protégés attended a few days of the annual meeting. Shirley Murillo, a member of the AMS Board on Women and Minorities, flew in to attend their meeting. Graduate student Rynda Hudman was particularly interested in a talk about the global budget of mercury; she made a presentation on the topic herself back at Harvard a few days later as part of her finals.

Besides attending talks and presenting a student poster, Erik Noble took advantage of a different opportunity. “A private company saw my résumé in the book and set up an interview. I learned a lot about how to interview, even though it turned out that I wasn’t interested in the job,” he said.

At the “Educational activities at UCAR” session during the 11th Symposium on Education, SOARS program director Thomas Windham gave a quick introduction about the SOARS learning community and mentoring model. Then he called

the protégés up to the stage and turned the microphone over to them. One by one, the protégés gave their name, academic year, school, and number of years in SOARS, followed by what they wanted to tell the audience about their SOARS experience.

Protégés told about making oral presentations and posters at national conferences, working alongside scientists in field projects, participating in networking opportunities that made them feel like they belonged in the scientific community, having the opportunity to research fields that weren’t available at their schools, and making suggestions that shaped the next summer’s program.

“It was unexpected by the audience, and the protégés’ comments had an impact,” said Thomas. “I got a lot of positive feedback afterwards from people interested in getting some of the protégés to attend their schools or consider research projects in their labs. Having the protégés up front also identified them so that audience members knew who to talk to during the week to learn more about SOARS.”

Presidential award... (continued from page 1)

candidate in atmospheric science at Colorado State University. Stephanie is teaching as an adjunct in the Department of Earth and Atmospheric Science at the Metropolitan State College of Denver and is student services coordinator in the Office of Multicultural and Academic Affairs at the University of Denver. Although their SOARS summers are behind them, both still influence the evolution of the program as members of the SOARS Steering Committee.

During the past few years, SOARS has been working to share its successful mentoring model with the wider scientific community. While Thomas was accepting the presidential award in Washington, Beverly Johnson

(SOARS administrator) was presenting a poster entitled "Strategies for diversity: SOARS—A case study" at the American Geophysical Union annual meeting. SOARS protégé Sarah Tessoroff and Thomas presented the same poster at the First American Meteorological Society (AMS) Student Conference. A few days later during the AMS annual meeting, Thomas and the protégés gave a talk about SOARS at the AMS 11th Symposium on Education. (See "Protégés present research at AMS" on page 4.) Thomas is also advising two programs that are using aspects of the SOARS model: the New York City Louis Stokes Alliance for Minority Participation and the Universidad Metropolitana in San Juan, Puerto Rico.

The recognition brought by the presidential award may be opening up more ways to share the SOARS model on a national level. NSF included copies of the SOARS summer 2001 publication, *Earth, Wind, Sea, and Sky: Protégé Abstracts*, in 15 press release packages accompanying the 2003 NSF budget. "This is impressive," Thomas wrote in e-mail congratulating the protégés. "YOU are influencing national policy through the successful communication of your summer research and learning." ①

Zhenya Gallon, UCAR Communications, also contributed to this article.

Returning protégés...

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take to complete a master's and a Ph.D. Rynda suggested that the protégés gather more information. "Each protégé asked their mentors about how long they were in graduate school. It was a way to talk about this issue with your mentor and ask other questions about graduate school," she said. Rynda compiled the responses, which showed that the time in graduate school was highly variable, due to different personal circumstances.

To further address the issue, Andrew and Sarah, who both started master's programs in the fall of 2000, told about their own degree timelines. Andrew said he anticipated finishing his master's at the end of spring 2002; Sarah told the group she expected to finish her master's by the end of summer 2002.

"SOARS gave me a huge head start over other graduate students in my department because my summer SOARS research is part of my thesis," Andrew said. "Some students in my department who started their master's when I did were still doing background reading when I was already doing research."

"How long it takes to get your degrees is up to you," added Sarah, whose SOARS research is also part of her master's thesis. "You do the work. You figure out when you can get it done."

The evaluations for both workshops were very positive. A different group of returning protégés, Sarah, Kate Dollen, Erik Noble, and Shanna Pitter, are planning the computer skills workshop for 2002. There will also be a graduate school applications workshop. ①

Utah graduate students provide Olympics support

Salt Lake City—home to the 2002 Winter Olympic and Paralympic Games—temporary home to protégés Lacey Holland and Andrew Church, graduate students in meteorology. While other University of Utah students had a seventeen-day vacation in February during the Olympics, Lacey and Andrew worked as part of the Olympics weather support group, gathering and monitoring weather data that was sent to the Salt Lake Olympics Committee. Lacey and Andrew resumed their roles again for nine days in March during the Paralympics.

correctly. Then we would contact someone to go out to the site and fix it," she said.

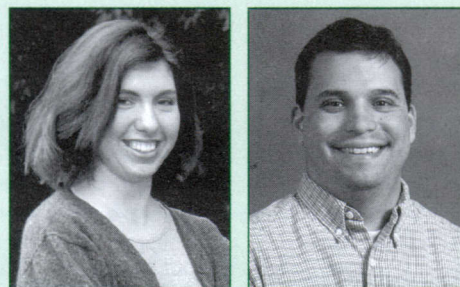
The operational support center for the Olympics weather forecasters was staffed around the clock. Lacey had the midnight to 8 A.M. shift. "We had a phone tree to direct us to who to call with various types of problems. Once when I was on shift, part of the network went down at 3 A.M.," she recalled. "One of the network people had to come in and fix it. Then we started the data processing up again."

Lacey also called the weather volunteers at the different Olympic venues to verify that the automatic instruments and computer networks were working okay. Andrew was one of the weather volunteers at Deer Valley, site of many skiing events.

"We trained last winter during the World Cup events, so we knew what to do," Andrew said. "We used handheld instruments that measured wind speed, temperature, dewpoint, and relative humidity. We also measured snow temperature and described sky and snow conditions." The handheld instruments were used to verify that the readings from the automatic sensors were correct.

The data gathered by Andrew and the other weather volunteers were radioed to the lead forecaster for the venue. Then the data were entered into a computer and routed to the main computers at the operational support center.

Andrew's duties sometimes placed him at the start house; other times he was at the bottom of the course. "I was right at the



Lacey Holland.
(Photos by Carlye Calvin.)

Andrew Church.

Lacey worked in the National Oceanic and Atmospheric Administration's Cooperative Institute for Regional Prediction, which is in the Department of Meteorology at the university. She has worked there as part of her graduate fellowship since July 1999, monitoring the computers and networks.

During the Olympics and Paralympics, Lacey monitored data from automatic surface readings, making sure that the data were recording properly. "If the temperature showed abnormal spikes at some location, we suspected the automatic sensors weren't working

Olympics support... (continued from page 5)

finish line for the men's and women's slaloms, the aerials, and the moguls," he said.

Away from the slopes, Andrew attended some of the medals ceremonies. "Everyone was cheering wildly for the athletes. And there were some great concerts after the medals were awarded," he reported.

Besides their Olympics and Paralympic duties, both Lacey and Andrew are working hard to complete their master's theses. Lacey's topic is on downslope windstorms along the Wasatch Front in Utah; Andy's is on precursors to anomalous rainfall in the La Plata River Basin in southeastern South America. Both hope to finish in the spring 2002 semester. ⑤

H I G H L I G H T S (continued from page 1)

Andrew Church presented a talk on "Interannual variations of precipitation over subtropical South America" at the VAMOS/CLIVAR Conference on the South American Low-Level Jet, February 2002, Santa Cruz de la Sierra, Bolivia.

Waleska Rivera Ríos gave a talk entitled "Exploratory investigation of indoor and outdoor VOCs in the Paso del Norte residences" at the Third Annual Río Bravo/Río Grande Environmental Conference, February 2002, South Padre Island, Texas.

Monica Rivera presented a poster on "Submicron organic and elemental aerosol composition by FTIR and XRF: Compositional overview, organic analysis, and case study results from the RHB data set" at the First ACE-Asia Data Workshop, October 2001, Pasadena, California.

Beverly Johnson presented a poster on "Strategies for diversity: SOARS—A case study," at the American

Geophysical Union annual meeting, December 2001, San Francisco, California.

Three protégés presented posters at the American Indian Science and Engineering Society (AISES) National Conference, November 2001, Albuquerque, New Mexico: **Michael Ray Johnson**, "An empirical model of ground-based magnetometer data for the study of electric currents in the ionosphere over the polar region"; **Erik Ulysses Noble**, "Ozone and water vapor: Analyzing their relationships within the mesosphere"; and **Casey C. Thornbrugh**, "Are America's cities ready for the hot times ahead?"

Theresa Jo Johnson attended AISES as a recruiter for SOARS and the Indian Natural Resources Science and Engineering Program at Humboldt State University. She also recruited for both programs at the 2nd Annual Summer Enrichment Program Conference, December 2001, Sacramento, California.

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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