NEWSLETTER

SOARS PROGRAM | FALL 2010

research | mentoring | community
SOARS®

SIGNIFICANT OPPORTUNITIES IN ATMOSPHERIC RESEARCH AND SCIENCE

FROM THE DIRECTOR

Lessons from the best job in the world...

My job, SOARS director, might be the coolest job at UCAR: I get the opportunity to peek into science across the institution; I get to work with dedicated and caring mentors who invest in the next generation; I get to rub shoulders with brilliant scientists, skilled writers, and genuinely nice people; and I get to contribute in some small way to the success of an amazing group of smart, innovative, and passionate students—students who will help transform our science and its relationship with society.

I've also had the chance to learn a tremendous amount. I've been immersed in cultures, perspectives, and ideas that I'd never have known about otherwise. I've been on Indian reservations, in downtown campuses where I (or at least the white part of me) was the minority, and in environments where I've heard more Spanish than English. It is increasingly clear–sometimes uncomfortably so–that we need more diversity in our scientific process if we are to have any hope of being relevant to a rapidly changing society. Equally importantly, our best and newest ideas–the ones that will transform our science—will come from the new perspectives, approaches and ideas that people from diverse backgrounds will introduce us to.

That, in turn, requires more from us, and from me, than merely helping students enter our workforce, learn our ways of doing things, and find success on our terms. My job includes helping our protégés add to our science—by helping them bring themselves, their cultures, their values, and their ways of knowing into our science. The director of SOARS should be open to amending and evolving the rules of science—helping protégés ask new questions, discover new methods, and even pioneer new models of success as scientists. Doing any less is abdicating leadership and letting down the protégés and mentors who have invested so much in the program.

SOARS is 15, and our host, UCAR, is 50. To me, it feels like the teenage optimism and rebellion of SOARS is a useful counterpoint to the wisdom and longstanding relationships of a mature UCAR. The challenge is balance: honoring the experience and successes of the past while opening the door to new ideas and new ways of doing things. The responsibility that goes with having the best job at UCAR is trying to help figure that balance out. ■

– Raj Pandya

SOARS 15TH ANNIVERSARY CELEBRATION

15TH ANNIVERSARY SOARS® research | mentoring | community

The SOARS program, celebrating 15 years of dedication to broadening participation in the atmospheric and related sciences, is built around a summer research internship, strong mentoring, and a supportive learning community. ■

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PROTÉGÉ EDITORIAL

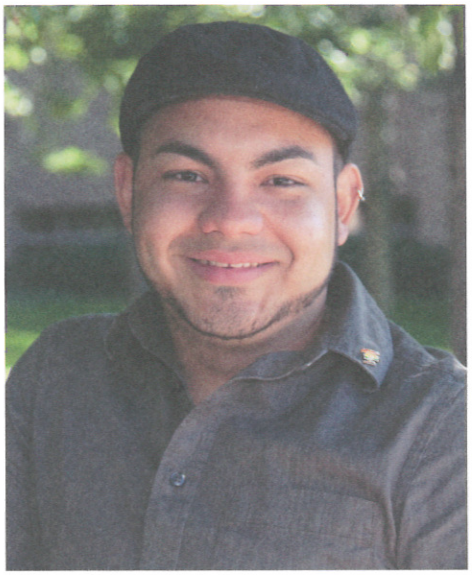
One of the most valuable opportunities that SOARS protégés have is the chance to go to conferences to present their work. I would like to encourage you—yes, you—the next time you go to a conference to take the next step. Don't just present your research; get involved in the scientific community and scientific organizations.

The first time I went to an American Meteorological Society (AMS) meeting, I wanted to do something to represent the Latino community, but I didn't have any experience or connections. I started going to and speaking up at open meetings of the Board on Women and Minorities (BWM), and was eventually asked to be a graduate student representative on the Board. After getting involved with the BWM, I realized that there were ways to make a difference. Eventually, this led to my involvement in other societies, such as the Society for Advancement of Chicanos and Native Americans in Science (SACNAS), where I organized the LGBTQ [lesbian-gay-bisexual-transgendered-questioning] group reception.

The accomplishment I'm most proud of was the first LGBTQ and Friends gathering, named CoRioliS, at the annual AMS meeting last January. I got support from AMS, BWM, UCAR's Community Building Program, and the National Organization of Gay and Lesbian Scientists and Technical Professionals. About 70 people came to the reception and we plan to make it an annual event.

During the organization process for CoRioliS, I had to explain to AMS leadership how an event like this would help students and professional scientists to integrate and network. Through this experience, I've improved my ability to communicate with individuals from different backgrounds—something that has helped me as a scientist.

So, for your own benefit, next time you go to a meeting, look for available opportunities to get involved in the community. Give back what was once given to you. Not only can you help others, you can also help yourself in the process. Talk to as many people as possible and let them know you; you never know who might offer you a grant—or a job.



Ian C. Colón-Pagán

If you need help, look for me! I'll be there, and I'll be more than happy to help you. ■

PROTÉGÉ AND ALUMNI ACCOMPLISHMENTS

Theresa Aguilar graduated with a BS in Geophysics from Texas Tech University and started her MS in atmospheric science at the South Dakota School of Mines & Technology.

Karl Clarke is starting graduate studies at the science education program with a concentration in "Free-choice Learning" at Oregon State University.

Ian C. Colón-Pagán graduated Summa Cum Laude with a MS in physics from North Carolina A&T State University and started his PhD work at the Georgia Institute of Technology.

Eowyn Connolly-Brown graduated with a BS in atmospheric science from Cornell University.

Raymond Detweiler graduated with a BS in chemistry and started graduate school in chemical oceanography at Oregon State University.

Max Menchaca is coauthor of a paper accepted for publication by the Monthly Weather Review: Skamarock, W.C. and M. Menchaca, 2010: Conservative Transport Schemes for Spherical Geodesic Grids: High-Order Reconstructions for Forward-In-Time Schemes. He also made the list of TAs rated as excellent by their students at the University of Illinois, Urbana-Champaign.

Dana Pauzauskie started graduate school in public health at the University of Kansas.

Matthew Paulus started graduate school in atmospheric science at Colorado State University and was awarded the Alliance for Graduate Education and the Professoriate (AGEP) fellowship.

Diamilet Perez-Betancourt presented her SOARS summer research entitled "Environmental factors influencing hurricane eye formation in the North Atlantic basin" at the University of Puerto Rico at Mayagüez Physics Department's sixth Atmospheric Science and Meteorology Symposium.

Daniel Pollak was awarded the American Meteorological Society's Undergraduate Dr. Yoram Kaufman Scholarship and the Penn State College of Earth and Mineral Sciences Matthew J. Wilson Honors Scholarship. He is also the Undergraduate President of Chi Epsilon Pi (XEP), Penn State's Honors Meteorological Society.

Garymar Rivera accepted a position with the Department of Disaster Management, Government of Virgin Islands (UK). She is working in the Mitigation and Planning Program as a Technical Planning Officer and is in charge of doing hazard vulnerability assessment using GIS generated maps.

Nancy Rivera published a paper in Atmospheric Environment. Nancy I. Rivera Rivera, Thomas E. Gill, Max P. Bleiweiss, Jenny L. Hand: Source characteristics of hazardous Chihuahuan Desert dust outbreaks, March 2009.

Vanessa Vincente continued her appointment as a Student Career Experience Program (SCEP) student for the Chicago National Weather Service. She was elected Vice-President of Valparaiso University's Meteorological Honors Society, Chi Epsilon Pi (XEP).

Christina Webb is being recognized for Excellence in Technology Award given by Women of Color in Technology. She was nominated by her company, The Boeing Company, and will receive the award at an annual conference in October. ■

Three protégés making connections

Three protégés spent their summer making connections—not just with scientists, peers, and community, as all protégés do, but correlations between cause and event, and action and response, in atmospheric phenomena as diverse as an 8200-year-old dip in the Earth's temperature and this summer's hurricanes.

Eowyn Connolly-Brown with her science mentor Jean-Francoise Lamarque

Arctic sea ice on the Chukchi Sea

Eowyn Connolly-Brown, who just earned a BS in atmospheric science from Cornell University, has been searching for a connection between black carbon transport to the Arctic and two atmospheric modes: the North Atlantic Oscillation (NAO) and the Pacific Decadal Oscillation (PDO). Wafted northward from European and Asian coal and biomass burning, black carbon that settles on the white Arctic snows is a significant contributor to the drastic warming of the far north. But how—or even whether—the two oscillations affect its deposition has been a question mark.

The NAO is a seesawing of high and low pressure between, approximately, Iceland and the Azores that occurs every year or few years; the PDO is a Pacific warm-water mass like El Niño, but with a 20-30-year cycle and centering on the North Pacific. "There weren't thought to be many connections between the two," says Connolly-Brown. "People had looked at the NAO in connection with carbon, but not the PDO." However, new research findings made her science mentor, Jean-Francois Lamarque, suggest it would be worth looking again.

Connolly-Brown spent the summer trying to spot correlations in model simulations of the climate from 1850 to 2008. "I looked at the data in as many ways as I could think of, especially after the first 14 or 15 tries didn't show much," she said. Just before she had to start writing her final paper, she finally found a connection: "When the PDO is negative and the NAO is positive, it looks like you have enhanced black carbon transport."

Connolly-Brown only recently became interested in atmospheric chemistry, and this project is a complete break from her previous SOARS research. Next year, she'll be working at the Portland State University doing exploratory research on biosphere-chemistry-climate interactions while choosing a graduate school.

Matthew Burger has been looking at how well the NCAR climate models can simulate a cooling period about 8200 years ago that was the result of a large freshwater release into the North Atlantic Ocean. Scientists originally thought the effects were confined to the North Atlantic region, but recent evidence shows it may have been more widespread. Burger focused on how the cooling affected the intertropical convergence zone, a stormy band near the equator where Northern and Southern Hemisphere winds meet.

Burger compared the models' simulation of the event with proxy data (such as ice cores and cave formations) from far-flung locations, including Lake Titicaca in Peru and Nightingale Island in the remote South Atlantic. He has uncovered some unexpected correlations. "One thing I find very interesting is that there's a lake in Venezuela that shows almost no signal at all, while the Carioco Basin off the coast of Venezuela shows a very strong signal." As for how well the NCAR models compare with the proxy data, he says, the closer to the equatorial regions, the better the match.

Science mentors Carrie Morrill and Amy Wagner with Matthew Burger (from left to right)

The Ohio University undergraduate has been interested in paleoclimatology for the last several years, but his interest in meteorology dates back to the age of nine. He expects to go on to graduate school.

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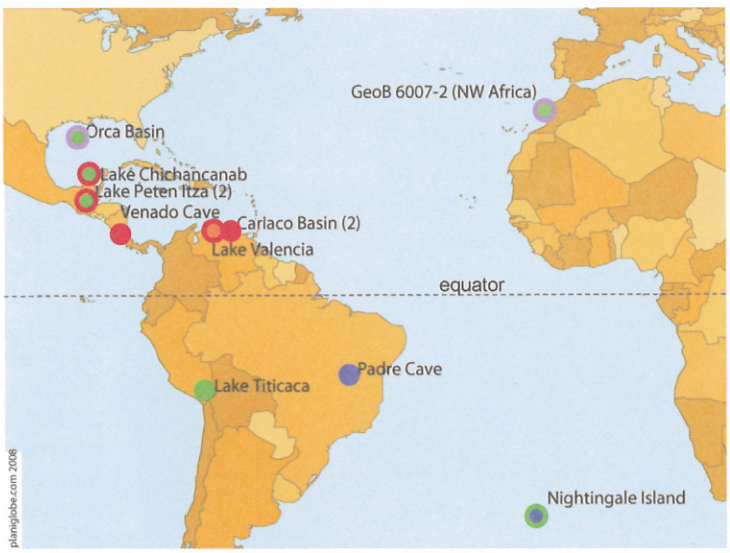

Figure: Map of proxy data sites and model results. Inner circle color indicates proxy record and outer circle color indicates model simulation results. Blue=Wet, Green=No change, Red=Dry, Orange=Possibly dry, Purple=Cool.

University Corporation for Atmospheric Research
SOARS Program Office
P.O. Box 3000
Boulder, CO 80307

Phone: 303-497-8622
E-mail: soars@ucar.edu

www.soars.ucar.edu

Subscriptions: Contact SOARS Program Office

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SIGNIFICANT OPPORTUNITIES IN ATMOSPHERIC RESEARCH AND SCIENCE

Three protégés make connections continued...

Science mentor James Done and Sandra Maina

Damage in North Carolina from Hurricane Dennis

Sandra Maina's objective was to create an index of hurricane damage to coastlines along the Gulf of Mexico. The Saffir-Simpson scale is often used in hurricane warnings, but it uses only wind speed, which alone has not proven to be a good predictor of damage. Maina had to find out which other characteristics of a hurricane are most closely connected to damage.

"First, we looked at many other indices that have been made to see what their limitations were—what they couldn't include that we could," says Maina. "We also did our own analyses using storms since the 1970s." Using regression analysis to plot individual storm parameters against damage, they found that the most damage-relevant storm characteristics are its size and its central pressure. Adding a term for coastal development, Sandra and her mentor created a formula "that spits out a number you can convert to an actual damage estimate," Maina says. "Now we're going to test it on the 2008 hurricanes that made landfall, which weren't part of our data set. If that works out well, I'm hoping we can use it for real hurricanes this season."

Maina, an undergraduate meteorology major at Florida Institute of Technology, points out that there are still many possible connections to be explored. "We looked into storm surge for a bit, but its way too involved for a ten-week project. I'm going to continue working on it in school as part of my work study."