

The SOARS Program - Engaging Minority Students through Geoscience Research Experiences

Significant Opportunities in Atmospheric and Related Sciences (SOARS) combines a summer internship with year-round mentoring, conference travel, and publishing support. During their ten week internship at the National Center for Atmospheric Research (NCAR), SOARS protégés get to choose a research topic and will explore it with the help of their scientific mentors. They also attend a weekly scientific communication workshop, seminars about graduate school and career choices, and complete end-of-summer poster and oral presentations. Topics of research span the broad field of climate and weather, including computing and engineering in support of the atmospheric sciences.



Mentor Julie Caron, protégé Manuel Hernandez and mentor Joseph Tribbia (left to right).

SOARS aims to help increase diversity in the atmospheric sciences by serving as a bridge between undergraduate studies and graduate school for students from backgrounds typically underrepresented in these fields. Studies have shown that students from traditionally underrepresented groups tend to shy away from the geosciences, in part because they don't see them as a field that has a direct positive impact on their communities (Seymour and Hewitt, 1997; Bembry et al., 2000). However, for some of our students, 'societal relevance' is a big part of their motivation in studying meteorology, atmospheric sciences, chemistry, physics, computing, engineering or environmental science, as environmental changes and the impacts of severe weather and climate events are becoming very relevant. Underserved communities already disproportionately feel the impacts of a changing environment, with poorer urban areas being susceptible to heat waves, poorer semi-rural areas frequently being devastated by tornados, or Native American lands suffering from drought. SOARS recognizes that our science needs students from these communities to participate at the highest level, in research and academia, and is committed to helping students find their place in this field.

Our approach is three-fold: 1) Provide students from underrepresented communities with relevant, hands-on experience in atmospheric and climate research, giving them a feel for what a career in academia and research could look like for them, and the resources to allow them to follow this path; 2) Provide them with the skills and opportunities to communicate their research to both scientific and non-scientific audiences and 3) To support them in identifying and carrying out research that is engaging and important to them.

The core of the SOARS program is the summer internship. This builds on the apprenticeship model common in academia, expanding it through an individualized team of mentors who teach essential research, communication and networking skills. SOARS protégés complete an authentic research project, which they present in written, oral and poster forms by the end of the 10 week experience. While their research is guided by a team of scientist/engineer mentors, SOARS also provides a comprehensive communication workshop to develop the skills needed to effectively communicate their research, and opportunities for outreach. These skills include media training, blogging, working with K-12 students and podcasting. By the end of the summer, protégés have the ability and skills to ‘think and work like a scientist’ and have been exposed to a wide range of career possibilities within the atmospheric and related sciences. In addition, they have become part of a strong peer-mentoring network and have developed the beginnings of a professional network that, in many cases, remains an important part of their future careers. After the summer, SOARS continues to support and engage protégés as they continue their studies, providing ongoing mentorship, guidance for funding and graduate school applications, and travel support for attending and presenting their research at national conferences.

We have learned that increasing the participation of students from traditionally underrepresented groups in the geosciences will be more successful if we invite students from these communities to bring their own research questions to the program. Instead of prescribing a project, opening up a dialogue about what the student is curious about will greatly enhance the student’s experience and increase the chances they will be retained in the geosciences (Sloan and Haacker-Santos, 2012). As such, SOARS works with our protégés to propose and carry out research that follows their own line of inquiries (e.g. see <https://www2.ucar.edu/atmosnews/research/7721/mapping-hurricane-vulnerability>). Some of our students have even gone a step further, doing field work to learn more about climate change impacts already felt by local communities. In 2012 and 2013 protégés studied community viability in the face of environmental change with local Native American and Cajun communities in Southern Louisiana. Protégés worked directly with the communities to define research problems and integrate physical science, geospatial technology and traditional ecological knowledge. These off-site research opportunities are limited to advanced protégés and often lead to graduate thesis work and publications.

SOARS carefully tracks their alumni, the vast majority of whom go on to excel in graduate school and move on to careers in atmospheric science or related STEM fields. Many of our alumni have entered academia as post docs, junior faculty, or as researchers at national research labs. Others are employed at federal intuitions such as FEMA, or the EPA. A few alumni serve as K-12 teachers or are employed in the private sector for consulting firms, the re-insurance industry or private weather companies. They remain connected to the SOARS community, committed to the SOARS mission of increasing diversity in the sciences, and play an important role in increasing the strength and diverseness of the STEM workforce.



SOARS Cohort 2013

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- Seymour, E. and N. M. Hewitt (1997), Talking about Leaving: Why Undergraduates Leave the Sciences, Westview Press, Boulder, CO.
- Sloan, V. and R. Haacker-Santos (2012), Finding the Right Match: Pairing Undergraduate Research Interns and Scientists as a Way of Engaging Students in their Topic of Interest, 2012 GSA Annual Meeting in Charlotte.

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