

ED12C-06 1520h**Frigid air and frozen oceans:
Educational outreach opportunities in
Arctic ocean-ice-atmosphere research**

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Arctic research provides a marvelous venue for educational outreach activities. The polar regions, with snow and ice, months-long winter nights and summer days, and marine mammals such as seals, whales, and polar bears, has an intrinsic sense of adventure and interest. This interest provides an entry point for educational outreach activities, but does not guarantee success. Arctic researchers studying ocean-ice-atmosphere interactions have used a myriad of techniques for education outreach activities: web sites, classroom visits, lectures, news articles, and e-mail correspondence from the field. One such web site, <http://arcss-oaii.hpl.umces.edu/outreach.htm>, has been developed as a clearinghouse for researchers to share ideas, strategies, and techniques. For K-12 outreach, developing an ongoing effort with several classroom visits over the school year, is particularly effective. Classroom visits with brief lectures, replete with pictures, followed by an experiment or activity make it relatively straightforward to convey the enthusiasm and excitement of polar research. A more difficult task, however, is to integrate outreach activities into the curriculum. Collaborating with teachers is essential to achieve this integration. In public lectures, it is productive to first capture the audience's attention by describing what it is like to work in the polar regions, then discuss the science. It is important to distill the science to one or two key concepts and present them clearly and concisely. A recurring theme was that not only were outreach activities fun and satisfying, but they also enhanced the researchers understanding of the material.

**ED12D MCC: 3012 Monday 1600h
Astrobiology Education: Bridging the
Gap Between Scientists and
Educators (joint with B, P)**

Presiding: D M Scalice, NASA
Astrobiology Institute; K Wilmoth,
NASA Astrobiology Institute

ED12D-01 1625h**Real Science for Real Science Teachers:
Providing Astrobiology Science
Content and Contemporary Pedagogy
for Today's Educators Online**

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As teachers strive to improve the way science is taught in the classroom, many are turning to the interdisciplinary science of astrobiology as a way integrate inquiry effectively in the science classroom. However, it is generally recognized that teachers do not often have easy access to understandable and usable cutting-edge science to enrich their science lessons. Through the generous support of the NASA Astrobiology Institute (NAI), middle and high school teachers have the opportunity to learn current and provocative scientific results within the context of astrobiology as well as receive training in pedagogically sound methods of incorporating astrobiology appropriately in the classroom. In Astrobiology for Teachers, a 15-week on-line distance learning course co-sponsored by NAI, the National Science Teachers Association (NSTA) Professional Development Institute, National Teachers Enhancement Network (NTEN), Montana State University, and the Department of Astronomy at University of Arizona, teachers engage in a virtual classroom facilitated by an integrated teaching team of educators and scientists using a standards-based, inquiry curriculum. The collaborative nature of the course encourages, demonstrates, and enhances a professional exchange among scientists

and educators which, in turn, fosters implementation of innovative science teaching in today's classroom.

URL: <http://shiraz.as.arizona.edu>

ED12D-02 1630h**The Challenges of Collaboration Across
Professional Cultures**

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I currently work as a cultural anthropologist researching and facilitating collaboration among members of a scientific "virtual institute." The NASA Astrobiology Institute (NAI) is focused on establishing a "culture of collaboration" that encourages and supports productive exchange among those representing a variety of disciplines who are pursuing key questions in the field of astrobiology. Within the context of NAI, interdisciplinary collaboration is important not only between those with expertise in the specific sciences that are part of the astrobiological research arena. Also very important is collaboration between these scientists and the educators who are striving to bring deeper awareness of and knowledge about astrobiological research findings to students of all ages and to the general public. As a member of this panel, I will offer an anthropological perspective on the diverse challenges that are associated with bridging across disciplinary, as well as geographical and institutional boundaries, and discuss the steps that are necessary to the development and maintenance of an effective culture of collaboration. Specific emphasis will be on the challenges that must be addressed in order to create effective collaborative relationships between those immersed in different professional cultures.

ED12D-03 1635h**Educators Experiencing Research -
Benefits for the Classroom**

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I have been involved with two Planetary Society geology expeditions looking for evidence of asteroid impacts. We worked in Belize and Italy with teams of international scientists from various scientific fields. Through the REVEL program, I spent two weeks on-board the RV Atlantis studying hydrothermal vents off the coast of Washington. I worked with an interdisciplinary team of scientists and graduate students and was involved in designing my own research project. As an educator I have designed activities for my students which were based on these research experiences. My students became aware of the type of science taking place in this "cutting-edge" research. I have learned to work in a team and have encouraged my students to work in that manner as well. The contacts that I have made have provided sources of information, borrowing equipment and other research opportunities. This research experience also supports my high school research science program.

ED12D-04 1640h**Scientist - Educator Partnerships**

Edna DeVore (650-960-4538; edevore@seti.org)

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Science is the quest for knowledge about the natural world, and scientists are often characterized as driven by curiosity and the desire to discover, traits they share with children exploring the world through youthful eyes. In contrast, formal science education at the pre-college and college levels frequently distills the joy of scientific research and discovery into a body of known facts, laws, and disciplinary studies, losing the excitement of doing science. When scientists partner with teachers and other educators, there is an opportunity for engaging students and the public with scientists and their research projects. Further, scientists provide expertise to create up-to-date and accurate materials for use in classrooms, science centers, and youth groups. Scientists also see engagement with teachers, students, and the public through science centers as a means of growing the next generation of scientists to continue the work. Often this process is facilitated by science education professionals who work at the interface between the worlds of scientific research and formal and informal education. The partnership between the research scientist and the science education professional can result in improved science education for a broad community of teachers, students and the public.

ED12D-05 1645h**NASA Astrobiology Institute
Scientist/Educator Bridges**

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NASA has engaged in many educational programs and projects, and one major focus of the Office of Space Science's priorities in establishing education and public outreach (E/PO) programs has been the inclusion of scientists in those efforts. However, the construction of scientist/educator teams remains a major challenge in NASA education efforts. The NASA Astrobiology Institute (NAI) seeks to build bridges between these two professions in ways that are respectful of the expertise of each in bringing astrobiology content to K-12 classrooms. Several of the NAI's Lead Teams, collaborative interdisciplinary research groups pursuing core questions in astrobiology and providing education and training, include teachers and other experts in education to focus their E/PO efforts while also integrating the unique scientific expertise of their teams. This approach is not without its challenges and difficulties. Communication, accuracy, inclusion, funding, and the larger science education reform efforts are among them. There is tremendous work to be done in the arena of winning mutual respect and inclusion of both scientists and educators in providing NASA content to K-12 audiences. NAI is engaged in a series of attempts through the venues of both science and education conferences where such understanding may be built. This panel discussion represents one of these efforts.

URL: <http://nai.arc.nasa.gov>

ED12D-06 1650h**The Role of Scientists in
Science-Educator Partnerships**

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Vital to meeting the need for improved science education is the involvement of scientists in collegial partnership with science educators in both formal and informal settings. This is especially true in Astrobiology where the multi-disciplinary nature of the realm provides provides both educational opportunities and challenges. This paper will address barriers and pathways to successful scientist participation in educational partnerships through a collection of concrete examples of astrobiologists in education.

URL: <http://www.spacescience.org>

ED12E MCC: 3012 Monday 1700h**Bringing Extrasolar Planets to
Teachers, Students, and the Public
(joint with P, PA)**

Presiding: E K DeVore, SETI
Institute; A Gould, Lawrence Hall of
Science, University of California,
Berkeley

ED12E-01 1700h INVITED**Discovering New Worlds**

Debra Ann Fischer (415-338-1697;
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Since 1995, more than 100 planets have been discovered orbiting nearby stars. I will present an overview of what we've learned and speculate about exciting discoveries on the horizon. Many classroom projects have been developed to teach astronomy at the middle school through high school level. I will highlight a few favorite projects that provide a good foundation for understanding key concepts. Examples of projects using data from our website will also be presented.

URL: <http://exoplanets.org>