

IPY Education and Outreach 2006
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[Program Solicitation 06-534](#)

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POLAR-PALOOZA	Geoffrey Haines-Stiles , Erna Akuginow, Jayne Aubele Geoff Haines-Stiles Productions ghs@passporttoknowledge.com Award # 632262
IPY: Collaborative Research: Live from the Poles; A Multimedia Educational Experience	Christopher Linder , James Kent Woods Hole Oceanographic Institution clinder@whoi.edu Award # 632219
	Paul Fontaine , Peter Wong Museum of Science pfontaine@mos.org Award # 632064
IPY: Engaging Antarctica	J. Michael Farrell , Judy Diamond, LuAnn Dahlman University of Nebraska-Lincoln jfarrell1@unl.edu Award # 632175
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IPY: Teachers' Domain -- Polar Sciences	Theodore Sicker WGBH Educational Foundation ted_sicker@wgbh.org Award # 632085

IPY Education and Outreach 2007 Project Abstracts

INFORMAL SCIENCE EDUCATION

POLAR-PALOOZA

Award # 632262

Geoffrey Haines-Stiles, Geoff Haines-Stiles Productions, ghs@passporttoknowledge.com

Co-PI: Erna Akuginow, Geoff Haines-Stiles Productions

Co-PI: Jayne Aubele, School and Public Programs, NM Museum of Natural History and Science

This project proposes using three complementary strategies to engage, inform and inspire large audiences. (1) A national tour called "Stories from a Changing Planet" that will include in-person presentations and hands-on activities by Polar scientists at science centers, museums, libraries and schools across the country. (2) the "HiDef video Science Story Capture Corp" team of professional videographers HD footage will be made available as public domain materials accessible to government research agencies, universities, science centers and others. (3) Video and Audio podcasts distributed through iTunes, google, Yahoo and IPY websites. The project will have front end, formative and summative evaluations.

IPY: Collaborative Research: Live from the Poles; A Multimedia Educational Experience

Award # 632219

Christopher Linder, Woods Hole Oceanographic Institution, clinder@whoi.edu

Co-PI: James Kent, Woods Hole Oceanographic Institution

Award # 632064

Paul Fontaine, Museum of Science, Boston, MA, pfontaine@mos.org

Co-PI: Peter Wong, School of Engineering, Tufts University

This project brings together polar researchers, science centers and broadcast media reporters to tell the story of four polar research expeditions to the general public, teachers and students. The four expeditions to the Arctic and Antarctic were chosen based on their relevance to the three primary IPY research emphasis areas defined by NSF. A science writer and a professional photographer/oceanographer reporting on each expedition will do daily webcasts on the Dive and Discover web site as well as several scheduled real-time phone patches to audiences at the Museum of Science, Boston, the Smithsonian Natural History Museum, The Field Museum (Chicago), the Houston Museum of Natural Science, the Pacific Science Center (Seattle), the Birch Aquarium (San Diego), National Public Radio stations, CBS News and to student "reporters" writing for Scholastic Online. Programs will also be broadcast on University of California TV. A museum exhibit at the WHOI Exhibit Center will highlight polar research. Components of it will either travel to partner museums or be replicated in the partnering museums. Photo archives of the expeditionary material will also be created and made available to interested users.

IPY: Engaging Antarctica

Award # 632175

J. Michael Farrell, University of Nebraska-Lincoln, jfarrell1@unl.edu

Co-PI: Judy Diamond, University of Nebraska State Museum

Co-PI: LuAnn Dahlman, Technical Education Research Centers

"IPY: Engaging Antarctica" is an informal science education project designed to increase public awareness of Antarctic geological research and discovery during the International Polar Year. Submitted through NET Television, the project will produce a PBS one-hour television documentary for air on NOVA in fall 2008 (w.t. "Antarctica's Icy Secrets") complemented by a multi-faceted outreach effort. The intended impacts of "Engaging Antarctica" are to: 1) enhance the general public's awareness and understanding of scientific research conducted in Antarctica; 2) create innovative collaborations for developing and disseminating Antarctic educational materials; and 3) enhance our knowledge of how youth and adults understand Antarctic research. The documentary will illuminate geoscience research as it being accomplished throughout IPY and specifically focus on the ANDRILL project, a major focal point during the global campaign of polar education and analyses. The program will document how scientists search for evidence to resolve conflicting hypotheses regarding ice sheet history and dynamics. NOVA Online will create a companion site for the program. In addition, the outreach materials include the Flexhibit, a digital package of high resolution images and files (visual and audio) accessible via the web, at no cost to the user. These will include scientist's stories in their own words, and inquiry-based activities developed by LuAnn Dahlman, the TERC geoscience curriculum specialist. Dahlman will work with the ARISE educators who have been selected to go to Antarctica to work with the ANDRILL science team. Mini-grants will be given to youth organizations in low income communities to participate in the trial test of the Flexhibit activities and enable participation in the project. Multimedia Research will conduct front-end and formative evaluation. Summative evaluation will be conducted by Multimedia Research and Amy Spiegel, from the University of Nebraska Center for Instructional Innovation.

IPY: Pole to Pole

Award # 632194

Moira Rankin, Soundprint Media Center, Inc., Moira@soundprint.org

This project will produce a multi-part radio project including eight half-hour documentaries, 40-50 short radio features, an audio clearinghouse and a website on scientific research in the Polar Regions. The content of the programs support the goals of IPY. The project will be produced with four international radio partners: the science units of The Australian Broadcasting Co., the BBC World Service, Radio Deutsche-Welle and Radio New Zealand. These international collaborators will look at issues such as the influence of conditions in Polar Regions on global climatic change, how animals adapt to rapid environmental change, survival in extreme environments and processes of change among native people in the Polar regions. The programs will reach a large audience in the United States as well as internationally through the collaborating partners. The clearinghouse/website will be designed to provide organized learning resources and an audio archive of the project's radio programs and archival interviews and sounds for use by both the general public and professional audiences. There will be both formative and summative evaluation of the programs and website.

Formal Science Education: Graduate and Undergraduate Education

IPY: Adapting SENCER to the Arctic. Improving Polar Science Education as a Legacy

Award # 632397

Lawrence Duffy, University of Alaska Fairbanks Campus, fychem@uaf.edu

Co-PI: David Barnes, University of Alaska Fairbanks Campus

This project is adapting for use in the Arctic the best practices for science course delivery based on results from NSF funded research in the Science Education for New Civic Engagements and Responsibilities Program by creating the course 'Environmental Radioactivity, Stewardship and People in the North.' This course is an interdisciplinary exploration of nuclear chemistry which explores use of radioactivity in the cultural and geopolitical context of the circumpolar north. The impact of nuclear weapons development on the Aleuts and the future development of nuclear power in the Arctic are being investigated by the students. Students are learning state-of-the-art nuclear chemistry and health concepts and they are discovering where nuclear development intersects with people and the land. This context-based approach shows the intellectual merit in using civic engagement to stimulate creative thinking by students. A broader impact of this project is use of the model to adapt other courses which will focus on use of northern natural resources and energy, topics known to engage the interest of arctic indigenous people and students. This course is expanding the science courses available to UARCTIC students.

Collaborative Research: Fostering Collaborative, Interdisciplinary Relationships Among the "New Generation" of Polar Researchers Participating in the IPY

Award # 632324

C. Susan Weiler, Whitman College, weiler@whitman.edu

Award # 632312

Sheldon Drobot, University of Colorado at Boulder, drobot@colorado.edu

The goal of the Next Generation Polar Research (NGPR) Symposium is to bring together past, current, and "new" polar investigators from diverse natural, physical and social science disciplines and to cultivate crossdisciplinary interactions during the International Polar Year 2007 (IPY). This will provide the new generation with a common sense of history and purpose, increase their understanding of each others' work, give them insights for conveying the essence of polar regions and their particular research beyond academia, and promote connections among research during IPY and in the years ahead. The net result will be a cadre of scientists prepared to carry on the IPY tradition and better equipped to handle pressing science questions of today and tomorrow, and a set of collegial connections that can flourish over their professional lifetimes. This proposal supports the NGPR symposium that builds on the success of 8 DIALOG symposia held between 1994 and 2005 plus the positive evaluations from the 2003 and 2006 DISCCRS symposia. It also incorporates recommendations from an October, 2003 workshop funded through NSF's Biocomplexity in the Environment initiative. The workshop brought together a group of recent interdisciplinary Ph.D. graduates, top scholars working on interdisciplinary research, and directors of leadership training programs to identify ways to foster interactions across the natural-social-science divide. This project is part of a suite of projects to involve new polar investigators in polar science during IPY 2007.

IPY-ROAM: International Polar Year Research and Educational Opportunities in Antarctica for Minorities

Award # 632360

Craig Tweedie, University of Texas at El Paso, ctweedie@utep.edu

Co-PI: Aaron Velasco, University of Texas at El Paso

Co-PI: William Robertson, University of Texas at El Paso

Co-PI: Vanessa Lougheed, University of Texas at El Paso

This proposal actively involves minority undergraduates, graduate students and K-12 teachers in hands-on research in Antarctica and provides a comprehensive mentoring program for the participants. Key drivers of the project are: 1) Remote hands-on field-based instructional and research experiences provide students and teachers with proven and transformational life and educational experiences. 2) Minority groups are severely under-represented in engineering and science and most university study abroad programs -- especially in the polar sciences. 3) The International Polar Year (IPY) provides a unique opportunity to educate the next generation of scientists and the general public about the Polar Regions and their importance to the global system. The principal objectives of this proposal are to 1) increase the number of underrepresented minorities continuing on to higher degrees or careers in science and 2) increase public awareness and knowledge about the Polar Regions. Both will be stimulated through a novel and life-changing opportunity for students and teachers to travel to Antarctica and acquire first-hand experience in Antarctic field-based research and system science.

Proposed activities include:

1. Building on an established Antarctic study abroad field course initiated by the Investigatory team that promotes inquiry and problem based learning using a systems science approach.
2. Recruiting 15 undergraduate and 5 graduate students from multiple disciplines, plus 5 high school science teachers (25 participants in total) from primarily underrepresented minorities across the U.S to participate in the program for course credit.
3. Web-casting of preparatory lectures plus a field trip to Washington DC, where participants will meet with a range of experts in the polar sciences and organizations affiliated with international policy and tourism in Antarctica. Participants will also explore concepts relating to the importance of advancing the representation of minorities in science and engineering.
4. A capstone 3-week field trip aboard an Antarctic tourist vessel from Tierra del Fuego to the Antarctic Peninsula where participants will be mentored in the design, implementation, documentation and dissemination of hands-on field based research including data archiving. Because over 20,000 tourists now visit Antarctica annually, this experience provides a unique educational opportunity for examining the activities and impacts of the growing Antarctic ecotourism industry.
5. Community outreach from Antarctica including live satellite feeds to public radio, a project web site with question/answer interactivity and journals from students and teachers, as well as the production of legacies such as curriculum products and an educational documentary of the Antarctic field experience.
6. Evaluating formal and informal education activities using quantitative and qualitative methods.

7. Publishing and archiving at the National Snow and Ice Data Center (NSIDC), course materials, field data, and evaluations related to the formal assessment of the success of the project.

The proposed activities will celebrate the IPY through the establishment of data and educational legacies that will improve scientific capacities and public awareness of the Polar Regions and the recruitment of minorities to polar science. The proposed activities will have significant intellectual merit: data gathering will include data rescue as well as generation of new data; development of K-12 curricula, an extensive web site and film documentary; a formal evaluation of the educational impact of the proposed activities will also be completed. All activities will focus on educational and professional development and will be underpinned by a systems science approach to ensure adequate linkage between physical, biological, social components of the Antarctic System and how these relate to the global system. The most significant contribution of this project will be the advancement of underrepresented students and teachers in science and engineering. All data and curricula will be made publicly available where appropriate and archived at NSIDC.

Formal Science Education K-12 and Classroom Teachers

IPY: PolarTREC -- Teachers and Researchers Exploring and Collaborating

Award # 632401

Wendy Warnick, Arctic Research Consortium of the U.S., warnick@arcus.org

"PolarTREC (Teachers and Researchers Exploring and Collaborating)" is a three-year teacher professional enhancement program that will advance polar science education by bringing K-12 educators and polar researchers together in hands-on field experiences in the Arctic and Antarctic. PolarTREC activities and products will foster the integration of research and education to produce a legacy of long-term teacher-researcher collaborations, improvement of teacher content knowledge and teaching practices, shareable online learning resources based on real-world science, improved student knowledge of and interest in the Arctic and Antarctic, and broad public engagement in polar science. ARCUS will adapt and extend existing Teacher Research Experience (TRE) models and its own experience delivering TREC -- a TRE program supported by NSF for the Arctic -- to develop PolarTREC, a comprehensive, sustained field research experience program for K-12 teachers focusing on IPY science themes at both polar regions. Thirty-six teachers will spend two to six weeks in the Arctic or Antarctic studying a topic relevant to one of the IPY emphasis areas, with "Live from IPY" calls, Internet presentations, and podcasts from the field, daily teacher journals, interactive bulletin boards, photo galleries, online multimedia learning resources and activities, and participation in CARE (Connecting Arctic/Antarctic Researchers and Educators) web-meetings to support translation of experiences into the classroom and beyond. PolarTREC is relevant to the education goals of the IPY by 1) providing a hands-on field research experience that can be realistically implemented in the polar regions; 2) broadly disseminating teacher experiences to students and other professionals; 3) developing a sustainable learning community; and 4) providing clear and appropriate measures of project success through a formative and summative evaluation. Additionally, the PolarTREC evaluation will provide a basis for replicating or expanding the program structure and best practices. PolarTREC will benefit from close coordination with logistics providers and international programs to ensure operational feasibility and an international reach.

IPY: Teachers' Domain -- Polar Sciences

Award # 632085

Theodore Sicker, WGBH Educational Foundation, ted_sicker@wgbh.org

The WGBH Educational Foundation is supporting K-12 teachers and students in learning about the focus, findings and implications of current research efforts in polar regions by developing and pilot testing the prototype of a digital library collection of relevant media-based resources. The project integrates with proposed research, education and outreach activities associated with the International Polar Year 2007-08 (IPY), leveraging the inherent appeal of the Arctic and Antarctic regions to teach about related science issues and their relevance to the Earth system. This initiative builds upon and expands the power, scope and established user base of WGBH's Teacher's' Domain (www.teachersdomain.org), a featured portal in NSF's National Science Digital Library (NSDL). This award-winning online service currently presents nearly 1,000 annotated rich-media resources selected and produced specifically for K-12 educators, organized by commonly taught curriculum topics in the Life, Physical and Earth/Space Sciences. The new "Polar Sciences" collection prototype will include video segments, interactive activities and other rich-media drawn from the archives of WGBH, PBS and a wide range of organizations, agencies, universities and other media outlets involved in polar studies, all fully contextualized in the Teachers' Domain model (e.g., with background essays, standards correlations, lesson plans, etc.). Structured to serve as a platform for additional media-based educational resources developed during and after the course of the IPY term, this prototype collection will also include a new "guided exploration" component that featuring multi-media resources produced as part of field studies conducted through the Teachers and Researchers Exploring and Collaborating (TREC) program at the Arctic Research Consortium of the United States (ARCUS).