

IPY Education and Outreach 2007 Summary Table: Projects and Investigators

[Program Solicitation 07-536](#)

Title	PIs (bold text)/Co-PIs
Informal Science Education	
IPY: Ice Planet Earth	Annette Schloss , Mark Fahnestock, Charles Vorosmarty, Richard Lammers, Carolyn Summers University of New Hampshire annette.schloss@unh.edu Award#732835
IPY: Polar Hydrobot Simulator	Brad McLain , James Harold Space Science Institute mclain@spacescience.org Award#732752
IPY: Improving the Public's Understanding of Polar Research Through Hands-On Fellowships for Science Journalists in the Arctic and Antarctic	Christopher Neill , Bruce Peterson, John Hobbie, Gaius Shaver, Hugh Ducklow Marine Biological Laboratory cneill@mbi.edu Award#732955
International POLAR-PALOOZA - Emphasizing the "I" in IPY & Enabling Global Conversations on the Antarctic Treaty	Geoffrey Haines-Stiles , Erna Akuginow Geoff Haines-Stiles Productions ghs@passporttoknowledge.com Award#732879
Encounters: Radio Experiences in the North	Richard Nelson KCAW-FM Raven Radio sitkasound@gmail.com Award#732438
Ice Stories: A Public Educational Resource for IPY	Mary Miller , Robyn Higdon Exploratorium marym@exploratorium.edu Award#733048
Discovery Research K-12	
Beyond Penguins and Polar Bears: Integrating Literacy and IPY in the K-5 Classroom	Kimberly Lightle , Carol Landis, Dean Krafft, Susan Van Gundy Ohio State University Research Foundation lightle.16@osu.edu Award#733024
IPY: SPRINTT: Student Polar Research with IPY National (and International) Teacher Training	Glen Schuster The U.S. Satellite Laboratory, Inc. gschuster@us-satellite.net Award#732793
Antarctic Penguins, Teaching the Science of Climate Change: A Celebration of IPY	David Ainley , Grant Ballard H.T. Harvey & Associates dainley@penguinscience.com Award#732502
IPY STEM Polar Connections: A three region initiative to integrate the study of Polar Regions and activities associated with the International Polar Year into the middle and high school curriculum.	Morton Sternheim , Julie Brigham-Grette University of Massachusetts Amherst mort@umassk12.net Award#732945

Additional IPY Education Awards	
Collaborative Research IPY: The Polaris Project: Rising Stars in the Arctic	William Sobczak College of the Holy Cross wsobczak@holycross.edu Award#732469
	Andrew Bunn Western Washington University andy.bunn@wwu.edu Award#732477
	Katey Walter University of Alaska Fairbanks Campus ftkmw1@uaf.edu Award#732533
	Karen Frey Clark University kfrey@clarku.edu Award#732586
	Sudeep Chandra University of Nevada Reno sudeep@cabnr.unr.edu Award#732609
	John Schade , Jo Beld Saint Olaf College schade@stolaf.edu Award#732618
	Robert Holmes , Sergei Zimov Woods Hole Research Center rmholmes@whrc.org Award#732944
	Aaron Velasco Society for Advancement of Chicanos & Native Americans in Science velasco@geo.utep.edu Award#
IPY: A SACNAS Initiative for Engaging New Audiences in Polar Science	

IPY Education and Outreach 2007 Project Abstracts

INFORMAL SCIENCE EDUCATION

IPY: Ice Planet Earth

Award # 732835

PI: Annette L Schloss, University of New Hampshire, fannette.schloss@unh.edu

Co-PI: Mark Fahnestock, University of New Hampshire

Co-PI: Charles Vorosmarty, University of New Hampshire

Co-PI: Richard Lammers, University of New Hampshire

Co-PI: Carolyn Sumners, Houston Museum of Natural Science

This project endeavors to create a portable, updatable dome show to engage audiences in the science of IPY. The main show “^a will introduce planet Earth as a unique ice and water world, compare it with other ice worlds in the solar system, and explore the global implications of dramatic changes at the poles, past and present, in the context of current research.” The innovative incorporation of two short pre-shows will serve as further enticement and directing of the audience’s interest by presenting focusing questions along with fisheye-view polar images and aspects of the latest IPY news. Event premieres are intended to be accompanied by talks from scientists and experts in polar science. All shows are designed to be shown in either existing digital planetariums or portable dome theaters, thereby allowing museums and sponsors to take the show ‘on the road’ and reach wider, and often underserved, audiences. To further enhance *Ice Planet Earth’s* educational value, teacher kits and a website will provide supplemental materials to the shows. The digital format of the design enables a product that can be quickly produced and easily updated, “making it a valuable product for repeated use in informal education outlets and for outreach to school districts.”^a

IPY: Polar Hydrobot Simulator

Award # 732752

PI: Brad D McLain, Space Science Institute, mclain@spacescience.org

Co-PI: James Harold, Space Science Institute

Online design and manipulation of virtual craft used by the *IPY Polar Hydrobot Simulator* will engross students in a learning environment that will promote polar science tenets while developing necessary technological skills. The simulator will emulate Antarctic underwater remotely operated vehicles (ROVs) with high fidelity and relevance to actual IPY field research. Through informal and after school programs such as the MATE Center ROV competition and Challenger Learning Centers, participants will acquire knowledge about polar environments and systems functioning within these places. The *IPY Polar Hydrobot Simulator* will promote skills transference from virtual “play” scenarios to real world situations, subtly promoting careers in science. Secondary audience expansion is provided through the development of a web presence to maintain project relevance along with CD masters of all project materials that can be used to reach underserved populations and/or those without adequate internet access.

IPY: Improving the Public's Understanding of Polar Research Through Hands-On Fellowships for Science Journalists in the Arctic and Antarctic

Award # 732955

PI: Christopher Neill, Marine Biological Laboratory, cneill@mbl.edu

Co-PI: Bruce Peterson, Marine Biological Laboratory

Co-PI: John Hobbie, Marine Biological Laboratory

Co-PI: Gaius Shaver, Marine Biological Laboratory

Co-PI: Hugh Ducklow, Marine Biological Laboratory

Polar Science will be made personal and hands-on with this project that endeavors to improve media reporting by first-hand field research experiences. Selected journalists will travel to Toolik Field Station in Alaska, and a later subset will go to Palmer Station Long-Term Ecological Research site in Antarctica, to undertake polar research for themselves. By immersing the journalists in every aspect of scientific inquiry, they will be better prepared to inform and educate their audiences about polar research and its implications for Earth's systems. An integrated and multidisciplinary approach to the field studies will enable journalists to provide better context and relevance in their long-term reporting. Science journalists from polar countries are targeted because of the large and international scope of their reach via a diversity of media. This makes the reach and impact of the project exponentially greater than the 30 participating journalists. Through the development of their own scientific understanding of the topics they report, participating journalists have the power to improve the polar science literacy and its ramifications of a large, far-reaching audience.

Ice Stories: A Public Educational Resource for IPY

Award # 733048

PI: Mary Miller, Exploratorium, marym@exploratorium.edu

Co-PI: Robyn Higdon, Exploratorium

Too often, science data reaches its audience by second and third hand narrative. *Ice Stories* endeavors to change that by training scientists as correspondents. The creative use of the latest communication media means that scientists need not leave the research site and can be direct conduits to the public. The immediacy of contact will convey the excitement, the reality, the depth, and the scope of field work in a way not realized by traditional media outlets. The use of Web 2.0 portals will expand the reach of the museum based production both temporally and geographically and will create an archived record of IPY activities. The use of modern technology enables the target audience of adolescent to adult public to extend to formal science education and even to the professional science community. “[*Ice Stories*] strategic impact lies in its focus on a new model of scientist-correspondent, which will inspire other scientists to engage the public and brings a new dynamism to informal science education that will impact audiences after the project ends.”^a

International POLAR-PALOOZA - Emphasizing the "I" in IPY & Enabling Global Conversations on the Antarctic Treaty

Award # 732879

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

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

International POLAR-PALOOZA leverages resources and infrastructure from an existing project, and adds substantial international components along with recent innovations of Web 2.0 cyber-infrastructure such as blogs, wikis and group discussions, to engage a global audience. An international version of the *Stories from a Changing Planet* tour introduces North American polar researchers and Alaskan Natives to global audiences as part of a traveling team that includes local scientists. Participants will see polar research as open to and benefiting from multiple perspectives and diverse contributors. The vital role of international collaboration is highlighted via the use of videography and satellite links for broadcast. There will be the first-ever “conjugate” television broadcast that links the North and South Poles, and the International Space Station, in *POLE2POLE2PLANET*. HDTV sequences show the work of NSF’s “North Pole Environmental Observatory,” and views of our changing planet from space. Carried live to science centers across America and around the world, programming also appears on BBC News, BBC websites and NHK, and on domestic network TV. Partners will work with iPPZA to monitor the Antarctic Treaty Summit’s online global conversations about peaceful scientific cooperation and the legacy of the 4th International Polar Year, with nodes in Washington, DC, and at the library/planetarium complex in Alexandria, Egypt. Web capabilities will enable two-way conversations between students across the globe and enable collaborative inquiry-based activities that complement media resources. Participants from diverse backgrounds will discover shared challenges in Earth’s changing climate and explore potential solutions or adaptations. Collaborations with researchers and international science centers will enable discussion of polar science by larger and more diverse audiences than ever before.

Encounters: Radio Experiences in the North

Award # 732438

PI: Richard Nelson, KCAW-FM Raven Radio, sitkasound@gmail.com

Each 29 minute *Encounters* program is recorded in the wilds of Alaska and northern Canada during close contact with the subject, giving scientific information in the context of a direct, authentic experience. The programs weave material from contemporary science together with the knowledge of indigenous people who have thrived in the Arctic for thousands of years. During IPY, *Encounters* format will include the voices of researchers who are making important scientific findings and the voices of indigenous people directly impacted by changes in the environment. The programs celebrate the insights of science, validate indigenous cultural and intellectual traditions, and encourage informed, thoughtful, responsible decision-making about relationships between communities and their sustaining environments. The radio broadcasts will be available internationally, and as website accessible podcasts. *Encounters* programs show that the polar environment is not remote and disconnected, but linked to the rest of the earth through unifying processes such as climate change, ocean currents, and animal migrations.

Beyond Penguins and Polar Bears: Integrating Literacy and IPY in the K-5 Classroom

Award # 733024

PI: Kimberly S Lightle, Ohio State University, lightle.16@osu.edu

Co-PI: Carol Landis, Ohio State University

Co-PI: Dean Krafft, National Science Digital Library, Cornell University

Co-PI: Susan Van Gundy, National Science Digital Library, Cornell University

IPY topics are easily incorporated into the K-5 classroom by coupling the enduring popularity of polar bears and penguins to literacy programs. Science content-rich literacy learning will be the focus of a multimedia cyberzine. The cyberzine will also be the vehicle for inquiry-based science activities to support covered topics. Development of materials will focus not only on science content, but on equity for all learners, ease of reuse and repurposing of content, resource accessibility for underrepresented groups (those with learning differences or from linguistically and culturally diverse groups). The project will be interdisciplinary in scope and occur during the International Polar Year (IPY) period in order to tap into the wealth of available resources. With the development of an IPY Learning Objects Repository, the necessary cyber-infrastructure will be created to collate these supplementary resources for science content and science literacy.

IPY: SPRINTT: Student Polar Research with IPY National (and International) Teacher Training

Award # 732793

PI: Glen Schuster, The U.S. Satellite Laboratory, Inc., gschuster@us-satellite.net

In order for K-12 teachers to implement cutting-edge, topical instruction within their established curricula, professional development must be timely, readily available, and effective. Project SPRINTT will do all that by bringing teachers together in an international, online classroom. Using both synchronous and asynchronous portals in their training, educators will learn about the content and materials required for infusing polar science into their existing standards-based curriculum, as they share with their peers best practices and other sound pedagogical strategies for adoption. Prepared modules will facilitate the teacher's own pursuit of inquiry based research using authentic polar data guided by elegant essential questions. Once in the classroom, Project SPRINTT will implement a collaborative space for students to partner with global peers, field scientists, and other educators to develop meaningful, real-time, research projects. Web conferencing will permit the authentic forum of a presentation symposium for student work, thus giving exposure and relevance to the scientific process while validating student work. With the support of many IPY scientists and collaborators, hundreds of teachers can be enabled to bring polar science concepts to thousands of students.

Antarctic Penguins, Teaching the Science of Climate Change: A Celebration of IPY

Award # 732502

PI: David G Ainley, H.T. Harvey & Associates, dainley@penguinscience.com

Co-PI: Grant Ballard, Oikonos

The Nature of Science and authentic, inquiry-based learning experiences are the outcomes of the *Antarctic Penguins* project. The amazingly popular Antarctic pack-ice penguins (Adélie and Emperor) will be used to look at biotic responses to environmental change, and address the question: “How do we know what we know?” Student generated experiments (carried out in the field by polar scientists) will be incorporated with current and historical data on the changing environment will be examined for effects on the population size and distribution of these creatures. These proxies will be compared – how the data are gathered, how they are analyzed, and what they mean – in a way that will be engaging to students. Multimedia and multidisciplinary materials, including “webisodes”, interactive website components, classroom activities, and background reading materials, will round out the project’s breadth and depth of climate change science and related topics.

IPY STEM Polar Connections: A three region initiative to integrate the study of Polar Regions and activities associated with the International Polar Year into the middle and high school curriculum.

Award#732945

PI: Morton M Sternheim, University of Massachusetts Amherst, mort@k12s.phast.umass.edu

Co-PI: Julie Brigham-Grette, University of Massachusetts Amherst

Polar Connections utilizes the correlations among polar science and regional topography, climate and ecosystems to engage middle and high school classes in all aspects of polar research. Using this “right here, right now” aspect of the science, this professional development program for teachers highlights the relevance of including polar topics in the curriculum. The target areas of New England, Mid-Atlantic, and Great Lakes Region for project inception, permits geographically accessible summer institutes for participating teachers and easy online follow-up sessions during the school year. As part of the pedagogical component, methods of cooperative learning, scientific inquiry, and formative assessment will be promoted by involvement in real research projects with collaborating professionals in the field. All teaching modules will be designed for use as stand-alone units, integration capabilities with existing curricular structure, or as enrichment materials. Providing educators with the research based materials and strategies needed to teach the relationships between polar data and local environments in key to ensuring that the goals of IPY are met.

ADDITIONAL IPY EDUCATION AWARDS

Collaborative Research. IPY: The Polaris Project: Rising Stars in the Arctic

Award # 732469

PI: William Sobczak , College of the Holy Cross, wsobczak@holycross.edu

Award # 732477

PI: Andrew Bunn, Western Washington University, andy.bunn@wwu.edu

Award # 732533

PI: Katey Walter, University of Alaska Fairbanks Campus, ftkmw1@uaf.edu

Award # 732586

PI: Karen Frey, Clark University, kfrey@clarku.edu

Award # 732609

PI: Sudeep Chandra, University of Nevada Reno, sudeep@cabnr.unr.edu

Award # 732944

PI: Robert Holmes, Woods Hole Research Center, rmholmes@whrc.org

Co-PI: Sergei Zimov, Cherski, Northeast Science Station, Pacific Institute of Geography, Russia

The Polaris Project actively recruits young faculty and students to Polar Science fields. The project mandates the involvement of multiple and diverse disciplines, audiences, and nationalities to examine the theme of carbon and nutrient transformations as they migrate through the environment. By design, the project structure includes scientists and groups not normally associated with polar science study, and thus propagate examination of polar research data's relationship to the entire Earth system. Interest is inculcated by field training and research opportunities for faculty and students that focus on collaboration and science by utilizing partner sites that minimize the logistics of polar travel. Future polar researchers are also recruited by the development of new courses; some at institutions that have not had a previous polar science presence. *The Polaris Project* endeavors to firmly establish the next generation of polar scientists by reaching out to the K-12 community through classroom visits, web presence, and material dissemination via established polar science related curricula and other sustainable resources to ensure project continuity.

IPY: A SACNAS Initiative for Engaging New Audiences in Polar Science

Award #

PI: Aaron A Velasco, Society for Advancement of Chicanos & Native Americans in Science,
velasco@geo.utep.edu

The SACNAS IPY project recognizes the critical relevance of polar research to many of the populations they serve and sets in place the appropriate mentoring strategies to recruit underrepresented minorities to the pursuit of scientific study. Through an IPY theme-based national conference, they plan to expose their membership to polar science topics via workshops, central exhibits, symposia, and keynote presentations. They will tailor established mentoring programs for secondary and undergraduate students to stimulate and maintain interest in polar studies. "Minority students will be: exposed to role models with similar backgrounds that are leaders in polar science who can advise on career options; alerted to internship opportunities; connected to URM student social networks; and advised on effective leadership skills to navigate the scientific enterprise"^a. Appropriate agencies will be recruited to expose URM students to internship, research, and other academic opportunities and events related to polar science. All these efforts are sustainable and will help generate the next generation of polar scientists.

^a Quotes taken from the original research proposals.