

A Scientist and A Teacher Squeeze into a Tent

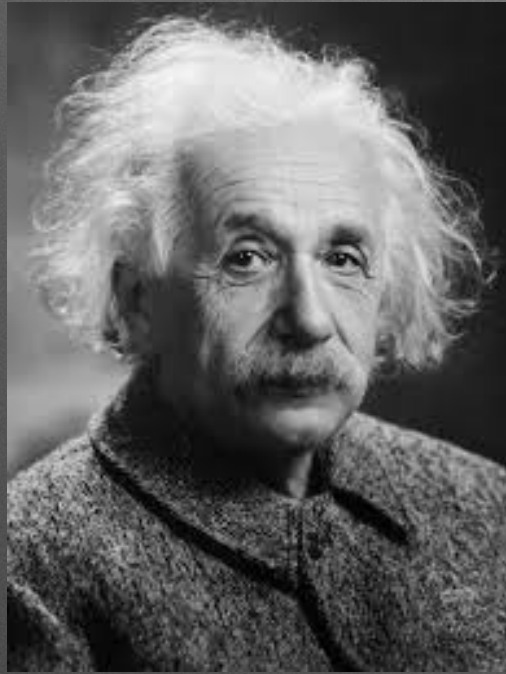
or A Scientist and a Teacher walk into a bar...



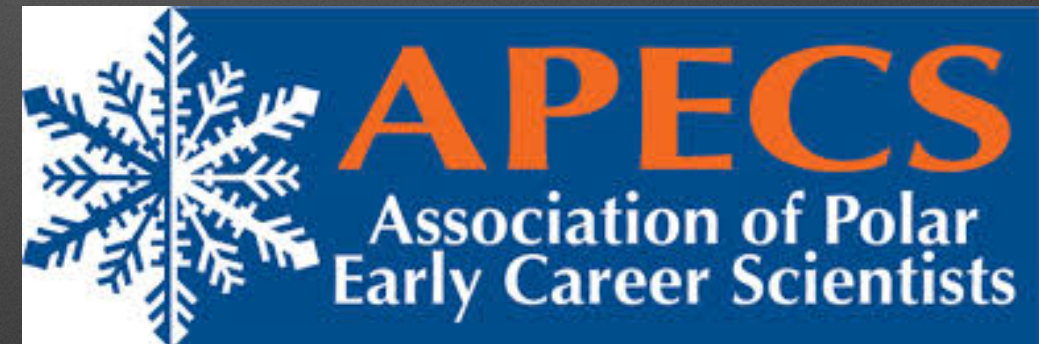
In the beginning...



The Fantastic Five



When money didn't matter...



Paying the Bills...



www.scar.org

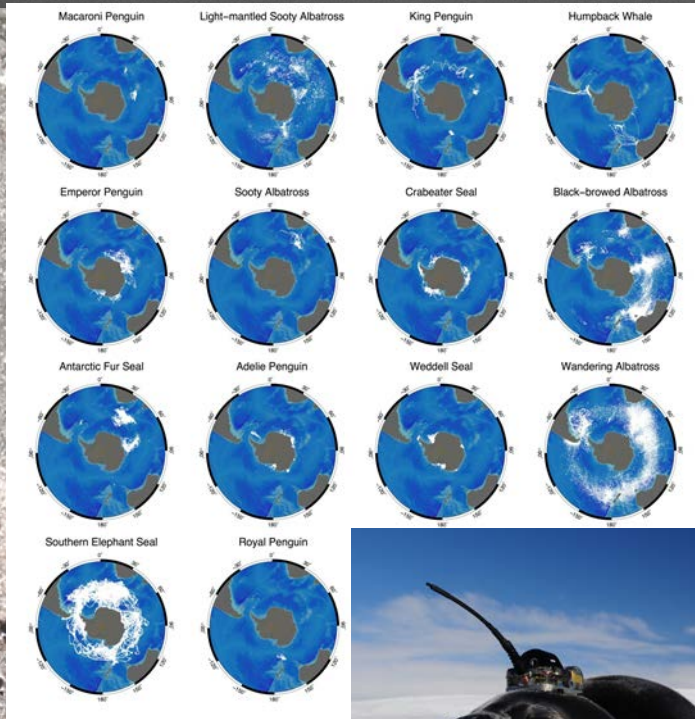
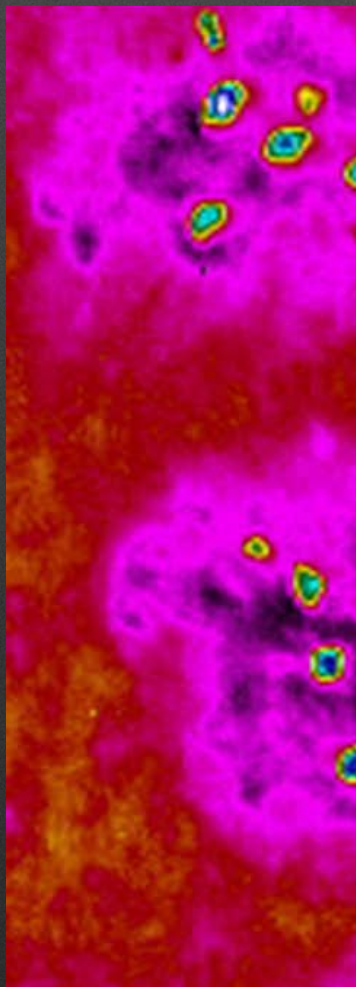
SCAR Mission



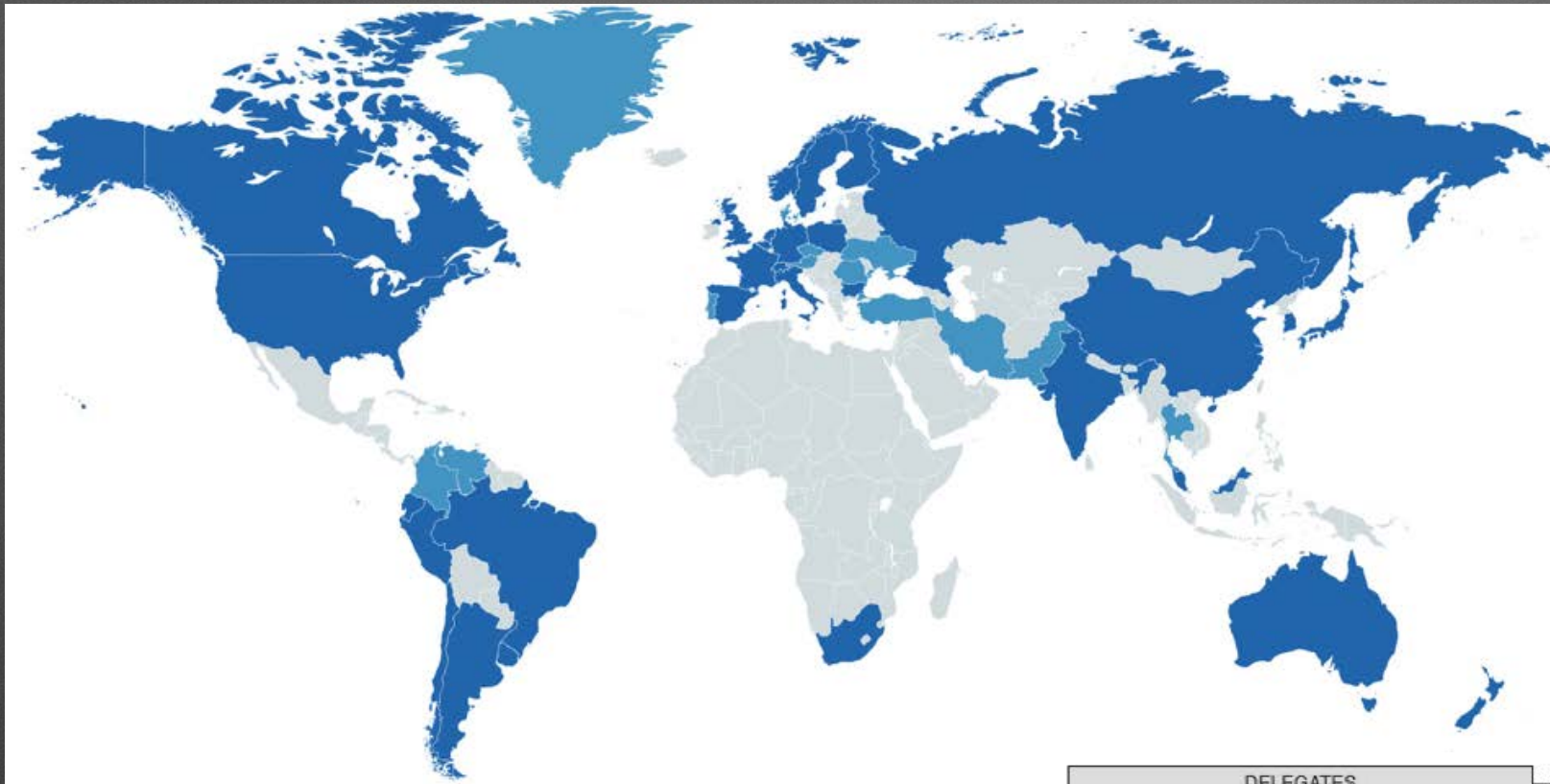
*Created in 1958
by the International Council for Science
during the International Geophysical Year*

- **Science Leadership** - initiate, develop and coordinate high quality international scientific research in the Antarctic and Southern Ocean region
- **Scientific Advice** - provide objective and independent scientific advice to the Antarctic Treaty System and other bodies, such as the IPCC

What does that *really* mean...

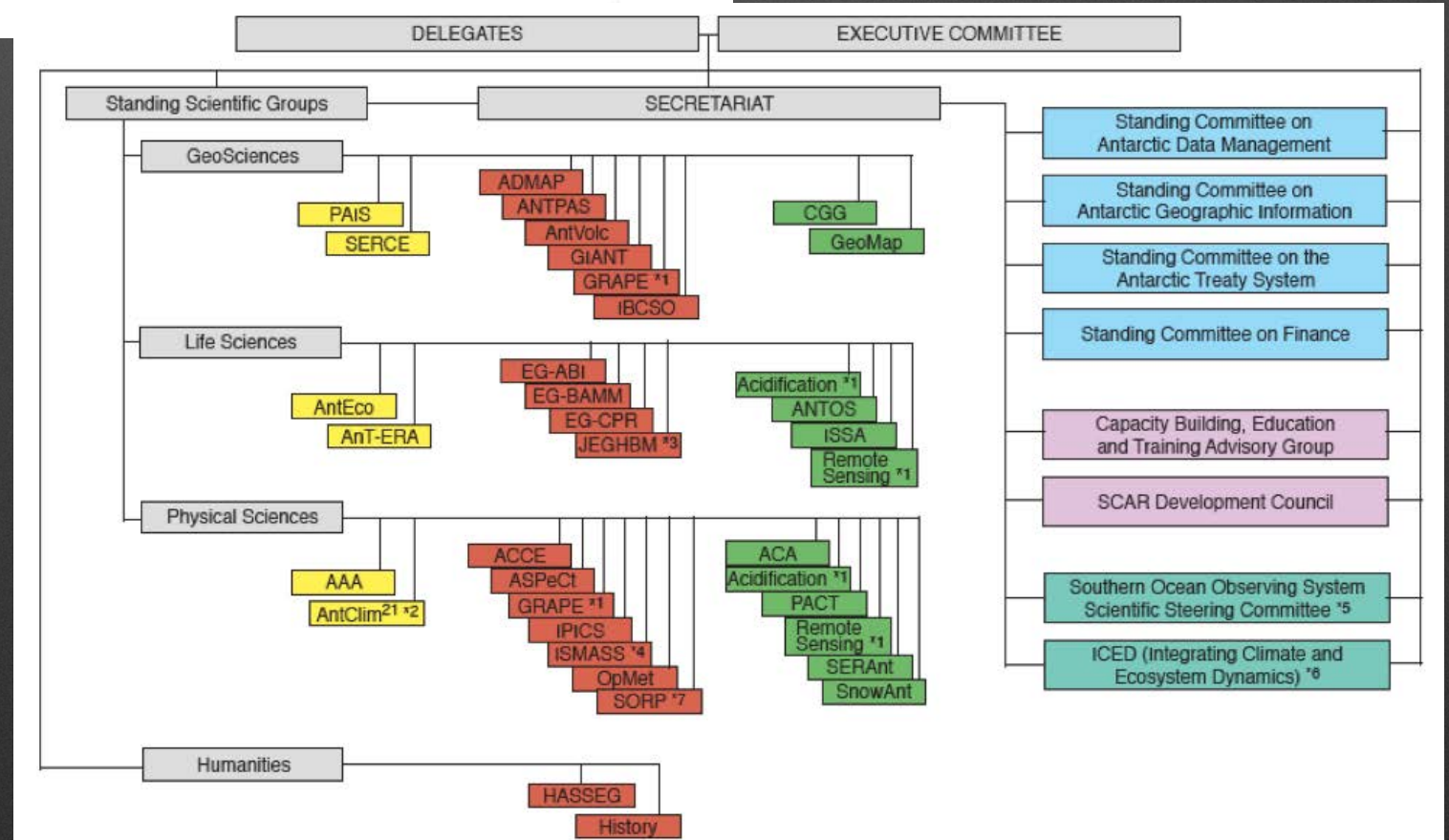


Who's involved...



43 Countries

37 Groups

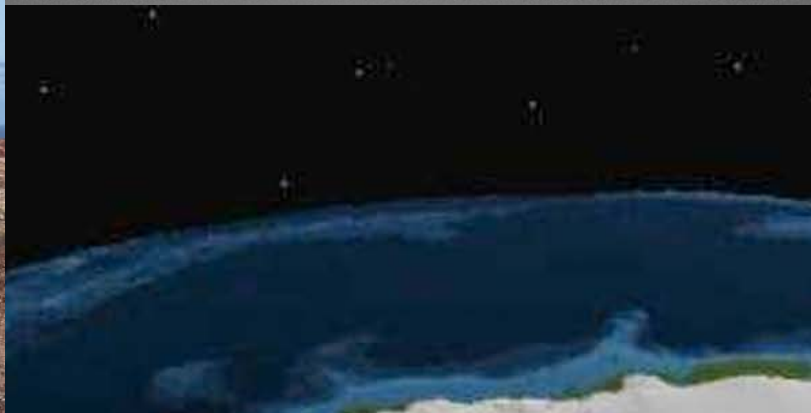


Why should *Educators* care...

- 37 groups x ~100 people* / 43 Countries =



Why should the *World* care...

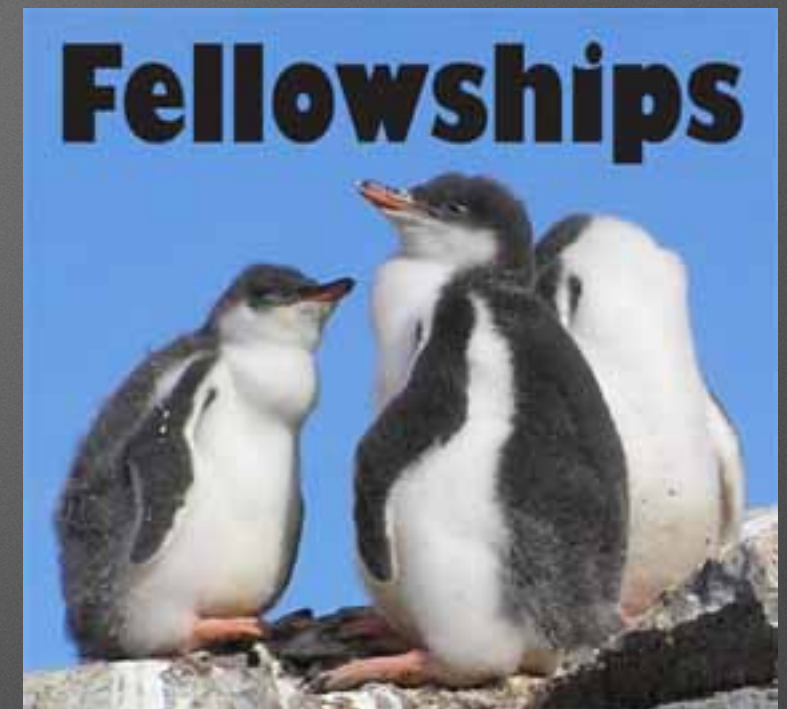


UMass - R. Decanto

What is SCAR doing now...



- Early career training opportunities
- Travel funding (Silvia and Anant!)
- Outreach sessions at conferences
- Initial stages of a PEI collaboration
- Capacity Building Education Award



If we didn't have to pay the bills...



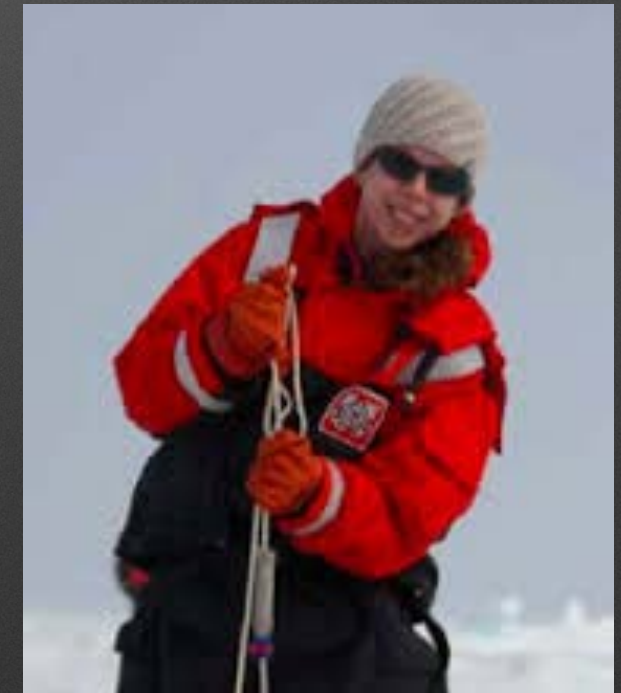
Polar Resource Book



Match Making



no.match.com



www.polarmatch.com

Take an Educator to Work...



Student Opportunities



Communications

FrostBytes

But we do have to pay the bills...



Use the Currency of Science

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The Polar Journal

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Education, outreach and communication during the International Polar Year 2007-2008: stimulating a global polar community

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FORUM

Training a New Scientist to Meet the Challenges of a Changing Environment

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The transboundary nature of global environmental change demands collaborative, multiscale, interdisciplinary research [U.S. National Academy of Sciences, 2005]. This requires "a new kind of scientist" [Schmidt and Moberg, 2006], collaborators must develop both sufficient understanding of one another's work and the skills to integrate data sets and expertise. Although numerous interdisciplinary academic programs have emerged to address this demand, success varies widely. While many address cultural and financial impediments to interdisciplinary research [Hessig, 2000; Rhoads, 2004], there is little discussion of the skills that facilitate interdisciplinary scholarship and how to obtain them.

An early-career researcher in global environmental change, we broached this topic with our peers, alumni of the Dissertations Initiative for the Advancement of Climate Change Research (DISCCRS) and New Generation of Polar Researchers (NGPR) programs, which aim to foster interdisciplinary collaborations among recent Ph.D.s in social, natural, and physical sciences. In June 2010 we sent an e-mail inviting DISCCRS and NGPR alumni to participate in an online survey. With three open-ended and 14 constrained-choice questions, the survey could be completed within 15 minutes. To develop a portrait of interdisciplinary training of climate researchers, we focused on (1) the role of interdisciplinarity in graduate training and (2) the skills and techniques used on a regular basis and how they were acquired.

Survey results indicate that successful interdisciplinary work requires training beyond the typical university curriculum as well as a large network of mentors to serve as teachers and collaborators.

Survey Findings

Of the 197 alumni of DISCCRS and NGPR, 92 individuals completed the survey, for a response rate of 57%, constrained with Web-based surveys [Cook et al., 2000]. More than 75% of survey respondents earned Ph.D.s in the past 5 years ($n = 57$, the number of respondents to the question) and reported a primary dissertation concentration in the life (38%), physical (38%), or social sciences (23%); nearly half (49%) reported a secondary concentration, and 11% reported a tertiary concentration.

Eos, Vol. 92, No. 16, 19 April 2011

Early-career global change researchers reported gaining multiple technical skills (e.g., statistical analysis and computer programming) during graduate school ($n = 40$). More than half of those skills were acquired via informal means, with nearly a quarter of skills self-taught; however, coursework and advisors also were important sources of training (Figure 1a). Modes of learning varied. For example, while statistical analysis was learned primarily via coursework (47%), computer programming was often self-taught (83%), and data collection skills (50%) and field techniques/instrumentation skills (68%) were acquired from field experience and graduate advisors. Although most (50–80) respondents reported three or more skills obtained in graduate school, 88% found the need to expand their skill set to enhance their current research. In an open-ended question, 45 respondents identified those additional skills to be primarily in the realms of data analysis and communication (Figure 2b).

In a nonexclusive question on the role of professional experiences in their training, respondents identified 5, extremely helpful, 1, nominally helpful) fellowship programs (average rating = 4.1), informal mentors (4.0), advisors (4.0), graduate advisors (3.9), graduate committees (3.8), earned degrees (e.g., M.S. and J.D.) (3.8), and peer interaction/support groups (3.8) as helpful to learning and conducting their interdisciplinary research ($n = 37$). Most respondents ($n = 37$) identified the following professional relationships as "extremely helpful" (i.e., 5) to conducting interdisciplinary research: advisor (31%), informal mentor (40%), graduate committee (44%). Reflecting the challenges of the new scientist, 70% of respondents ($n = 47$) reported the following "inhibitors" in their pursuit of interdisciplinary experiences: did not know about opportunities (28%), difficulty identifying collaborators (17%), funding (17%), graduate advisor (15%), administration (13%), graduate committee (6%).

Improving Interdisciplinary Training

Interdisciplinary programs provide coursework in a variety of disciplines; however, many of the analytical and communications skills required for tackling complex problems are not part of the curriculum. The study identified communication, data collection/analysis, and computer programming/modeling skills as key to interdisciplinary research, yet they are primarily self-taught or learned from informal mentors. Furthermore, our findings highlight the importance of professional relationships in training new scientists. Cross-disciplinary graduate committees and informal mentors can provide technical and emotional support in an academic environment unresponsive to interdisciplinary work. These student-mentor relationships can build and sustain interdisciplinary research.

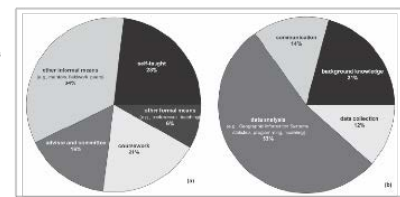


Fig. 1. (a) Means of acquiring skills during graduate school to conduct interdisciplinary research. "Other" refers to organized modes of learning while "informal" refers to courses taught not created by the student. (b) Types of skills acquired since completion of a Ph.D. to enhance global change research. See text for descriptions of categories.

Educating new generation of polar researchers: IPY and beyond

Vladimir A. Alexeev (1), Irina Repina (2), Jenny Baesemann (3)
(1) International Arctic Research Center, (2) Chukotka Institute for Atmospheric Physics, (3) Association for Polar Early Career Scientists

The International Arctic Research Center (IARC) of the University of Alaska Fairbanks actively promotes Arctic Science, in collaboration with other major climate institutions in the USA and around the world. IARC organized at least one summer school every year since 2003 in different locations, including Russian Icebreaker "Kapitan Dranitsyn" jointly with a scientific expedition to the Laptev Sea, Alaska Fairbanks, Barrow, Toolik Lake, Deadhorse and Kenai; a forest reserve in Fedorovskaya (Russia, Tver' region) and Russian Antarctic station Bellingshausen. Leading invited scientists addressed a wide spectrum of polar disciplines from oceanography and meteorology to biology, chemistry, and paleoclimatology. In addition to the opportunities for learning and professional training provided by a traditional classroom educational system, the students were given a unique chance to experience polar exploration, to acquire invaluable skills in fieldwork under harsh conditions, and to gain a better understanding of how science is organized in practice. Students learned first-hand about terrestrial, oceanographic, biological, ice, and meteorological observations in the high latitudes. Working with international teams of experienced polar researchers provided excellent opportunities to learn more about modern methods of observations and analysis and to personally participate in the study of the fast-changing polar environment. We are showing only two examples of our successful programs in this poster. This success would not have been possible without help from many different people from all over the world. We would like to thank all of them for investing their effort to the future of polar research.



ACKNOWLEDGMENTS
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POLAR RESEARCH EDUCATION, OUTREACH AND COMMUNICATION DURING THE FOURTH IPY

How the 2007-2008 International Polar Year contributed to the future of education, outreach and communication



- More peer-reviewed literature about the importance and impact of outreach

- Help funders to see the value

- “Reward” scientists for their CVs

Inspiring Examples and Best Practices



Science that can be *used*???

The screenshot shows the Antarctic Environments Portal homepage. The header includes the logo, the title "Antarctic Environments Portal", the tagline "Science to Management", a "Login" button, and a "Forgot Password?" link. The navigation bar contains links for "Home", "Map", "About", "Contact", and "Sitemap", along with a search bar. The main content area features a featured article titled "Introduction of non-native species" with a photo of orange lichen and a brief description. Below this is a "Current Priority Issues" section with a grid of six topics, each with a "More" button. To the right is an "Interactive Map" of Antarctica with a "View Full Map" link. At the bottom right, a "What's Changed?" section lists recent updates with dates. A green "Emerging Issues" button is at the bottom right.

This screenshot shows a document page titled "Sources, dispersal and impacts of wastewater in Antarctica". It includes a thumbnail image of a hand holding a test tube. The page lists five authors: Jonathan S. Stark, Kathleen E. Conlan, Kevin A. Hughes, Stacy Kim, and César C. Martins. It indicates the document is "PEER-REVIEWED" and provides a "Comment on this page" link. The "Synopsis" section states that wastewater discharge in Antarctica poses a significant risk to the environment, including the introduction of non-native species and pathogens. It mentions that the highest priority for the Committee for Environmental Protection (CEP) is addressing the introduction of non-native species, and that advanced wastewater treatment could substantially reduce the associated risk.

The image shows the cover of a report titled "ANTARCTIC CLIMATE CHANGE AND THE ENVIRONMENT - AN UPDATE". The cover features a large photograph of a massive iceberg floating in the ocean. The text on the cover includes the title, the subtitle "A contribution to the International Council for the Study of the Environment", and the names of the editors: John Turner, British Antarctic Survey, UK; Robert Lindacher, National Science Foundation, USA; Peter Conway, British Antarctic Survey, UK; and Guido Di Franco, Institute of Physics, University of Vienna, Austria. The cover also lists the names of the authors and the title of the report.

Educators at Conferences



Training and Motivating Scientists



Where do we go from here...

- Give up because we have limited resources
- Retire so money doesn't matter
- Convince [*Insert Rich Person Here*] that Polar Science and Education partnerships are the solution to all the World's problems
- Use traditional energy solutions
- Combine with Alternative fuels...

Sometimes you just
gotta gun it...

