

Antarctic Sciences Division GPRA highlights, FY2007

Center for Remote Sensing of Ice Sheets (CReSIS)

Highlight ID: 12776, Version: AC/GPA

A group of NSF-supported researchers at the Center for Remote Sensing of Ice Sheets (CReSIS) have been developing new ways to image the base of the polar ice sheets. CReSIS is conducting multidisciplinary research that will result in technology, new data sets, and models necessary to achieve a better understanding of the mass balance of the Antarctic and Greenland ice sheets and their contributions to sea-level rise. The Center is developing several sensors (radar and seismic) and platforms (UAVs) that will provide long-term benefits to the polar community as enabling technologies for various other investigations. The sensors will also have wide applications outside of the polar community. One of these advanced sensors is a synthetic aperture radar that can sound ice and map layers with fine resolution. It can also image the ice-bed interface. It has also produced the first successful demonstration of imaging through 3-km thick ice. This sensor has the potential to revolutionize the study of polar ice sheets. This work is jointly supported by the Office of Integrative Activities and the Office of Polar Programs (both the Arctic and Antarctic Sections).

Primary Strategic Outcome Goal:

- Research Infrastructure: Build the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure and experimental tools.

Secondary Strategic Outcome Goals:

- Learning: Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.

How does this highlight address the strategic outcome goal(s) as described in the [NSF Strategic Plan 2006-2011](#)?

The tools being developed under CReSIS will revolutionize the field of glaciology and will lead to a better understanding of polar ice sheets and how they contribute to sea level change. Because of the immense size and complexity of these ice sheets, data from satellite and airborne platforms, combined with ground-based, in-situ measurements and observations, are needed to accurately assess their mass balance state. Technological innovations are being made in three areas, including sensors, platforms, and cyberinfrastructure. The next generation of researchers should reflect the diversity of our society. To this end, the Center is working closely with two minority-serving institutions, Haskell Indian Nations University (Haskell) in Lawrence, Kansas, and Elizabeth City State University (ECSU) in Elizabeth City, North Carolina. The Center is conducting extensive outreach and education programs to attract minority students to careers in science and technology.

Does this highlight represent transformative research?

No

OPP/ANT 2007

Tags: 2010 Transition Team and 2010 Budget, Societal Benefits

Program Officer: Julie Palais

NSF Award Numbers:

[0424589](#)

Award Title: Center for Remote Sensing of Ice Sheets (CReSIS)

PI: S. Prasad Gogineni, pgogineni@ku.edu

Institution Name: University of Kansas Center for Research Inc

State Code: KS
PE Codes: 7555, 5280, 5116, 5111, 1297

NSF Contract Numbers:

NSF Investments: Climate Change, Dynamics of Earth's Water System, International Polar Year (IPY), Sensor Research

Related Center or Large Facility: CReSIS STC

Balzan Prize for BOOMERANG - 1 Million Swiss Francs

Highlight ID: 12858, Version: AC/GPA

Dr. Andrew Lange of CalTech is sharing the 2006 Balzan Prize for Astronomy and Astrophysics with his Boomerang co-investigator Dr. Paolo de Bernardis of Italy. The prize, awarded only occasionally in Astrophysics, is in recognition of their contributions to cosmology, in particular the BOOMERANG Antarctic Long Duration Balloon experiment which produced the first images of structure in the Cosmic Microwave Background (Nature, vol. 404, p 955-959, 27 April 2000). BOOMERANG (Balloon Observations of Millimetric Extragalactic Radiation and Geomagnetism) was an international consortium with funding from national agencies in Italy, the United Kingdom and the U.S. Within the U.S., the payload development and flight were supported by NASA and by NSF. Additional support for the development of the detector system was by Caltech.

The Balzan Prize is 1M Swiss Francs, and there is a stipulation that half of the prize be used to support research of early career scientists. See:

http://www.balzan.it/default_eng.aspx?codice=0000000057 and

<http://www.balzan.org/en/preistraeger/index.cfm>

The BOOMERANG project was a key part of a series of studies to study the properties of the Cosmic Microwave Background (CMB) radiation. The Cosmic Microwave Background is essentially the afterglow of the Big Bang and it is providing important clues to processes active in the earliest stages of the universe. Ongoing and future experiments exploiting the CMB include the BICEP experiment and QUAD, both active at South Pole Station, and the 10m telescope planned for operation at South Pole in 2007.

Primary Strategic Outcome Goal:

- Discovery: Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering. (AC/GPA selected)

Secondary Strategic Outcome Goals:

How does this highlight address the strategic outcome goal(s) as described in the [NSF Strategic Plan 2006-2011](#)?

It honors work that constitutes a major discovery about the Cosmic Microwave Background.

Does this highlight represent transformative research?

Yes

Observing structure in the CMB was a key element in advancing understanding of the universe because this meant that detailed structure, including anisotropy of the CMB could be used to test models of inflation and other aspect of evolution and origin of the universe.

OPP/ANT 2007

Tags: FY 09 Congressional Budget Request, FY09 OMB Budget Request
Program Officer: Vladimir Papitashvili
NSF Award Numbers:
[9729121](#)

Award Title: Antarctic Long-Duration Balloon-Borne Observations of the Anisotropy of the Cosmic Microwave Background on Angular Scales of 0.2 to 4 Degrees
PI: Andrew Lange, ael@astro.caltech.edu
Institution Name: California Institute of Technology
State Code: CA
PE Codes: 5115, 1217

NSF Contract Numbers:
NSF Investments: None Applicable
Related Center or Large Facility: US Antarctic Program

Polar researcher honored for seal research by WINGS Worldquest

Highlight ID: 12984, Version: AC/GPA

Terrie Williams, a Professor at the University of California, Santa Cruz, is being recognized by WINGS Worldquest for her extensive work on Weddell seal ecology and physiology in Antarctica. Her studies have led to breakthroughs in understanding the relationships among seal foraging behavior and physiology, prey ecology, and global change. Specifically, her research team developed novel technologies and approaches to develop an energy budget for large marine organisms, which allowed them to quantify the energetic costs of diving, and link diving behavior to foraging effort. Foraging effort is driven in part by prey availability, and in Antarctic ecosystems, common prey for predators such as whales, seals, and penguins, have been impacted by global change. The research thus links foraging energetics to changing climate.

Primary Strategic Outcome Goal:

- Discovery: Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering.

Secondary Strategic Outcome Goals:

- Learning: Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.

How does this highlight address the strategic outcome goal(s) as described in the [NSF Strategic Plan 2006-2011](#)?

The research is cross disciplinary, linking physiology, ecology, and environment. It is among the first studies to develop an energy budget for large mammals.

Does this highlight represent transformative research?

Yes

see above
OPP/ANT 2007

Program Officer: Roberta Marinelli

NSF Award Numbers:

[9909862](#)

Award Title: Collaborative Research: Hunting Behavior and Energetics of Free Ranging Weddell Seals
PI: Terrie Williams, williams@biology.ucsc.edu
Institution Name: University of California-Santa Cruz
State Code: CA
PE Codes: 5111

[0433496](#)

Award Title: SGER: Weddell Seal Visualization Project
PI: Terrie Williams, williams@biology.ucsc.edu
Institution Name: University of California-Santa Cruz
State Code: CA
PE Codes: 5111

[9618384](#)

Award Title: Collaborative Research: Weddell Sea Foraging: Behavior and Energetic Strategies for Hunting
PI: Terrie Williams, williams@biology.ucsc.edu
Institution Name: University of California-Santa Cruz
State Code: CA
PE Codes: 5111

NSF Contract Numbers:

NSF Investments: Climate Change, International Polar Year (IPY)

Related Center or Large Facility:

Stellar Axis: Antarctica

Highlight ID: 13070, Version: AC/GPA

A **National Science Foundation Antarctic Artist and Writers Grant recipient**, artist [Lita Albuquerque](#), has conceived of ***Stellar Axis: Antarctica***, an art expedition to Antarctica and **Phase I of a two-part project** that entails a tracing of the stars above the North and South Pole onto the ice at both poles. Albuquerque's international team members, British astronomer Simon Balm, British documentary filmmaker Sophie Pegrum, French Antarctic photographer Jean De Pomereu, and Italian-based French cinematographer Lionel Cousin deployed to McMurdo Station, Ross Island, Antarctica, on the first week of December 2006. They positioned ninety-nine blue spheres in alignment to the stars over the South Pole onto the Ross Ice Shelf on December 22, 2006. A performance indicating the motion of the stars at the poles was filmed to share with audiences upon their return. As an arts educator, her work impacts her students as well as the wider public through lectures and exhibits.

"By doing a star alignment on the ice at both poles, it engages the whole planet," says Albuquerque. "I'm interested in creating a mental image of the patterns aligning. In a way, it's like taking a snapshot of a moment in time when the stars are aligned to the pattern on the ground, so that the

'picture is an accurate picture of not just a planet floating in space, but a planet surrounded by a vast circulatory system of stars of which we are a part.'

Primary Strategic Outcome Goal:

- Learning: Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.

Secondary Strategic Outcome Goals:

- Discovery: Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering.

How does this highlight address the strategic outcome goal(s) as described in the [NSF Strategic Plan 2006-2011](#)?

The purpose of the Antarctic Artists and Writers Program is to enable serious writings and works of art that exemplify the Antarctic heritage of humankind. In particular, the program seeks to increase public understanding of the Antarctic region, including the continent and the surrounding oceans, as well as the associated research and education endeavors. This program and the subsequent projects support both Stewardship and Learning in the works' expansion of science literacy and intrigue.

Does this highlight represent transformative research?

No

OPP/ANT 2007

Tags: FY 09 Congressional Budget Request

Program Officer: Kim Silverman

NSF Award Numbers:

[0537948](#)

Award Title: SOUTH POLE STELLAR AXIS

PI: Lita Albuquerque, lita.albuquerque@verizon.net

Institution Name: Albuquerque Lita

State Code: CA

PE Codes: 5130

NSF Contract Numbers:

NSF Investments: International Polar Year (IPY)

Related Center or Large Facility:

Polar microbial ecologist named at AAAS fellow

Highlight ID: 13120, Version: AC/GPA

John Priscu is honored for his contributions to the understanding of life in extreme environments, especially the study of life in ice and in ice-covered polar lakes in Antarctica. This work has been supported through the LTER program as well as individual awards to Dr. Priscu and his colleagues.

Primary Strategic Outcome Goal:

- Discovery: Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering.

Secondary Strategic Outcome Goals:

- Learning: Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.

How does this highlight address the strategic outcome goal(s) as described in the [NSF Strategic Plan 2006-2011](#)?

Dr. Priscu has been at the frontier of discovering how organisms can persist in extreme environments, thereby shedding light on the limits of life and unique adaptations that allow organisms to survive and thrive in difficult circumstances.

Does this highlight represent transformative research?

Yes

His discoveries in Antarctic Lakes have changed our thinking on how life exists in environments characterized by extreme cold and marked seasonality.

OPP/ANT 2007

Tags: FY09 OMB Budget Request

Program Officer: Roberta Marinelli

NSF Award Numbers:

[9815512](#)

Award Title: Collaborative Research: Microbial Life within the Extreme Environment Posed by Permanent Antarctic Lake Ice

PI: John Priscu, jpriscu@montana.edu

Institution Name: Montana State University

State Code: MT

PE Codes: 1075

[0440943](#)

Award Title: Paleo Records of Biotic and Abiotic Particles in Polar Ice Cores

PI: John Priscu, jpriscu@montana.edu

Institution Name: Montana State University

State Code: MT

PE Codes: 5116, 5111

[0423595](#)

Award Title: The Role of Resource Legacy on Contemporary Linkages Between Biodiversity and Ecosystem Processes in a Cold Desert Ecosystem: The McMurdo Dry Valley LTER Program

PI: Andrew Fountain, andrew@pdx.edu

Institution Name: Ohio State University Research Foundation

State Code: OH

PE Codes: 5116, 5111, 1195

Award Title: The Role of Resource Legacy on Contemporary Linkages Between Biodiversity and Ecosystem Processes in a Cold Desert Ecosystem: The McMurdo Dry Valley LTER Program

PI: W. Berry Lyons, lyons.142@osu.edu

Institution Name: Ohio State University Research Foundation

State Code: OH

PE Codes: 5116, 5111, 1195

NSF Contract Numbers:
NSF Investments: International Polar Year (IPY)
Related Center or Large Facility:

Polar researcher receives Earth Award from Wings Worldquest

Highlight ID: 14691, Version: AC/GPA

Erin Pettit, a glaciologist, affiliated with both the University of Washington and Portland State University was recognized by WINGS Worldquest for her Girls on Ice program and her research into the dynamics of polar glaciers and ice sheets. The Girls on Ice program provides high school girls the opportunity to learn about science while acquiring mountaineering skills in a wilderness setting. Erin has been a mentor and a great role model for future women scientists at the same time as she has been carrying out important research in Antarctica studying the dynamical behavior of glaciers and ice sheets. Several of the participants in her research program on the Mechanics of Dry-based Ice Cliffs were women students, some whom have continued on in science.

Primary Strategic Outcome Goal:

- Learning: Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.

Secondary Strategic Outcome Goals:

- Discovery: Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering.

How does this highlight address the strategic outcome goal(s) as described in the [NSF Strategic Plan 2006-2011](#)?

Erin's Antarctic research program on glaciers and ice sheet dynamics (see Highlight 711 from 2003) has provided an important venue to train the next generation of scientists and engineers. Several of the graduate and undergraduate students involved in her research program were woman, a group that is under-represented in the field of glaciology. In addition, the Girls on Ice program for high school students provide a source of young women who will hopefully become part of the next generation of polar researchers.

Does this highlight represent transformative research?

No

OPP/ANT 2007

Tags: FY09 OMB Budget Request

Program Officer: Julie Palais

NSF Award Numbers:

[0230338](#)

Award Title: Collaborative Research: Mechanics of Dry-Land Calving of Ice Cliffs

PI: Bernard Hallet, hallet@u.washington.edu

Institution Name: University of Washington

State Code: WA

PE Codes: 5116

NSF Contract Numbers:

NSF Investments: Climate Change, Dynamics of Earth's Water System, Educating Innovators for the 21st Century

Related Center or Large Facility:

Antarctic Glaciologist honored with first-ever SCAR Medal of Excellence for Antarctic Research

Highlight ID: 14692, Version: AC/GPA

Paul Mayewski is the Director of the Climate Change Institute at the University of Maine Orono and has been an active researcher supported by the Office of Polar Programs for many years. Mayewski has had a long and distinguished career in Antarctic research in addition to being the chief scientist of the very successful Greenland Ice Sheet Project 2 (GISP2). In July 2006 he was the recipient of the first-ever Scientific Committee on Antarctic Research (SCAR) Medal for Excellence in Antarctic Research. Mayewski's research on climate change uses ice cores and snow samples to reconstruct the chemistry of the atmosphere and the spatial and temporal variability of Antarctic climate parameters. He is the founder and Chair of the Executive Committee for the International Trans-Antarctic Scientific Expedition (ITASE), which is reconstructing the last 200 years of Antarctic climate history. ITASE is one of the major programs that the U.S. will be involved with during the upcoming International Polar Year (IPY). Mayewski is also being honored at the 2007 Explorers Club Annual Dinner which takes place on March 17, 2007 and is featuring research in the polar regions. The title of the evening program is "The Importance of Polar Places". Mayewski has also been very active in promoting and fostering public understanding of climate change research with a number of museums including the Science Museum in Boston and the American Museum of Natural History in New York.

Primary Strategic Outcome Goal:

- Discovery: Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering.

Secondary Strategic Outcome Goals:

- Learning: Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.

How does this highlight address the strategic outcome goal(s) as described in the [NSF Strategic Plan 2006-2011](#)?

Mayewski is not only doing cutting edge research on climate, which has advanced the frontiers of knowledge but he has also been a dynamic leader in the international community coordinating scientists from close to 20 countries to combine their efforts under the auspices of ITASE. It is through Mayewski's efforts that ITASE was adopted as a key science initiative by both the International Geosphere-Biosphere Program (IGBP) and SCAR.

Does this highlight represent transformative research?

No

OPP/ANT 2007

Tags: FY09 OMB Budget Request

Program Officer: Julie Palais

NSF Award Numbers:

[0439589](#)

Award Title: US ITASE Glaciochemistry Phase 2: East Antarctica

PI: Paul Mayewski, paul.mayewski@maine.edu
Institution Name: University of Maine
State Code: ME
PE Codes: 5116

[0440679](#)

Award Title: A Science Management Office for the United States Component of the International Trans Antarctic Expedition (US ITASE SMO) - A Collaborative Program of Research from Taylor Dome to
PI: Paul Mayewski, paul.mayewski@maine.edu
Institution Name: University of Maine
State Code: ME
PE Codes: 5140, 5116

NSF Contract Numbers:

NSF Investments: Climate Change, Educating Innovators for the 21st Century, International Polar Year (IPY)

Related Center or Large Facility:

Discovery of a possible link between subglacial lakes and ice streams

Highlight ID: 14694, Version: AC/GPA

A research team led by Robin Bell and Michael Studinger from Lamont-Doherty Earth Observatory at Columbia University has discovered a possible link between the subglacial lakes that are known to exist beneath the Antarctic ice sheet and the location of the initiation of ice streams which drain the East Antarctic ice sheet. In conjunction with scientists supported by NASA, these NSF-funded researchers have found four new subglacial lakes that coincide with the origin of tributaries of Recovery Glacier ice stream. The research team believes that the lakes provide a source of water which acts to lubricate the bed of the glacier and in turn speeds up the flow of ice. The scientists used satellite radar images and high-resolution radar profiles to arrive at their conclusions. This data demonstrates a rapid increase in ice flow downstream of the lakes where it accelerates from about 2-3 meters per year to nearly 50 meters per year in the ice streams. The awards which supported these researchers enabled the original fundamental studies of Lake Vostok and allowed these scientists to develop a better understanding of subglacial lakes and how they work. Their studies of the mass and energy fluxes through Lake Vostok and the models developed under their previous NSF funding have provided critical information not only about lake circulation but also about the boundary conditions (e.g. melting/freezing zones, geothermal flux, thickness changes of the overlying ice sheet etc.) which affect the stability and longevity of Lake Vostok and all other subglacial lakes.

Primary Strategic Outcome Goal:

- Discovery: Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering.

Secondary Strategic Outcome Goals:

- Research Infrastructure: Build the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure and experimental tools.

How does this highlight address the strategic outcome goal(s) as described in the [NSF Strategic Plan 2006-2011](#)?

This exciting, interdisciplinary research is at the forefront of a new field of Antarctic research; the study of subglacial antarctic lakes. Scientists from a wide range of disciplines (i.e. glaciology, geophysics, biology, ecology, robotics etc.) have become extremely interested in these subglacial lakes and what they may be able to tell us about topics ranging from life in extreme environments all the way to ice sheet history and dynamics. Antarctic subglacial lake research will likely be an important focus of the upcoming International Polar Year (IPY).

Does this highlight represent transformative research?

Yes

If it turns out that subglacial lakes are associated with ice streams this has profound implications for our understanding of how the ice sheet works and the potential of the entire Antarctic ice sheet (not just West Antarctica, as is normally assumed) to play an important role in sea level rise.

OPP/ANT 2007

Tags: FY 09 Congressional Budget Request, FY09 OMB Budget Request

Program Officer: Julie Palais

NSF Award Numbers:

[0088047](#)

Award Title: Mass and Energy Fluxes Through Lake Vostok: Observations and Models

PI: Robin Bell, robinb@ldeo.columbia.edu

Institution Name: Columbia University

State Code: NY

PE Codes: 5116

[9978236](#)

Award Title: Understanding the Boundary Conditions of the Lake Vostok Environment: A Site Survey for Future Work

PI: Robin Bell, robinb@ldeo.columbia.edu

Institution Name: Columbia University

State Code: NY

PE Codes: 5112, 1629, 1075

NSF Contract Numbers:

NSF Investments: Climate Change, Dynamics of Earth's Water System, International Polar Year (IPY)

Related Center or Large Facility:

ANDRILL - Antarctic Geological Drilling for Climate History

Highlight ID: 14705, Version: AC/GPA

ANDRILL (ANtartic geological DRILLing) - - McMurdo Ice Shelf (MIS) Project

<http://andrill.org>

The ANDRILL Program drilled to a record depth of 1284.87 meters below sea-floor, through an access hole in the 85 meter-thick McMurdo Ice Shelf. This is the deepest sub-bottom penetration a drilling rig has reached in the Antarctic region, and is the first drilling system to operate through a floating ice shelf, which was located in nearly 900 meters of water depth. With three nested drill strings and a sea-riser, more than 6,600 meters of drill pipe was deployed by the ANDRILL team. Those successes are amplified by recovery of more than 98% of the drilled interval as

sediment cores that represent a nearly unbroken geological history of substantial glacial and climatic variation. Alternations of clastic-rich glacial sediment and diatomaceous marine sediment indicate a dynamic history of West Antarctica's ice shelf /sheet advancing and retreating more than 50 times during the last 5 million years.

A team of fifty-eight scientists, technicians, educators and support staff from United States, New Zealand, Italy and Germany spent three months in the Crary Lab of McMurdo Station providing the initial description and characterization of the recovered core. Their initial results document how Antarctic ice sheets behaved during periods of global warmth greater than the present day. Volcanic ashes, microfossils and paleomagnetic stratigraphy provide ages of the sediments and a means to compare this high latitude climatic history with that of other regions. Climate and ice sheet models will extend these results and provide guidance regarding potential response by the West Antarctic Ice Sheet and Ross Ice Shelf to future scenarios of global warming. Frequency and apparent speed of the retreating ice shelf, leading to interglacial and open marine conditions in the Ross Embayment, will be one focus of future studies on these cores.

The collaborative effort of six ARISE (ANDRILL Research Immersion for Science Educators) members embedded within the on-ice Science Team, resulted in extensive educational and outreach materials (e.g. blogs, video journals) and a number of video conferences from the ice to classrooms in the U.S., New Zealand and Italy, teleconference participation of the co-Chief Scientists in the United Nations Conference "Our Common Humanity in the Information Age", as well as numerous media interviews with reporters from the Chicago Tribune, Reuters, MSNBC and NET/NOVA, among others. These activities all highlighted the international collaboration inherent in science of the International Polar Year and established ANDRILL as a leader in IPY outreach activities. Logistical requirements of ANDRILL's McMurdo Ice Shelf Project demonstrated the smooth coordination among Raytheon Polar Services Corp., Antarctica New Zealand, National Science Foundation, and the ANDRILL Team to accomplish a complex and dynamic mission involving Antarctic logistics, science and geoscience education.

Primary Strategic Outcome Goal:

- Discovery: Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering.

Secondary Strategic Outcome Goals:

- Learning: Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.
- Research Infrastructure: Build the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure and experimental tools.

How does this highlight address the strategic outcome goal(s) as described in the [NSF Strategic Plan 2006-2011](#)?

Important new paleoclimate and paleo-oceanographic records that offer detailed information about Antarctic ice sheet history over the last 5 million years. Records are important for understanding how the Antarctic ice sheet fluctuated during the transition from an Earth dominated by ~40 K year cycles prior to a million years ago and an Earth dominated by ~100 K year cycles since that time.

Does this highlight represent transformative research?

Yes

The recovered sediment records indicate a much more dynamic behavior for the Ross Ice Shelf than had been previously recognized and this will require major new models for ice sheet behavior over the last several million years.

OPP/ANT 2007

Tags: FY 09 Congressional Budget Request, FY09 OMB Budget Request
Program Officer: Tom Wagner

NSF Award Numbers:

[0342484](#)

Award Title: Collaborative Research: ANDRILL - - Investigating Antarctica's Role in Cenozoic
Global Environmental Change

PI: David Harwood, dharwood1@unl.edu

Institution Name: University of Nebraska-Lincoln

State Code: NE

PE Codes: 5130, 5112

NSF Contract Numbers:

NSF Investments: American Competitiveness Initiative (ACI), Climate Change, International Polar
Year (IPY)

Related Center or Large Facility: