

## **PRESS RELEASE:**

# **Antarctic Expedition Invites Children of All Ages to Take Part**

**Award-winning writer posts two interactive blogs from the ice, one for kids ages 8-12, the other for teens and up.**

MOSS LANDING, Calif., April 15/ PR Newswire/ -- In the darkness of Antarctic winter, a team of scientists on a lonely icebreaker will soon explore the mysterious icebergs of the Weddell Sea, with a twist. Children are invited.

Global warming in the Antarctic has recently caused ancient ice shelves to shatter into thousands of free-drifting icebergs that affect the air, the water, and possibly Earth's climate in complex, unknown ways. As the NSF-funded researchers seek answers, writer Nancy Etchemendy will recount each day's events via daily posts at [www.icebreakerblog.org](http://www.icebreakerblog.org). Readers can ask questions and receive answers while the expedition is at sea, May 31 - June 30.

"The initial plan was to write at least one K-12 book about the expedition. I still intend to do that. But books and most websites communicate in only one direction. Scientists and teachers go to Antarctica and talk to students when they return. But while events unfold, kids are out of the loop. Not enough students choose to go into the sciences, so I hope this opportunity to ask questions and get answers in real time will show how cool life as a scientist can be, pun intended," says Etchemendy.

The project's two blogs for different age groups are already underway. "Unarctica" combines science fact and adventure fiction for children ages 8-12. "Rime of the Modern Mariner" uses Etchemendy's gothic sensibilities to draw in teens and adults. Both blogs include photos and allow readers to ask questions using a "comments" feature.

"We're thrilled to have a writer of Nancy's stature with us. The science we're doing is cutting edge. Properly presented, the basics can be understood by anyone, but it takes talent to

do that well. Nancy has that talent," says oceanographer Kenneth Smith, the expedition's chief investigator.

As the icebergs melt and release dissolved nutrients, they become "hotspots" for ocean life, with thriving communities of seabirds above and a web of phytoplankton, krill, and fish (and possibly marine mammals, though none have been observed yet). The researchers will use various means -- including remotely operated underwater vehicles, sonar, radar, aerial videography, and sampling devices -- to learn as much as they can about the icebergs themselves, nearby air and water, and surrounding "halos" of life, which may be affecting greenhouse gas levels.

According to the National Science Board's *Science and Engineering Indicators 2004*, there is "...a troubling decline in the number of U.S. citizens who are training to become scientists and engineers, whereas the number of jobs requiring science and engineering training continues to grow. These trends threaten the economic welfare and security of our country."

For further details and a press kit, see [www.icebreakerblog.org](http://www.icebreakerblog.org), or contact:

Nancy Etchemendy

[www.etchemendy.com](http://www.etchemendy.com)

nancy@etchemendy.com

Please email for phone number

## **FACT SHEET:**

### **\* Purpose of the research**

Because the large-scale breakup of the Antarctic ice shelves is such a recent phenomenon, very little is known about the resulting tabular (table-like) icebergs. A preliminary study in 2005 showed that both large and small icebergs are surrounded by

"halos" of abundant marine life that extend out several kilometers in all directions. Data from that expedition also showed that these icebergs have substantially enhanced the biological productivity of the Weddell Sea's waters. "The Southern Ocean lacks a major source of terrestrial material from the continent due to the absence of major rivers. The icebergs that we have studied act like a moving estuary, distributing micro-nutrients from the land that, in other oceans, are typically supplied by rivers," says geochemist Timothy Shaw of the University of South Carolina.

Thousands of questions remain unanswered. How dense are the icebergs? Where are they going and how fast? How quickly are they melting? How much fresh water are they adding to the sea? How many different kinds of nutrients are they adding to the water, and in what quantities? How did nutrients get into the icebergs, and where did the nutrients come from? Are the nutrients the cause of the halos of marine life? What types of life forms inhabit the iceberg halos, and what are the populations? What life forms live under the icebergs, where no one has been able to look before? The researchers will try to answer these and many other questions.

But one of the most urgent questions is certainly this: are these remnants of the ice shelves helping to reduce carbon dioxide levels, and if so, how much. "We already know the new icebergs affect the water in complicated ways. We suspect they're drawing down atmospheric carbon dioxide and sequestering particulate carbon deep in the sea. We want to know for certain, because the answers will add to our understanding of global climate change," said oceanographer Ken Smith, principal investigator for the project.

#### \* **Scope of the research**

This is the first of two related voyages to the Weddell Sea by the same research team. (The second is planned for March of 2009.) In the course of the two voyages, the research team will address five specific areas:

- 1) What are the physical properties of the icebergs?
- 2) What is the relationship between the physical properties of the icebergs and the nutrient distributions?

- 3) What is the relationship between the nutrient distributions and the associated communities of life forms (halos)?
- 4) What is the relationship between the halos and the amount of carbon in the water?
- 5) What impact are the icebergs having on biological productivity, carbon production, and carbon sequestration?

\* **How is the expedition funded?**

The expedition is funded primarily by a grant from the U.S. **National Science Foundation**. Some support has also been contributed by the **Monterey Bay Aquarium Research Institute** (MBARI).

\* **Members of the research team**

**John Helly** of UC San Diego and **David Long** of BYU (studying iceberg dynamics)

**Steve Rock** of Stanford University (using high-resolution sonar to map and image the underwater portions of icebergs)

**Timothy Shaw** and **Benjamin Twining** of the University of South Carolina (studying nutrients, radioactive isotopes, and trace elements, especially iron, in the water around the icebergs)

**Maria Vernet** of Scripps Institute of Oceanography at UC San Diego and **Alison Murray** of the Desert Research Institute (studying how communities of microscopic organisms affect the amount of organic carbon in the seawater around the icebergs). Murray is unable to accompany us on the first voyage, but will send her research assistant, **Victoria Peng**.

**Ron Kaufmann** of University of San Diego and **Bruce Robison** of MBARI (studying the communities of larger organisms living under and around the icebergs, including zooplankton, fish, and birds)

**Ken Smith** of MBARI, Chief Investigator, and **Tim Shaw**, mentioned above (studying whether icebergs affect global warming, and if so, how)

\* **Departure dates and locations**

The first expedition will depart from Punta Arenas, Chile, on May 31, 2008. We will spend 24 hours in deep water just off Punta Arenas calibrating some of the equipment and will then head across the Drake Passage, east around the tip of the Antarctic Peninsula and into the Weddell Sea.

We are going at this time of year out of practical necessity. The icebreaker is very much in demand. This was the only available time slot for 2008. On the bright side, it will provide an unexpected opportunity to study seasonal changes in iceberg ecosystem dynamics.

The second expedition will follow a similar course, but will depart from Punta Arenas on March 12, 2009.

\* **Destination**

Our destination is the northeastern region of the Weddell Sea. The Weddell Sea may be generally characterized as lying to the south of the Atlantic Ocean. We expect to spend most of the voyage in the northeast region of the Weddell, between 60 and 62 degrees South latitude, and 30 to 50 degrees West longitude. (Yes, the Weddell Sea is where Ernest Shackleton lost the *Endurance* -- and made an amazing escape with no loss of life.)

The Weddell Sea is essentially an enormous bay (2000 km across at its widest point). Until recently, its coast was almost entirely hemmed by ice shelves, including the Larsen, Ronne, and Ruser-Larsen shelves. The Larsen Ice Shelf is much diminished, and the Ronne and Ruser-Larsen have experienced very significant breakup in the last decade. As a result, there are more tabular icebergs in the Weddell Sea than anywhere else on the planet, and any effects they may be having on the environment will be easiest to detect there.

Click here for a map of Antarctica: [www.mapsofworld.com/antarctica/maps/antarctica-political-map.jpg](http://www.mapsofworld.com/antarctica/maps/antarctica-political-map.jpg)

\* **Return date and location**

We will return to Punta Arenas, Chile on June 30, 2008.

\* **The weather**

Antarctic winter officially begins on June 20. So we will be departing in late autumn, and by the time we return, winter will be fully underway. Temperatures on the Weddell Sea, which are moderated by the seawater and the low altitude, are generally a bit milder than those of inland Antarctica. Even so, we expect to encounter temperatures as low as -46 C. (-50 F.) Winter weather on the Weddell can be quite fierce. Even in the summer, wind speeds frequently exceed 40 knots (46 mph) and occasionally exceed hurricane speed (64 knots; 73 mph). All personnel will be issued Extreme Weather Clothing at Punta Arenas prior to deployment. This gear includes, among other items, insulated bib overalls, down parkas, fleece jackets and pants, thermal underwear, heavy wool socks, thermal boots, and multiple pairs of gloves. We will have four to six hours of daylight out of each 24.

\* **About the icebreaker**



We will be sailing aboard the National Science Foundation's Antarctic Research Vessel, the icebreaker **Nathaniel B. Palmer**. The Palmer was built in 1992, and is 300 ft. (93.9 m) in length and 60 ft. (18.3 m) in breadth. Its four Caterpillar diesel engines, delivering 12,720 horsepower total, allow it to break up to 3 ft. of ice at a speed of 3 knots.

Living arrangements aboard the NBP are comfortable. Researchers will share cabins that feature two bunks, a head, and a shower. All cabins are equipped with a TV/VCR, stereo, telephone and a LAN jack for connection to the ship's network. There is a small library of books and DVDs, a gym, and laundry facilities (though doing laundry in seas greater than 15 ft is not recommended).

Because of the extremely cold working conditions, five meals per day are served aboard the ship. In addition to usual meals, late dinner is served from 7:30 p.m. to 10:30 p.m., and midnight rations ("midrats") are served from 11:30 p.m. till 12:30 a.m.

Because communications with the outside world take place exclusively by satellite and bandwidth is extremely limited (35 megabytes per week total), there is no Web access aboard the NBP. Email is sent and received twice each day. Nancy will be able to post to each of her blogs once each day, and include one photo with each post, but this will have to be done via email with help from volunteers at home.

\* **Research equipment on board**



1. Phantom Remotely Operated Vehicle (ROV) -- The Phantom will be used for viewing the underside of the icebergs and for collecting water and biological samples. It is connected to the ship with a tether that can extend up to 2,200 feet in length. This ROV features real time control and video feed on board the ship.
2. Three remote controlled model airplanes -- These planes will be used to image the tops of the icebergs as well as dropping GPS units on the icebergs for tracking.
3. Lagrangian sediment traps (LST) -- LSTs are autonomous instruments that will float under the icebergs and collect sinking particles in inverted cones.
4. Conductivity, Temperature and Depth (CTD) -- A recording instrument with a rosette of water bottles that can be tripped at any depth. This instrument is lowered on a conducting wire from the ship with real-time readout on deck.
5. Multiple Opening-Closing Net Environmental Sensing System (MOCNESS) -- This is a large system towed from the ship's conducting cable through the stern A-frame. It has six nets, each with a 10 square meter mouth opening, which each provide a discrete sample at any desired depth (opening/ closing at depth). This instrument has a real-time data link to the ship for control. It will be used to collect the zooplankton and micronekton around the iceberg (krill will be a major component of this sampling). There will also be a smaller version of this net system for sampling smaller plankton.
6. Pole-mounted sonar -- A pole will be mounted on the side of the ship to support a multi-beam echosounder that will be used to image the undersurface of the iceberg.

7. Ship-mounted sonar -- A Simrad multibeam echosounder will be used to image scattering layers of pelagic animals in the water under the ship.
8. Radar -- The ship's radar along with a laser system will be used to image the aerial portion of each iceberg.
9. Water pumping system -- A hose attached to a tow fish will be used to sample large volumes of water for metal and nutrient analyses.

\* **Target audiences for the blogs**

Nancy will be posting daily to two blogs, intended to provide interesting and informative reading for different age groups, and classroom opportunities and science facts for teachers. Both are accessible from [www.icebreakerblog.org](http://www.icebreakerblog.org):

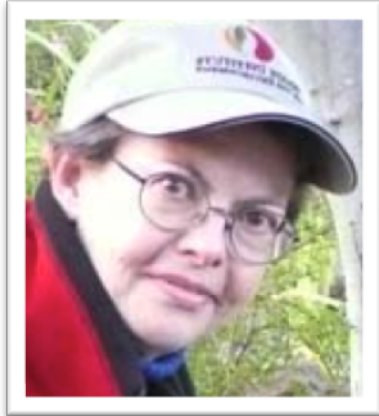
**"Unarctica"**

For children ages 8-12 (middle graders), this blog tells the story of the expedition from the point of view of the three middle-school protagonists of her novel **The Power of Un**. The blog weaves each day's factual and scientific events into an adventure story bound to hold the attention of even the most reluctant readers.

**"Rime of the Modern Mariner"**

Subtitled "A Horror Writer's Journey to Darkest Antarctica," this blog targets teens and adults in a more traditional blog format, with each day's events and science activities mingled with Nancy's observations as an award-winning horror writer and amateur naturalist.

\* **Nancy's bio**



Nancy Etchemendy's novels, short fiction, and poetry have appeared regularly for the past 25 years, both in the U.S. and abroad. Her work has earned a number of awards, including three Bram Stoker Awards (two for children's horror), a Golden Duck Award for excellence in children's science fiction, and an Anne Spencer Lindbergh silver medal for excellence in children's fantasy. Her fourth novel, *The Power of Un*, was published by Front Street/ Cricket Books in March 2000. *Cat in Glass and Other Tales of the Unnatural*, her collection of short dark fantasy for young adults, was published in 2002, also by Front Street/ Cricket Books and appears on the ALA Best Books for Young Adults list for 2002. She lives and works in Northern California where she leads a somewhat schizophrenic life, alternating between unkempt, introverted writer of weird tales and requisite gracious wife of Stanford University's Provost.

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Nancy Etchemendy

[www.etchemendy.com](http://www.etchemendy.com)

nancy@etchemendy.com

Please email for a phone number