Observe

Newsletter of the Institute for Global Environmental Strategies
www.strategies.org

Fall 2007 Vol. 2, No. 1

WELCOME! *As IGES enters its 14th year, the past 12 months have been filled with many achievements. We were awarded a cooperative agreement from the National Science Foundation to implement an Earth science professional development program for teachers, received a record number of entries for our grades 2–4 art contest, crowned two fantastic winners in our Thacher Scholars Award competition, and launched a brand new Earth Day photo contest for grades 5–8.*

And there's more… *IGES went international with a climate change project for BBCnews.com, and the Institute's Alliance for Earth Observations® has embarked on a partnership with* Imaging Notes *magazine.*

I hope you'll read about all of our exciting projects in this issue of Observe, *as well as articles about designing effective student science contests and tips and tricks for biking to work. Also, make sure to visit us throughout the coming year at* ***www.strategies.org****.*

Nancy Colleton
IGES President

Featured Articles Inside This Issue of **Observe**

With NSF Support, IGES Launches National Program to Improve Geoscience Education

Jessi Krebs, supervisor of reptiles and amphibians at Omaha's Henry Doorly Zoo, presents at the ESSEA annual meeting, held in August 2007 at the University of Nebraska, Omaha.

IGES announced in June the selection of 24 partners and 10 associate members to take part in the Earth System Science Education Alliance (ESSEA), an innovative professional development program for pre-service and in-service middle and high school teachers.

ESSEA is funded through a $3 million cooperative agreement awarded to IGES last year by the National Science Foundation under its Geoscience Teacher Training (GEO-Teach) program, which supports projects designed to improve the quality of geoscience education, primarily at the middle and high school levels.

Institutions selected to participate in ESSEA include state universities, private colleges, and science research and education organizations spread among 22 states and the District of Columbia. Nine of the institutions chosen focus on serving minority populations. "I believe the cohort of partners and associates we have selected are an excellent mix that will bring varied and innovative approaches to implementing the ESSEA courses," said Theresa Schwerin, IGES's associate director for education.

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Partners will receive funding and training to offer a series of online Earth system science courses geared toward teachers of specific grade levels and aligned to national education standards. Working in collaborative groups, teachers who enroll in an ESSEA course can earn undergraduate, graduate or continuing education credit while learning to teach Earth system science using inquiry-based classroom methods.

Associate members will have access to the courses, training and to the ESSEA network via annual meetings, the program's Web site and e-mail communications. IGES continues to accept applications for associate membership.

IGES will assist participating institutions by helping them create a sustainable infrastructure for delivering the courses, and by providing evaluation tools to ensure that, upon course completion, teachers have a strong understanding of Earth system science and how to effectively teach the subject. In addition, IGES will inform ESSEA participants about the latest Earth system science research and teaching practices through presentations at conferences, Web seminars, teleconferences and e-mail updates.

The NSF-funded program will build and expand on the original ESSEA program funded by NASA and administered by IGES from 2000 to 2005. IGES has updated the original courses with additional online tools, modules and materials.

For more information on ESSEA, including how to apply for associate membership, please visit: ***http://essea.strategies.org***

ESSEA Partners and Associates

PARTNERS

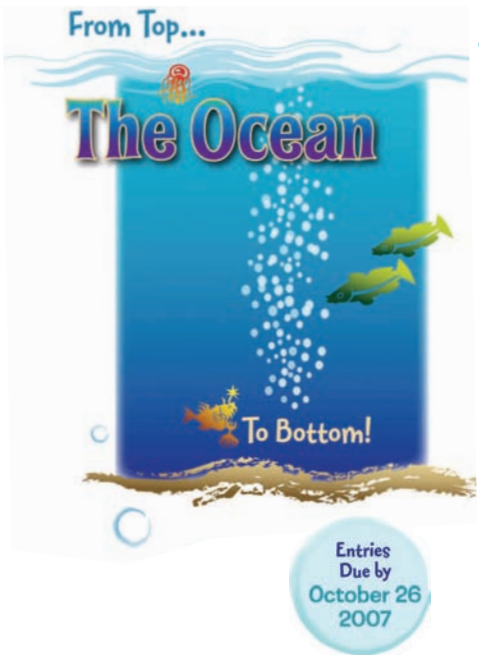
*California State University Los Angeles**
*California State University Northridge**
*College of Charleston/ SC Space Grant**
Denver Museum of Nature & Science
Florida Atlantic University
Fort Hays State University
Loyola University Chicago
Montana State University
*New Mexico State University**
Northern Michigan University
Plymouth State University
PRI/Museum of the Earth/Cornell University
*San Jose State University**
Seattle Pacific University
SUNY–Oneonta
Texas A&M University–Texarkana
University of Arizona
University of Nebraska at Omaha
*University of New Mexico**
University of Texas at Tyler
*University of Toledo/ Central State University**
Utah State University
Western Governors University
Wright State University

ASSOCIATES

A-B-Sea Foundation
American Geological Institute
*Elizabeth City State University**
GLOBE
*Hampton University**
Morehead State University
Scripps Institution/UCSD
*University of Alaska–Fairbanks & Anchorage**
University of Tennessee, Martin
Western Kentucky University

**Minority-serving institution or high minority enrollment*

Announcing the IGES 12th Annual Art Contest For Children in Grades 2–4



The Ocean: From Top to Bottom!

IGES is asking children what they see when they picture the ocean. Waves crashing onto a sandy beach? Dolphins leaping out of and into the water? A sailboat or large ship floating in the distance? These are probably the kinds of images that come to mind. Yet, there's more to the ocean than what's going on at the surface. There's a whole world of water, plants and animals below.

This year's IGES art contest encourages kids in grades 2–4 to explore the ocean from top to bottom by reading stories and books, searching Web sites, watching movies, and then drawing a picture showing what they learned. They might draw something happening along the water's surface, deep underwater or both.

For more information, including detailed contest instructions, information for teachers and parents, interesting ocean facts and a list of educational resources, please visit: ***www.strategies.org/ArtContest***

Lockheed Martin Corporation is generously funding the development and printing of a 2008 calendar featuring the top 12 entries in the 2007 IGES art contest. The students whose artwork is featured in this calendar will each receive copies of the calendar; their teachers will also receive calendars.

Grades 2–4 Art Contest Draws Record Number of Entries in 2006

Ha-young Kim of Centreville, Va., won first place in the IGES 11th Annual Art Contest for Childern in Grades 2–4, held in fall 2006. Kim's work was selected from more than 1,400 entries sent in by children from 28 states. The third-grader received a $250 savings bond for her picture titled, "Penguins that March," which was featured on the 2006 IGES holiday card.

1st Place: Ha-young Kim

The contest theme—***Polar Exploration: Going to Extremes!***—was tied to the 2007–2009 International Polar Year. IPY is a coordinated effort by the international science and education communities to learn more about the polar regions and their role in global processes, and to attract a new generation of scientists and engineers with the versatility to tackle complex global issues.

Students participating in the contest were challenged to pick either Earth's northern (Arctic) or southern (Antarctic) polar region, explore the region using a variety of educational resources, and then draw a picture showing what they learned. The planet's polar areas are teeming with plants, animals and even people. Polar bears and penguins aside, these icy regions at opposite ends of the globe are important pieces in Earth's climate system.

The 1,442 entries received was the most in the history of the contest. Submissions came from across the continental United States and from Alaska and Hawaii. Artwork was judged by a panel of artists and IGES staff members.

"This year's theme really struck a chord with students, and it was obvious they learned a lot about the Arctic and Antarctic," said Theresa Schwerin, IGES associate director for education. "As a result, the quality of artwork that we received was unbelievably good. It made judging and selecting the winning entries a difficult task."

Christine Yoo, a third-grader from Fairfax, Va., earned second place and a $100 savings bond with "Penguins at Sunset." Tying for third place were fourth-grader Jimmy Dawley from Houston, Texas, second-grader Emily Kairalla from Palm Beach Gardens, Fla., and third-grader Jasmine Kim from Centreville, Va. All three received a $50 savings bond.

(Cont. on next pg.)

2nd Place: Christine Yoo

3rd Place: Jimmy Dawley

3rd Place: Emily Kairalla

3rd Place: Jasmine Kim

Observe


KidsPost

TODAY'S NEWS

Virginia Third-Graders On Top of the Art World

Winners of the 2006 IGES art contest are featured in the Washington Post's KidsPost section.

(Cont. from previous pg.)
IGES has sponsored the contest annually since 1996. Each year's contest has a different theme and supports national science education standards. Recent themes include "Connect 4: Air, Land, Water and Life" (2005), "Picture Me! What Kind of Earth Scientist Would I Be?" (2004), "Earth Explorers: Past, Present, and Future!" (2003), and "The Height of Your Flight Determines Your Sight!" (2002).

To view the winning entries from this year and previous years, please visit: ***www.strategies.org/ArtContest***

STUNNING SNAPSHOTS

Nearly 500 Middle-Schoolers Enter First-Ever IGES Earth Day Photo Contest

In honor of Earth Day, students in grades 5–8 took part in a unique national effort to capture our changing world. IGES challenged students across the country to take a photograph of something changing in their local environment.

Nearly 500 students—from 28 states and the Virgin Islands—participated in the first-ever IGES Earth Day Photo Contest.

"What a wonderful thing it is when a student is rewarded for doing something above and beyond their normal classwork," said Jeanne Nye, teacher of top-50 winner Gianna Enders from Lake Mills, Wisconsin. "It's rewarding for both student and teacher when students take advantage of excellent opportunities like this."

Along with their photograph, students submitted an essay answering the following questions:

- What is the change taking place in your photograph?
- What may be causing the change?
- Was the change expected?
- How might the change impact surrounding areas, including people?
- How might this picture look different in the future?

Entries were judged by IGES staff based on relevance to the contest theme (depiction of change in the environment), uniqueness and overall appearance of the photo, and thoroughness of the written explanation.

Kristen Tanabe, a seventh-grader from Kaneohe, Hawaii, earned first place with her photograph of "picturesque Mapkapu'u Beach… the result of hundreds of years of wave erosion and salt weathering," according to her essay.

Blakeley Schiffman, a sixth-grader from Lake Ronkonkoma, N.Y., took second place with his photograph of lake water engulfing a county park. Third place belonged to Claire Cooper, a sixth-grader from Raleigh, N.C. Cooper captured a picture of newborn Tufted Titmice in their nest.

The top three winners received cash prizes in the amount of $100, $75 and $50, respectively. The top 10 winners (including the top 3) received their photograph in a special frame commemorating the contest.

The top 50 photographs (including the top 10) can be viewed on the IGES Web site at: ***www.strategies.org/EarthDayPhoto***

1st Place: Kristen Tanabe

2nd Place: Blakeley Schiffman

3rd Place: Claire Cooper

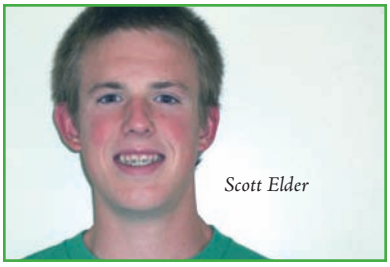
High-Schoolers Receive 2007 Thacher Scholars Award

Peter S. Thacher

$3,000 in Prizes Awarded

Rachael Born of Norfolk, Va., and Scott Elder of Chino Hills, Calif., were recipients of the 2007 Thacher Scholars Award, given to secondary school students designing and conducting the best projects using satellite observations of the Earth, also known as remote sensing. The award is given annually by IGES in an effort to engage the next generation of scientists in the use of geospatial technology to study the environment.

Rachael Born



Scott Elder

"With so many environmental challenges facing our world, it is important that young scholars such as these are engaged in science and technology projects to better understand the planet," said Theresa Schwerin, IGES associate director for education. *"Rachael and Scott best exemplified the spirit of this competition and demonstrated thoughtful uses of remote sensing. We hope they will pursue careers in science and technology."*

Born, who will be a 12th-grader this fall at Norfolk Technical Center, earned first place in the competition with her project titled, **"The Chesapeake Bay—A National Treasure in Decline."** Born attempted to correlate the amount of rainfall within the Chesapeake Bay watershed with the health of the bay and its ecosystem. She used river discharge data, satellite images showing chlorophyll concentrations, and measurements of dissolved oxygen in her research. Born received a cash award of $2,000.

"While I have always loved science, winning this award has reaffirmed my interests in science research," said Born, who planned to attend a summer workshop in atmospheric, Earth and space sciences at the University of Wisconsin. *"While I am still very undecided about what I want to do with my life, this award has motivated me to look at what science programs colleges offer."*

Elder, who will enter the 12th grade this fall at Chino Hills High School, took second place with **"Tracking Storms in the Ionosphere."** Solar activity triggers storms in the ionosphere, which can delay Global Positioning System signals. Elder showed that these storms can be tracked by correlating GPS altitude measurement errors (caused by the signal delay) with an index that measures geomagnetic activity. Elder received a cash award of $1,000.

As Elder prepared to start his senior year in high school, he was already thinking ahead to a possible college major in environmental biology.

"Winning the Thacher award showed me that I can combine my love of satellites with the environment," said Elder, who worked over the summer with the city of Chino Hills water department on a project to map sources of stream pollution using GPS technology.

In addition to the prizes for the winning students, Born's teacher, Joy Young, and Elder's teacher, Kimberly Cabrera, were recognized with gift cards from Amazon.com.

The Thacher Scholars Award, previously known as the Thacher Scholarship, was founded in honor of former IGES board member Peter S. Thacher, an internationally recognized leader in promoting the use of satellite remote sensing. During a distinguished career, he served as deputy director of the United Nations Environment Program, as an advisor to NASA and, at the time of his death in 1999, as president of the Earth Council Foundation–U.S.

Satellite observations of the Earth have numerous uses in science research, ranging from climate prediction to archaeology. They can improve human understanding of the Earth system, including interactions among the atmosphere, biosphere, geosphere and hydrosphere. And they can improve quality of life by supporting weather prediction, natural hazards monitoring, transportation, land-use planning, agriculture, coastal management, public health and emergency response.

For more information on the Thacher Scholars Award, please visit: ***www.strategies.org/Thacher Scholars.***

Science and Technology Policy: Looking Back to Look Forward

IGES Conducts Survey for Wilson Center

By Anne McCauley

With a new administration on the horizon, many in the science and technology world are wondering what this change could mean for science and technology public policy. It has Mark Schaefer and David Rejeski of the Woodrow Wilson International Center for Scholars thinking about the current status of science and technology policy, and pondering the question: What are the challenges facing the field today?

To begin to answer this question, it is necessary to first look backward rather than forward. To that end, the Wilson Center asked IGES to compile a survey of past studies on science and technology policy.

Going back 10 to 15 years, I looked for key studies and reports that addressed science and technology policy issues, specifically those that stand out as landmarks or important contributions. Guided by Schaefer and Rejeski, I looked through the Web pages of organizations such as the National Academies, the Congressional Research Service, the World Bank and Harvard University's John F. Kennedy School of Government. The more I read, the more I realized how much had been studied. Schaefer had explained to me earlier that this research would be something of a crash course in science and technology policy, and indeed it was. After a few months passed, my list consisted of more than 80 studies, reports and projects.

Organizing the list was no easy task. I recorded the title of each study, the organization responsible, the date it was published (or if it was ongoing), contact information, a URL for more information, and a brief description or abstract. Schaefer, Rejeski and Evan Michelson, also of the Wilson Center, then reviewed the list and grouped the studies into categories to give a broad sense of what issues had been covered. Categories emerged such as science and technology governance, technology transfer, information technology, energy/environment and international projects.

Next, we presented the list to a committee of science and technology experts, who were immediately impressed. To our knowledge, such a list had never before been compiled, and its value quickly became apparent. A sense of pride filled the room as the committee read over the many works published by scholars and experts in their field over the past decade. Many of those present had personal connections to the studies, in some cases having authored or contributed to them in some way.

Committee members began to brainstorm potential applications for the list. They also suggested additional sources for further investigation. Despite the abundance of previous studies, it was clear that there remains a large gap in science and technology policy research. Perhaps looking over the work of the past does more than just guard against duplication. It also inspires us to accomplish that much more.

Anne McCauley is a program associate at IGES.

NOAA Data Users Conference

Nov. 5–6, 2007
Asheville, NC

IGES is organizing a conference for public- and private-sector users of National Oceanic and Atmospheric Administration data.

*Sponsored by NOAA's National Climatic Data Center, the two-day conference—**NOAA Data and Information for a Changing Climate: A Conference for Public and Private Sector Users**—will be held Nov. 5–6, 2007, in Asheville, N.C.*

Conference sessions and working groups will focus on identifying data needs of the energy, insurance and transportation sectors, as required by a climate that is changing now and expected to change in the future.

Working together, participants will develop a list of recommendations for NOAA to consider in its near-term and long-term planning.

✶ *Learn more:* ***www.noaadata.com***

Bicycling to Work: Preparation and Protection

By John Ensworth

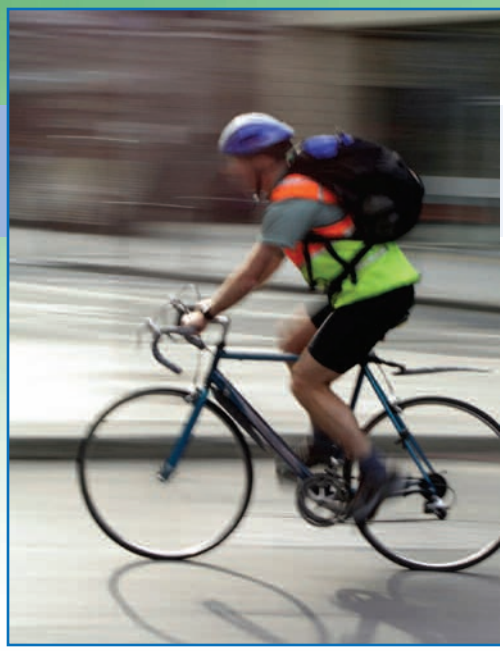
There is nothing as exhilarating as riding through a cool summer morning rain and being intimately connected with nature and the environment; immersing myself in it rather than hiding from it. I sit on the saddle of my mountain bike watching another broken branch speed by on the surface of the brown floodwaters. The trail, part dirt and part vehicle wheel track, carelessly plunges through normally benign streambeds, oblivious to the potential hazards of swollen waters.

Bicycling to work has the reputation of being only for the strong of heart. A rider and a backpack full of clean clothes and work documents sit at the mercy of the elements. But come rain, wind, snow, sleet or dark of night, the bicycle commuter must make it to the office and back. With some preparation and a good attitude, the weather doesn't have to force you to find the car keys.

The first component of a comfortable ride to work is what you choose to wear. You don't want to dress yourself in office attire and cover it with rainproof gear. Even on the coldest winter day, you're likely to perspire when climbing hills or keeping up with other riders, and you won't look or smell your best at the end of the ride. Store your office clothing, nicely folded, in a backpack or soft case that can be sealed in a plastic bag. This can ride on your back or on an inexpensive rack behind you. The rack will also protect you from mud and water spray from the back tire, and keep your upper body free to turn and keep an eye on approaching vehicles.

Any bicycling store will offer clothing that will breathe (i.e., not hold your sweat against your skin) and keep you warm and dry. In snow and rain, begin by protecting your feet and shoes with neoprene boots. These boots will also keep your feet warm on cold mornings. Protect your legs with any of a large selection of insulating long pants (if you want maximum comfort), but if your budget is tight, the jacket and gloves are the most important items to concentrate on when shopping.

The core temperature of your torso is the temperature your body works hardest to maintain. It will close down circulation to legs and arms if need be. Your legs aren't much of a concern since they are working hard, but your arms sit on the handlebars, not doing much, and catch the first cold air or chilling rain. **You'll need a breathable, lightweight jacket that has an optional inner lining for colder days.** Make sure you can close the sleeves with Velcro to keep wind and rain out, and open the front and underarms for unexpected warm-ups during the ride. Always dress on the cold side when you set out. Plan to be a bit chilled for the first 10 minutes of your ride and the rest of the ride will be perfect; you won't sweat excessively. A heavy coat will ALWAYS become too hot, even if temperatures are far below freezing.



Also, keep your hands protected with insulated gloves. Of course, these should be water resistant and they should be made with articulated fingers so you can operate your brakes, gears, light and other instrumentation.

Last but not least—take care of your head. It's always wise to ride with a certified bicycle helmet (ASTM or ANSI), which usually keeps you fairly warm in addition to protecting you from head trauma. If you don't want your hair to get wet, or you wish more protection from cold air, there are nylon covers that stretch over the helmet. You can even purchase them with creative colors or slogans.

I look upstream and downstream and decide that there is no easy crossing to be had today. Even my waterproof boots won't survive wading through a foot of cold water. I back up to the last surface road and weave my way north along quiet house-lined streets, rejoining the trail just as the rain begins once more.

John Ensworth is a senior science education specialist at IGES.

ON MESSAGE

Alliance for Earth Observations® Urges U.S. Leaders to Invest in Sustained Climate Measurements

By Nancy Colleton

Over the last several months, representatives of IGES's Alliance for Earth Observations® have communicated a clear and consistent message in testimony before House and Senate committees and in discussions with several presidential campaigns: An increased investment in sustained observations of the Earth, as well as improved modeling and information management, will not only enable the United States to better understand and respond to climate changes, but also generate tangible value to the economy through more efficient operations and the creation of value-added products and services.

The Alliance was formed in 2004 to facilitate participation by the private sector in U.S. and international planning for Earth observations. More than 20 companies, research centers and non-government organizations make up the Alliance, which convenes meetings and workshops that bring together industry and government leaders, provides congressional testimony on the status and importance of Earth observations, and conducts outreach and education efforts that highlight the value of environmental data.

The Alliance for Earth Observations® and the Space Foundation jointly sponsored an Earth-observations briefing for congressional staff in July 2007. Pictured from left to right: Nancy Colleton (Alliance for Earth Observations®), Marty Hauser (Space Foundation), Tracey Laws (Reinsurance Association of America), former Gov. of Wyoming Jim Geringer (ESRI), Gene Whitney (White House Office of Science and Technology Policy).

Representing the Alliance, former Gov. of Wyoming Jim Geringer stated in his Feb. 13, 2007, testimony before the House Science Committee, "My part of the Rocky Mountain West continues to suffer extreme drought. I have been a strong advocate of the use of satellite and other observations to lessen its impact on our region. We must enable risk management by individuals, businesses and governments, dramatically shifting from our practice of reaction and response to natural disasters to one of prediction and mitigation," said Geringer, now director for policy and public sector strategies at ESRI. "The American people deserve the best and most comprehensive information about our changing planet."

> ***"The American people deserve the best and most comprehensive information about our changing planet."***

The United States has traditionally been the leader in providing Earth science and environmental information, with a long history of observing the Earth and developing tools that monitor, analyze and predict environmental changes. The Alliance advocates that a key component of a national strategy to respond to climate change must focus on a strong, increased national commitment to:

- A comprehensive and sustained monitoring system supported by national Earth-observation technologies;
- A mature information technology capacity to transform these observations into actionable products and services;
- A robust modeling capability to improve our ability to accurately predict or perform "what-if" analyses of the future state of our environment at spatial and temporal scales sufficient to enable appropriate action at national, state and local levels; and
- An information management infrastructure that will enable these environmental data, predictions, products and services to be easily discovered, accessed, integrated and exploited by a number of stakeholders.

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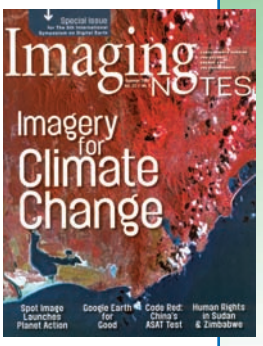
Given that the planned lifetime of current operational climate monitoring assets ends in 2026, given the urgency of climate-related measurement and monitoring, and given the time required to design, develop and deploy Earth-observing satellites and the importance of continuity between current and future sensors, the Alliance urges that a new administration must engage potential users in the development of an operational global change monitoring system. Such a system would measure essential climate variables, as defined by international science teams, and should evolve in a timely manner to ensure collection of key data beyond 2026 and out through 2050.

Nancy Colleton is the president of IGES, and executive director of the Alliance for Earth Observations®.

IGES, through its Alliance for Earth Observations®, has partnered with* Imaging Notes *magazine. *IGES president and Alliance executive director Nancy Colleton sits on the magazine's editorial advisory board, and experts from Alliance member organizations provide engaging stories and viewpoints related to observing our planet.*



THE QUESTION: How Has Climate Change Affected You?

IGES Helps the BBC Sort and Summarize the Answers

By Dan Stillman

Looking back on my academic years, Thick Skin 101 should have been a required course for anyone majoring in meteorology, or at least offered as an elective. The comments, the jokes—over the years I've heard them all:

- What's it like to be in a profession where you can be wrong 50 percent of the time and still keep your job?
- What does a fortune teller and a weatherman have in common? Neither one can predict the future.
- How do you out-predict the weatherman? Stick your head out the window and look up.

But for all the snide remarks aimed at meteorologists, the reality is that most people generally believe that what they hear in a weather forecast for the next few days will, for the most part, come to fruition. This faith is not blind, but rather is based on the accuracy of previous forecasts. In fact, many people trust modern-day weather predictions enough to choose their outfits and plan their day's and week's activities based on the forecast.

Climate forecasts, on the other hand, are a completely different animal. Because climate models have only reached

a point of maturity in past 10 to 15 years, there isn't a long history of verified climate forecasts on which a person could base their confidence in predictions for the future. As a result, a climate forecast for years or decades from now is, understandably, more abstract to the average person than a daily weather forecast.

While some may have trouble believing dire warnings of a warmer and more extreme climate in the coming years and decades, it is hard to ignore changes that are already taking place. By nature, we are more likely to react to something happening in the here and now.

With this in mind, the BBC News Web site solicited comments from around the world to find out how climate change has affected people where they live, and asked IGES to sort and summarize the responses, and place them in context with scientific data and climate change research.

The responses received suggested that people across the globe are connecting a variety of locally observed changes in weather and the environment to climate change. In some cases scientific data and research were found to support such a link, while in others the evidence was not sufficient to identify climate change as a direct cause.

Read the complete story at: ***http://news.bbc.co.uk/2/hi/talking_point/6506561.stm***

Dan Stillman is a science communications manager at IGES.

Designing Successful Student Science Contests

By Theresa Schwerin

In 1996, IGES president Nancy Colleton found there was a limited selection from which to choose the Institute's annual holiday card.

"None of the cards in the stores were very original or creative. I got to thinking about how interesting and fun children's artwork can be, and then came up with the idea of holding an art competition for kids and using the winning picture on the IGES holiday card," Colleton said.

1996 IGES Holiday Card

From that start—a small contest that asked children to draw their favorite thing about the environment—IGES began sponsoring annual science competitions that challenge hundreds of students across the nation. The most recent contests include:

- ***The 2006 IGES Art Contest—"Polar Exploration: Going to Extremes!"***—challenged students in grades 2 to 4 to pick either Earth's northern (Arctic) or southern (Antarctic) polar region, explore the region using a variety of educational resources, and then draw a picture showing what they learned. In 2007, students are being asked to explore "The Ocean: From Top to Bottom!"
- ***The 2007 Thacher Scholars Award*** recognized students in grades 9 to 12 who designed and conducted the best projects using satellite remote sensing of Earth. The award was established in 2000 in honor of IGES board member Peter S. Thacher, a leader in Earth remote sensing, who passed away in 1999.
- Also in 2007, nearly 500 students in grades 5 to 8—from 28 states and the Virgin Islands—participated in the first-ever ***IGES Earth Day Photo Contest.*** Students took a photograph of something changing in their local environment and wrote a science essay explaining the changes they observed.

What are some of the key ingredients in designing science contests that successfully engage and challenge students? Based on our 12 years of experience, these are at the top of the list:

Pick an engaging theme or topic, one that is interesting and appropriate to your audience and their abilities.

The topic might spring from a current event or popular movie. The 2007–2009 International Polar Year was the inspiration for our 2006 art contest theme, "Polar Exploration: Going to Extremes!" which also capitalized on the popularity of movies such as "March of the Penguins" and "Happy Feet." Over 1,400 children from across the country responded to the announcement.

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Give prizes that will not only motivate young people to enter the contest, but also reward outstanding efforts.

In addition to savings bonds for the top three entries in our annual art contest, we also recognize all students with certificates of participation. Our Thacher competition provides cash awards for high school students. For some, winning the Thacher award marks the first time they are recognized for a scientific accomplishment, and inspires them to begin thinking of themselves as scientists.

Provide support for participants.

Include resources for students, teachers and parents to learn more about the topic; classroom activities for teachers to use; and correlations to national education standards in science, mathematics, geography and/or technology.

Time it right, including strategically planning when to announce the contest, deadlines and winners.

We've found summer teacher workshops are a good time to introduce teachers to a new contest, so they can incorporate it into their plans for the upcoming year. If you want teachers to use the contest as part of their curriculum, then entry deadlines and when winning entries will be announced need to be scheduled before the end of the school year, and not during school breaks (winter or summer).

Get the word out by leveraging science and education networks for communication.

We publicize our contests through a variety of networks. For example, the National Marine Educators e-mail list, "The Scuttlebutt," is one way we are letting teachers know about our 2007 art contest, "The Ocean: From Top to Bottom!"

Other networks include the homeschooling community. There are over 1 million U.S. students who are homeschooled, according to the National Center for Educational Statistics, and their parents are eager for meaningful experiences for their children. And don't forget after-school groups such as the Brownies/Girl Scouts, Cub Scouts/Boy Scouts, and 4-H clubs.

IGES also sends out press releases announcing winners—which can also be sent to the winning students' local newspapers. This serves to further recognize students, as well as promote your contest to future participants.

Theresa Schwerin is associate director for education at IGES.

Inspiring the Next Generation of Explorers

Lake Pontchartrain may be best known as the source of floodwaters that devastated much of New Orleans in the wake of Hurricane Katrina. For Lissa Lyncker, the lake is both the culprit responsible for destroying the homes of many of her family and friends, and the laboratory in which she conducts scientific research. Lyncker is featured in "After Katrina, a Story of Survival and Science," an article appearing in NASA's Earth Explorers Series.

Anyone can be a scientist, no matter the challenges that may stand in the way. That's the message IGES communicates through its Earth Explorers and Space Science Explorers series, both of which appear on the NASA Web site. In an effort to show that a science career is a worthy and attainable goal, both series profile real-life scientists, young and old, with a variety of backgrounds and interests. Most articles are presented in three different versions according to reading level: one for grades 9–12 and up, one for grades 5–8, and one for grades K–4.

EARTH EXPLORERS
http://science.hq.nasa.gov/education/earth_explorers

SPACE SCIENCE EXPLORERS
http://science.hq.nasa.gov/education/space_explorers

About IGES

The Institute for Global Environmental Strategies is a trusted leader in Earth and space science education, communication and outreach, and in fostering national and international cooperation in global Earth observations. These efforts—designed to improve understanding of, and response to, natural and human-induced changes in the Earth system—require multidisciplinary approaches to complex and critical social, environmental and economic challenges.

Located in Arlington, Va., IGES was established in 1994 and is a 501(c)3 nonprofit organization supported by public and private entities.

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