



# Observe

Newsletter of the Institute for Global Environmental Strategies  
[www.strategies.org](http://www.strategies.org)

Winter 2008–2009

Vol. 3, No. 1

**W**elcome! It's hard to believe IGES is celebrating its 15th anniversary. The past year has been another great one for our student contests in art, photography, and projects using geospatial technologies or data to study Earth. We've also been busy growing our ESSEA program, which trains geoscience teachers in the systems approach to Earth science via a series of online courses.

Meanwhile, IGES's Alliance for Earth Observations has been actively involved in efforts—which have included workshops, meetings and congressional briefings—to communicate the urgent need for improved observations of the Earth. This issue takes on even greater importance as a new administration comes to power amidst the nation's declining ability to adequately observe the planet. Please enjoy this latest edition of *Observe*, which includes highlights of our various projects, as well as a look at how students interpret climate change, tips on bicycle safety, and recommended Earth science books for kids.

Nancy Colleton  
IGES President

## Earth Science Books for Kids

By Theresa Schwerin  
Associate Director for Education, IGES

**G**reat books not only stir children's imaginations. They can deepen their knowledge and increase their desire to learn more about a topic.

In developing the theme for IGES's annual art contest, I always look for connections between art and science, including literature. Children need science reading materials that go beyond the information found in their textbooks. The National Science Education Standards state that "science content must be embedded in a variety of curriculum patterns that

are developmentally appropriate, interesting and relevant to students' lives."

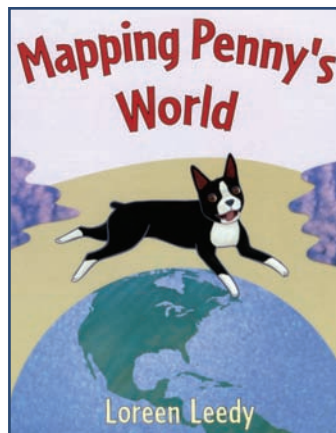
Research has also shown the importance of providing elementary school students with reading materials that stimulate critical thinking in problem-solving contexts (Alvarez, 1993 and Schallert, 1996).

The following are some of my favorite children's books that explore Earth science topics. Many are available in your local library. They would also be great gifts for the budding scientists and readers in your life!



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### Kindergarten – Grade 2

#### Mapping Penny's World

By Loreen Leedy, 2000

After learning about maps in school, Lisa draws a few of her own, including her bedroom, her dog Penny's favorite spots to hide bones and toys, and some of their other hangouts. (From Horn Book) (Cont. on pg. 4)



## 2008 IGES Art Contest Attracts More Than 2,100 Entries



More than 2,100 students from 34 states and the District of Columbia participated in the 2008 IGES Art Contest for Children in Grades 2–4. The contest—**“Trees: Making a World of Difference!”**—challenged students to explore trees and their importance to the world by reading stories and books, searching Web sites and doing activities, and then draw a picture showing what they learned.



Many entries were created as part of classroom projects; the contest addressed national education standards in both geography and science.

*“My students know so much about trees now. Before, trees were just something green growing outside. We see them every day,”* said Sharon Anderson, a Texas teacher whose student won honorable mention. *“Now, the students’ hands fly up to tell me how [trees] make a difference in our world.”*



Nimai Agarwal, a Maryland fourth-grader, earned first place and a \$100 Visa gift card with *“Cradle of Life.”* Michelle Minzhi Li, a California third-grader, won second place and a \$75 Visa gift card with *“The Earth’s Lung.”* And four fourth-graders—Robert Qiu and Lauren Yang from California, Joseph Le-en Chiu from Maryland, and Alex Sorrels from Colorado—tied for third place, each receiving a \$50 Visa gift card.



Certificates of participation were made available to all contest participants. Winning artwork will also be featured in a 2009 calendar funded by Lockheed Martin Corp., and on KidsCom.com.

To view the winning entries from the 2008 contest and previous years, please visit • <http://www.strategies.org/ArtContest>



- (Counter-clockwise from top left)
- **FIRST PLACE**
- *Cradle of Life*, by Nimai Agarwal, Grade 4, Columbia, Maryland
- **SECOND PLACE**
- *The Earth’s Lung*, by Michelle Minzhi Li, Grade 3, Sunnyvale, California
- **TIED FOR THIRD PLACE**
- *Moving*, by Robert Qiu, Grade 4, Cupertino, California
- *Trees Provide So Much!*, by Le-en Joseph Chiu, Grade 4, Fruitland, Maryland
- *Fall Is Here*, by Alex Sorrels, Grade 4, Colorado Springs, Colorado
- *Magic Trees*, by Lauren Yang, Grade 4, Los Altos, California
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## 2009 Thacher Scholars Award

**2008** was another year of environmental extremes across the nation and around the world, including near-record flooding in the Midwest, deadly hurricanes that hammered the Gulf Coast, raging wildfires in California, drought conditions in the Southeast and West, and severe summer melting of Arctic sea ice.



Scientists of today are working hard to study and respond to these environmental, economic and societal challenges. But it's the scientists of tomorrow who will soon bear the responsibility of tackling these issues using the latest tools and technology. **The 2009 IGES Thacher Scholars Award** will be given to secondary school students (grades

9–12) demonstrating the best use of geospatial technologies or data to study Earth.

**1st, 2nd and 3rd place will receive \$2,000, \$1,000 and \$500, respectively.** Entries can be submitted by individuals or teams. Teachers or adult “coaches” of winning entrants will receive a \$200 gift card.

**Entries must be postmarked no later than April 6, 2009.** IGES plans to announce the winning entries by May 12, 2009. Entries will be judged by IGES staff.

**Eligible geospatial tools and data** include satellite remote sensing, aerial photography, geographic information systems (GIS) and the Global Positioning System (GPS). The main focus of the project must be on the application of the geospatial tool(s) or data to study a problem related to Earth's environment.

**Geospatial technologies and data have numerous uses in science research,** ranging from climate prediction to archaeology. They can be used to improve our understanding of the Earth system, including interactions among the



atmosphere, biosphere, geosphere and hydrosphere. They can also be used to improve the quality of our lives by supporting weather prediction, natural hazards monitoring, agriculture, land-use



planning, coastal management, transportation, public health, emergency response and other fields.

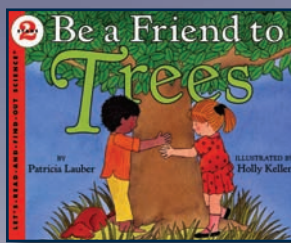
**The Thacher Scholars Award was founded in honor of former IGES board member Peter Thacher,** who died in 1999.

Peter Thacher served as deputy executive director of the United Nations Environment Program, a NASA advisor and, at the time of his death, president of the Earth Council Foundation/U.S. He was a leader in promoting the use of satellite remote sensing.

For more information, please visit • <http://www.strategies.org/ThacherScholars>

# Observe

(K–2 Books cont. from pg. 1)



## Be a Friend to Trees

By Patricia Lauber, illustrated by Holly Keller, 1994

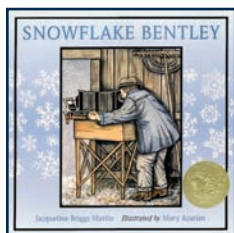
Part of the “Let’s Read and Find Out Science” series, this book discusses the importance of trees as sources of food, oxygen and other essential things.



## Hurricane!

By Corinne Demas, illustrated by Lenice Strohmeier, 2000

Hurricane Bob, a 1991 storm that hit Cape Cod, was the inspiration for this picture book for young children. The story is told from the perspective of young Margo who, with her dog Pepper, helps her family prepare for the coming hurricane.



## Snowflake Bentley

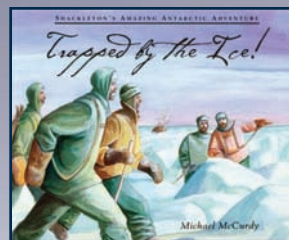
By Jacqueline Briggs Martin, illustrated by Mary Azarian, 1998

This biography tells the true story of Wilson Bentley, a Vermont farmer who, as a young boy, became fascinated by snowflakes. He became a self-taught scientist who photographed thousands of individual snowflakes in order to study their unique formations, and

discovered that no two snowflakes are alike. Sidebars explain snowflake science.



**Elementary GLOBE** is a series of five storybooks and activities designed to help K–4 teachers integrate Earth science into their curriculum. Each book focuses on a different Earth science topic as the main characters—Simon, Anita, Dennis and their dog, Scoop—explore the natural world. By Lisa Gardiner, Becca Hatheway, Lynne Hehr, Sandra Henderson, Peggy LeMone & Kerry Zarlengo, illustrated by Lisa Gardiner



## Trapped by the Ice! Shackleton's Amazing Antarctic Adventure

By Michael McCurdy, 1997

This beautifully illustrated picture book presents the story of Robert Shackleton and his ill-fated expedition to be the first to cross the South Pole, and the miraculous survival of him and his crew.



## Sea Soup:

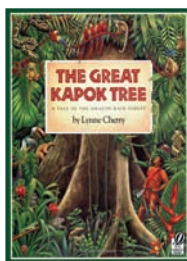
### Phytoplankton (1999)

### Sea Soup: Zooplankton (2001)

By Mary Cerullo, photography by Bill Curtsinger

The two volumes provide a fascinating look at these tiny ocean plants and animals. A companion book—“Sea Soup Teacher’s Guide: Discovering the Watery World of Phytoplankton and Zooplankton” by Betsy T. Stevens—includes inquiry-based science activities.

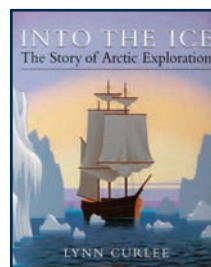
## Grades 3–6



## The Great Kapok Tree: A Tale of the Amazon Rain Forest

By Lynne Cherry, 1990

This story is about a man who falls asleep while chopping down a kapok tree. The forest’s inhabitants—snakes, butterflies, a jaguar, and finally a child—each whisper in his ear about the terrible consequences of living in “a world without trees” or beauty, and the interconnectedness of all living things.



## Into the Ice: The Story of Arctic Exploration

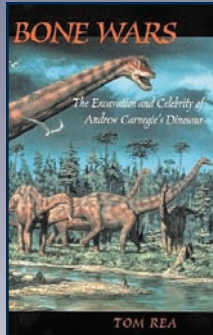
By Lynn Curlee, 1998

This book provides a history of arctic exploration, from the ancient Greeks to the early 1900s.

(Cont. on pg. 5)

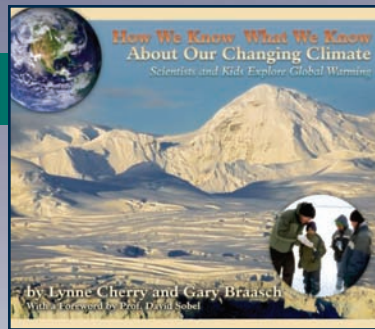
(Cont. from pg. 4)

## Grades 5–8



**Bone Wars: The Excavation of Andrew Carnegie's Dinosaur**  
By Tom Rea, 2004

In the late 1800s, the discovery of dinosaur bones in Wyoming sparked a scientific gold rush among museums, universities, and individuals looking for a part of the glory and fame. Among the interested parties was steel magnate Andrew Carnegie, who, at that time, was looking to sell his business interests and build a museum. (From Booklist)



**How We Know What We Know About Our Changing Climate**  
By Lynne Cherry & Gary Braasch, 2008

The latest book from children's environmental book author, Lynne Cherry, provides an even-handed approach to explaining the science behind the headlines. Several "citizen science" projects are included that provide an avenue for young people to contribute. A companion teachers guide by Carol Malnor includes lessons and resources for middle school teachers.

“READING and the use of literature are of great benefit beyond the boundaries of the language arts classroom. Teachers can enrich their students' understanding through the integration of quality literature selections into the science and mathematics lessons.”

—California Department of Education  
[www.cde.ca.gov/ci/sc/ll/litscimatstands.asp](http://www.cde.ca.gov/ci/sc/ll/litscimatstands.asp)

## Oceans Come Alive in Calendar-Quality Artwork

Over 2,000 students from across the country participated in the 2007 IGES Art Contest for Children in Grades 2–4, “**The Ocean from Top to Bottom!**” The contest challenged students to explore the ocean from top to bottom by reading stories and books, searching Web sites and watching movies, and then draw a picture showing what they learned.

For the first time, winning artwork was featured in a 2008 calendar funded by Lockheed Martin Corp.

Maryland third-grader Nimai Agarwal and Virginia second-grader Andrew Lee won first and second place, respective-



ly, while three third-graders—Joseph Le-en Chiu from Maryland, Nathan Riskey from Mississippi, and April Yiwen Ye from California—tied for third place.

To view the winning entries from the 2007 contest and previous years, please visit • <http://www.strategies.org/ArtContest>



**1st Place/Cover:** *Heartbeat of the Deep Blue*, Nimai Agarwal, Grade 3, Columbia, Maryland  
**2nd Place/November:** *Let the Ocean Laugh*, Andrew Lee, Grade 2, Chantilly, Virginia



Eric Barron

Twenty-two years after leaving the National Center for Atmospheric Research for a position at Pennsylvania State University, departing IGES board member Eric Barron has returned to NCAR—this time as the organization’s director.

Located in Boulder, Colo., NCAR provides the university science and teaching community with tools,

## Barron Becomes Head of NCAR

facilities and support—including access to supercomputers, aircraft and radar—needed to improve understanding of atmospheric and Earth system processes.

Barron took over as NCAR director in July 2008, after two years serving as dean of the Jackson School of Geosciences at the University of Texas at Austin. He first came to NCAR in the 1970s on a summer fellowship. After completing a doctorate in oceanography in 1980, he returned to NCAR as a postdoctoral research fellow and then a research scientist in the global climate modeling group.

Barron left NCAR in the mid-1980s to direct Penn State’s newly formed Earth System Science

Center within the school’s College of Earth and Mineral Sciences. He remained at Penn State until moving to the University of Texas in 2006, followed by a return to NCAR in summer 2008.

In a recent interview appearing on the NCAR Web site, Barron talks about how he first got interested in science:

*“I was interested in marine geology and geophysics. I decided that plate tectonics was fascinating, and so I started to work. Then I decided that there were already too many people working in the area and that I needed to think about what was going to happen after the notion of plate tectonics. I came to the conclusion that how changing mountains and continents influenced ocean-atmosphere circulation was an interesting topic.”*



## ESSEA: Teaching Teachers Who Teach Earth Science

The declining populations of frogs, toads and other amphibians; the critical role fog plays in maintaining coastal forests; and the pros and cons of drilling for natural gas in urban locations are just three of the many topics covered by Earth System Science Education Alliance (ESSEA) course modules.

An initiative of IGES and sponsored by the National Science Foundation, ESSEA supports educational institutions across the country in offering a series of se-

mester-long, online Earth system science courses for teachers. ESSEA participants earn undergraduate or graduate credit while learning to teach Earth system science using inquiry-based classroom methods.

Learning modules used in the courses are available to anyone through the ESSEA Web site. Each module starts with a scenario (text and images) that sets the stage for investigation of an Earth

science topic. Sample investigations are provided for varying grade levels, as are links to related resources and a listing of national science education standards addressed by the module. (Cont. on pg. 7)



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(Cont. from pg. 6)



Faculty at participating institutions are developing upward of 30 new modules to be added to the existing set of nearly 20 by the end of 2009. “**The Camanchaca**” is one

of several modules made available in fall 2008. Developed by contributors from Seattle Pacific University, Pontificia Universidad Católica de Chile and California State University, Los Angeles, the module focuses on fog’s role in the Earth system, specifically along the northern coast of Chile where fog provides the moisture needed to support a dense forest, despite desert-like rainfall totals of about four inches per year.

Other soon-to-be-added modules include “**Amphibian Crisis**,” which describes how amphibian species around the world are being threatened with extinction, and “**Barnett Shale**,” which looks at the impacts

of drilling for natural gas in urban areas such as Forth Worth, Texas.

“*The uniqueness of the ESSEA Web site is that even before enrolling in the courses, teachers can avail themselves of the modules and put them to immediate classroom use,*” said IGES’s Bob Myers, principal investigator for ESSEA. “*The modules allow students to take a critical look at potential threats to Earth’s health and to grow in the critical thinking skills needed to become environmentally literate citizens.*”

Course offerings, modules and additional information are available at <http://essea.strategies.org>

## Earth Observations 101: The History

By Dan Stillman  
Science Communications Manager, IGES

The quest to observe and monitor Earth has a long and interesting history, which began between 1400 and 1600 when European scholars first designed and built weather instruments. These included the invention of the thermometer to measure temperature, the barometer to measure pressure, the hygrometer to measure humidity, and the anemometer to measure wind speed.

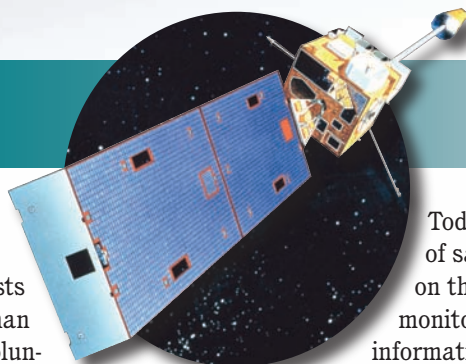
Efforts to systematically observe the Earth followed suit in the 1700s, when networks of weather stations were established in Europe and North America. Observations were made using standardized methods and calibrated instruments for the purposes of scientific use and record-keeping.

The National Weather Service’s Cooperative Weather Observer

Program, which today consists of more than 11,000 volunteer observers, has provided continuous weather and climate data to forecasters and scientists since the program’s inception in the late 1800s.

Eventually, scientists realized that observations made from the ground alone would not be enough to fully understand the planet and its atmosphere. The 1800s brought the advent of weather balloons, which measure atmospheric conditions as they rise vertically through the air. Aircraft observations started in the 1920s, followed by the development of radar in the 1950s.

In 1960, NASA’s Television and Infrared Observation Satellite (TIROS 1) provided the first view of Earth and its clouds from space.



Today, there are hundreds of satellites looking down on the planet, constantly monitoring and gathering information about the Earth’s atmosphere, land and oceans.

While the earliest Earth-observation efforts were focused on tracking and predicting weather, over time evolving technology has been applied to a broad spectrum of subject areas. Observations of the Earth are now applied in many fields, including public health, transportation, allocation of natural resources, and emergency management.

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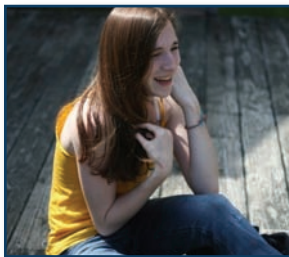
*The above is excerpted from the Alliance for Earth Observations primer, “Earth Observations 101.” Read the full document—intended to inform students, teachers, policy-makers and the public at large—at [http://alliance.strategies.org/docs/EO%20101\\_Final.pdf](http://alliance.strategies.org/docs/EO%20101_Final.pdf)*



Deborah Mack, Thacher Scholars Award 2008, First Place.



Scott Elder, Thacher Scholars Award 2008, Second Place.



Arielle Alpert, Thacher Scholars Award 2008, Third Place.



## High School Senior Studies Coyote Patterns; Maps Her Way to National Scholarship

### Deborah Mack Wins First Place in the 2008 Thacher Scholars Award

With the help of questionnaires, a geographic information system and statistical analysis, 12th-grader Deborah Mack of Irvington, N.Y., brought New York coyotes into better focus. Her project captured first place in the 2008 Thacher Scholars Award competition.

Joining Mack as recipients of the 2008 award—given to secondary school students demonstrating the best use of geospatial technologies or data to study Earth—were Scott Elder of Chino Hills, Calif., and Arielle Alpert of Livingston, N.J.

The Thacher Scholars Award is given annually by IGES as part of its effort to engage and inspire the next generation of Earth scientists.

*“Through the Thacher Scholars competition, IGES is motivating and rewarding students’ enthusiasm for learning about the Earth,”* said Theresa Schwerin, IGES associate director for education. *“The contest is also furthering their ability to design and communicate creative approaches to environmental issues using 21st century technologies. Deborah, Scott and Arielle all did an outstanding job on their projects and I’m very proud of their work.”*

Mack’s project, **“Mapping Coyote Habitat Suitability in Suburban Westchester County, New York, Using Surveys,”** is particularly relevant in light

of the state’s growing coyote population and more frequent run-ins between coyotes and people across the country.

Mack distributed questionnaires to elementary, middle and high school students in southern Westchester County, asking for reports of coyote sightings within the last three years.

The response data, from more than 1,500 participants, was imported into a geographic information system (GIS) to determine

distances between coyote sightings and significant geographic features.

A statistical analysis then showed the distances to forests and grasslands as the best predictors of where to find a coyote, and the distances to high- and medium-intensity developments as the best predictors of where not to find a coyote. The results of the study are intended to help with management of the coyote population and to reduce potential conflicts between people and coyotes.

Mack received a cash award of \$2,000.

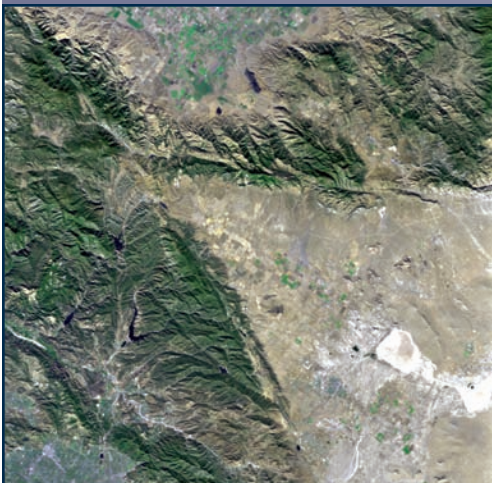
*“I learned about the complexity of developing a study and gathering the necessary data in order to test the hypothesis. It was fascinating to uncover the significance of the data using GIS,”* said Mack, who plans to attend Bates College in Lewiston, Maine, in fall 2008. *“I’m hoping to continue science research and major in biology.”*

*(Cont. on pg. 9)*





(Cont. from pg. 8)



## Scott Elder Wins Second Place

**E**lder, an 11th-grader at Chino Hills High School, captured second place for the second year in a row, this time with his study titled, **“Impact of Urbanization on Creek Ecology and Pollution.”** Elder used NASA and IKONOS satellite imagery to examine the influence of urbanization on the size, flow and vegetation of creeks in the Chino Hills watershed, and to identify locations from which to collect water samples. Water

sample analysis showed the effects of pollution on water quality, clarity and velocity.

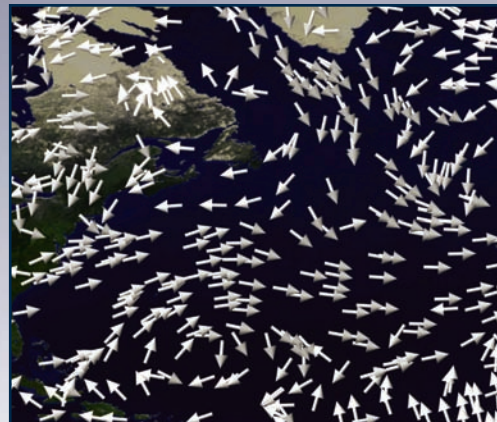
Elder received a cash award of \$1,000.

*“It’s amazing how we can locate environmental problems from space and then have the ability to analyze the data to solve environmental problems on Earth,”* said Elder. *“This means we can more efficiently locate and clean polluted areas—and also prevent pollution in the future.”*

Elder will begin his freshman year at California State Polytechnic University, Pomona, in fall 2008. He plans to major in environmental biology.

## Arielle Alpert Wins Third Place

**A**lpert, a 12th-grader at Livingston High School, took third place with her paper, **“Impact of El Niño on Hurricane Development through Barotropic Flow: Utilization of Geopotential Height Fields.”** Using satellite observations of hurricanes and other historical environmental data, Alpert conclud-



ed that El Niño inhibits hurricane formation in the Atlantic Ocean by altering wind patterns about 18,000 feet high in the atmosphere.

Alpert plans to pursue a degree in environmental Earth sciences at Johns Hopkins University starting in fall 2008. *“There are many more discoveries to be made, and I feel I can contribute to the scientific community because of my fascination in learning about the environment,”* said Alpert, who received a cash award of \$500.

Each of the winning students’ teachers were recognized with \$200 gift cards from Amazon.com.

## California Roundtable on Environmental Information and Technology



Front Row (L-R): Richard Baum, Gov. Jim Geringer, Lt. Gov. John Garamendi, Charles Kennel; Second Row (L-R): Nancy Colleton, Marc Ebbin, Dag Syrrist, Paul Bunje, Mike Mader, Robert Shokes, Janice Dunn, Daniel Bosch, Alexis Livanos, Pete Worden, Amisha Patel. Not pictured: Mark Schaefer.  
Photo Courtesy of Greg Vaughn, SAIC

**R**ecognizing the unprecedented environmental and economic challenges posed by an accelerating climate and energy crisis, leaders from the public, private and academic sectors came together in Sausalito, Calif., on Nov. 13, 2008, to call for an *“aggressive and robust state economic development initiative to establish California as the leader in providing Earth and environment-related information products, services and technologies*

*to better manage our response to climate change and transition to a new, green economy.”*

**The California Roundtable on Improving Environmental Information and Technology to Manage Climate Risk and Opportunity** was organized by IGES’s Alliance for Earth Observations and the California Chamber of Commerce, with financial support from Northrop Grumman Corp., Raytheon, and Science Applications International Corp. (SAIC).

## How Students Interpret Climate Change

By Catherine Fahey  
Education Program Associate, IGES

**ONE** of the most “hotly” contested environmental issues today is that of global climate change. Having a scientific phenomenon debated before our eyes is both rare and valuable, but may also hinder efforts to educate students about the underlying science of climate change. Students are very aware of the issue and both interested and energized by it, but the wealth of information available to them is often conflicting and confusing.

**To investigate, I went straight to the source and discussed the issue** with a handful of Earth science teachers. While teaching a complex, politically charged issue is never an easy task, my suspicion was confirmed. The biggest obstacle with climate change appears to be most teachers’ worst nightmare—preconceived ideas. Perhaps two of the largest influences on students are their parents and the media, which may lead to opinions fueled more so by the political, social and economic aspects of climate change than the scientific.

**Familial influence is inevitable and expected to some extent**, but the teachers I spoke with also noted the media’s lackluster attempt at providing a “fair” perspective. Climate change is often presented as a debate between two opposing scientists, which can undermine the general agreement that it is real and happening. The fourth

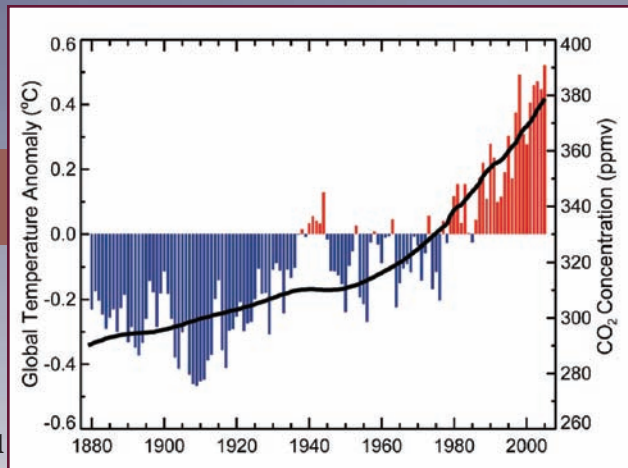
and most recent report from the Intergovernmental Panel on Climate Change said that “warming of the climate system is unequivocal.”

**Regardless of what students’ preconceived ideas are**, not coming to class with an open mind can prevent them from actively learning about the issue. This is unfortunate because climate change is a great opportunity to teach about the many aspects of Earth science, including the atmosphere, the oceans, land and ice.

**So, how are teachers getting around these issues?** To effectively teach climate change it is important teachers not only present the data, but also illuminate the scientific reasoning that influences their thinking and interpretation. The missing link is often as simple as explaining how scientists reach their conclusions.

**Teachers cited good experiences using real scientific data** and through problem-based learning (PBL). Allowing students to work with real numbers to observe trends and results for themselves demonstrates the significance of the data and how to interpret it. For example, a long-term global surface warming trend of  $0.74^{\circ}\text{C}$  is considerable, but students must be able to distinguish this from daily weather variability in which  $1^{\circ}\text{C}$  is negligible.

Further, PBL allows students to choose their own path to research,



which limits external influence. It also helps, teachers say, to explain how global changes can have local impacts, addressing the question, “What does this mean to me?”

**Throw in terms like the greenhouse effect and global warming**, and teaching climate change takes on an even more complicated facade, but at the very least, teachers can give their students the tools necessary to analyze the issue for themselves, and hope the seed takes root into independent thought.

**The Earth System Science Education Alliance (ESSEA)** offers two modules on global climate change. Each presents situations, connections to science standards, sample investigations and further resources: <http://esseacourses.strategies.org>

### Some additional resources include:

- Global Climate Change Research Explorer: <http://www.exploratorium.edu/climate/index.html>
- MY NASA DATA: <http://mynasa.data.larc.nasa.gov>
- Intergovernmental Panel on Climate Change: <http://www.ipcc.ch>
- US Global Change Research Information Office: <http://www.gcrio.org>
- Illinois Mathematics and Science Academy PBL Network: <http://pbln.imsa.edu>



**1st Place, Emma Jamison:**  
*Rocks along the Mediterranean coast.*



**3rd Place, Max Anderson:**  
*Caterpillar climbing a flowering milkweed.*



**2nd Place, William Stalcup:** *Eastern tent caterpillars and their self-constructed silk tent.*

## SNAPSHOTS OF SPRING

### 2008 Earth Day Photo Contest Attracts More Than 600 Submissions

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?

In honor of Earth Day 2008, more than 600 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.

*“I want to tell you how pleased I was to be able to have my students participate in this wonderful contest,”* said Jennifer Camilletti, a sixth-grade teacher in New Jersey. *“It was a magnificent way for me to include science in my literacy classroom. I love being able to make lessons interdisciplinary, and this was a perfect way for me to do so.”*

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.

Emma Jamison, a seventh-grade U.S. student living in Belgium, captured first place with her photograph of rocks along the Mediterranean Sea. *“The waves which hold tiny sand particles are constantly washing over the rocks, which gives them the finished, smooth, and polished look they have now,”* reads an excerpt from Emma’s essay. *(Cont. on pg. 12)*

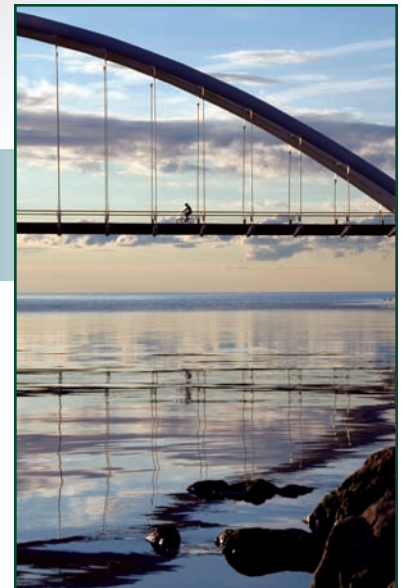
The winning photographs from the 2007 and 2008 contests can be viewed on the IGES Web site at: <http://www.strategies.org/EarthDayPhoto>

(Cont. from pg. 11)

William Stalcup, a Virginia seventh-grader, earned second place with his photograph of eastern tent caterpillars crawling about their self-constructed silk tent. *"The Eastern Tent Caterpillar is a type of caterpillar that is fascinating to watch, though it is often considered a pest. They are often seen in the morning, out of their many layered web, often called a tent, eating the leaves off the tree they inhabit,"* reads an excerpt from William's essay.

Third place went to Max Anderson, a Florida seventh-grader. Max snapped a colorful photograph of a caterpillar climbing a flowering milkweed.

The top three winners received a digital camera, digital photo frame and digital photo key chain, respectively. The top 10 winners (including the top 3) received their photograph in a commemorative frame.



## Bicycling to Work: Getting There Safe & Sound

By John Ensworth  
Senior Science Education Specialist, IGES

**No one is taking that SUV off your hands, and you can't stomach any more of that pain at the pump—so bicycling to work it is.**

In last year's *Observe* ([http://www.strategies.org/docs/IGES\\_ObserveFall07\\_Sept14.pdf](http://www.strategies.org/docs/IGES_ObserveFall07_Sept14.pdf)) we talked about how to get to work warm and dry, with a change of clothes in tow so you can present a professional face to your co-workers (even if you may still have helmet hair).

**But what about the ride itself?** How do you get to work safe and sound, day after day?

**Let's start with a few important facts to remember:**

- 1. Cars can't see you.**
- 2. Cars win every time.**
- 3. You are completely responsible for your own safety.**

Taking these three points together, constant road-wise awareness of everything around you is critical, if not life-saving.

**One of the greatest and simplest tools a cyclist can own is a rearview mirror,** which can be mounted on the left handlebar (assuming you are riding on the right side of the road—like you should be) or on the left side of your helmet. I've not used the handlebar mirror because it must be bigger to be useful at that distance from your eyes, and it doesn't show what's at your back when steering the bicycle. Helmet-mounted mirrors are smaller and can be directed by small changes in where you point your head. It becomes second nature very quickly.

(Cont. on pg. 13)



# Observe



(Cont. from pg. 12)

**A great set of tools is reflective clothing**, reflective belts for you to wear, and reflective tape and stickers that you can add to your bicycle. Reflective gear is no guarantee that cars will see you (remember that), but it does help make you stand out against the sea of buildings, signs, bushes and dogs that drivers are more likely to focus on. If you ride on a military base, the stickers and a reflective belt are mandatory.

**Flashing LED lights** (red toward the rear, white or yellow to the front and yellow to the sides) help make you somewhat more visible day and night. At night you must have a bright headlight. Modern headlights come with halogen bulbs that put to shame the old flashlight design of decades past. These light up the road ahead far enough to actually warn you of branches, holes and skunks. These headlights make you stand out like a car (or motorcycle if you have a single-

bulb design) when on the road.

**As you ride, stick to the right side of the road** outside the gutter and actually on the roadbed.

In most situations, there is room for a car

to pass you safely while still staying in its lane. You must think like a car and ride like a car. Don't ride in the gutter—it is full of rocks and large drain openings.

**Don't ride on the sidewalk.** You are more likely to hit cracks, buckled pieces of concrete and kids' toys there. You are also much more likely to meet a car carelessly exiting its driveway—drivers are often more focused on finding a break in traffic on the road rather than who or what may be coming down the sidewalk.

**In fact, while you are going down the road, mimic a car** even to the extent that you merge with traffic and take a place in the left turn lane when you want to turn that way. Traffic speeds at lights are usually low enough that you can signal your way out

into traffic and wait for the light to change. This takes practice and it is good to start riding like this on the weekends with your local bicycle club. They will show you when and where it is safe to dominate the lane (like a car) and make yourself seen.

**Finally, signal.** Back when you took your driver's test, you may have learned to signal left with an outstretched left arm, right with a bent left arm (go ahead and point right over your head with your finger) and stop with a downwardly bent left arm (palm open flat helps the image). Use this for bicycling too! Help other riders and cars know what you are doing. If you are on a back trail approaching other riders, hikers or runners, call out that you are about to pass them and the side you are going to pass them on ("Passing on the left!").

You may startle them, but you'll diminish the chances they suddenly step or turn into your path and ruin everyone's day.

With some common sense and good road-wise awareness, you can ensure a safe ride to work. Be as cognizant of your surroundings as possible (keep the iPod volume low or do without earphones) and:

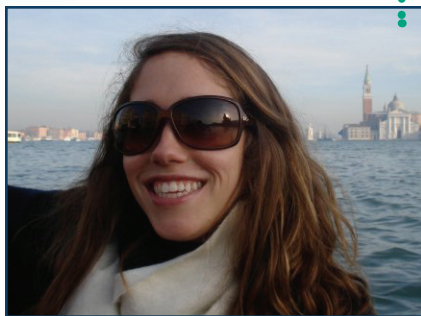
**Remember...the cars never see you.**





Rachael Born

**The Thacher Scholars Award**, previously the Thacher Scholarship, is given annually by IGES to secondary school students demonstrating the best use of geospatial technologies or data to study Earth. The 2009 contest is featured on page 3, and 2008 winners on page 8.



Meghan Grant



Yimin Yao

## Thacher Award Winners: Where Are They Now?

By Dan Stillman  
Science Communications Manager, IGES

### Rachael Born 2007

Rachael earned first place in the 2007 Thacher Scholars Award competition with her project titled, “**The Chesapeake Bay—A National Treasure in Decline**,” which correlated the amount of rainfall within the Chesapeake Bay watershed with the health of the bay and its ecosystem.

After graduating from high school in June 2008 and earning the prestigious International Baccalaureate diploma, Rachael started her first year at the College of William and Mary in Williamsburg, Va., in fall 2008.

*“I hope to major in environmental science/policy, employing the skills I learned through participating in the Thacher competition and using the Thacher scholarship toward studying abroad to gain a more in-depth view of our natural resources,”* Rachael said.

### Meghan Grant 2004

A visit during her sophomore year in high school to a Louisiana marsh helped spur Meghan’s interest in wetland loss and her 2004 Thacher-winning paper, “**Wetland Loss Along Louisiana’s Coastline**,” which investigated whether it is oil and gas extraction, or geological fault

movement, that triggers more wetland loss.

Meghan is now on track to graduate at the end of 2008 from Louisiana State University with a major in international studies and minors in political science and Italian, and in the future hopes to go to law school. At LSU, Meghan helped to start the Model UN Club and has been a member of the Italian film club.

*“Participating in the Thacher Scholarship has played a huge part in my academic and professional career,”* Meghan said. *“I did not follow my initial science career, but I have found a subject matter that greatly interests me and continues to push me to further my education.”*

### Yimin Yao 2003

Yimin garnered the 2003 Thacher award for her paper, “**The Transcontinental Journey of Dust**,” just four years after moving to the United States from Hangzhou, China.

After graduating in 2007 from the University of California, Berkeley, where she studied computer science and neurobiology, Yimin deferred enrollment in a Ph.D. program in neuroscience at Stanford University. She is currently a senior engineer at Oracle Corp.

*(Cont. on pg. 15)*

# Observe

(Cont. from pg. 14)

*“At Oracle, I constantly take a real-world problem and break it down with technical and analytical skills I acquired from school in order to draw a conclusion or to propose a solution, just like I had done for the Thacher project,” says Yimin. “The Thacher experience showed me how great it is to be able to apply what we learned from the static textbooks to real-life scenarios, and how important it is to be able to communicate and present your discoveries and ideas.”*

## William Werbel 2002



After receiving the 2002 Thacher Scholarship for his paper, **“Chernobyl: A Disaster?”**, Werbel scored a 1600 on the SAT and was accepted at Harvard University, from which he graduated in June 2008 with an honors degree in human evolutionary biology and a certificate in health policy. As an undergraduate, he co-founded a global health student group and was awarded a fellowship to lead a research program to Tanzania to assess and assist the



private health care sector. Additionally, he conducted research at Harvard’s Skeletal Biology Lab and completed an undergraduate honors thesis comparing kinematics and kinetics of habitually barefoot and shod distance runners, linking the findings to human evolutionary history as well as public health and injury prevalence. Werbel’s research paper was awarded Harvard’s Thomas T. Hoopes prize for outstanding undergraduate research.

Werbel has stayed on at the laboratory, researching evolutionary biomechanics while he applies to medical school.

## Yuliya Kuznetsova 2001



A little more than four years after arriving in America from Siberia and barely able to speak English, Yuliya earned the 2001 Thacher award with her paper, **“The Recession of Glaciers Due to an Increase in the Emission of Greenhouse Gases in the Atmosphere,”** a

topic she picked because of her concern about global warming.

Yuliya now has a B.S. in physics from the California Institute of Technology, and is currently pursuing a Ph.D. in physics at the University of California, San Diego. In summers 2007 and 2008, she taught nuclear science at Johns Hopkins University.

## Julia Greenberg 2000



Since winning the first Annual Thacher Scholarship in 2000 as an Illinois high school freshman, Julia has attended Columbia University’s Department of Ecology, Evolution and Environmental Biology; worked as an intern at Chicago’s Lincoln Park Zoo researching great apes; and recently graduated from Carleton College in Minnesota with a degree in psychology.

At Carleton, Julia worked in the primate cognition lab, participated in two field courses in the rainforests of Costa Rica, co-authored a paper on how primates judge social inequity, (Cont. on pg. 16)

# Observe

(Cont. from pg. 15)

and completed a thesis entitled, **“A Test of Cooperative Problem Solving in Cotton-Top Tamarins: The Role of Competition and Tolerance.”** Julia is now working with primates at the Leipzig Zoo in Germany, as a Fulbright Fellow at the Max Planck Institute for Evolutionary Anthropology in

the Department of Developmental and Comparative Psychology.

*“I am excited to again be working at a zoo that doubles as a major research institution. I hope to also work on a project investigating how the cognitive research we are working on can be conveyed effectively to visitors and used as*

*an effective educational tool.”*

In the coming years, Julia plans to go to graduate school and pursue her interest in how environmental changes affect the behavior of animals, eventually applying behavioral research to conservation, rehabilitation and reintroduction programs.

## Climate Change & The Plant Sector: A Growing Interest

**IGES**, along with the North Carolina Arboretum and the University Corporation for Atmospheric Research, organized a one-and-a-half-day workshop, **“Climate Change & The**

**Plant Sector: A Growing Interest,”** sponsored by the National Oceanic and Atmospheric Administration (NOAA) and held Nov. 17–18, 2008, in Asheville, N.C.

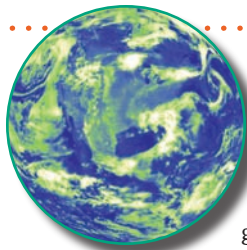
The workshop was an important first step in building a critical information bridge between the climate science community and the numerous, diverse business sectors and public interests that rely on the health and well-being of plants. Participants included leading figures from NOAA as well as members of the landscape architecture, golf course design and maintenance, conservation, horticulture gardening, nursery management, arboreta, botanical gardens, and public land management communities.

For more information, visit • <http://www.agrowinginterest.com>



## ADVICE To the Next Administration

*IGES's Alliance for Earth Observations was one of eight sponsoring organizations of the University Corporation for Atmospheric Research-led document, “Advice to the New Administration and Congress: Actions to Make Our Nation Resilient to Severe Weather and Climate Change.” Released in August 2008, the document's recommendations include:*



- **Fully fund** the Earth-observing system from satellite and ground-based instruments as recommended by the National Research Council;
- **Greatly increase** the computing power available for weather and climate research, predictions and related applications;
- **Support** a broad fundamental and applied research program in Earth sciences and related fields to advance

present understanding of weather and climate and their impacts on society;

- **Support** education, training and communication efforts to use the observations, models and application tools for the maximum benefit of society; and
- **Implement** effective leadership, management and evaluation approaches to ensure that these investments are done in the best interest of the nation.

For more information, visit <http://www.ucar.edu/td>

## 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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