

Observe

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

2011

Welcome to the 2011 edition of *Observe*, our annual overview of IGES programs and activities. If the events of the past year have taught us anything, it's that environmental information and a scientifically informed public have never been more important.

Exhibit A was the Gulf oil spill, which served as a stark reminder of how fragile our coastal waters and lands truly are, and how little we know about our oceans, especially deep below the surface.

Meanwhile, record heat in the U.S. and Russia, and record snow in the Northeast, dominated headlines and took lives, too. Not to mention the catastrophic earthquake in Haiti, extreme flooding in Pakistan, and the volcanic eruption in Iceland that brought air traffic in Europe to a halt.

Whatever environmental challenges arise in 2011 and beyond, it's clear that information will be of the utmost importance—both accurate and comprehensive information about our changing planet, and information that helps promote a scientifically literate public better prepared to make informed decisions.

With the lessons of 2010 in mind, IGES's **Alliance for Earth Observations** continues with its mission to ensure credible and accessible environmental information for improved decision-making. This year's Forum

on Earth Observations V, the Alliance's signature event, will focus on a national strategy for environmental intelligence.

Another major project of ours, the IGES-led NASA Earth Science Education and Public Outreach Forum, continues its work with other NASA forums to increase the effectiveness and efficiency of NASA's education and public outreach programs.

Of course, our annual student contests in art, photography and environmental research are back again, inspiring the next generation of scientists. And our Earth System Science Education Alliance (ESSEA) program is poised to make more strides in improving geoscience education.

I hope you'll enjoy this edition of *Observe*, which not only describes our various projects, but also takes a look at why it's important that scientists communicate their work to the public, and provides handy tips on biking to work in hot weather.

Nancy Colleton
IGES President

Executive Roundtable: Business Leaders Discuss Improved Environmental Information with Top U.S. Officials



Secretary of Commerce Gary Locke (head of table) discusses environmental information with U.S. business leaders.

As part of IGES's mission to promote private sector input and participation in national planning and strategy relating to environmental information, IGES convened the *Executive Roundtable on Environmental Information: Meeting the Climate Needs of U.S. Business*. The roundtable, held Oct. 20, 2010, in Washington, D.C., brought together Secretary of Commerce Gary Locke and NOAA Administrator Jane Lubchenco with a distinguished group of business leaders, who collectively communicated their interest in improved environmental information and need for the NOAA Climate Service.



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ROUNDTABLE MEMBERS

From left to right in the adjacent photo:

Dan Berkenstock
Chairman and CEO
Skybox Imaging Inc.

William H. Hooke
Senior Policy Fellow and Director of
the Policy Program
American Meteorological Society

Gerald Sehlke
Former President
American Water Resources Association;
Advisory Scientist
Idaho National Laboratory

John F.A.V. "Jack" Cecil
President
Biltmore Farms LLC

Nancy Colleton
President
Institute for Global Environmental Strategies

George Briggs
Executive Director
The North Carolina Arboretum

The Honorable Gary Locke
U.S. Secretary of Commerce

The Honorable Jim Geringer
Director, Policy & Public Sector Strategies
ESRI

Jane Lubchenco
NOAA Administrator

Peter Gourlay
President
Maryland-Asia Environmental Partnership

Kimberly T. Nelson
Executive Director, eGovernment
Microsoft

General Charles "Chuck" F. Wald
Retired Four Star General, U.S. Air Force;
Director and Senior Advisor, Aerospace and
Defense Industry
Deloitte Services LP

Jigar Shah
CEO
Carbon War Room

Bill Dewey
Public Affairs Manager
Taylor Shellfish Company Inc.

Roundtable participants ranged from a former governor,



to a Microsoft executive, to an expert on energy and national security issues. A wide variety of sectors vulnerable to climate change were represented, including water resources, the fishing and aquaculture industries, the plants and landscape sector, residential and commercial building, and national security.

The interest in improved environmental information fell into two categories: 1) The need of companies to have access to credible environmental intelligence to manage risk effectively and make informed decisions in response to a changing climate; and 2) the opportunity for U.S. business to leverage govern-

ment investment in climate, weather and ocean services to create new products and services for global markets.

A letter to Locke from Jack Cecil, roundtable chair and president of Biltmore Farms, summarized the roundtable discussion and communicated the following key points:

- Both Fortune 500 companies and smaller businesses will benefit from the credible, accurate and accessible climate information that the NOAA Climate Service will provide. This information will help corporations calculate the benefits of embracing clean and renewable energies, and will enable improved private-sector planning, research and decision-making that will minimize risk, create jobs and build wealth.
- The design and implementation of the NOAA Climate Service must facilitate easy and efficient interaction between government and the users and providers of climate information, especially the business leaders and entrepreneurs who stand ready to invest in

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climate-related services and utilize them for economic and environmental gain.

- The climate services supply chain begins with observations. A well-funded satellite and in situ observation program, and adequate computing and data storage capabilities, are critically important to the development of models that can predict regional-scale climate changes with greater certainty.
- Climate change is a tremendous threat to America's military operations. NOAA climate data is increasingly used by the Department of Defense (DoD) to improve its energy efficiency, which

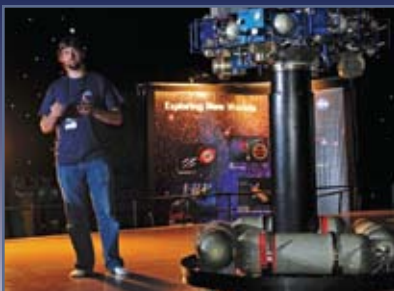
saves on fuel costs and makes fuel supply lines less vulnerable to attack, and to anticipate the destabilizing effects of climate change on developing countries. As a major user of NOAA climate information, DoD should be engaged in the development and implementation of the NOAA Climate Service.

- Much like the National Weather Service fuels a \$1.7 billion private sector weather services industry, the NOAA Climate Service has the potential to spur a multi-million dollar, if not multi-billion dollar, climate services industry that generates thousands of jobs; aids

mitigation of and adaptation to climate change; and supports informed decision-making by a multitude of business sectors, governments, and people across the nation and around the world.

- An effective public-private partnership is essential to creating a NOAA Climate Service that meets the needs of its users and strengthens America's competitiveness.

In closing, the letter stated that the roundtable participants *“strongly believe it is time to move the discussion of climate change beyond science to economics, particularly to that of U.S. economic prosperity and job creation.”*



Top: Marshall Shepherd talks about NASA's role in understanding hurricanes; Bottom: At a NASA Jet Propulsion Laboratory open house, engineers show hardware for planet-hunting telescopes.



IGES Helps Develop New Web Portal for NASA E/PO Community

IGES helped develop and is playing a key role in the ongoing evolution of a new website facilitating unprecedented interaction and collaboration among the broad and diverse NASA education and public outreach community.

Launched in 2010, smdepo.org provides resources to assist those funded by NASA's Science Mission Directorate

(SMD) in carrying out education and public outreach (E/PO) programs. Program leaders and team members can post announcements and calendar events, share work in progress, and participate in discussion groups. Information that may be of broad interest, such as meeting notes or tips for getting involved in SMD education and public outreach, can be



Ed Maibach, director of George Mason University's Center for Climate Change Communication, and Heidi Cullen, CEO and director of communications for Climate Central, participate in a panel on climate science communication at the 2010 NASA Earth Science Education and Public Outreach Community Meeting.

accessed without logging into the workspace.

The website is a project of the NASA SMD Science Education and Public Outreach Forums. Each forum—Earth science, astrophysics, heliophysics and planetary science—has its own workspace on the website for communicating, planning and collaborating on activities, projects and resources. There are also shared resources that cut across all four forums.

IGES leads NASA's Earth Science Education and Public Outreach Forum—the first-ever such forum for NASA's Earth science division—in partnership with the Universities Space Research Association's Lunar Planetary Institute and NASA's Goddard Space Flight Center. The forums, created in

2009, are working together and with NASA to organize SMD education and public outreach into a coordinated effort that effectively uses NASA Earth and space science discoveries, expertise and resources.

Recent and planned activities of the IGES-led Earth science forum include:

- **Monthly conference calls** for community members to share information and explore common issues.
- **NASA Earth Science Education and Public Outreach Community Meeting**, May 17–20, 2010, Airlie Center, Warrenton, Va.: Over 70 NASA and NASA-funded education and outreach specialists attended to discuss topics of common interest, plan collaborative activities, and learn more about some of the latest advances in communications and education.
- **Ongoing series of professional development webinars.** Topics include the use of social media in E/PO, new NASA education products, and other items and issues of interest to the community.
- **Developing an “Earth Scientist E/PO Advocates” group** to support scientists with an interest and talent for E/PO.

- **Geophysical Information for Teachers (GIFT) workshops:** middle and high school teachers attended the workshops, which were held at the annual AGU Fall Meetings in San Francisco. The forums, led by the Earth science forum, worked together to plan and conduct NASA science and education sessions.

- **Detailed analysis and cataloging of NASA Earth science education products and projects,** and helping to develop an online catalog for finding SMD E/PO information and resources. The Earth science forum leads a cross-forum team working to ensure that analysis and cataloging is carried out in a consistent manner across the forums.

- **Q&A series appearing on smdepo.org** with NASA or NASA-funded scientists involved in E/PO. The series is intended to encourage other scientists to participate in E/PO.

“A major area of work for the forums is engaging those involved in NASA science education and public outreach, with the vision of going from 300-plus individual activities to a real community of practice,” said Theresa Schwerin, IGES vice president for education.



Top: Screenshot from an IGES-produced video that tours an online NASA education product.

Bottom: Emily Calandrelli, profiled last year in the IGES-produced Earth and Space Science Explorers Series for the NASA portal, floats during a moment of weightlessness on a reduced-gravity flight.

IGES's Ongoing Work for NASA Earth and Space Science Education



Earth and Space Science Education Video Professional Development Portal

IGES maintains a portal of videos for educators that explain, demonstrate and present NASA Earth and space science educational products and science content. The site includes recordings of live events conducted by IGES and by other organizations conducting NASA Earth and space science teacher professional development.

Visit the site at:

<http://video.strategies.org>

NASA Earth and Space Science Education Product Review

IGES manages the peer review of NASA Earth and space science education materials. Panels of both scientists and educators (e.g., classroom teachers, college faculty, NASA teacher trainers, curriculum developers and national education standards experts) review the products to ensure they are of high quality and meet rigorous standards, and to provide feedback to product developers.

Learn more at:

<http://nasareviews.strategies.org>

NASA Earth and Space Science Education News

IGES compiles and produces an online listing and monthly e-mail newsletter detailing upcoming educational programs, events, opportunities and the latest resources from NASA's Science Mission Directorate.

View the latest entries and archive:

<http://www.smdeponews.org>

Suscribe to the monthly e-mail newsletter by sending an e-mail to ese_ed_newslist-subscribe@lists.hq.nasa.gov with "Subscribe" as the subject.

Student and Educator Articles on the NASA Portal

IGES develops news and feature articles for the NASA website. These articles, geared toward students and educators of varying grade levels, explain NASA science topics and highlight NASA-supported educational materials, programs and themes in Earth and space science.

As part of this work, IGES develops and writes the *Earth and Space Science Explorers Series*, which features teachers and scientists with a variety of backgrounds and interests, all with a connection to NASA. Select articles are written in three different versions, one for each of three reading levels—grades K–4, grades 5–8, and grades 9–12 and up.

All IGES-Produced NASA Articles:

<http://www.strategies.org/NASA/articles>

Earth and Space Science Explorers Series:

<http://science.nasa.gov/educators/earth-space-explorers>



Second-Grader Wins 2010 Science-Art Contest with a Smile

Nearly 1,400 children explored the solar system and beyond—through stories, books, websites, movies and other resources—and then made a picture showing what they



learned as part of the 15th annual IGES national science-art contest for grades 2–4, “My Place in Space!” The five winning pictures can be viewed online at www.strategies.org/ArtContest along with winners from previous contests.

“The winning pictures provide a colorful insight into how these kids view the universe and their place within it,” said Theresa Schwerin, IGES vice president for education. “The winners really let their imagination run free and showed some impressive artistic skills.”

Willie Yeh, a Washington state second-grader, won first place and a \$100 Visa gift card with “We are the World,” which showed a smiling boy with Earth at the center of his body, and his arms and legs connecting to different planets.

Alejandro Toledo Navarro, a New Jersey fourth-grader, won second place and a \$75 Visa gift card with “I am Mercury.” His artwork was later showcased on the education and public outreach website for NASA’s Messenger mission. The Messenger spacecraft is on its way to becoming the first to orbit Mercury.

And three students—Josette Cruz, a second-grader from New Jersey; Anu Iyer, a fourth-grader from Virginia;

and Jerry Huang, a third-grader from Washington state—tied for third place, all receiving \$50 Visa gift cards.

“This is the fourth year my students have participated in this art contest,” said May Lee, who teaches both Yeh and Huang. “It encourages students to love science and art, and also gives students a great opportunity to show their talent.”

Certificates of participation were made available to all contest participants.

“We’re always thrilled to see so many teachers make the art contest an annual activity in their class,” Schwerin said. “It’s truly amazing the quality of artwork students so young can produce. And it’s gratifying to know they’re learning about the world and universe around them at the same time.”

To view winning entries from all contests, please visit:

<http://www.strategies.org/ArtContest>

Check www.strategies.org/ArtContest in September for information about the 2011 IGES Art Contest.

Entries are typically due in late October or early November.



2010 Winning Art
This column, top to bottom: 1st Place—Willie Yeh; 3rd Place (tie)—Anu Iyer, Jerry Huang, and Josette Cruz. Top right: 2nd Place—Alejandro Toledo Navarro.



Forum on Earth Observations IV

**Climate, Energy & National Security:
Meeting the Environmental Information Challenge**

June 9, 2010



Organized by IGES and its Alliance for Earth Observations, the Forum on Earth Observations IV—Climate, Energy & National Security: Meeting the Environmental Information Challenge—held June 9, 2010, in Washington, D.C., brought together those that develop the tools to monitor the planet with those that need and use the information to manage it. With day 51 of the Deepwater Horizon disaster as backdrop, underscoring the fragility of our environment and the ripple effects of our decisions, the Forum highlighted the need for sustained, robust, accurate and openly available environmental data.

Thomas Armstrong, senior advisor for climate change at the U.S. Department of the Interior (DOI), kicked off the Forum with a keynote that provided an overview of DOI's Earth observation activities and the importance of environmental information for sound decision-making. Armstrong, attending in place of DOI Deputy Secretary David Hayes, who was called away at the last moment to testify on Capitol Hill regarding Deepwater Horizon, highlighted the critical importance of maintaining and enhancing the health of our ecosystems, both on land and at sea.

He stressed that scientific information derived from ground-based, aircraft and satellite imagery is vital to the stewardship of our nation's lands, and said that DOI will work to ensure the continuous, long-term availability of data essential to supporting U.S. national security, national and international global carbon estimates, and climate mitigation and adaptation

strategies. Only with the most comprehensive and accurate information, he added, can the nation's assets and resources be successfully managed amidst a changing climate.

West Virginia Congressman Allan Mollohan followed at the podium with remarks about the relationship between public policy and science, and the temptation policymakers face to, as he said, *"ignore science, or suppress science, or even deliberately misuse science."* As the policymaker of a coal state, Mollohan said his evaluation of the climate bill, which he ultimately voted against, had to factor whether the proposed solution was realistic and whether it would be effective and regionally equitable. He candidly admitted that *"the politics of climate change lags the science."*

Despite his vote, Mollohan acknowledged that *"we face critical choices on energy and climate—both will affect our national security for decades to come and both are intimately connected to our economic prosperity. While we cannot postpone choices until we have complete understanding of climate and energy technologies, we must have all the information we can get to guide our decisions—individual, corporate and governmental."* To that end Mollohan, as chair of the House Subcommittee on Commerce, Justice, Science, and Related Agencies, commissioned *America's Climate Choices*, a suite of studies by the National Research Council.

Conference participants also heard from **Jigar Shah**, CEO of the Carbon War Room, and founder and

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Left to right: Monica Medina, NOAA; Nancy Colleton, IGES; Jigar Shah, Carbon War Room.

CEO of SunEdison. The Carbon War Room was co-founded by British business mogul Richard Branson, with the goal of harnessing the power of entrepreneurs and entrepreneurial thinking to unlock market-driven solutions to climate change. One such solution, as Shah explained, centers around a Carbon War Room project that rates the fuel efficiency of ships—by choosing to transport goods on fuel-efficient ships, companies can save millions of dollars on fuel costs that are passed on to them.

As for the challenge of translating climate knowledge to action,

Shah argued that the average person is not data driven, and therefore communicating the facts in ways that prompt actions with long-term, positive impacts on the climate will take time and persistence.

Other speakers and panelists included:

- Sherri Goodman, senior vice president, general counsel and board secretary, CNA.
- Jack A. Kaye, Ph.D., associate director for research, Earth Science Division, Science Mission Directorate, NASA.
- Jim Ludes, Ph.D., executive director, American Security Project.
- Monica Medina, principal deputy undersecretary for Oceans and Atmosphere, NOAA.
- Rear Admiral David W. Titley, oceanographer and navigator of the Navy; director, Task Force Climate Change, U.S. Navy.
- Vouter Weening, co-founder & president, Institute for Environmental Security; chair of the IUCN/CEC Specialist Group on Environmental Security.

Three panels consisting of high-level government officials and industry leaders promoted lively discussion around the topics of:

- Responding to the Urgency of Climate Change—The New Information Demands and the Melting Arctic;
- Monitoring Carbon; and
- Supporting a Broader U.S. Climate and Energy Strategy.

The Forum was organized by IGES and its Alliance for Earth Observations. Sponsors included the U.S. Geological Survey, National Oceanic and Atmospheric Administration, NASA, Northrop Grumman and Raytheon. Cooperating partners included the National Council for Science and the Environment, the IUCN Commission on Education and Communication, the American Security Project, the American Institute of Aeronautics and Astronautics, the American Academy of Environmental Engineers, and the Center for Strategic and International Studies.

For more information, visit:
<http://www.ForumOnEO4.com>

The Forum On Earth Observations V

June 14, 2011
Washington DC
Hyatt Regency on Capitol Hill

Organized by: ALLIANCE FOR EARTH OBSERVATIONS

INSTITUTE for GLOBAL ENVIRONMENTAL STRATEGIES

The Forum on Earth Observations V, scheduled for June 14, 2011, at the Hyatt Regency Washington on Capitol Hill, will focus on creating a national strategy for environmental intelligence—actionable information that enables decision-makers to better respond to, adapt to and manage the changing planet.

The Forum on Earth Observations is the signature event of IGES's Alliance for Earth Observations. This year's Forum brings together public and private sector leaders to discuss the nation's growing demand for improved environmental information

and strategies by which our civil, defense and commercial programs will meet the nation's priorities, which range from more accurate weather and climate models, to more robust and accessible information for emergency response, to a less vulnerable and more energy efficient military.

A diverse community of stakeholders critical to the environmental information supply chain will share their ideas, priorities and potential contributions for creating a cohesive and comprehensive national strategy for environmental intelligence.

www.ForumOnEO5.com

ALLIANCE FOR EARTH OBSERVATIONS



An initiative of IGES, the Alliance for Earth Observations works to ensure the rapid and broad delivery of the most timely, comprehensive and accurate environmental information for improved decision-making. The Alliance:

- Brings together those that develop the tools to monitor the planet with those that need and use the information to manage it;
- Communicates to the public and decision-makers the importance of continued and sustained monitoring of the planet, and the best ways to do so; and
- Educates its members on important related challenges of the day to which their science and technology solutions can be applied.

Alliance activities include educating policymakers and the public on the importance of environmental information to climate change mitigation and adaptation strategies, national security, and response to other environmental, economic and societal challenges; organizing briefings, meetings and workshops that bring together leaders from the private sector and government in the areas of science, space and the environ-

Alliance for Earth Observations: Giving Voice to the Private Sector

ment; and e-blasts that keep its members apprised of pertinent news and events related to the environment and Earth observations.

“The Alliance for Earth Observations provides a unique venue for the Earth observations community—industry, academia and other nongovernmental organizations—to interact with each other and with federal, state and local governments,”

said Steve Moran, director of space and environmental mission solutions at Raytheon.

“Through high-level community forums, off-the-record government meetings, and community white papers and reports, the Alliance has developed and presented consensus positions on a number of issues ranging from administration policy and pending legislative actions to Earth observation program plans and implementation.”

Key Alliance accomplishments in 2010 include:

- Convening the Forum on Earth Observations IV;
- Hill briefings with Senate and House staff;
- Briefings with USGS Executive Director Marcia McNutt, NOAA Climate Services Transition

Director Thomas Karl and other high-level NOAA officials;

- Co-sponsored IOOS Hill Briefing;
- Moderated or participated on panels at NCSE’s “The New Green Economy” conference, AAS Goddard Memorial Symposium, “AIAA’s Inside Aerospace-Earth Observation Day” and “NOAA Day on the Hill: Where Science Meets Service”; and
- Co-branded “The Global Clean Energy Race: Competing in Asia’s Renewable Energy Marketplace” and “Forum to Honor Rita Colwell: Addressing the Nexus between Climate Change, Water and Health.”



Thomas Karl, NOAA climate services transition director, briefs Alliance for Earth Observations members.

For more information about the Alliance for Earth Observations, please visit:

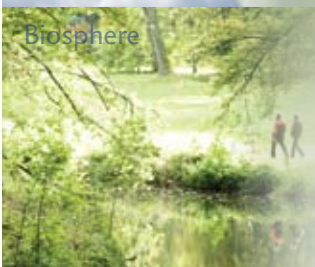
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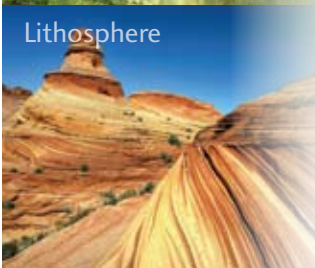
Atmosphere



Biosphere



Lithosphere



Cryosphere



Hydrosphere



ESSEA: Learn to Teach Earth as a System

A dust storm from China brings an increased risk for asthma sufferers in the western United States. Melting polar ice threatens sea levels high enough to submerge an island nation along the equator. And a cyclical decrease in solar energy can temporarily offset the warming influence of greenhouse gases.

These are just a few examples of how what happens in one part of the world or solar system can affect places and people far away, and how interwoven Earth's various components really are. Understanding the connections among the planet's spheres—biosphere, atmosphere, cryosphere, hydrosphere and lithosphere—is crucial to preparing today's students to meet the challenges of our complex and constantly changing environment.

The Earth System Science Education Alliance—an IGES initiative sponsored by NASA, NOAA and the National Science Foundation—supports a network of more than 40 educational institutions across the country in offering a series of semester-long, online Earth system science courses for K–12 and informal educators. More

than 4,000 teachers have completed an ESSEA course since the program's inception in 2000.

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 website. Each module starts with a scenario (text and images) that sets the stage for investigation of an Earth science topic. Many of the modules incorporate problem-based learning.

New modules are added regularly, including:

■ **DUST WORLD:** Dust may be one of the least understood aspects of Earth's atmosphere. Yet a dust storm on one side of the globe can travel to and affect areas on the opposite side. The impacts on weather, climate and health can range from a decrease in hurricanes to increased reports of asthma.

■ **SEA LEVEL CHANGE/COASTAL INUNDATION:** More than half of the U.S. population lives within 50 miles of the coast. Climate change is expected to produce differing amounts of sea level rise in different locations around the world, with hard-to-predict consequences for coastal communities and economies.

■ **SUNSPOTS:** Sunspot activity waxes and wanes with a maximum occurring, on average, every 11 years. When sunspot numbers are low, the amount of solar energy reaching Earth is reduced, which could result in a temporary cooling effect.

Sample investigations for varying grade levels are provided within each module, as are links to related resources and a listing of national science education standards addressed by the module. A series of modules geared toward K–4 teachers explore the different parts of the Earth system—air, land, water and life—from a general, polar, climate and oceans perspective.

“Studying Earth and global climate change is similar to putting together a jigsaw puzzle. The more we look at the planet in terms of interactions among its different components, the better we understand how all the pieces fit together,” said Bob Myers, program manager for ESSEA. *“The ESSEA courses and modules allow teachers and their students to take a critical look at potential threats to Earth's health from a systems perspective, and to grow in the critical thinking skills needed to become environmentally literate citizens.”* For course offerings, modules and additional information: <http://essea.strategies.org>





Tanya Petach, First Place in 2010 Thacher Contest.

Too much salt in the bloodstream can raise your blood pressure and strain vital organs. Similarly, too much salt in waters used for irrigation can damage soil and destroy plants.

The high salinity of the Colorado River, which causes more than \$300 million in damages per year according to the U.S. Department of Agriculture, was the focus of Tanya Petach's winning entry into the 2010 Thacher Environmental Research Contest. The contest, an activity of IGES, awards cash prizes to grades 9–12 students whose projects show the best use of satellites and other geospatial technologies or data to study Earth.

2010 Thacher Winners Show Power of Geospatial Data

Petach, from Boulder, Colo., earned the competition's first-place prize of \$2,000 with a study that used water measurements, the Global Positioning System, and geo-

graphic information systems to track salinity levels along the Colorado River and its tributaries within Grand Canyon National Park, and to identify the most important sources of salt into the river. She also explored methods for reducing river salt concentrations.

"The rivers of the West support unique ecosystems, agricultural development and urban needs. I became fascinated with these rivers while hiking on the Colorado Plateau as a young child," said Petach, who entered her senior year in high school in 2010, and was a 2010 Intel International Science & Engineering Fair award winner. *"The interaction between field studies, geospatial analysis, and laboratory investigations is*

crucial in solving today's environmental issues. Multidisciplinary approaches allow us to tackle environmental issues from multiple points of view."

The second-place award of \$1,000 went to Eric Keen from Bethesda, Md. He used satellite imagery and precipitation data to investigate whether the altering of topography by mountaintop coal mining affects precipitation patterns. Keen is home-schooled and started the 11th grade in fall 2010.

Akshar Wunnava of Chantilly, Va., earned third place and \$500 with a study that evaluated the relative strength of existing climate models, and created a new model that combined these strengths in an effort to better predict precipitation extremes, which are expected to increase in frequency as a result of climate change. Wunnava, who entered his senior year in high school in 2010, finished first in the 2009 Thacher contest.

Each of the winning students' teachers were recognized with a \$200 Amazon.com gift card.

Sponsor a
**STUDENT
CONTEST!**

Is your company or organization looking for a way to support science education?

Contact IGES for sponsorship opportunities.

1600 Wilson Blvd., Ste. 600
Arlington, VA 22209

www.strategies.org

E-mail: info@strategies.org



2011 Thacher Environmental Research Contest for Grades 9–12

Entries due by April 11, 2011

third place. Entries can be submitted by individuals or teams. In the case of team entries, the cash award is split equally among the winning team members. Winners are also featured in an online *Encyclopedia of Earth* article.

In addition to the student prizes, teachers of the first-, second- and third-place students or teams receive a \$200 Amazon.com gift card. If participation is part of an after-school club or other activity independent of school, the student or team can identify an adult “coach” who would be eligible for this award (e.g., a parent, club leader, etc.). Entries must be received by April 11, 2011, and are judged by IGES staff.

Eligible geospatial tools and data include satellite remote sensing, aerial photography, geographic information systems (GIS) and 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 tools and data have numerous uses in science research, ranging from climate prediction to archaeology. They can be used to improve our understanding of Earth systems, including interactions within and among the atmosphere, biosphere, geosphere and hydrosphere. They also can 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 Environmental Research Contest (formerly the Thacher Scholars Award) was founded in honor of former IGES board member Peter Thacher, who was a leader in promoting the use of satellite remote sensing. During his distinguished career, Thacher served as deputy executive director of the United Nations Environment Program, NASA advisor and, at the time of his death, president of the Earth Council Foundation/U.S.

From the massive Gulf oil spill to the continued decline of Arctic sea ice, satellites and other observing instruments proved crucial in 2010 in monitoring the many environmental changes—both natural and human-induced—occurring on global, regional and local scales.

The 2011 Thacher Environmental Research Contest, sponsored by IGES, challenges high school students (grades 9–12) to conduct innovative research on our changing planet using the latest geospatial tools and data, which in recent years have become increasingly accessible to the public.

The best projects receive cash awards in the amount of \$2,000 for first place, \$1,000 for second place and \$500 for

For more information on the 2011 Thacher Environmental Research Contest, please visit: <http://www.strategies.org/ThacherContest>



Middle Schoolers Snap Stunning Nature Shots in the 2010 IGES Earth Day Photo Contest

More than 800 students in grades 5–8 took part in a unique national contest to photograph our changing world, in our fourth annual Earth Day Photo & Essay Contest.



Along with their photograph of something changing in their local environment, middle schoolers 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 quality of the written explanation.

Martin Serrano, a sixth-grader from Rye Brook, N.Y., earned first place with his photograph of a yellow jacket building a nest (top left). *“Our environment is constantly changing in beautiful ways. What we see in my photograph is a queen yellow jacket building a nest after having mated with one or several male wasps,”* reads an excerpt from Serrano’s essay. *“This yellow jacket will soon lay eggs and store them separately in the small cavities of the sack also shown in the photograph. This way every egg will have its own cell.”*

Jessica Steinort, a seventh-grader from Scarborough, Maine, won second place with her picture of a road flooded out by a torrent of water (center left). Steinort wrote: *“This road was changed by the force of nature faster than a running gazelle, as are many natural disasters. Hurricanes, tornadoes, tsunamis, these are all this flooded-out road on a massive scale. One change, one extra inch of snow, one more droplet of water, can change the world forever. Blink and you’ll miss it.”*

Third place went to Andrew Broffman, an eighth-grader from East Norwich, N.Y., whose colorful snapshot captured flowering tree branches framing a blue sky with clouds and birds (bottom left).

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

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To view the winning photos from this year and previous years—and for information on our 2011 Photo Contest (entries due mid-May)—please visit: <http://www.strategies.org/EarthDayPhoto>



This was the fourth annual Earth Day Photo and Essay Contest held by IGES.

“We’re delighted that so many young students had the chance to discover the value and fun of documenting the nature and science of our changing planet through photography,” said IGES President Nancy Colleton. *“The quality of the entries was truly remarkable and made it quite challenging to select the winners.”*

top stars inspiring uses of hubble in education

Top Stars: Showcasing Exemplary Use of Hubble in Education

Top Stars, a NASA-sponsored contest celebrating the 20th anniversary of Hubble, has produced a collection of nearly 20 award-winning education products. Educators wanting to incorporate Hubble into formal and informal settings can download Top Stars activities from the Showcase section of the Top Stars website—<http://topstars.strategies.org>.

The Top Stars contest invited U.S. formal and informal educators to submit their best examples of using NASA's Hubble Space Telescope in science, technology, engineering or mathematics (STEM) education. IGES conducted the contest in cooperation with the Space Telescope Science Institute, which manages the Hubble Space Telescope for NASA. Submissions were accepted from individuals and from teams of up to four members. Entries included any combination of text, graphics, video and photos.

In July 2010, 14 educators received "Gold Stars," awarded to the best of the best—as judged by IGES and NASA scientists and educators—from the entries selected as Top Stars during the contest's four rounds of competition. Examples of Gold Star-winning products include:

- **PLAYGROUND PLANETARIUM**—A curriculum that teaches elementary school students about constellations and the myths surrounding them. Younger students design and create their own planetarium using a dome-shaped playground climber, while older students analyze Hubble images.
- **TWENTY YEARS OF HUBBLE**—Middle school students create a timeline of Hubble events and discover new vocabulary using foldable cards.
- **THE LIFE AND DEATH OF BOB (a.k.a. NGC 6397)**—A slide show and supplemental images chronicle the use of Hubble images through a semester-long, college-level introductory astronomy course.

Gold Star winners received the following prizes (in addition to previously awarded Top Stars prizes):

- An official letter of commendation from NASA.
- An invitation to present their entry to other educators nationwide using the NASA Digital Learning Network.
- A pair of IMAX movie tickets to see "Hubble 3D."
- A "Hubble 3D" movie poster for classroom display.

Educators selected as Gold Stars were also to be featured in articles on NASA's website.

"All of our Gold Star and Top Star winners should be extremely proud of their work," said Bonnie McClain, NASA Hubble education plan co-lead. *"Educators and students around the world will benefit from their effective use of Hubble in high-quality education products and activities."*

For more information, including access to all Top Stars activities, please visit:

<http://topstars.strategies.org>

Carbon Benefits Project

IGES organized the public roll-out event for the Carbon Benefits Project (CBP). The program, titled "Unlocking Carbon's Promise: Breakthroughs in Measuring, Monitoring, and Management," took place at the World Wildlife Fund headquarters in Washington, D.C. The CBP is a project of the United Nations Environment Programme, funded by the Global Environmental Facility,

and led by the World Wildlife Fund and Michigan State University. By combining ground-based measurements with remote sensing technology and statistical analysis, the CBP will assess the levels of carbon stored through sustainable land management practices, allowing some of the world's poorest people to benefit from carbon sequestration by plugging them into the world carbon market.

David Reed, WWF senior vice president, policy, speaks at the Carbon Benefits Project roll-out event.





Biking to Work in Hot Weather

*John Ensworth
IGES Senior Science Education Specialist*

Hot weather presents a host of challenges for those of you who bike to and from work. But it doesn't have to stop you in your tracks. There are many things that you can do to make yourself more comfortable while and after you ride in the heat (and sometimes the humidity too), besides packing work clothes and finding a shower at the office (don't discount the value of finishing with cold water to help you stop perspiring).

WATER

Make sure you have plenty of fresh water with you. It won't increase your bicycle weight too much to have a second water bottle mounted on the frame or in the bags on the back. If your commute is longer, consider filling your water bottle with just crushed ice. There will be a cold drink ready for you within 15 to 20 minutes. Most convenience stores will allow you to refill your bottle with more crushed ice if you need it.

LIGHT-COLORED CLOTHING

Whether you are on or off the bike, the standard advice in the summer is to wear light-colored clothing. On a 100-degree day, a white car will be around 135F inside while a black car could reach 190F (source: National Safe Kids Organization). The advantage cyclists have over a car interior is that we are out in the wind. The air will

carry off some heat and cause sweat to evaporate off your skin (a very efficient way to cool, which is why most bicycle clothing is made to wick sweat from your skin). But if you have to ride with the breeze, this won't help as much.

Simply for the sake of visibility, you probably already (or certainly should) have a light-colored jersey top. Many helmets are light-colored as well. Alternatively, you can get a helmet cover with a light color, but get one that is very porous, since the air coming through the helmet will cool you more than anything else.

As for the pants, well, almost all bicycling shorts are black. And wearing white shorts might look like underwear... this may be one accessory that just needs to remain dark.

HUMIDITY

Summer humidity (or the lack of it) should figure into your comfort as much as temperature does. If you are in the desert Southwest, for example, you may get a chill in the cool dry mornings and need a light windbreaker, but then have to ride home in air at or over 100F—it may be a dry heat, but it's still darn hot.

In more humid regions of the country, actual morning temperatures may not seem overly uncomfortable. But with moderate to high humidity, the sweat you do generate won't evaporate. That means clothing can get soaked and water may even pool under your helmet, potentially releasing into your eyes when you check for

traffic over your shoulder. Place an absorbent cloth (or wear a headband) under the helmet to combat this. Without the benefit of evaporative cooling, you could even overheat on a cool but humid morning (again, we see just how important evaporative cooling is to the body). Slow down and enjoy the ride!

Afternoon heat and humidity can be deadly. If you push too hard, even slowing down or stopping for a while may not be enough to cool you down. Beware of signs of heat stroke: chills, dry clammy skin, cramps, disorientation, nausea or vomiting. If you begin to feel any one of these symptoms, then stop, get in the shade or an air conditioned building, drink lots of water, and (if you don't recover quickly) call for medical help—always pack your cell phone, and personal ID with an emergency contact number in case someone else must make a call on your behalf.

When it comes down to it, the key to bicycling in hot weather is the same as it is for riding in rainy or cold conditions or when it's dark: PREPARATION. Being prepared will make the difference between an experience you want to repeat every day of the year, or something you quit for seasons at a time. The hot weather shouldn't stop you, but if it taxes you—slow down and smell the flowers!

This is the fourth installment in a series on biking safely and comfortably. See the first, second and third installments in the 2007, 2008–2009, and 2010 issues of Observe, respectively.

Why Should Scientists Communicate Their Science to the Public?

Dan Stillman
Science Communications
Manager, IGES

More and more, the answer is because if they don't, someone else will.

Now, that's not always a bad thing. There are plenty examples—in print, on the Web and on TV—of reporters, science writers and bloggers—accurately and objectively communicating the latest science research and discoveries.

There are, however, just as many cases in which science is miscommunicated, twisted or reported out of context, sometimes inadvertently and other times intentionally. **Exhibit A: Climate change.**

Climate change is an inherently challenging topic to communicate to the public. First, it deals largely (though not exclusively) with changes expected to occur far in the future. Such changes and their consequences are naturally more difficult for people to grasp than those in the here and now, like an approaching heat wave or winter storm.

Add in a world where policy advocates on both sides cherry-pick the science to suit their interests, and where the blogosphere has blurred the line between news and opinion, and what you have is a public being bombarded by a constant and confusing stream of climate change news and commentary.

This is why organizations such as the American Geophysical Union have, in recent years, launched campaigns to connect climate scientists directly with the media. The AGU's most recent effort in this area, which ran for two to three months starting in late 2010, involved about 700 scientists.

It's also why Matt Rogers, a research scientist at Colorado State University and education and public outreach lead for NASA's CloudSat mission, is outspoken about the need for scientists to engage with the public about climate change.

"I'd suggest reading any newspaper publishing letters to the editor where writers are expressing opinions on climate change—the fundamental components of science are not being communicated, and the level of discourse about science topics in the general public is shockingly uninformed," Rogers said. *"If scientists are not part of the discussion, then other parties*

will have a disproportionate role in guiding the public opinion of science and research, which will ultimately have a very negative effect on our ability to conduct meaningful research."

Rogers notes that scientists who get involved in education and outreach not only promote a more scientifically literate public, but also become better scientists.

"The ability to explain complex phenomena to an audience using simple terms and concepts requires you to have a comprehensive understanding of the topic at hand, especially when fielding questions from an audience," Rogers said. *"Being able to operate in 'public' mode improves your abilities as a scientist to interact professionally with other scientists. The extra experience in public speaking and interaction makes for more confident and meaningful professional interactions."*

If that's not motivation enough, Rogers has one more reason scientists should consider taking their science directly to the public—the very survival of science itself.

"Ultimately, an educated public who understands the fundamentals of science will be enthusiastic in supporting scientific research, and will respond to research results in an informed manner," Rogers said.



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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 environmental, economic and societal challenges.

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