



# ISTS

***Conquer the Winter Doldrums with These Opportunities!***

Nadine Weirather, Editor

November, 2011

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## Iowa Academy of Science Mission

- \* Promote scientific research and dissemination
- \* Improve instruction in the sciences
- \* Promote public understanding of science
- \* Recognize excellence in science and science teaching

## ISTS Leadership

Your Leadership team can be found at <http://ists.pls.uni.edu/officers.html>.

We are always looking for good people. Send a line to [De Anna Tibben <dtibben@ames.k12.ia.us>](mailto:DeAnna.Tibben@ames.k12.ia.us) if you would like to be more involved.

## ISTS Fall Conference News

*Thanks to Past Chair, Kathy Megivern, for a fabulous Fall Conference in Ames.*

### **Soar to the Core a Success**

The ISTS Fall Conference was a chance to get away from regular classroom duties, and at the same time be invigorated with new ideas, validated in what we are already doing, and connected with colleagues from across the state.

Participants were treated to a tour of Reiman Gardens, a session on ISU Extension Science, Engineering, and Technology, and a session on the

Biotechnology Outreach Education Center.

Colleen Anderson and Yvette McCauley discussed issues that are on the horizon for Iowa science teachers. The focal point of our work in the next few years in Iowa schools include: STEM, Next Generation Science Standards, Iowa Core – Science in Literacy, and Response to Intervention.



We continue to seek those who would like to become more active in the Iowa Academy of Science and the Iowa Science Teachers Section. If you know of those who are trying to promote science or science teaching in Iowa and who are not members, please encourage them to join. Send names of anyone who you believe would be a good presenter or exhibitor at next year's Fall Conference to a member of the leadership team.

# How to Get More Science Teachers Who Can “Do” Science: And Use Their Teaching as an Example

— by Dr. Robert Yager, Professor of Science Education, University of Iowa

Why is there not more attention to all students (and teachers) actually “doing” science in every K-16 science classroom? The faulty assumption is that there is information thought to be accurate that all must “Know” before “doing” science. Most science teachers continue to use typical science textbooks and lab directions in excess of 90% of the time! Doing science means personal exploration of nature and attempting to explain objects and events encountered. It also means exploring what others have done (and reported) as ways of evaluating their initial ideas. Science cannot be done in a vacuum! It takes “doing”, “trying”, “creative thinking”, and “evidence gathering”! Textbooks, lab manuals, and quick fixes are all the opposite of actually “doing science”.

Most Professional Development efforts invite persons with current understandings of science to tell, share, and encourage others to remember and repeat relevant research

results. This view of doing science is what characterizes procedures for conferences and for most Professional Development efforts which are typically designed to influence the science that is taught. There should be major efforts to produce students who recognize and produce questions and then to investigate personally the validity of the evidence collected. Such actions would illustrate “doing science”. Could not Professional Development efforts (including reports at conferences) start with problems/questions followed by varied attempts to answer them? This would lead to the collection of multiple responses and a sharing of such evidence in science classrooms? Could there be some sharing of results and changes in teaching that occur after actual Professional Development sessions or conference presentations? We need more than happy attendees; we need reporting of new approaches to teaching which are tried and

evaluated after a Professional Development experience!

Science is typically taught by sharing the explanations and interpretations of others. These are then used to determine what is put in textbooks. This information is then used for evaluating student learning. Student ideas and involvement are not expected nor are they welcomed. Science is too often like art where teachers admire and/or criticize the performances of the best students. Standardized tests too often require only statements repeating what has been presented or assigned. The information included in textbooks or directions for labs only focus on students remembering and/or duplicating performances with no use of questions, possible answers, real investigations, or interpretations. Such teaching does not consider how science can be done better and made a part of efforts illustrating real learning and human life itself!

## Exploring Iowa's Natural Resources On-line Course January 23 – May 6, 2012

The goal of this course is to help you utilize local natural resources as unifying themes to implement Iowa Core concepts in your curriculum.

Participants will:

1. Become more knowledgeable about local natural resources and issues facing them.
2. Increase knowledge/skills on finding credible electronic resources.
3. Compile a list of local natural resources areas and contacts.
4. Develop a topical unit that meets their specific teaching needs.
5. Be acquainted with a variety of additional resources to enhance their personal knowledge of Iowa's natural resources and issues facing them.

### [You must register on-line.](#)

Registration deadline is January 16, 2012. Registration fee includes materials and 3 license renewal credit for \$60. *This course is being offered by AEA PD Online, a joint initiative by all of Iowa's Area Education Agencies. This course therefore uses AEA PD Online's alternative fee schedule for license renewal credit. Transcripts and credit will be issued by AEA PD Online instead of Heartland AEA.*

For more information, contact:  
Shannon Hafner, Aquatic Education Program, Iowa DNR, (641) 747-2051,

## Computational Thinking Workshops @ ISU

The Department of Computer Science is presenting a set of free workshops on computational thinking. The workshops (Saturday December 10, 2011, Saturday January 14, 2012, Saturday February 11, 2012, Saturday March 3, 2012) are designed to help teachers and students prepare for the Computational Thinking Competition (<http://www.cs.iastate.edu/ctc.shtml>) to be held at Iowa State University

IOWA STATE UNIVERSITY  
Birthplace of the Electronic Digital Computer

April 14, 2012.

Computational thinking and the rules for the competition will be explained. Examples of computational thinking will be given using Java, Greenfoot, Scratch, and no computer. After the basics and examples have been covered, the attendees will be divided into small groups to spend time working on a sample project that is appropriate for the competition, and lunch will be provided. The workshops will run 9:00-12:00 on the days listed below.

Registration for the workshops can be found at <http://www.cs.iastate.edu/ctc.shtml>. Registration should be completed at least a week prior to the

workshop you plan to attend. Registration will be processed on a first come basis.

Workshop attendees can also register for a Scratch workshop that will be conducted after the Computational Thinking Workshop concludes. Both are **free** to Iowa K-12 students and teachers.

## Science Center of Iowa *Lost Egypt: Ancient Secrets, Modern Science opens @ SCI*



*Lost Egypt* is an immersive quest for knowledge – particularly inspiring for young people, illuminating the roles they can play as future archaeologists, scientists, engineers, technicians and lifelong learners.

Learn about archaeology, including how science changes over time as new techniques are developed and new information is uncovered. Explore how mummies, artifacts and other material remains contribute to our scientific understanding of past cultures.

### Passing the Gavel, Adam Puderbaugh to De Anna Tibben:

*All conference photos taken  
by Tom Ervin.*



## Compete for \$300K in Prizes in the Siemens We Can Change the World Challenge



This environmental, sustainability competition for grades K–12 encourages teams of students to create solutions to environmental problems in their schools, communities, and districts while learning about science and conservation. Using the fundamentals of project-based scientific inquiry, students are given the tools to identify an ecological problem, research it, and determine how their green solution can be replicated by other communities that face similar challenges. They'll learn. They'll take action. And their ideas might just change the world.

Access is available to a wealth of free digital tools to help integrate the Challenge into your curriculum. More than \$300K in prizes including scholarships, adventure trips, and even a chance to present at the United Nations will be awarded. To win big and save the planet, visit [www.wecanchange.com](http://www.wecanchange.com) to find out more. The Challenge is open through March 15, 2012.

*from NSTA Express, November 21, 2011*



## New Opportunity to Plan Student Experiments Aboard the ISS

The National Center for Earth and Space Science Education, in partnership with NanoRacks, is inviting communities across the U.S. to participate in the Student Spaceflight Experiments Program (SSEP) Mission 2 to the International Space Station (ISS).

Each participating community will be provided all launch services to fly a real microgravity research mini-laboratory on the ISS from September 28 to November 12, 2012, and a kit for assembly of their mini-lab. An eight-week experiment design competition in the community, held in the spring of 2012, will allow teams of students in grades 5–12 to design real microgravity experiments vying for their community's reserved mini-lab slot on the ISS.

Interested in getting your school/community involved? Visit the [SSEP web page](#). For more information, or contact [ssep@ncesse.org](mailto:ssep@ncesse.org) or call 301-395-0770.

*from NSTA Express, November 21, 2011*

## National STEM Video Game Challenge Now Open to Students and K–12 Teachers

The annual National STEM Video Game Challenge for both students and K–12 teachers is now open for entries. The annual competition, held by the [Joan Ganz Cooney Center at Sesame Workshop](#) and [E-Line Media](#) in partnership with sponsors [AMD Foundation](#), [the Corporation for Public Broadcasting/PBS KIDS](#)

[Ready To Learn Initiative](#), [Entertainment Software Association](#), and [Xbox 360](#), is accepting submissions of original video game concepts and designs from students and educators in four categories at [www.stemchallenge.org](http://www.stemchallenge.org).

“The National STEM Video Game Challenge will channel the potential of a new generation of game creators to develop innovative tools for learning,” said H. Melvin Ming, President and CEO, Sesame Workshop. Entries can be created using any game-making platform including, but not limited to, written concepts, Gamestar Mechanic, Microsoft's Kodu Game Lab, GameMaker, and Scratch.

The Middle School and High School Category winners will each receive AMD-based laptops, game design software packages, and other tools to support their skill development. Each winner's youth-sponsoring organization will receive cash prizes and educational software (there will be a total of \$80,000 in prizes for youth and youth-sponsoring organizations). A prize pool of \$30,000 will be awarded to the Collegiate Category winners and a prize pool of \$40,000 to winners in the Educator Category.

The Challenge will accept entries through March 12, 2012. Complete guidelines and details on how to enter are available at [www.stemchallenge.org](http://www.stemchallenge.org).

*from NSTA Express, November 21, 2011*

**2012 CHALLENGE IS OPEN!  
ENTER NOW!**



## Learning Registry

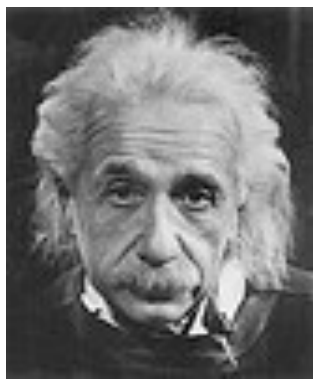
*Departments of Education and Defense to launch “Learning Registry” tools and Community*

The U.S. Departments of Education and Defense announced the launch of “Learning Registry,” an open-source community and technology designed to improve the quality and availability of learning resources. Rather than creating an alternative destination to existing websites, Learning Registry is a communication system that allows existing educational portals and online systems to publish, consume, and share important information about learning resources with each other and the public, while respecting the privacy of individual users.

Basic data about resources—grade level, subject area, and author—can be shared through Learning Registry, as well as more complex data such as curricular standards alignment information. This platform for innovative data sharing also allows user activities to be shared anonymously, such as the types of educators who find a specific resource particularly useful.

For further information and contact with collaborators using Learning Registry, visit the community website: [www.learningregistry.org](http://www.learningregistry.org).

*from NSTA Express, November 14, 2011*



## Albert Einstein Distinguished Educator Fellowship Program

*by Richard Jones from NESTA E-News, October, 2011*

**The [Albert Einstein Distinguished Educator Fellowship Program](#) began accepting applications for 2012-2013 fellowships on October 20, 2011. The fellowship offers current; public or private; elementary and secondary; science, technology, engineering, and mathematics classroom teachers with demonstrated excellence in teaching an opportunity to serve in the national public policy arena. Fellows provide practical insight in establishing and operating education programs. Fellowships increase understanding, communication, and cooperation between legislative and executive branches and the science, mathematics, and technology education community.**

Albert Einstein Fellows bring to Congress and appropriate branches of the federal government the extensive knowledge and experience of classroom teachers. They provide practical insights and “real world” perspectives to policy makers and program managers developing or managing educational programs. During the Fellowship, each Einstein Fellow receives a monthly stipend of \$6000.00 plus a \$1000.00 monthly cost of living allowance. In addition, there is a moving/relocation allowance as well as a professional travel allowance.

For more information regarding this fantastic opportunity click [here](#).



## Climate Change Website

The U.S. Environmental Protection Agency (EPA) launched an all new website titled “A Student’s Guide to Global Climate Change” devoted to educating 6-8<sup>th</sup> graders about Earth’s climate and how it is changing as a result of burning fossil fuels and other human activities.

The site provides content on the science of climate change, how it affects society and ecosystems, and information about solutions to the climate change problem. The information is presented in a variety of compelling formats including video, animations, interactive graphics, and “expeditions” where students can explore and learn how climate change will affect places around the world. This new web resource can be used by teachers, and informal educators to develop class activities and homework.

The site covers the Climate Literacy Principles developed by the National Oceanic and Atmospheric Administration.

To view the site: <http://epa.gov/climatechange/students/>.



## Waste Reduction Workshop

### **Waste Reduction: Addressing the Overlooked "R"**

It's about our environment...not just another course about recycling. Course addresses Iowa Core content...Lesson plans are *interesting, relevant, and meaningful* to students and they incorporate the Characteristics of Effective Instruction...Great for middle school, but may be adapted for K-12 grades.

### **Prairie Heritage Center**

**Just off Hwy 10 between Sutherland and Peterson in O'Brien Co.**

Part I: Friday, Jan. 13 (6 - 9 pm),  
Saturday, Jan. 14 (8:30 am - 4:30 pm)  
Part II: Friday, April 13 (6-9 pm)

Go to <http://www.ceee.uni.edu/wastereduction/workshops.aspx> for workshop details and to register.

\* **\$50** \* A limited number of free registrations are available to teachers in select areas. See website for details.

Supporters: REAP Conservation Education Program, Iowa Department of Natural Resources Solid Waste Alternatives Program, landfills and solid waste agencies, and the Clay, Lyon, O'Brien, Page, Palo Alto, and Sioux County Conservation Boards.



## Project Dragonfly

OXFORD, Ohio – Applications are being accepted for 2012 summer/fall graduate field courses and a master's program that offer international studies in 11 countries throughout Africa, Asia, Australia and the Americas.

Offered by Miami University's Project Dragonfly, the Cincinnati Zoo & Botanical Garden and partners worldwide, the GFP Master's degree brings together graduate students, scientists, educators and community leaders at critical conservation field sites across the planet. Sites for 2012 include the Amazon, Australia, Baja, Belize, Borneo, Costa Rica, Guyana, Kenya, Mongolia, Namibia, and Thailand.

Tuition for seven graduate credits and all basic in-country expenses are covered in the \$1,290 course costs. Accepted students are responsible for airfare.

Earth Expeditions and the GFP, which can be completed part-time from anywhere in the United States or abroad, are open to educators and other professionals from all disciplines and settings. For information and to apply, please visit:



Earth Expeditions: <http://www.EarthExpeditions.org>  
Global Field Program: <http://www.MastersGFP.org>

Project Dragonfly is a non-profit program that reaches millions of people each year through inquiry-driven learning media, public exhibits and graduate programs worldwide. Dragonfly is housed at Miami University, a state university in Oxford, Ohio, established in 1809 and listed as one of the eight original Public Ivies.

## About NGSS

*Next Generation Science Standards for Today's Students and Tomorrow's Workforce:*

Through a collaborative, state-led process, new K–12 science standards are being developed that will be rich in content and practice, arranged in a coherent manner across disciplines and grades to provide all students an internationally benchmarked science education. The NGSS will be based on the Framework for K–12 Science Education developed by the National Research Council. The development of the Next Generation Science Standards is a state-led effort.

- Iowa is a lead state.
- For more information, see <http://www.nextgenscience.org/>

## THE SEARCH FOR AN OUTSTANDING BIOLOGY TEACHER

Every year, the Outstanding Biology Teacher Award (OBTA) program of the National Association of Biology Teachers (NABT) tries to recognize an outstanding biology educator (grades 7-12) in each of the 50 states; Washington, D.C.; Canada; Puerto Rico; and overseas territories. Candidates for this award do not have to be NABT members, but they must have at least three years public, private, or parochial school teaching experience. A major portion of the nominee's career must have been devoted to the teaching of biology/life science.

Candidates are judged on their teaching ability and experience, cooperativeness in the school and community, inventiveness, initiative, and student-teacher relationships. OBTA recipients are honored at a special event during the NABT Professional Development Conference sponsored by BIOZONE and receive microscopes from Leica Microsystems, Inc., and certificates and a complimentary one-year membership from the NABT.

To nominate a colleague or yourself, follow the nomination instructions found in the Awards and Opportunities section of the NABT website at [www.nabt.org](http://www.nabt.org). The deadline for 2012 nominations is March 15, 2012. For more information, contact Iowa's OBTA Awards Directors Doug Herman [herman.doug@iccsd.k12.ia.us](mailto:herman.doug@iccsd.k12.ia.us) or Mike Zeller, [mzeller@iastate.edu](mailto:mzeller@iastate.edu).

## NASA Websites

### The Space Place News

Have you ever wondered how astronomers can predict when there's going to be an abundance of shooting stars in the night sky? Showers of meteors, the scientific name for "shooting stars," occur predictably several times a year, usually peaking within the same two- or three-day period. So what causes them? Why do they seem to come from the same part of the sky? What's the best way to see them? Visit <http://spaceplace.nasa.gov/meteor-shower> and get ready to enjoy the next show.



### A NASA Occupation

What's it like to work right in the middle of an exciting NASA science mission? The Space Place decided to find out by asking NASA scientists and engineers to describe some of their most exciting moments on the job. The result is Mission Chronicles, a blog for parents and teachers—although kids are welcome to read it too. The latest post comes from a mission ACE, more formally called a mission controller. He or she is the one who maintains the human link between spacecraft and Earth as the robotic explorer carries out its mission of discovery in deep space. Check out



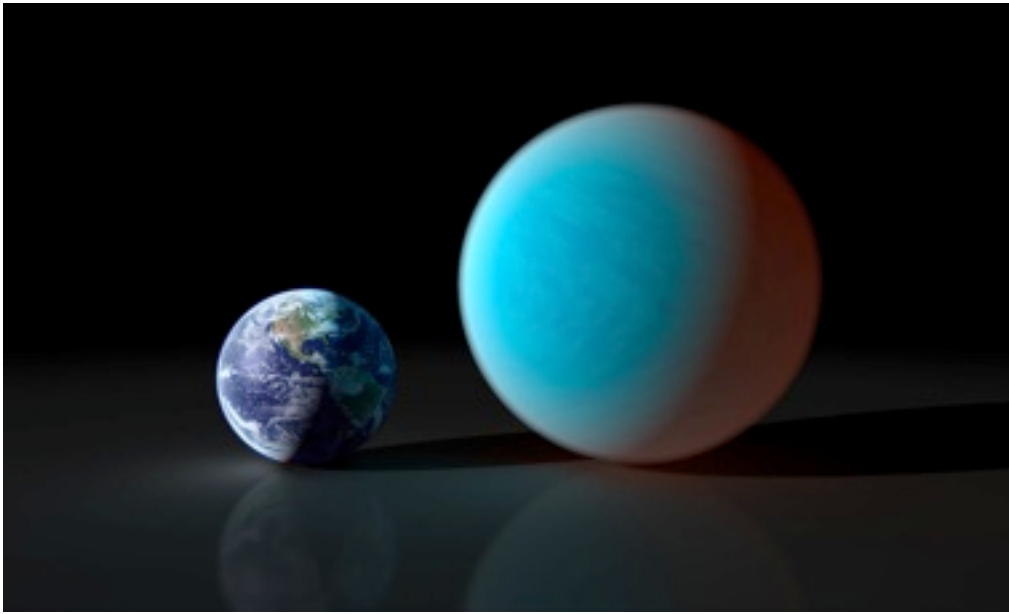
the ACE's story at <http://spaceplace.nasa.gov/mission-chronicles>.

### iPhone App

"Satellite Insight" for iPhone and other iOS devices is now available on iTunes. It's free! It's challenging! It's fun! Colored blocks represent different types of data gathered by GOES-R's amazing science instruments. The data blocks fall into columns on a grid. Your job is to bundle like data types together and store them safely before the data grid overflows. It is the very first iPhone app from the National Oceanic and Atmospheric Administration (in partnership with NASA). Check it out at <http://itunes.apple.com/us/app/satellite-insight/id463588902?mt=8>.

### More Conference Photos:





## Re-thinking an Alien World: The Strange Case of 55 Cancri e

Forty light years from Earth, a rocky world named “55 Cancri e” circles perilously close to a stellar inferno. Completing one orbit in only 18 hours, the alien planet is 26 times closer to its parent star than Mercury is to the Sun. If Earth were in the same position, the soil beneath our feet would heat up to about 3200 F. Researchers have long thought that 55 Cancri e must be a wasteland of parched rock.

Now they’re thinking again. New observations by NASA’s Spitzer Space Telescope suggest that 55 Cancri e may be wetter and weirder than anyone imagined.

Spitzer recently measured the extraordinarily small amount of light 55 Cancri e blocks when it crosses in front of its star. These transits occur every 18 hours, giving researchers repeated opportunities to gather the data they need to estimate the width, volume and density of the planet.

According to the new observations, 55 Cancri e has a mass 7.8 times and a radius just over twice that of Earth. Those properties place 55 Cancri e in the “super-Earth” class of

exoplanets, a few dozen of which have been found. Only a handful of known super-Earths, however, cross the face of their stars as viewed from our vantage point in the cosmos, so 55 Cancri e is better understood than most.

When 55 Cancri e was discovered in 2004, initial estimates of its size and mass were consistent with a dense planet of solid rock. Spitzer data suggest otherwise: About a fifth of the planet’s mass must be made of light elements and compounds—including water. Given the intense heat and high pressure these materials likely experience, researchers think the compounds likely exist in a “supercritical” fluid state.

A supercritical fluid is a high-pressure, high-temperature state of matter best described as a liquid-like gas, and a marvelous solvent. Water becomes supercritical in some steam turbines—and it tends to dissolve the tips of the turbine blades. Supercritical carbon dioxide is used to remove caffeine from coffee beans, and sometimes to dry-clean clothes. Liquid-fueled rocket propellant is

also supercritical when it emerges from the tail of a spaceship.

On 55 Cancri e, this stuff may be literally oozing—or is it steaming?—out of the rocks.

With supercritical solvents rising from the planet’s surface, a star of terrifying proportions filling much of the daytime sky, and whole years rushing past in a matter of hours, 55 Cancri e teaches a valuable lesson: Just because a planet is similar in size to Earth does not mean the planet is like Earth.

It’s something to *re*-think about.

Get a kid thinking about extrasolar planets by pointing him or her to “Lucy’s Planet Hunt,” a story in rhyme about a girl who wanted nothing more than to look for Earth-like planets when she grew up. Go to <http://spaceplace.nasa.gov/story-lucy>.

The original research reported in this story has been accepted for publication in *Astronomy and Astrophysics*. The lead author is Brice-Olivier Demory, a post-doctoral associate in Professor Sara Seager’s group at MIT.