# WORKING TOGETHER

## Making Connections Within Science and Mathematics


Iowa Council of Teachers of Mathematics and
Iowa Academy of Science-Iowa Science Teaching Section
Math Science Fall Conference 2013

Scheman Center on ISU campus in Ames. October 23, 2013

# 2013 Corporate Sponsors

This conference is made possible through the generous support of corporate sponsors.

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17 year sponsor

## Presidential Awards for Excellence in Mathematics and Science Teaching

The Presidential Award for Excellence in Mathematics and Science Teaching (PAEMST) is the highest recognition that a kindergarten through 12th-grade mathematics or science teacher may receive for outstanding teaching in the United States. Enacted by Congress in 1983, this program authorizes the President to bestow up to 108 awards each year. The National Science Foundation administers PAEMST on behalf of the White House Office of Science and Technology Policy. This year, PAEMST is partnering with the Iowa Academy of Science to sponsor the recognition of Iowa's 2011 PAEMST Award winner and the 2012 nominees.

4 year sponsor

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|---|---|
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This program will not be available in print version at the conference.

Thank-you to the Ames Convention and Visitors Bureau for all their support and effort on behalf of the ICTM / IAS-ISTS 2013 Fall Conference. Their help has been invaluable.


Cover design and app graphics by Jen DeYoe, 2013 Team Captain, Inc

# Welcome to the Iowa Council of Teachers of Mathematics and the Iowa Academy of Science –Iowa Science Teaching Section 2013 Fall Conference

# Announcements

## Table of Contents



## Exhibit Hall

Wednesday 8:00 a.m.–4:00 p.m.
Don't miss the
Exhibitor Door
Prize Drawing at 4:00!

## Exhibitor Door Prize Check-off

Conference exhibitors have donated more than 50 prizes to be given away at the end of the conference. An Exhibitor Check-off Card is included in your registration packet. As you visit with an exhibitor, have the representative stamp a blank box on the card. Fill at least 50% of the boxes by the end of the sessions on Friday to be eligible to win a door prize. Submit your card at the Exhibit Hall before 4:00.

You must be present to win.

# We're Going Green
# Follow us on Twitter–
# Fall Conference Scheduling App -

## Note: This program will not be available in print version at the conference.

See next page for *Your Guide to a Twitterific Conference*

Here is some information to help you use your app–

STRANDS:

Teaching and Learning - Sessions that focus on the research and practice of how teachers teach and how learners learn; classroom activities.

Deeper Understanding - Sessions that focus on the development of a strong understanding of specific science or mathematics content.

The Integration of STEM Disciplines - Sessions that introduce participants to strategies for integrating any two or more STEM disciplines in new or authentic ways.

TYPE OF PRESENTATION:

HANDS-ON WORKSHOP: a presentation that provides everyone with a hands-on experience. Tables/Chairs are provided for participants.

DEMONSTRATION: a series of activities or experiments allowing only a limited participation by the audience. Chairs are provided for the participants.

LECTURE: a sharing of ideas, techniques, or research results with audience participation limited to questions. Chairs are provided for the participants.

COMPUTER LAB SESSION: a presentation that provides participants with the opportunity to work with software or other technology in a computer lab setting. Computer sessions may be limited.

TOPICS:

Science
Technology
Engineering
Mathematics
Scientific Practices (Science as Inquiry)
Engineering Practices
Physical Sciences
Life Sciences
Earth & Space Sciences
Numbers & Operations
Measurement
Geometry
Algebra
Statistics & Probability
Pre-Calculus & Calculus

LEVEL:

Lower Elementary
Upper Elementary
Middle School
High School
College
Supervision/Administration
Pre-Service Teachers

The success of this conference is due to the Fall Conference Committee and many other amazing volunteer supporters. Thanks to all those listed on pages 40-42 and any volunteers not listed that helped make this conference possible.

# Your Guide to a Twitterific Conference

① Start by logging into your Twitter account and searching for our event hashtag:

**#IctmIsts13**

② Contribute to the conversation by including the event hashtag in your own tweets:

**#IctmIsts13**

③ Each session of the day we'll be focusing twitter content on a specific topic. Search for these tags to be a part of the conversation each hour:

All Conference = **#IctmIsts13**

Session 1–Modeling in Math & Science Classrooms #model

Session 2–Formative Assessment Ideas #fai

Session 3–Authentic use of Technology #tech

Session 4–Student-centered Classrooms #kid1st

Don't forget to follow ICTM and ISTS:

@iowamathteach

www.iowamath.org

@iowasciteachers

www.iacad.org

Stop at the STEMCafe on 2nd Floor all day to learn more.

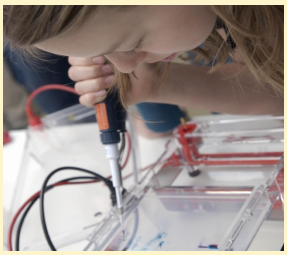
Are you taking advantage of the Iowa Science Teachers Journal?
ISTS supports a premier online teaching magazine at
http://www.iacad.org/istj/
Submit your articles and ideas to the journal. Read it!
An excellent resource that is online.

ISTJ
Iowa Science Teachers Journal

# *Iowa Junior Academy of Science*

**Visit the IAS Booth for more information and to join.**

The Iowa Junior Academy of Science provides resources and programs for 6th-12th grade science students and their teachers/ parents. IJAS promotes individual and small group student research, awards, scholarships, and extra-curricular activities to broaden a student's science experiences.



Save the date!
April 11 - 12, 2014

The 126th Annual Meeting of the Iowa Academy of Science will be held Friday and Saturday, April 11 - 12, 2014 in Fort Dodge at the Iowa Central Community College campus.

**The Governor's STEM Advisory Council**, a cross-sectional body of professionals charged with invigorating the STEM education pipeline for Iowa, was assembled in September of 2011 to fulfill the goals of Executive Order #74, including "Work to dramatically increase studentsôinterest and achievement in STEM subjects so they will have a greater opportunity to pursue STEM careers." The Iowa Mathematics & Science Education Partnership, a four year-old inter-university STEM collaborative, has been assigned to manage the programmatic and administrative functions of the new Council. The make-up, functions, ambitions, and actions of the Council are being determined at a swift pace through fall of 2011. The input of STEM education practitioners to the Council is vital to its mission.
Jeff Weld, Executive Director, Governor's STEM Advisory Council

# Tuesday Opportunities & Activities
# October 22, 2013

## NSF Presidential Award for Excellence in Mathematics and Science Teaching Reception

Join us at the Prairie Moon Winery
for a reception in celebration of
Iowa's 2012 Presidential Award for Excellence in
Mathematics and Science Teaching winner.

4:30-5:30 P.M. On-site registration
5:00-8:00 P.M. Connecting time: Time for teachers to reconnect with colleagues, socialize, network with HUB Managers; wine tasting, Hors d'oeuvres, and tours of winery hosted by Prairie Moon Staff available. *Must be 21 years of age to participate in wine tasting. Bottles of wine, artwork, misc. available for purchase.*

5:30 P.M. Welcome ISTS Fall Conference Chair

6:00 P.M. PAEMST award presentation- hosted by Yvette McCulley, Iowa Dept of Ed
*Networking time, tours, wine tasting, all suspended during this time. Heavy hors d'oeuvres will be placed out after introduction and presentation. Networking, wine tasting, etc. may resume once presentation completed.*

7:00 P.M. "The Science of Beer Brewing and Wine Making"

*Learn the science of beer brewing! An event designed for all participants, including pre-service teachers.*

8:00-10:00 P.M. ISTS Chair Reception, tasting room; desserts and light refreshments will be served.

Click logo for map to winery.

3801 W 190th St
Ames, IA 50014

http://www.123rf.com/

## AEA Science Consultant Meeting

10:00 A.M.–3:30 P.M.
By invitation

Room 299 Scheman Center ISU

# Tuesday Opportunities & Activities
# October 22, 2013

# Math Pre-service Teaching Session

## New Teachers & Future Teachers:

Join us for a special ICTM pre-conference session with other teachers and leaders in math education. There is no fee but please pre-register at www.iowamath.org

You are invited to a special welcome session created just for new and future teachers.

Tuesday Evening, October 22, 2013

6:00 p.m. – 9:00 p.m.

Ground Floor Scheman Building, ISU Campus, Ames, Iowa

Meet and share a session with Zalman Usiskin, keynote speaker for the conference as he offers "Some Advice for Tenderfoots from an Experienced Hand"

- Snacks and beverages provided
- Free teaching materials & ideas
- Fun activities, fun people
- Find out who's who in math education and how they can help you
- Get an overview of the ICTM conference – the ins and outs of making it a great conference
- Network with other pre-service & beginning teachers

Join us in Ames the evening before the ICTM-IAS/ISTS Conference. We'd love to meet you, help make your conference attendance a success and pass on some teaching hints and special surprises.

Questions? Contact Deb Tvrdik, samdeb@wccta.net or Julia North, northj@uni.edu

Even though registration is free, please pre-register to help us make sure we have enough materials for everyone. Enter the following link: https://docs.google.com/spreadsheet/ccc?key=0Arx31pMMz-

# Wednesday Opportunities

## October 23, 2013
## Scheman Center ISU

| | |
|---|---|
| 7:30-8:00 A.M. | Registration & On-site Registration<br>coffee and pastry |
| 8:00 A.M. | Welcome by ICTM & ISTS – opening of Exhibit Hall;<br>1st Twitter entry computer bar, fellowship time, |
| 8:15-8:45 A.M. | Joint Morning Session with STEM Hub Managers |
| 9:00-9:45 A.M. | Breakout Session 1 *(tweets go out 5 minutes before start of new sessions w/ topics)* |
| 10:00-10:45 A.M. | Breakout Session 2 |
| 11:00 A.M.–12:00 | ICTM Luncheon Served Room 220 -230–240<br>ISTS Luncheon Speaker in Auditorium |
| 12:00-12:30 P.M. | Breakout Session 3<br>- Roundtable time /repeated sessions |
| 12:30 P.M.-1:30 P.M. | ISTS Lunch Served Room 220 -230–240<br>ICTM Luncheon Speaker in Auditorium |
| 1:30 P.M. -2:00 P.M. | Visit the Exhibit Hall and Networking time |
| 2:00 P.M. -2:45 P.M. | Breakout Session 4 |
| 3:00 P.M.-3:45 P.M. | Breakout Session 5 |
| 4:00 P.M. | Closing & Door Prizes (must be present to win) |

Conference Registration & Check in for All Participants:

Wednesday, October 23, 7:30–11:00 a.m.

Times and rooms for individual breakout sessions in this program are subject to change.

## In the Exhibit Hall

8:00 a.m.–10:00 a.m.
Rolls and coffee compliments of exhibitors!

# Featured Workshops & Events

## 8:00 A.M.
## Welcome by ICTM & ISTS – opening of Exhibit Hall

## Joint Morning Session with STEM Hub Managers
## 8:15 A.M. – 8:45 A.M.

Click link to see what districts are in the hub.

| | |
|---|---|
| Northwest Hub - Iowa Lakes Community College | Room 171 |
| North Central Hub - Iowa State University | 004 |
| Northeast Hub - University of Northern Iowa | 080 |
| Southwest Hub - Southwestern Community College | Room 175 |
| South Central Hub - Drake University | Benton Auditorium |
| Southeast Hub - University of Iowa & Kirkwood Community College | Room 167 |

## Roundtables–Session 3
## 12:00–12:30

| | | | |
|---|---|---|---|
| Math Grades PreK - 2 | 204 | Biology/Life Science | 250 |
| Math Grades 3 - 5 | 175 | Chemistry | 88 |
| Math Grades 6 - 8 | 158 | Elementary Science | 275 |
| Pre-Algebra & Algebra 1 | 252 | Earth Science | Fisher Auditorium |
| Geometry | 254 | Middle School Science | 260 |
| Algebra 2 | 179 | Pre-Calculus/Calculus/Statistics | 299 |

Join the IAS-ISTS Keynote Speakers Robert and Michelle Root-Bernstein in a continuation workshop featured sessions 4 & 5.

# Professional Development

Leadership for the Iowa Council of Teachers of Mathematics (ICTM) and the Iowa Science Teaching Section of the Iowa Academy of Science (ISTS) is proud to announce an amazing opportunity for Iowa STEM teachers. We are offering 1.0 credit course focused on supporting STEM classroom teachers in creating meaningful collaborations with business and industry. Details are included below and in the attachment. Please forward to anyone you feel might be interested in this unique and forward-thinking opportunity!

Pre-registration Link: http://goo.gl/LiimFS

# Concurrent Session 1

| | | |
|---|---|---|
| Benton Auditorium<br>Evaluating Student Learning: Resources for Algebra Progress Monitoring<br><br>Lecture | Are you teaching algebra to struggling learners? This session will share resources being developed at Iowa State University for monitoring student progress in Algebra 1 and PreAlgebra. Assessment tools, methods for evaluating student growth in algebra proficiency, and professional development resources will be described. A case study will be used to illustrate algebra progress monitoring in action. | Anne Foegen<br>Iowa State University |
| Fischer Auditorium<br>Building Fluency with Number Sense: Addition and Subtraction PreK - Primary Grades<br><br>Lecture | What conceptual experiences do children need to develop fluency with addition and subtraction? How can brief daily mini-lessons help provide those experiences? Sample lessons will be shared.<br><br>*This presentation will be repeated session 5.* | Edward Rathmell<br>University of Northern Iowa |
| 004<br>Meeting Modeling Requirements in the New Standards Using Computational Modeling<br><br>Demonstration | The new curriculum standards call for modeling in both science and mathematics. Learn how to meet the modeling and computational thinking requirements using the Scratch programming environment. Attendees will receive science and mathematics demo examples to use in their classes and information on how to engage their students in model building. Scratch is easy to learn and is free from scratch.mit.edu. | Les Miller<br>Iowa State University |
| 080<br>Where'd it go?: Using Compost to Investigate Decomposition<br><br>Hands On | Students often disregard the role living organisms play in biological decomposition. This session will explore how to use compost to mentally engage students in life science classrooms. We will emphasize how to elicit students' ideas and scaffold students through a logical sequence that challenges students' thinking–moving students to a deeper understanding of decomposition. | Anna Bahnson<br>Kathryn Hopper<br>Iowa State University |
| 150<br>Reasons Why Students May Dismiss Nature of Science Ideas<br><br>Lecture | Prior misconceptions or a lack of understanding may cause students to dismiss nature of science ideas. In order to help students understand and accept nature of science ideas, we must plan for instruction that targets their misconceptions. Black box activities and historical short stories can expose students to these ideas and asking reflective questions will help students to understand these ideas. | Kayla Brauer<br>Jerrid Kruse<br>Drake University |
| 154<br>Fun With Fractions<br><br>Demonstration | Teachers will learn strategies to teach fractions so that students gain a deep understanding of fractions in the elementary grades. | Lori Mueller<br>Great Prairie Area Education Agency |
| 158<br>Mathematical Language: The Core for Mastering Concepts<br>Lecture | Helping children develop deep understanding of mathematical concepts from all strands requires teachers to appropriately model the language of mathematics. Language can be the bridge for support by using stories, concrete resources, and pictorial representation. Explore language stages to facilitate meaning making for mathematical concepts. | Rosemary Irons<br>Origo Education |
| 160<br>ISS Science Challenge<br><br>Computer Lab session | The ISS Science Challenge project offers students in grades 5-8 the opportunity to connect the science done in the unique environment of microgravity on the International Space Station with literacy projects. Students work in groups to select an ISS science experiment, decipher the experiment fact sheet, and develop creative projects to teach others about their chosen NASA science experiment. | Lisa Chizek<br>Kelly Chizek<br>North Tama |
| 167<br>Exit Passes as Formative Assessment<br>Lecture | How to use exit passes with a routine in an elementary math class to benefit the students and the teacher. | Shari Crouch<br>Aglona Community School District |

# 9:00 A.M.–9:45 A.M.

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| 171<br>Collaboration Instead of Compliance: How to effectively manage an interactive classroom through student decision-making | Effectively managing a classroom can be a difficult task especially during laboratory activities. While many teachers want students to make important learning decisions, some students often struggle to make good choices. This session will explore how teachers can create a classroom atmosphere with a great deal of student decision-making while reducing classroom management issues. | Collin Reichert<br>Ames Middle School<br>Jesse Wilcox<br>Iowa State University |
| 175<br>Implementation of SBG in our classroom.<br><br>Lecture | We will show how we have implemented Standards-Based Grading in classrooms and show how we report out our data to parents and students. | Rhys Pate<br>Seth Hagarty<br>Josef Sigrist<br>Valley Southwoods |
| 179<br>Fun Physics For All with the Marble Launcher | Perform engaging projectile motion investigations with a fun and unique marble launcher. Predict the path of a projectile by collecting data, graphing results, and drawing conclusions. Free raffle for a marble launcher! | Jessie Herman<br>CPO Science |
| 204<br>Chances Are<br><br>Hands On | Chances Are you will enjoy these three activities that reflect the seventh grade probability standards. The activities have students digging to deeper understandings through collecting data in order to make predictions and then justify their decisions mathematically. | Susan Parker<br>Grant Wood AEA |
| 208<br>Improving Student Learning through Test Journals<br><br>Lecture | We will describe how we have used test journals in our team taught AP Calculus APB/Physics class and in Geometry to improve student learning and understanding. | Allysen Lovstuen<br>Tim Hayes<br>Decorah High School |
| 252<br>Hints and Activities for Successfully Co-teaching Math and Science in a Middle School Setting<br><br>Demonstration | Regardless of the co-teaching model utilized, collaboration between math and science colleagues has the potential to benefit everyone involved. Personally, I became a more effective teacher for all learners through the sharing of expertise, data and resources with my colleague. However, it was not always smooth sailing. This presentation will briefly discuss planning productive partnerships and then focus on activities that lend themselves to a co-teaching model. | Alison Beharka<br>University of Northern Iowa |
| 250<br>The Next Generation Science Standards are Here.. Now What?<br><br>Hands On | Focus on getting started, learn to easily read, interpret, and implement the Next Generation Science Standards. Explore the structure of the NGSS, develop your knowledge to communicate and create a dynamic district interest that will highly engage your staff in implementation integrity. Leave with tools to accelerate your NGSS journey. | Dr. Carolyn Pistorius<br>Carolina Curriculum |
| 254<br>HiMCM Co-Map Math Modeling Competition<br><br>Lecture | Math Modeling links classroom mathematics and statistics to everyday life, work and decision-making. Math Modeling is one of the high school standards for the Common Core. Learn how to organize and plan the event from both a high school teacher and a college professor that have had teams compete in the nationwide competition. Students research a problem and work in a team of 4 to find a solution and write a paper. This session is for High School Math and Science teachers and pre-service | Rick Spellerberg<br>Simpson College<br>Vicki Hamdorf<br>North Cedar Schools |

Session 1 continued on next page.

# Concurrent Session 1

| | | |
|---|---|---|
| 260<br>ICTM-ISTS PD Strand Workshop<br><br>Lecture | For those attendees who are choosing to take advantage of the ICTM-ISTS professional development strand (for credit), this workshop is required. Details regarding expectations and requirements will be shared to those involved. | Eric Hall<br>Hoover HS Des Moines<br>Kris Kilibarda<br>Drake University |
| 275<br>Celebrate Earth Science Week on Mole Day<br><br>Demonstration | The focus is integrating the Earth Sciences, a little Geology and a little Geohydrology with Chemistry Activities. Using rocks and minerals with a focus on some Chemistry in the classroom helps students to understand the sciences are interrelated. Caves in limestone reflect dissolution procesess that involve the reaction of groundwater with the rock layers. Chemical weathering of granites involve an understanding of the minerals in granite, and the reaction of those minerals with surface conditions. | Sherman Lundy<br>Iowa Limestone Producers Association |
| 262<br>Resources for the Iowa Math Additional Standards<br><br>Hands On | Are you implementing the Iowa Math Additions for the Iowa Core? If so, there are resources available to you for free! These resources can be used either online or in print. They include activities that put your students at the center of their learning. | Megan Balong<br>University of Northern Iowa |
| 299<br>Disciplinary Literacy: Reading, Writing and Thinking in the Science Classroom<br><br>Hands On | Do you want your students to understand how science concepts relate to the world outside the classroom? Do you want productive discussions to become a part of your classroom repertoire? If so, join us for a lively session using high interest reading and discussion techniques designed to help students learn, investigate and apply concepts of science to the real world. Sample texts for upper elementary through high school will be provided. | Marsha Krabbenhoft<br>National Graphic Learning-<br>Cengage Learning |

# Concurrent Session 2

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| Benton Auditorium<br>It Egg-sploded!<br><br>Lecture | Teaching science through concrete experiences and questioning strategies. This activity is a useful experiment in demonstrating matter change in a way that is appropriate for students in lower elementary. The activity we will discuss is an implicit and explicit way to demonstrate the social and collaborative nature of science while teaching science content and adhering to state standards. | Destiny Warner<br>Drake University |
| Fischer Auditorium<br>Supporting Iowa High School Physics & Physical Science Teachers to Address the NGSS<br><br>Lecture / Discussion | Professional development for high school physics and physical science teachers have been offered on Modeling Instruction and/or PRISMS at all 3 Regents institutions. Participants from all of these programs as well as teachers who would benefit from such programs are invited to attend. The session will engage the audience in discussions of how the Iowa physics education community can network and provide support for implementation in the classroom that is consistent with the NGSS. | Lawrence Escalada,<br>Shannon McLaughlin,<br>Jeffrey Morgan,<br>Les Burns<br>University of Northern Iowa |
| 004<br>Teaching Energy & Matter as Crosscutting Concepts<br><br>Hands On | Energy & Matter are a Crosscutting Concept In the Next Generation Science Standards (NGSS). Understanding energy and matter helps students better understand core ideas, practices, and vocabulary in science and engineering. We'll discuss these concepts and build sample models that meet the Performance Expectations from the NGSS. | Patricia Higby<br>Kameron LeFebvre<br>University of Northern Iowa |

# 10:00 A.M.–10:45 A.M.

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| 080<br>Science vs. Engineering: Including both in the science classroom through activities.<br><br>Hands On | Through several activities, which may be used with students, participants will explore the difference between science activities and engineering activities. Examples of engineering activities for the science classroom will be presented along with relatively simple ideas for getting engineering practices and engineering design into the science classroom without drastic changes to the curriculum. | Sarah Boesdorfer<br>University of Northern Iowa |
| 150<br>Lesson Plan: How are Electricity and Magnetism Related?<br><br>Hands On | This lesson plan addresses the Next Generation Science Standard: "Students will plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current." I utilize effective questioning, the learning cycle model and inquiry to engage students in developing a deep understanding of the interrelationship between electricity and magnetism. Nature of science concepts and literacy are also interwoven in the lesson. | Rose Davila-Gay<br>Jerrid Kruse<br>Drake University |
| 154<br>Creating a Positive Feedback Loop: How providing extensive feedback on students' work can help students become better learners<br><br>Hands On | In this session, we will engage participants in an assessment activity. This activity will be used to discuss how feedback is often given in classrooms, how feedback practices can be improved in profound, yet reasonable ways. We will then discuss how improving the quality of our feedback can improve our communication with students and parents and can deepen student learning. | Jesse Wilcox<br>Iowa State University<br>Jerrid Kruse<br>Drake University<br>Hallie Edgerly<br>ADM Middle School |
| 158<br>Mastering Mental Math Number Facts…and Beyond<br><br>Lecture | Mental math should be a major goal of all mathematics programs. It is used every day and is essential for high school math. I will use pictorial representations to show how to achieve that goal, beginning with strategies to master basic number facts for all four operations These are | Calvin Irons<br>Origo Education |
| 160<br>Mathematical Proofs and Everyday Truths<br><br>Lecture | Using examples from science and law to explore how students construct truth in their lives, teaching proof writing as a new way of knowing is presented. An activity is shared as an example of how to teach proof writing within this context.. | Catherine Miller<br>University of Northern Iowa |
| 167<br>Iowa Bats and STEM<br><br>Lecture | Iowa Bats and STEM will share how new curriculum has been created that teaches students how to be scientists now and use STEM guidelines to impact the understanding and management of one of Iowa's threatened species. At the conclusion of the curriculum students will have an understanding of the role of bats concerning biodiversity, how to engineer and build a roost monitoring station and how to collect data that will be used state wide to monitor bats and the effects of White-Nose Syndrome. | Ron DeArmond<br>Kristie Burns<br>Pella Wildlife Company |
| 171<br>Integrating Math, Literacy, and Science In the Elementary Classroom<br><br>Hands On | Science provides concrete examples for mathematical ideas and requires writing skills to communicate understanding. This session previews a unit designed to allow elementary students to apply their mathematical understanding and ELA skills, while exploring the science concept of conservation of mass. | Tami Plein<br>MaryBeth Murrell<br>Great Prairie AEA |

Session 2 continued on next page.

# Concurrent Session 2

| | | |
|---|---|---|
| 175<br>Integrating STEM Across the Elementary Curriculum<br><br>Hands On | Educators throughout the session, will examine the need for STEM programming at the elementary level, experience standards-based interdisciplinary STEM-focused lessons, and learn an easy to follow a format for delivering STEM programming that is unique to individual schools' students and staff. Participants will walk away prepared to delivering rigorous STEM instruction. STEM captures the interest that leads to achievement. | Glory Oljace<br>STEM is Elementary, LLC |
| 179<br>Engage Your Students and Promote Deep Conceptual Understanding of Mathematics With Formative Assessment Driving the Instruction<br>Demonstration | Come and learn about Carnegie Mellon Universities cognitive research on how students learn and a software program that uses artificial intelligence to individualize instruction for all students. Working on this software is highly motivational and engaging, it promotes a deep conceptual understanding, and provides powerful ongoing formative assessment to drive instruction. | Jon Dary<br>Carnegie Learning |
| 204<br>Augmented Reality in the Classroom Using Layar to Create Layers<br>Demonstration | This session will show the benefits of using Layar (augmented reality) in the classroom. The session will also show how to create interactive assignments and pages using Layar to actively engage students and to enrich student learning through differentiation in the math classroom. | Ricardo Martinez<br>Colo Nesco |
| 208<br>Math Intervention for Non-proficent Learners<br><br>Lecture | In our middle school we piloted a program to target specific skills students struggled with and then taught a class based on those skills. We saw HUGE gains. Our 16 students averaged 25 Scaled score points and 14 - 16 became proficient. Our Class has reading components fused with math to help students in understand vocabulary and procedure in mathematics | Jason Anderson<br>Pella Middle School |
| 250<br>The Next Generation Science Standards...and the Common Core?<br><br>Hands On | Reflect on the makeup of the Next Generation Science Standards: Disciplinary Core Ideas, Scientific and Engineering Practices, Crosscutting Concepts, and Performance Expectations. Apply this knowledge and understanding to integrate the Common Core ELA and Math connections. Leave with tools that will make resource selection simpler for your district. | Dr. Carolyn Pistorius<br>Carolina Curriculum |
| 252<br>Water Sourcebook<br><br>Lecture | The Water Sourcebook is a hands-on K-12 curriculum that 'supplements' any science or environmental science curriculum. It emphasizes water, wastewater, surface water, groundwater, and wetlands. The IAWEA supplies this curriculum free to schools (in CD format) and will maintain a revolving fund for teacher out-of-pocket expenses incurred in teaching this curriculum. | Bob Watson<br>IAWEA |
| 254<br>Real World Externships for Teachers of Science, Math and Technology<br><br>Lecture | Real World Externships for Teachers of Mathematics, Science and Technology is a program coordinated by the Iowa Governor's STEM Advisory Council. For the past 5 summers Iowa educators have worked with business hosts providing teachers an opportunity to gain "real world" experience. Join us to hear the experiences of teachers that participated in the Real World Externship program and learn how you can get involved next summer. | Jason Lang<br>Meghan Reynolds<br>Iowa Governor's STEM Advisory Council |
| 260<br>Designing Experimental Design<br>Hands On | Tired of those old ways of teaching experimental design? Can't find new and exciting ways to incorporate scientific argumentation into your curriculum? Participants will be provided with a fantastic tool that aids in accomplishing both of these in nearly any science class and grade level. A simple experimental design activity will be part of the workshop. | Eric Hall<br>Hoover HS Des Moines |

# 10:00 A.M.–10:45 A.M.

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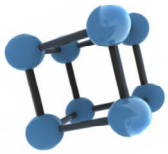
| 262<br>Instructional Technology and Math Anxiety in Undergraduate Mathematics Courses<br>Lecture | The session will explore the potential for instructional technology to help reduce students' math anxiety in undergraduate mathematics courses. Several forms of technology will be considered, including clickers, graphing calculators, and tutorial software. The relationship between math anxiety and student achievement will also be discussed. | John Batchelor<br>Iowa State University |
| 275<br>A New Look to Project Wild and other DNR Programs<br><br>Hands On | A new look is coming to how the Iowa DNR will be presenting Project WILD and Project WILD Aquatic. Come join in as you experience some of the new ideas that these curricula can bring to your classroom. | Kelen Panec<br>Barb Geiger<br>Shannon Hafner<br>DNR-<br>Placed Based Education |
| 299<br>An Idea So Bright It Could Only Be Called Einstein<br><br>Demonstration | The Einstein Learning Platform™ is the cost-effective solution to your STEM/technology integration goals. It features seamless integration of interactive multimedia content, hands-on experiments, data logging/analysis capabilities to create an unparalleled experience, all in one android tablet. Designed for ease of use, the next evolution of STEM & NGSS education is just a finger swipe away with the Einstein Tablet. Join me at our workshop so that you can view and participate in a science activity that will model the use of Einstein Tablet and LabMate. | Kevin Schroeder<br>It's About Time |

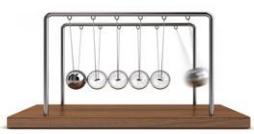


## The Iowa Academy of Science

**Iowa's only statewide organization for scientists, science educators, science students and science enthusiasts representing all scientific disciplines.**

**Join us in our mission to further scientific research, science education, public understanding of science and to recognize excellence in these endeavors.**

**Your IAS Membership includes membership to the Iowa Science Teaching Section and up to three additional sections of the Academy.**



**Join the Academy today!**

**Visit our booth in the exhibit hall or visit us online: [www.iacad.org](http://www.iacad.org)**

# 11:00 A.M.–12:00 noon
# ISTS General Session & Keynote
# ICTM Luncheon

*Lunch provided as part of your registration fee.*

Welcome –De Anna Tibben, Conference Chair
Eric Hall – ISTS Chair
Special Welcome and Introduction of IAS Board – Craig Johnson,
Executive Director of Iowa Academy of Science
Recognition and Thanks– De Anna Tibben, Conference Chair
Introductions of ISTS 2013-14 Officers – Eric Hall, ISTS Chair
Recognition of the 2013 Conference Chair – Tom Ervin, Awards Chair
Recognition of Excellence in Science Teaching Awards – Eric Hall, ISTS Chair

Recognition of Presidential Award for Excellence in Mathematics and Science Teaching Nominees
– Yvette McCulley, DOE Science Consultant
ISTS Corporate Friends of Science Awards – Eric Hall
ISTS Friend of Science Award – Eric Hall
ISTS Outstanding Service Award – Eric Hall

# 12:30 P.M. –1:30 P.M.
# ICTM General Session & Keynote
# ISTS Luncheon

Being a member of the Iowa Council of Teachers of Mathematics (ICTM) means you are a member of a professional organization that is working to promote and improve mathematics education in Iowa.

Benefits include:

- ☐Annual ICTM conference discount
- ☐ICTM yearly journal
- ☐Tri-annual newsletters
- ☐Discount on NCTM publications
- ☐Grant opportunities
- ☐Networking with other mathematics educators across the state
- ☐Professional development component for Iowa Teaching Standards

Visit our booth in the exhibit hall or visit us online: www.iowamath.org
Join today!

# IAS-ISTS Keynote

Robert Root-Bernstein received his AB (Biochemistry) and PH.D. (History of Science) from Princeton University. He did post-doctoral work at the Salk Institute for Biological Studies, where he was awarded one of the first MacArthur Fellowships. A Professor in the Physiology Department at Michigan State University since 1987, he studies the evolution of physiological control systems and autoimmune diseases. Bob is author of *Discovering, Inventing and Solving Problems at the Frontiers of Scientific Knowledge* (1989) and of numerous articles on creative process in science and on arts/sciences interactions. He edits 'ArtScience', a regular section devoted to these intersections for *Leonardo,* the journal of The International Society for Science, Technology and the Arts. With artist Adam Brown, he directs an NSF-funded 'Origins of Life' project that is both art and science. In addition, he is co-author, with his wife Michele, of *Sparks of Genius, The 13 Thinking Tools of the World's Most Creative People,* a study of imaginative skills used by creators of all kinds. Together they write, consult and lead workshops on imaginative thinking, polymathy and trans-disciplinary education. *Contact:* rootbern@msu.edu

*Sparks of Genius* has been translated into six languages and has reached people in many walks of life. Now in its ninth paperback printing in the U.S., it is a stalwart among parents, teachers and professionals focused on understanding and exercising the creative imagination. Mining that book and subsequent research, Bob and Michele have delivered keynotes at conferences nationally and internationally, notably presenting the Paul Torrance Creativity Lecture for the National Association for Gifted Children Conference, New Orleans, in November of 2011 and opening the UNESCO 2nd World Conference on Arts Education in Seoul, South Korea in May of 2010. *Sparks of Genius* will be available as an eBook in 2013.

Michele Root-Bernstein received her B.A. from the University of Pennsylvania in 1975 and a Ph.D. in History from Princeton University in 1981. She first joined Bob as co-author with *Honey, Mud, Maggots and Other Medical Marvels* (Houghton Mifflin, 1997), a look at folk medicines in modern medical culture. From this study she and Bob turned to the examination of creative imagination with *Sparks of Genius*, and have since expanded their research into arts-innovation interactions and the capacities that characterize new and effective thinking. Currently an Adjunct Faculty member at Michigan State University, Michele is completing a book on the invention of imaginary worlds and its role in lifelong creative giftedness. A Kennedy Center Teaching Artist, she co-presents a tools-for-thinking approach to haiku/dance. She also writes haiku for journals across the U.S. and Canada and serves as associate editor of *Frogpond*, the journal of the Haiku Society of America. *Contact:* rootber3@msu.edu

Thanks to Rockwell Collins for helping sponsor our keynote speakers.

# ICTM Keynote

## Unpacking Mathematical Understanding in the Common Core

The words "understand", "understanding", and their plurals appear over 250 times in the Common Core. With so many appearances, it is not surprising that these words are used in a broad variety of ways, a variety that goes far beyond skills. Furthermore, even when the word "understand" is not used, some understanding is implied. In this talk, a framework is offered to help teachers deal with this variety

Zalman P. Usiskin is a winner of the 2001 MET Lifetime Achievement award from the National Council of Teachers of Mathematics. A former teacher of junior and senior high mathematics, Dr. Usiskin currently is Professor Emeritus of Education at the University of Chicago and Director of the University of Chicago School Mathematics Project. He is the author of more than a dozen books on mathematics including *The Classification of Quadrilaterals: A Study in Definition* (2007), *Developments in School Mathematics Education Around the World: Proceedings of the UCSMP International Conference on Mathematics Education* (1998), *Future Curricular Trends in School Algebra and Geometry: Proceedings of a Conference* (2010), *Future Curricular Trends in School Algebra and Geometry: Proceedings of a Conference* (2002), *Geometry (University of Chicago School Mathematics Project)* (2002).

He began to contribute to mathematics education while completing his doctoral degree at the University of Michigan, where he authored a precalculus text and *Geometry: A Transformation Approach*. The latter included several concepts used in European textbooks and changed the way geometry courses were conducted in U.S. secondary schools. Since 1987, he has been overall director of the University of Chicago School Mathematics Project (UCSMP) which produced a complete curriculum for grades 7-12. Early on, Dr. Usiskin realized the importance of understanding the approaches to mathematics education used by other countries. He has played a role in all the meetings of the International Congress on Mathematical Education since 1972, is a frequent lecturer at international gatherings, and has helped sponsor meetings. Generous with his time and energy, Dr. Usiskin has served on the boards of many professional groups, including NCTM. As a member of the Mathematical Sciences Education Board, he helped pave the way for current reform efforts in mathematics education. http://www.nctm.org/resources/content.aspx?id=14307#sthash.xylc0dhn.dpuf

The University School Mathematics Project has grown to become the nation's largest university-based curriculum project for kindergarten through 12th-grade mathematics, with several million students using its elementary and secondary textbooks and other materials.

Notes:

# Concurrent Session 3

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| 004<br>Atom in a Bag-An Activity to Illustrate the Nature of Science Regarding Things We Cannot See<br><br>Hands On | This black-box activity emphasizes many of the ways scientists work to uncover information about phenomena we cannot see directly- such as atoms. Students are given sealed bags in which they cannot see the objects inside. The teacher guides groups of students to work together to determine what the contents of their bags are and to provide evidence of their findings using outside information. This activity is used to introduce or emphasize several key nature of science ideas. The activity can be later modified and used as a formative assessment for subatomic particles. | Sakinah Haque<br>Iowa City West<br>Senior High School |
| 080<br>Proportions to Algebra<br><br>Hands On | In this session we will engage in several tasks that help link proportional reasoning to algebra. Concepts and Connections will be discussed. | Matt Webb<br>Olof Steinthorsdottir<br>University of<br>Northern Iowa |
| Fischer Auditorium<br>The REAL deal:<br>Measuring Teacher Performance<br><br>Lecture | In this era of accountability and evaluation, teachers are under the microscope. It is critical that we engage in a discussion about how we can demonstrate our excellence. Participants will investigate a video/written performance assessment targeted on mathematical and science pedagogy currently used with student teachers at the largest teacher preparation program in the state, the University of Northern Iowa. | Kristi Powers<br>Lyn Countryman<br>University of<br>Northern Iowa |
| 150<br>Overcoming Student Resistance to Reform-Based Teaching<br><br>Lecture | Despite the benefits of reform-based teaching for student learning, it is not uncommon for students to develop negative attitudes towards the class and the teacher due to the level of student engagement, thinking, and accountability expected. The purpose of this presentation is to provide teachers with practical tips for overcoming student resistance when implementing research-based instructional practices. | Tiffany Roby<br>Jerrid Kruse<br>Drake University |
| 154<br>Helping Students Understand STEM: Developing meaningful understanding of the purposes of science, technology, and engineering<br><br>Hands On | The pursuit of pure science, applied science, engineering, and technology is vital to the scientific enterprise. This session will explore how engaging students in understanding differences between these distinct, yet interdependent, disciplines promotes the Next Generation Science Standards' "Engineering, Technology, and Applications of Science" core ideas alongside science content. | Jesse Wilcox<br>Lori Ihrig<br>Anna Bahnson<br>Iowa State University |
| 160<br>Investigative Tasks in the Geometry Classroom<br><br>Lecture | How using investigative tasks in the geometry classroom increases student understanding of the geometric concepts. | Lynette Schriever<br>Rockford |

Roundtables are discussion groups with teachers of similar courses and interests. We invite you to join in one of these discussions or attend a presentation.

# 12:00 Noon–12:30 P.M.

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| 167<br>14 Aspects of the Nature of Engineering Not in the Framework<br><br>Lecture | The Framework for Science Education (NRC, 2012) includes engineering as an integral part of science education. How accurately is engineering portrayed to students? This session will provide an analysis of the Framework and its portrayal of engineering, and propose 14 key ideas from the philosophy of engineering that should be considered for a more complete education regarding engineering and technology. | Joanne Olson<br>Iowa State University |
| 171<br>Mystery Liquids: Incorporating the Nature of Science into an Inquiry Density Activity<br><br>Hands On | During this presentation, you will participate in an inquiry-based activity used to introduce middle or high school students to the concept of density. We will describe ways to regularly incorporate nature of science ideas in lessons as well as the teacher behaviors necessary to produce a highly effective learning environment. | Amy Root<br>Geoff Root<br>Southeast Polk Junior High |
| 208<br>Intelligent Play<br><br>Demonstration | This session will focus on gaming in the middle school math classroom, with special emphasis on Sifteo Cubes, Scratch, and web-based games. | Diane Royer<br>Coon Rapids-Bayard CSD |

# Roundtables

| Room | Roundtable | Host |
|---|---|---|
| 299 | Pre-calc/Calc/Stat Roundtable | Rob Keller |
| 262 | Earth Science Roundtable | |
| 158 | Math Grades 6 - 8 | Christi Donald |
| 175 | Math Grades 3 - 5 | Jeannette Pillsbury |
| 179 | Algebra 2 | Megan Balong |
| 204 | Math Grades PreK - 2 | Judy Miller |
| 250 | Life Science Roundtable | |
| 252 | Pre-Algebra & Algebra 1 | Sue Runyon |
| 254 | Geometry | Cathy Miller |
| 260 | Middle School Science Roundtable | |
| 088 | Chemistry Roundtable | |
| 275 | Elementary Science Roundtable | |

# The Presidential Awards for Excellence in Mathematics and Science Teaching

(PAEMST) are the Nation's highest honors for teachers of mathematics and science. The awards recognize highly qualified K-12 teachers for their contributions in the classroom and to their profession. The core of the award is a $10,000 National Science Foundation grant to the recipient's school, to be spent at the teacher's discretion.

# ICTM AWARDS

## State Friend of Mathematics Award

The State Friend of Mathematics Award honors an individual who has made significant contributions to mathematics education in the state of Iowa. Regional Directors are responsible for submitting the names of potential nominees. These names are presented at the June Executive Board meeting. The Executive Board is responsible for nominating and awarding the State Friend of Mathematics through a vote. The State Friend of Mathematics Award is presented at the ICTM Annual Conference. Awardees are given a wooden plaque with a metal plate inscribed with the ICTM logo and the name of the recipient.

## Lifetime Achievement Award

The Lifetime Achievement Award honors an individual who has made significant contributions to mathematics education during her or his lifetime. ICTM Executive Board members nominate individuals for this award. The recipient is determined by vote during the Executive Board meeting. The Lifetime Achievement Award is presented to the recipient at the ICTM Annual Conference. The recipient of the award receives a wooden plaque with a metal plate inscribed with the ICTM logo and the name of the recipient.

## Conference Grant

ICTM offers two grants each year of up to $800 each to encourage and support a certified mathematics teacher in attending an NCTM regional or national conference.

## Curriculum Grant

ICTM offers three grants of up to $500 each year to encourage and support the efforts of individual or teams of certified mathematics teaching staff in the development and implementation of innovative teaching strategies or projects in the field of mathematics.

## Advanced Tuition Grant

ICTM offers two grants of up to $500 each to support an ICTM member who is pursuing education related to mathematics education and/or mathematics teaching.

# ISTS AWARDS

The mission of the Iowa Academy of Science is to further scientific research, science education, public understanding of science and recognize excellence in these endeavors. One of the ways to recognize this excellence is by awards. We encourage you to nominate a deserving individual or corporation for an appropriate award.

The Friend of Science (FOS) Award - Individual - ISTS recognizes with a plaque an individual or group, within the state, who has made significant contributions to ISTS and/or to science education at the local, regional or statewide level.

The Friend of Science (FOS) Award - Corporate - ISTS recognizes with a plaque a corporation, company, coalition, foundation or government entity who has made significant contributions to ISTS and/or to science education at the local, regional or statewide level.

The Outstanding Service Award (OSA) - ISTS recognizes with a plaque an ISTS member who has made sustained, extraordinary contributions to ISTS and/or to science education at the state and/or national level.

Excellence in Science Teaching Awards (ESTA) - The Iowa Academy of Science (IAS) awards to outstanding teachers of all grade levels and areas of science, teachers who are recognized for their work and innovations in science education. The core of the Award is $200 for the teacher and a Plaque. Nominations are accepted in the following categories:

Physical Science (physics, chemistry and physical science)
Life Science (biology, anatomy/physiology, life science)
Earth/Space Science/Environmental Science
General/Multiple Science (integrated science, interdisciplinary courses, multiple preps)
Middle School/Junior High Science
Elementary Science (two awards may be given/year)
Science Supervisory (District, private, AEA, museum, naturalist, etc.)

# Fellows of the Iowa Academy of Science

A Fellow is elected by the Board of Directors from those members who have provided meritorious service to the Academy and effective promotion of science in Iowa. Fellows remain as long as they maintain membership. This is an honor with the same privileges and responsibilities as a Professional Member. The Board of Directors solicits nominations for Fellows from the membership in the fall of each year.

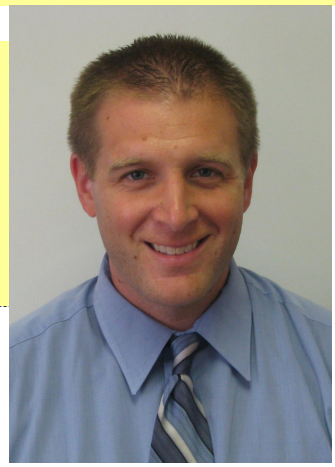
Please consider nominating a worthy candidate today!

For more information, contact IAS at iascience@uni.edu.

# The Presidential Awards for Excellence in Mathematics and Science Teaching

## 2012 Science Nominees

Shelly Bromwich
Kindergarten
Malcolm Price Laboratory School
University of Northern Iowa
Cedar Falls



Mason A. Kuhn
4th Grade
Shell Rock Elementary
Waverly-Shell Rock

## 2013 Nominees for Iowa

### Mathematics Nominees

Allysen Lovstuen
Decorah High School

Jeff Marks
Roosevelt High School
Des Moines

Brian Reece
Central Academy
Des Moines

### Science Nominees

Shannon McLaughlin
Norwalk High School
Norwalk

"Shannon has collaborated with regents' physics staff to fund and conduct Modeling workshops for three consecutive summers; he is committed to improving education at all levels with great fervor."

Marcia Powell
West Delaware High School
Manchester

"Marcia is a passionate teacher not only for continual learning but also having an impact on the future of science and technology curriculum, instruction and assessment to meet student needs in an ever changing global society."

# Outstanding Service Awards

## Carl W. Bollwinkel - Outstanding Service

Having taught science for 60 years including elementary, middle school, high school, community college, college and university biology, botany, science education and environmental education at graduate and undergraduate levels, Carl W. Bollwinkel has been very involved in science education in Iowa. He has made dozens of presentations at NSTA and EE national, regional and state conferences; edited the Iowa Science Teachers Journal for 12 years when it was a printed and refereed journal; served on IAS Board and many committees. Additionally Dr. Bollwinkel developed, taught and directed Environmental Issues Instruction (eii) for 20+ years with the help of wonderful teacher colleagues as well as authored numerous articles, chapters, booklets and audio-visual materials for several publishers including Outlook, a K-12 environmental education program. He served as a Full Professor and Graduate Faculty Member at UNI. He was elected as a Fellow of the Iowa Academy of Science and in 2010 was awarded Aldo Leopold Education Award for “Lifetime Achievement in EE Excellence and Leadership” by the Iowa Association of Naturalists and Iowa Conservation Education Council.

## Jeffery Weld – Outstanding Service

One of the greatest privileges of my professional life was presiding over the ISTS in 2004-05, taking the reins from Ernie Schiller in the spring of '03, and then handing them off to Mike Clough in the spring of '05, thus I sandwiched myself between two rockstars of Iowa science education. That's been my strategy all along - to immerse or surround myself with excellent people and devote my time to helping them be even more excellent - whether they be my students, my colleagues and peers, or my superiors. I am a servant to learners. In selecting me for this honor, the ISTS is validating that which we all do - give of ourselves so that the planet can be more science and STEM literate, benefiting everyone. If I can hold up that banner this year and represent all of you, so be it!

Proudly your partner in this scared business of education, Jeff.

# 2013 Friend of Science Awards

The 2013 Individual Friend of Science is Adah Leshem, Program Director for Pre-College Education, NSF Engineering Research Center for Bio-renewable Chemicals at Iowa State University.

The main objectives of Adah's focus are how to engage the community at large in engineering and science. This involves working closely with school districts in Iowa, providing science teachers with enriching professional development programs at Iowa State University; bringing opportunities to K-12 students that will help them become more interested in and connected to Science, Technology, Engineering and Mathematics (STEM) fields; and finally helping engineering and science graduate students become successful communicators of their research programs. These objectives will hopefully support the growth of (1) a more scientifically literate society and(2) a workforce academically prepared to meet the challenges of the 21st century.

Adah received her undergraduate degree in Environmental Science at King's College, London University and then went on to get a master's degree in Applied Biology at Cambridge University. Her Ph. D. dissertation was on the embryonic development of turtle eggs in changing environmental conditions and she conducted her field-work on the Nile Soft-Shelled Turtlein central Israel. She began her teaching career at Iowa State University in the Department of Zoology and received numerous teaching awards. Over the past twelve years Adah has devoted her career to providing teachers and students opportunities to strengthen their STEM knowledge base and experiences to braoden their understanding of scientific research. She has been awarded federal funds to support the *Research Experiences for Teachers* program, the *Young Engineers and Scientists* Program, the *Summer Academy in Biorenewables* for Middle School Teachers, *STEM Workshops* for Elementary School Teachers and *SYMBI GK12* - a program that brings STEM graduate students into 7th-12th grade science classrooms to serve as resident engineers and scientists. She is the recipient of Iowa State University's Strong-Minded Woman Award and the Federal Laboratory Consortium for Technology Transfer Outstanding STEM Mentorship Award. Adah serves on the North Central Governor's STEM Advisory Council.

# 2013 Excellence in Science Teaching Award

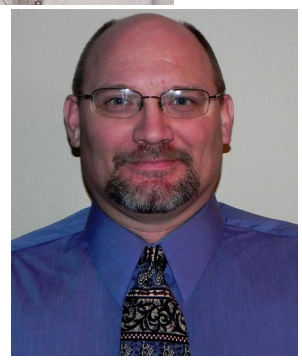
Sue Sparrow Meggers

Lisa Chizek

Matthew J. Stier

Kacia Ann Cain

Matthew Joseph Harding



Troy D. Schwemm

# Friend of Science Awards

# Corporate Friend of Science

The Ames Convention & Visitors Bureau in partnership with Iowa State University Extension and Outreach provides a number of services for the Iowa Science Teaching Section of the Iowa Academy of Science.

The Bureau provides complimentary meeting space for our planning committee and coordinates the facility site visit allowing us to meet in Ames and make the necessary arrangements for this year's event. Their staff works with us to produce and print our Save the Date cards that we send to our teachers to help encourage attendance at the conference. The Bureau also reaches out to their member organizations to provide the items that you each received in your welcome bags. This year, they provided gift baskets including an overnight hotel stay, for our raffle. Our event exhibitors also get to enjoy Ames' hospitality from the time they arrive and throughout the conference as the Bureau works to make sure they have a great experience and will return next year.

They continue to provide great support throughout our event, by staffing Ames ambassadors onsite to help with questions about the event, the facility and the community. They staff the Ames welcome table providing additional community information for our attendees and host the computer station during our conference.

The Bureau looks forward to providing services in the future on behalf of the Ames and Iowa State University community and adding to the success of our conference.

Rockwell Collins was founded in 1933 in Cedar Rapids, Iowa as a radio communications company. Rockwell Collins provides industry-leading aviation electronics and communications solutions for military and commercial customers worldwide.

The Rockwell Collins Education Access to Computer Technology (REACT Center) refurbishes excessed computers and donates more than 2000 computers to Iowa schools each year. Rockwell Collins aligns its charitable giving and volunteer programs to support education – specifically science, technology, engineering and math – as a way to develop a quality workforce and enhance the knowledge of all children in order to become better citizens. Currently the company is engaged in the Iowa Space Grant Consortium, NASA Explorer Schools, Ames Lab/Iowa State University Science Bowl, National Engineers Week, Future City Competition, US FIRST Robotics and LEGO League Programs, Educators to Space Camp, Project Lead the Way and many other STEM related activities and organizations. We applaud and thank the efforts of Rockwell Collins for science education in Iowa.

# Concurrent Session 4

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|---|---|---|
| Benton Auditorium<br>What sense do students make of multiplication with fractions?<br><br>Lecture | 164 elementary teacher education students at different phases in their program were asked to write a story problem for a fraction multiplication problem, and their strategies and error patterns were examined. Also, different types of math textbooks were reviewed to compare instructional approaches to fraction multiplication. Findings and implications will be discussed. | Jihwa Noh<br>Karen Sabey<br>Katie Wilford<br>University of Northern Iowa |
| Fisher Auditorium<br>Empowering Students to Make Mathematical Connections<br><br>Hands On | Participate in activities that make the connections between a pattern, table, graph and its rule. Learn ways to help students move from each representation to the others while developing a deep understanding of multiple ways to solve problems and to communicate that understanding both verbally and visually. Teachers will receive ideas and materials that they can use in their own algebra classrooms. | Marty Beck<br>Bettendorf High School & College Preparatory Mathematics |
| 004<br>Applying Mathematics with Solar Graphing and Wind Roses<br><br>Hands On | Graphing the position of the sun in the sky for different times of the day, days of the year, and locations on Earth is facilitated with a template. Then using a spot light we will evaluate your comprehension of the graph. Other applications include why the days are shorter, and changes in temperature. Wind roses are pie charts on steroids that represent the wind resource in different locations. Test your interpretation by locating model wind turbines or wind socks on a model landscape. | Patricia Higby<br>Kameron LeFebvre<br>University of Northern Iowa |
| 080<br>Teaching Probability through Game Shows<br><br>Hands On | You're the next contestant! Join us for an exciting session as we explore probabilities associated with game shows such as The Price is Right and Wheel of Fortune. We will connect activities to the Eight Mathematical Practices of the Common Core Standards. | Caitlin O'Connor<br>Dallas Center-Grimes Middle School<br>Jordan Edgerly<br>Prairieview School (Waukee CSD) |
| 262<br>Preserving and Protecting Our Water Resources<br><br>Hands On | Attendees will learn the importance of preserving and protecting our water resources in an inquiry based, hands-on activity and how using the eii model teaches environmental issues. | Barb Ehlers<br>Upper Iowa University<br>Jeff Monteith<br>New Hampton Community Schools) |
| 150<br>Beyond an Equation: Helping students deeply understand density through scaffolded inquiry<br>Hands On | While density is often taught to middle and high school students, they often struggle to deeply understand it. In this session, we will engage participants through hands-on activities to demonstrate how inquiry can be used to scaffold student understanding. Further, the density activities will demonstrate how to move from more teacher-directed to more student-directed activities as the unit progresses. | Jesse Wilcox<br>Iowa State University<br>Jerrid Kruse<br>Drake University<br>Kathryn Borton<br>Nevada Middle School |
| 154<br>The Building Blocks to Meaningful Understanding of DNA<br><br>Hands On | DNA misconceptions abound–44% of high school students wrongly think that some organisms do not have DNA and 40% of middle school students think only animals have DNA (AAAS). This session will explore a logic flow that can be used to develop students' understanding of the ubiquitous nature of DNA and conceptually introduce DNA's structure through mentally engaging concrete activities. | Lori Ihrig<br>Jennifer Smith<br>Iowa State University |

Session 4 continued on next page.

# 2:00 P.M.–2:45 P.M.

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| 160<br>Using Summative Assessments to Drive Instruction<br><br>Lecture | This session would be about making sure students are retaining the concepts by spiraling back to them. These weekly spiral reviews would be determined by the data from my unit tests. So many times unit assessments are just given and then dropped, but it's important to use this data to help plan your instruction. | Chelsea Weis<br>Ankeny CSD |
| 158<br>Avoiding Condensed Learning: Exploring Water Cycle with Elementary Students<br><br>Hands On | This lesson is designed to introduce students to the different states of water and the water cycle. The lesson is organized based on the learning cycle to best support student learning of an abstract concept. This lesson addresses The National Science Education Standards A and C and Iowa Teaching Standards 1, 2, 3, 4, 5, and 6. | Alexandra Young<br>Jerrid Kruse<br>Drake University |
| 167<br>Star Trek: Good Physics-Bad Physics<br><br>Demonstration | Concepts in physics from clips of the Star Trek TV programs and movies will be presented. Demonstrations, discussions and calculations will be given on the concepts so that teachers can use them in their classroom. Lesson plans will be made available. | Michael Blair<br>Adam Puderbaugh<br>Des Moines Hoover High School |
| 171<br>Proportional Reasoning: Numbers and Context do Matter<br><br>Hands On | Proportional reasoning is an important strand in the Common Core State Standards for the middle grades. This session will explore the influence of context and number choices in sequencing proportion problems to students. It will help teachers to recognize how the number choices impact students' strategies and ability to solve proportion problems. Sample problems will be shared. | Olof Steinthorsdottir<br>University of Northern Iowa |
| 175<br>Real World Design Challenge<br><br>Demonstration | The RWDC provides high school students the opportunity to work on real world engineering challenges in a collaborative, team-based environment applying lessons of the classroom to the technical problems of the workplace. The RWDC is a public-private partnership aimed at increasing the STEM workforce for the long term. The software plus other tools and resources are provided free to participating teams and the challenge is "real". | Yvette McCulley<br>Iowa Department of Education |
| 179<br>Sparrks of Genius: Arts, Crafts and Innovation Part 1 | Our keynote speakers will continue the discussion of how arts and crafts significantly affect scientific and engineering ability and innovation. Please join them for this longer workshop. This workshop is sessions 4 and 5. | Robert Root-Bernstein<br>Michele Root-Bernstein<br>Michigan State University |
| 204<br>Googalormps: Using Imaginary Monsters to Reinforce the Nature of Science<br><br>Hands On | The presentation demonstrates how to structure a learning activity that demonstrates to students how every new piece of learning impacts "the big picture". It illustrates that ideas have to flex with new information and understanding. | Sarah Borzo<br>South Middle School, Waukee |
| 208<br>Using Mathematical Modeling to Engage All Learners<br><br>Demonstration | Modeling is both a Practice Standard and a Content Standard of the Common Core State Standards. Modeling is also listed in the Next Generation Science Standards as one of the four fundamental practices to understanding the nature of science. Learn how modeling is implemented as part of a successful mathematics class and how to engage students in their learning to make meaning of mathematics. | David Ebert<br>Oregon WI High School |

# Concurrent Session 4

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| 250<br>Using Technology to Facilitate a Progression in Students' Understanding of the Structure and Properties of Matter<br><br>Demonstration | Progressing from middle to high school, students' understanding of the structure and properties of matter is expected to increase in complexity. Physics-based, interactive, 3D atomic and molecular models, on iPads and laptops, provide an array of visual and engaging tools that facilitate this growth in understanding. Starting with the structure and properties of solids, liquids and gases and progressing through the atomic composition of simple molecules, their properties and how they interact, to atomic structure and the arrangement of the periodic table, and advancing through large molecule topics, we will demonstrate models to help students build their knowledge of matter. | David Doherty<br>Bitwixt Software Systems |
| 252<br>Iowa Department of Education Resource Webpage for Iowa Core Mathematics<br><br>Lecture | The Department of Education is supporting a resource webpage for educators on the DE website. The webpage has a collection of resources for both classroom and professional development use to support student learning K-12. Spend a few minutes learning about the site and what is available. | Lynn Selking<br>Great Prairie AEA |
| 254<br>Building a Dodecahedron<br><br>Hands On | Participants will be learning how to construct a regular pentagon and then use that pattern to build a 3-dimensional dodecahedron. This is a project that I have done for over 15 years in high school Geometry. This could be used in middle school or in upper level mathematics classes too. Everyone will be building a model to take with you. | Vicki Hamdorf<br>North Cedar Schools |
| 260<br>Cutting Edge Bio-renewables for All<br><br>Hands On | Ever wonder where that plastic bottle came from? Maybe not where you think! This session will provide participants with content related to cutting-edge research in bio-renewable fuels and chemicals and will share activity and lab ideas for use in middle and high school science classrooms. Participants will also learn how bio-renewables can provide a rich context for integrating STEM education into any existing science curriculum. | Dawn Colsch<br>Collin Reichert<br>Cara Rinehart<br>Michelle Vandewall<br>Eric Hall<br>Hoover HS Des Moines |
| 275<br>Just the Facts?<br><br>Hands On | Have you ever investigated the properties of multiplication? Do you have a strong visual image of multiplication? Join us for this hands-on session to examine the "facts" and walk away with materials and ideas to take back to your classroom. Limited to 30 participants. | Barb Rokahr-Froiland<br>Janet Kawecki<br>Pearson |
| 299<br>Problem Based Math through Interactive Mathematics Program and Meaningful Math<br><br>Hands On | Finally you have a choice for a high school mathematics curriculum designed to challenge ALL students with college preparatory mathematics. The Interactive Mathematics Program and Meaningful Math are both problem-based curriculum that offers challenging content and emphasizes mathematical reasoning. Designed and field-tested with support from the National Science Foundation, they have demonstrated in schools throughout the country that the successful study of advanced mathematics is an achievable standard for all students but do it in different sequences. Interactive Mathematics Program offers an integrated approach and Meaningful Math offers a more traditional approach to problem-based math. | Kevin Schroeder<br>It's About Time |

# Concurrent Session 5

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|---|---|---|
| Benton Auditorium<br>Hitting the Wall<br><br>Lecture | How do your students approach learning new material? What strategies are needed when bright students “hit the wall”? We’ll look at emotions tied into learning new material after having many years of easy learning as well as discuss strategies to use with students and parents. We will also discuss what might be the repercussions in college. | Chris Schultz<br>Iowa State University |
| Fischer Auditorium<br>Building Fluency with Number Sense: Addition and Subtraction PreK - Primary Grades<br><br>Lecture | What conceptual experiences do children need to develop fluency with addition and subtraction? How can brief daily mini-lessons help provide those experiences? Sample lessons will be shared.<br><br>*This presentation is a repeat from session 1.* | Edward Rathmell<br>University of Northern Iowa |
| 004<br>Engineering for Little Fingers Too!<br><br>Hands On | How is engineering related to mathematics for K-6?What does engineering look like for the K-6 classroom? Classroom teachers can get acquainted with engineering activities, look at engineering in the Iowa Core, and consider how to incorporate engineering in their classes. | Teresa Finken<br>ICTM vice President for Post Secondary |
| 080<br>How Many People Sit at Zero Tables? Recursion & Starting Values in Algebra | Slopes and y-intercepts are very specific terms for some simple ideas. Empower students to naturally seek out starting points ("zero-rows"/y-intercepts) and recursive rules (slope) to tell the "back story" of the equation--what each symbol, character, and number mean & why they are used there. | Matt Harrison<br>North Scott Junior High |
| 088<br>Bubble-ology 101<br><br>Demonstration | What exactly is a bubble? Are all bubbles the same? Depending on how they are formed, bubbles may be spherical, or even cubical or spiral. We will make, explore, and discuss the mathematical and chemical properties of crazy-looking bubbles. We will engage in the scientific process of observing, experimenting, making predictions, and drawing conclusions about bubbles. | Wendy Weber<br>Ashley Garr<br>Central College |
| 150<br>Integrating the Teaching of Science and the Nature of Science, Technology & Engineering<br><br>Hands On | The Next Generation Science Standards emphasize scientific practices and connections to engineering and technology, but have a very limited notion of the latter. Our session will engage participants in a hands-on science activity that promotes an understanding of science content, science practices, and the nature of technology and engineering. Implications for STEM teaching more widely will be addressed along with materials that assist attendees in effectively integrating the teaching of science and the nature of science, technology and engineering. | Michael Clough<br>Iowa State University<br>Jerrid Kruse<br>Drake University |
| 154<br>Mathematics: Tricks or Treats<br><br>Lecture | As mathematics educators, we can have a profound effect on our students' perceptions of and attitudes toward mathematics. Are we presenting mathematics in such a way as to promote a portrayal of mathematics as "just a bunch of tricks" to be memorized and used, or as "a limitless source of treats" which can be modified and applied to solve real problems? | Darren Row<br>Upper Iowa University |
| 158<br>Accessing the Core with the NSpire and the Navigator:<br><br>Hands On | In this session we will provide snapshots of how we address different components of the Core by utilizing The Texas Intruments' NSpire graphing calculator and Navigator software. We plan to take a glimpse at constructions in Geometry, transformations of some common functions, looking for patterns and conjecturing, and formative/ summative assessments. | Mike Baker,<br>Akron-Westfield Community High School<br>Tracy Wingert,<br>LeMars Community High School |

# 3:00 P.M. – 3:45 P.M.

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|---|---|---|
| 160<br>Exploring Functions Using Geometer's Sketchpad<br><br>Computer Lab | In this session, participants will explore functions in a variety of ways using Geometer's Sketchpad (or any dynamic geometry system). Participants will leave with a plethora of free Geometer's Sketchpad files! | Matt Miller<br>Iowa City City High |
| 167<br>Collaboration That Works: Science, Literacy, and 21st Century Skills<br><br>Lecture | The collaborative project eighth grade students completed spanning Science, Reading, and Writing courses was guided by essentials questions, including writers' civic responsibilities and inheritance patterns of genetic disorders. Students effectively collaborated using Google Drive to conduct research, write, edit, and design final products on tri-fold board, including a feature article, pedigree, and QR codes and presented at a local hospital. | Hallie Edgerly<br>Kate Willems<br>ADM MS |
| 171<br>An Open Approach - Programming in the Mathematics Classroom<br><br>Demonstration | This session will cover why programing is important and how programing can help students better understand some mathematical concepts, while learning how to program. The session will look at two free programs R and Scilab and how to use them in the classroom. | Ricardo Martinez<br>Colo Nesco |
| 175<br>Exit Slips: Moving from teacher center to student motivated<br><br>Demonstration | Exit slips are typically used in classrooms to inform the teacher of students understanding. The teacher uses the information to drive instruction. What if students were self-monitoring their own learning? My presentation will focus on student motivation and student self-motivation on exit slips. My own classroom approach to using exit slips for both the teacher AND the students. | Lindsay Warren<br>Bondurant Farrar |
| 179<br>Sparks of Genius: Arts, Crafts and Innovation Part 2 | Our keynote speakers will continue the discussion of how arts and crafts significantly affect scientific and engineering ability and innovation. Please join them for this longer workshop. This is a continuation of the workshop. | Robert Root-Bernstein<br>Michele Root-Bernstein<br>Michigan State University |
| 204<br>Math lessons using Science resources<br><br>Demonstration | We are encouraged to use hands on activities to teach math, yet budgets are tight, and math budgets are even tighter. Your science department may be able to help. This session will showcase activities that can be done in the math class, by borrowing tools from your colleagues in the science department. | Steven Wilcken<br>Fort Dodge Senior High |
| 208<br>Writing for Understanding<br><br>Lecture | Rural Iowa geometry students become pen pals with Urban Massachusetts geometry students. Students write in an authentic voice as they correspond with each other. We will discuss what we learned as teachers, what students learned,and how students can gain deeper understanding of concepts when they have a chance to write to other students to explain new concepts and share problem solving strategies. | Deidra Baker<br>Keota High School<br>Bonnie Sunstein PhD<br>University of Iowa |
| 250<br>Engineering Ingenuity Illuminates - Smoke and mirrors<br><br>Hands On | Participants will blend the mathematics of light reflection with engineering design and learn the physics of kaleidoscopes. Each participant will take home his/her engineered illuminator | Lyn Countryman<br>Kristi Powers<br>University of Northern Iowa |

Session 5 continued on next page.

# Concurrent Session 5

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|---|---|---|
| 252<br>What is STEM and Are We Doing It?<br><br>Hands On | Workshop participants will clarify the ambiguities surrounding the term “STEM education” and learn of the varying STEM models in use across the country. The session shares resources and materials that make STEM easy to implement at all levels. Educators will experience STEM-focused lessons that are standards-based and interdisciplinary as well as learn how to design STEM lessons that raise student achievement and increase teacher effectiveness | Glory Oljace<br>STEM is Elementary, LLC |
| 254<br>90 Degree Math Club<br><br>Hands On | The 90 Degree Math Club was started at North Cedar to promote math. Service projects have included collecting one million pop tabs as a district to donate to the Shriner's and having Family Nights for the elementary students. Competitions, robotics, field trips, barn quilts, math modeling and STEM career nights are some of the activities that we have done. Membership averages 40-50 students for the last 8 years. | Vicki Hamdorf<br>North Cedar Schools |
| 260<br>Sticky Science<br><br>Lecture | How do we make our teaching "sticky"? Participants will learn about basic principles of classroom engagement and how to use simple tools and tricks to make your teaching stick. | Eric Hall<br>Hoover High School<br>Des Moines |
| 262<br>Elementary GLOBE<br><br>Hands On | Elementary GLOBE is a series of free science based picture books and related activities that engage 1st-5th grade students in building observation, investigation, and communication skills. We will demonstrate LEA and Science strategies used in the books and do one of the Elementary GLOBE activities. | Marcy Seavey<br>Iowa Academy of Science |
| 275<br>Pinwheel Geometry for Wind Turbines<br><br>Hands On | Motivate your students with the problem of making pinwheels with different numbers of blades and areas. Measure the performance of their solutions on a simple model turbine. Graph the results to determine the best blade. Materials are available to borrow from the UNI Fabulous Resources for Energy Education (FREE) loan program. | Patricia Higby<br>Kameron LeFebvre<br>University of Northern Iowa |
| 299 | | Vince Zaccardi<br>FREY Scientific |

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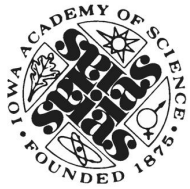


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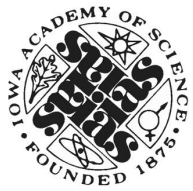


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| Tvrdik, Deb | P.O. Box 445<br>Gowrie, IA 50543 | Treasurer<br>Pre-Conference Chair | samdeb@wccta.net |
| Terry, Connie | 355 NW Locust<br>Earlham, IA 50072 | Reg. Dir - Green Hills AEA | cterry@ghaea.org |
| Ubben, Sandy | 18028 310th St.<br>Aplington, IA 50604 | Reg. Dir AEA 267 | sandy.ubben@uni.edu |

# ISTS Officers & Conference Organizers

| Position | Name | Address | Phone / Fax / E-mail |
|---|---|---|---|
| Fall Conference Chair<br>Conference Facilities Coordinator | De Anna Tibben | 1921 Ames High Drive, Ames, IA 50011Ames High School | (515) 817-0600 ext 261<br>deanna.tibben@ames.k12.ia.us |
| Chair 2012-2013 | Eric Hall | Des Moines<br>Hoover High School | Eric.Hall@dmschools.org |
| Vice Chair /<br>2013-2014 Chair | Kelen Panec | Red Oak High School<br>2011 N. 8th St.<br>Red Oak, IA 51566 | paneck@roschools.com |
| Treasurer<br>Biology Teaching Interest Area Chair | Alicia Schiller | Central Lee High School<br>2642 Hwy #218, Donnellson, IA 52625 | (319) 835-9510<br>aschiller@central-lee.k12.ia.us |
| Secretary | Kathryn Borton | Nevada Middle School<br>1035 15th Street<br>Nevada IA 50201 | (515)745-6172<br>wrigh262@gmail.com |
| Publicity /<br>Newsletter Editor | Nadine Weirather | Central Lee Middle School<br>2642 Hwy #218, Donnellson, IA 52625 | (319) 835-5121<br>nweirather@central-lee.k12.ia.us |
| ISTS Webmaster,<br>Registration Coordinator | Aaron Spurr | Cedar Falls, IA 50613 | aaron.spurr@uni.edu |
| Conf. Photographer<br>Awards Coordinator | Tom Ervin | 21799 282nd Ave<br>LeClaire, IA 52753 | 563-289-3139<br>tomervin@mchsi.com |
| Conference Exhibits Coordinator | Barb Jacobsen | Bettendorf High School<br>3333 18th Street, Bettendorf, IA 52722 | (563) 332-7001<br>bjacobse@bettendorf.k12.ia.us |
| Program Coordinator | Traci Maxted | Jefferson High School<br>Cedar Rapids, IA 52403 | 319-558-4776<br>tmaxted@cr.k12.ia.us |
| IAS Program Director<br>Social Media Coordinator | Marcy Seavey | Iowa Academy of Science<br>UNI -175 Baker Hall,<br>2607 Campus St.<br>Cedar Falls, IA 50614-0508 | (319) 273-7486<br>seavey@uni.edu |
| Earth Sci. Teaching Interest Area Chair | Teri Wiese | Davenport North High School<br>626 W 53rd St., Davenport, IA 52803 | (563) 388-9880<br>wieset@davenportschools.org |
| Elementary Teaching Interest Area Chair | Lynne Campbell | AEA 267 909 S 12th Street<br>Marshalltown, Iowa 50158 | (515) 294-1521<br>lynnec@iastate.edu |
| IAS Executive Director | Craig Johnson | Iowa Academy of Science<br>UNI -175 Baker Hall,<br>2607 Campus St.<br>Cedar Falls, IA 50614-0508 | (319) 273-2581<br>(319) 273-2807 (fax)<br>craig.johnson@uni.edu |
| IAS Executive Assistant | Debbie Dean | Iowa Academy of Science<br>UNI -175 Baker Hall,<br>2607 Campus St.<br>Cedar Falls, IA 50614-0508 | (319) 273-2021<br>iasscience@uni.edu |
| DOE Science Consultant | Yvette McCulley | Science and STEM Education<br>Grimes State Office Building,<br>Des Moines, IA 50319 | (515) 281-3966<br>yvette.mcculley@iowa.gov |

# ISTS Regional Directors 2013-2014

| | | |
|---|---|---|
| Keystone | Jason Martin-Hiner<br>Science Facilitator Keystone AEA<br>Jmartin-hiner@aea1.k12.ia.us | 1400 2nd St NW<br>Elkader, IA 52043<br>563-245-1480 ext. 455 |
| AEA 267 | This position is available | |
| Prairie Lakes | Hope Brown<br>St. Edmond High School<br>brownh@st-edmond.pvt.k12.ia.us | 501 North 22nd St<br>North Dodge, IA 50501<br>515-955-5850 ext. 942 |
| Mississippi Bend | Tom Ervin<br>tomervin@mchsi.com | 21799 282nd Ave<br>LeClaire, IA 52753<br>563-289-3139 |
| Grant Wood | Matt Stier<br>City High<br>stier.matt@iccsd.k12.ia.us | Iowa City<br>319-688-1040 |
| Heartland | Rob Kleinow<br>Science Consultant Heartland AEA<br>rkleinow@aea11.k12.ia.us | 65000 Corporate Drive<br>Johnston, IA 50131<br>1-800-362-2720 ext.14376 |
| Northwest | Jim Kollman<br>Denison High School<br>jkollman@denison.k12.ia.us | North 16th Street<br>Denison, IA<br>51442712-263-3101 |
| Green Hills | Kim Wise<br>Science Consultant Loess Hills AEA<br>kwise@aea13.org | 2802-2 12th St<br>Harlan, IA 51537<br>712-755-3896 |
| Great Prairie | Gale Vermeulen<br>vermeulengc@hotmail.com | 2560 Karen Lane,<br>Oskaloosa, IA 52577<br>641-672-2018 |

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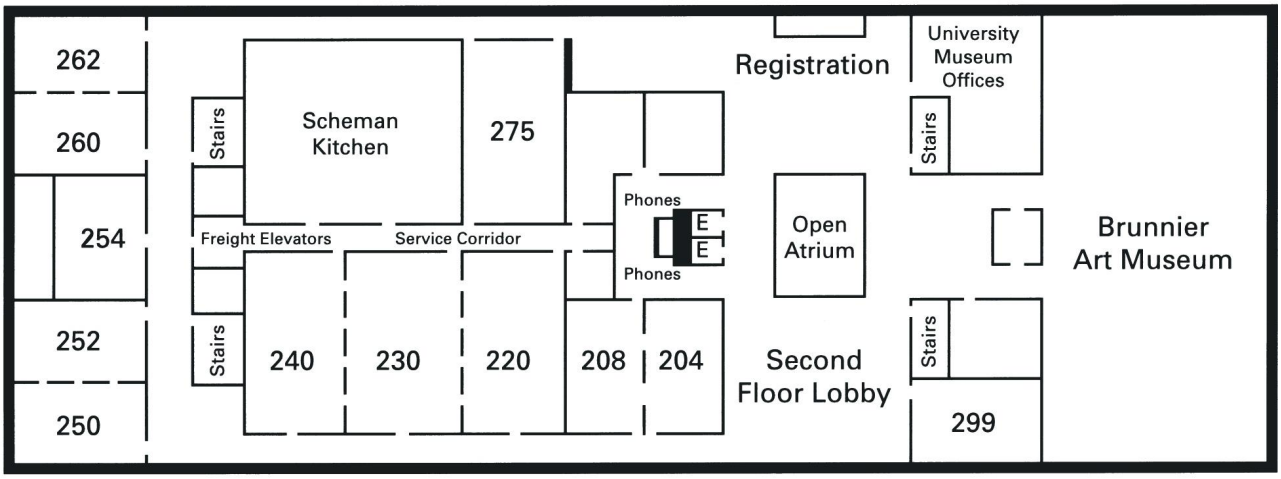
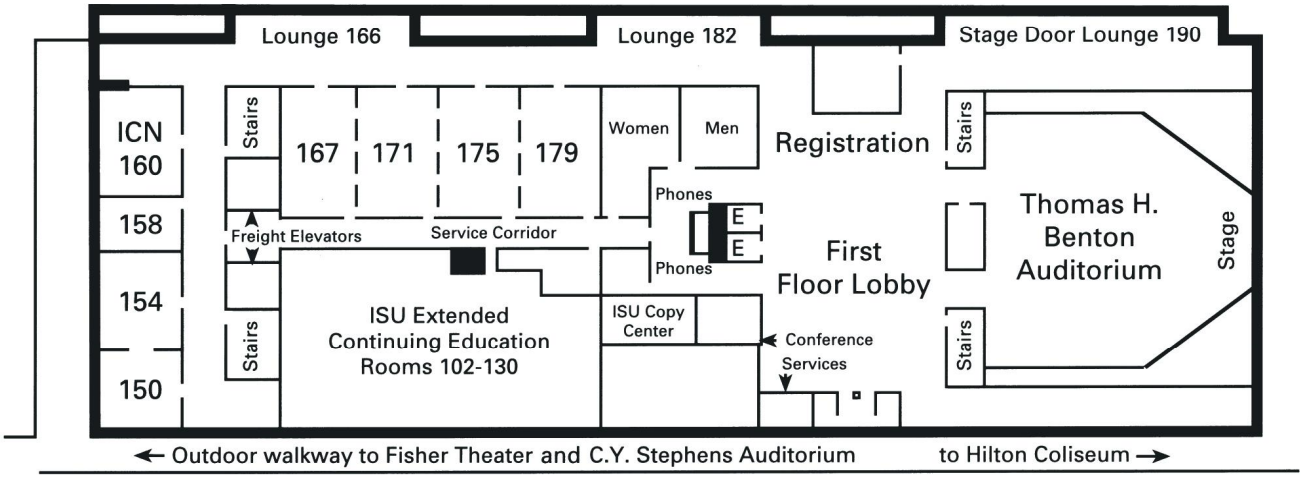
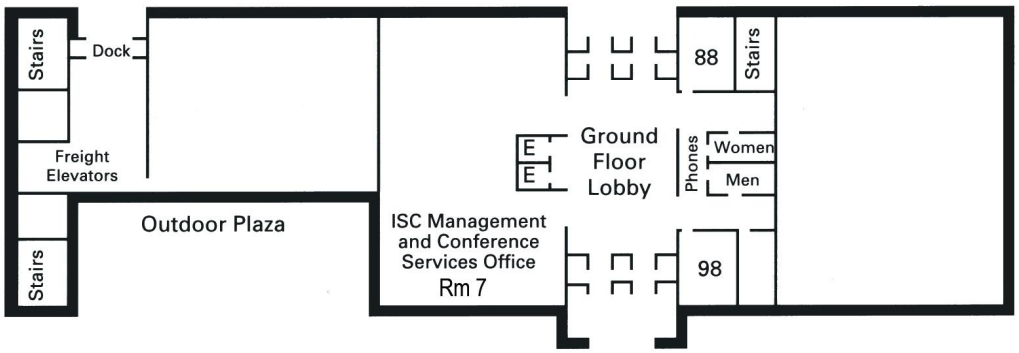



**Second Floor**




**First Floor**




**Ground Floor**