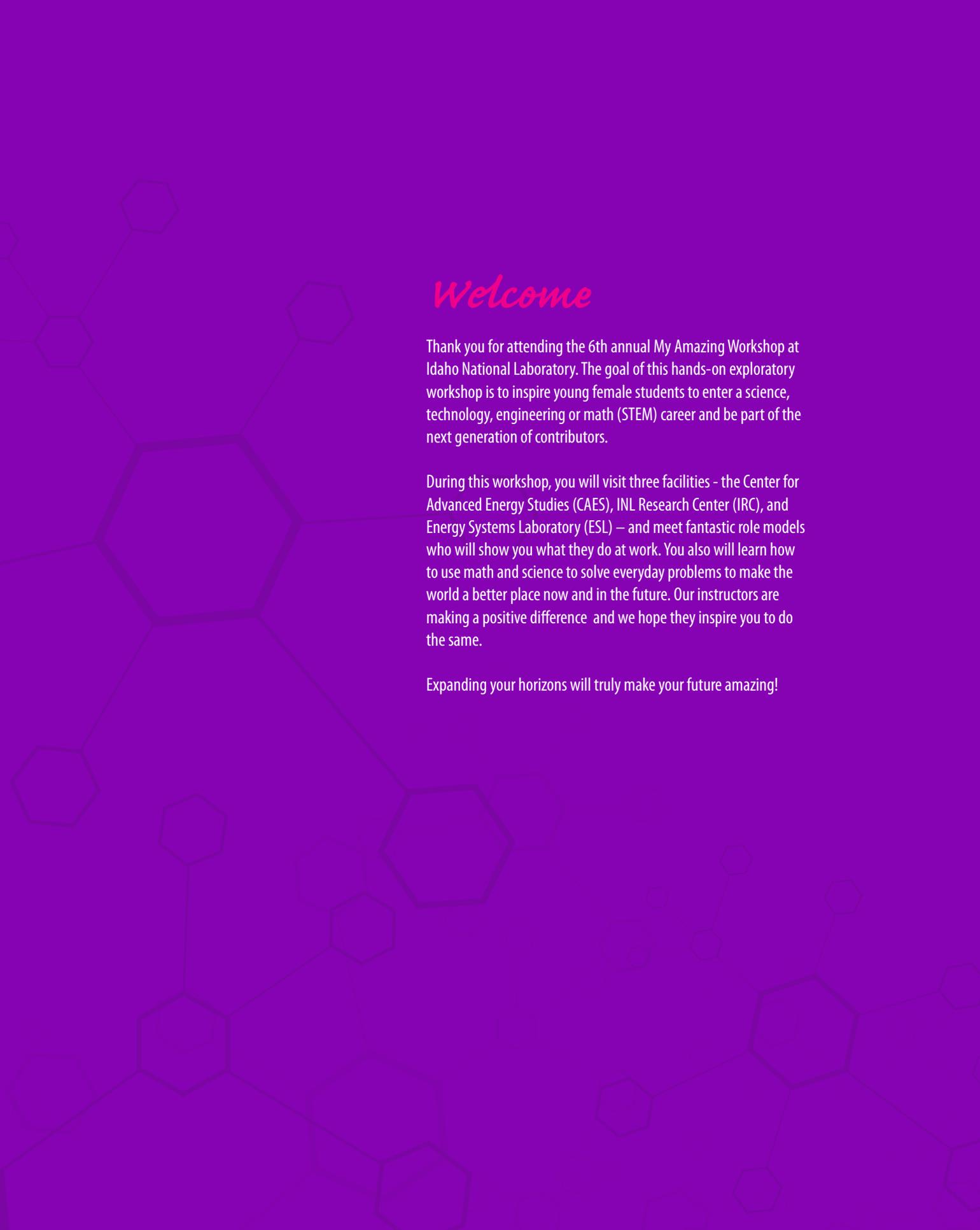


# *My Amazing Future*

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*6<sup>th</sup> Annual Idaho National Laboratory  
Exploring and Experiencing Science  
and Technology Workshop*

*March 1, 2013*



## *Welcome*

Thank you for attending the 6th annual My Amazing Workshop at Idaho National Laboratory. The goal of this hands-on exploratory workshop is to inspire young female students to enter a science, technology, engineering or math (STEM) career and be part of the next generation of contributors.

During this workshop, you will visit three facilities - the Center for Advanced Energy Studies (CAES), INL Research Center (IRC), and Energy Systems Laboratory (ESL) – and meet fantastic role models who will show you what they do at work. You also will learn how to use math and science to solve everyday problems to make the world a better place now and in the future. Our instructors are making a positive difference and we hope they inspire you to do the same.

Expanding your horizons will truly make your future amazing!



## Sponsors





## Workshop Descriptions

### **Cyber Security Games**

*Rita Wells, Bri Rolston, Melinda Cebull, Jonathan Gray*

Have you ever wondered, "If I text Brittney about Jazy's ugly blouse, it won't get back to Jazy, right?" The same concepts of hacking text messages applies to real large infrastructures such as water systems and electric grids. Tablets and laptops are common in today's culture and security plays an important role in your privacy when using these devices. During this session, you team up to defend or attack large-scale utility systems that enable our complex way of life.

### **Dancing Craisins**

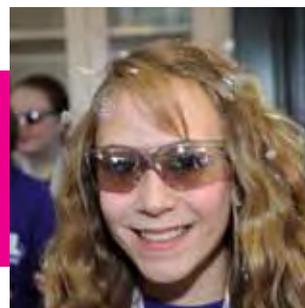
*Dawn Scates*

What? You have never seen a craisin dance? Are you kidding me? Learn this cool trick, to amaze your friends and family, and other awesome science-based experiments, like having your fortune told by a fish, making objects glow in the dark, making snow in a machine, and concocting gooey, slimy stuff for movies like Ghostbusters.

## DNA and Microorganisms

*Debra Bruhn, Cynthia Breckenridge, Dayna Daubaras, Yoshiko Fujita, Amber Miller*

Learn about microbiology and genetics and their impact on all living things. In this workshop you work side by side with scientists to learn about bacteria, yeast and fungus and their importance to the cycle of life. You will also experiment with microscopy, extract deoxyribonucleic acid (aka DNA) from bacteria, and use gels to separate the DNA and use it for identification – such as positively identifying a criminal suspect!



## Experiment with a Chemist

*Mary Adamic, Linda Polson*

In this hands-on workshop, you solve a crime using paper chromatography. You also perform various chemical experiments (super absorbers—how diapers work and amazing growing toys), make slime (examine properties of polymers), understand glow sticks (chemiluminescence), and examine irradiated table salt, and learn about the benefits of radiation (for example, in food irradiation, cancer treatment, etc.).

## Explosive Volcanism

*Shannon Nowotniak, Carrie Bottenberg*

Idaho has one of the most fascinating volcanic histories in the United States. Rather than waiting for the next explosion, you can create an eruption (no baking soda involved) and use it to investigate volcanic processes such as explosive mechanisms and deposit distribution around a vent.

## Magneto Science

*Steve Shropshire*

Learn the secrets of Dr. Magneto! Build your own motor and learn how to make speakers, microphones, and other cool electronic toys. Explore magnetic levitation and use electromagnetic waves to make light bulbs turn on underwater. You can work with super strong magnets, magneto coil guns, and other cool sparky, magnetic things for lots of hands-on science fun.

## Nuclear Forensics: The Science of Discovery

*Catherine Riddle*

Have you ever wondered how chemistry is used to solve a mystery? How do investigators use chemistry to search for clues at an explosive detonation crime scene? Was this a run of the mill explosive or a dirty bomb? Was it an accident or terrorism? Chemists have many tools to answer these questions. In this workshop, you will hunt for clues attached to the detonation of an explosive device and use analytical and radiochemistry techniques to look for clues that aid National and Homeland Security's quest for answers.

## Nuclear Space Batteries

*Robin Stewart*

How do we power deep space missions when we can't carry enough fuel and solar power is not available? We use a space battery! Heat from the radioactive decay of plutonium-oxide fuel is converted into electricity through various space battery designs. In this workshop, you will learn more about these unusual batteries and have an opportunity to assemble a mock battery.



### **Our Amazing Aquifer: Protecting Our Most Precious Resource**

*Flint Hall, Michell Walker, Jack Rainey*

You open the tap to get a glass of water or to keep your garden fresh and green. Where did that water come from? For most of us in Idaho, it came from the Snake River Aquifer. What is an aquifer and how does water travel through one? Where did that water underground come from and where is it going? What can we do to protect this most important resource? This will be an experience to see and taste!

### **Radiation and Life**

*Jessica Peters, Melody Wheeler, Micki Goodrich,  
Linda Vecellio, and Laurel Hill*

Did you know you are radioactive? We live in a naturally radioactive world, so radiation is all around us and even in us! And because human kind is so very clever, we've harnessed the energy of radiation to do things like treat cancer, send probes to outer space, and even sterilize cosmetics! Come and see if you can detect radiation in our workshop and discover more about the ways we use it every day.

### **Robotics and Applied Engineering**

*Michael Clark, Victor Walker, Kevin Croft*

Have you ever wanted to learn about robotics? In this workshop, you learn about thermodynamics, heat transfer, material science, and strength of materials concepts through the use of robotics, liquid nitrogen, and other engineering tools. You will see and touch the "guts" and inner workings of manipulators, mechanical components, electronics, and software used in robotics and remote systems and learn how all of these are integrated.

### **Traveling Roadshow: The Physics of Carnival Games**

*Michel Hall, Kerry Martin, Jim Jackson*

Learn how to defeat the Carnie and win big on the Midway! In this workshop you explore basic concepts of the scientific method and the physics principles behind the most common midway carnival games. You participate in a series of experiments that demonstrate how science can be used to conquer these games. Activities will include the milk bottle toss as well as other midway games, designed to make every student a winner!

### **Wave your Wand in a CAVE**

*Keith Wilson*

Spend an hour in the CAES Automatic Virtual Environment – or CAVE. This is the ultimate gaming environment. The four-panel system uses rear projection to display computer graphics on three walls and the floor. By donning stereo glasses to create depth perception and holding a "wand" (kind of like a Wii remote) to manipulate and control data, you can tour a building still under design, plot a new transmission route over terrain, or delve into the core of a nuclear reactor.

# Presenters and Tour Guide

## Group and Rotation Schedule

Emergency Contacts, Michelle Bingham (520-9875) or Julie Merrill (251-6689)

### Activities and Workshops

|           |   |
|-----------|---|
| 5:45-9:30 | Twin Falls (5:45), Pocatello (8:00), Fort Hall (8:30), Blackfoot (9:00) Students Travel to Idaho Falls, IRC - Registration, Briefing, Nancy Stewart |
| 7:00-8:00 | Idaho Falls Students Travel to CAES by INL bus - Mary Ann Willmore, Julie Ulrich  |
| 7:30-8:00 | Tour Guides Meet in CAES Gallery for Orientation Session, Frances Marshall  |
| 8:00-8:30 | Idaho Falls Students Badging and Registration (Marie, Donna, Julie, Reva) , T-shirts (Jill, Katelyn), Program Bags (Christy, Cheryl)                |
| 8:30-8:45 | Welcome and Safety Information for Idaho Falls Students in CAES Gallery, Michelle Bingham   |

### Workshop Schedule by Group

| Student Groups    | 1 - IF  | 2 - IF                                    | 3 - IF  | 4 - IF                          | 5 - TF/P/B/FH  | 6 - TF/P/B/FH                | 7 - TF/P/B/FH                   | 8 - TF/P/B/FH              |
|-------------------|---|---|---|---------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Group Tour Guides | Marya Morrison, Julie Foster  | Leah Squires, Julie Ulrich, Hope Forsmann | Jill Mitchell, Cindi Papesch, Donna Wuthrich, | Stephanie Walsh, Christy Frazee | LaWanda Wold, Mary Ann Willmore                                    | Katelyn Wachs, Deborah Newby | Cheradan Fikstad, Alison Conner | Val Seeley, Marcela Stacey |
| 8:45              | CAES 210  | CAES Lobby                                | CAES 113                                      | CAES CAVE                       | Students on bus. Arrive IRC by 9:30. Badging, registration on bus. |                              |                                 |                            |
| 9:45              | Restroom Break, Evaluations, Transition to Next Workshop                          |   |   |                                 |  |                              |                                 |                            |
| 10:00             | CAES CAVE   | ESL A106                                  | CAES 203                                      | CAES 210                        | IRC Annex  | IRC 120                      | IRC 303                         | IRC B-8                    |
| 11:00             | Groups 1, 2, 3, 4 Restroom Break and Evaluations                                  |   |   |                                 | Groups 5, 6, 7, 8, Restroom Break, Evaluations, Travel to CAES     |                              |                                 |                            |
| 11:15             | Lunch for ALL in CAES Gallery, Cheryl O'Brien speaker, "Your Amazing Future"      |   |   |                                 |  |                              |                                 |                            |
| 11:45             | All Students, Presenters, Tour Guides in the CAES gallery , Photo (Chris Morgan)  |   |   |                                 |  |                              |                                 |                            |
| 12:00             | Groups 1, 2 Travel to IRC   |   | Groups 3, 4, 5, 6, 7, 8 stay in CAES or ESL   |                                 |  |                              |                                 |                            |
| 12:15             | IRC Annex   | IRC 120                                   | ESL A104                                      | CAES 201                        | CAES 113   | CAES 203                     | ESL B102                        | CAES 210                   |
| 1:15              | Restroom Break, Evaluations, Transition to Next Workshop                          |   |   |                                 |  |                              |                                 |                            |
| 1:30              | IRC B-8   | IRC 303                                   | ESL A106                                      | ESL B102                        | CAES 201   | CAES Lobby                   | ESL A104                        | CAES 203                   |
| 2:30              | Snack, Restroom Break, Evaluations, Transition to Next Workshop                   |   |   |                                 |  |                              |                                 |                            |
| 3:00              | IRC 120   | IRC Annex                                 | CAES CAVE                                     | ESL A104                        | CAES Lobby   | ESL A106                     | CAES 113                        | CAES 201                   |
| 4:00              | Restroom Break, Evaluations, Good-byes, Students Board Buses for Travel Back Home |   |   |                                 |  |                              |                                 |                            |

- Cyber Security Games:** *Rita Wells, Bri Rolston, Melinda Cebull, Jonathan Gray, CAES lobby*
- Dancing Craisins:** *Dawn Scates, CAES 113*
- DNA and Microorganisms:** *Debra Bruhn, Amber Miller, Yoshiko Fujita, Dayna Daubaras, Cynthia Breckenridge, IRC Laboratory B-8*
- Experiment with a Chemist:** *Mary Adamic, Linda Polson, IRC Conference Room 120*
- Explosive Volcanism:** *Shannon Nawotniak, Carrie Bottenberg, ESL A104, Jo Anna Stenzel, Cheryl O'Brien escort for presenters*
- Magneto Science:** *Steve Shropshire, CAES 201 (Teton Conference Room)*
- Nuclear Forensics:** *The Science of Discovery, Catherine Riddle, CAES Laboratory 210*
- Nuclear Space Batteries:** *Robin Stewart, ESL B102*
- Our Amazing Aquifer:** *Flint Hall, Michell Walker, Jack Rainey, CAES 203 (Snake River Conference Room)*
- Radiation and Life:** *Jessica Peters, Melody Wheeler, Micki Goodrich, Linda Vecellio, ESL A106*
- Robotics and Applied Engineering:** *Michael Clark, Victor Walker, Kevin Croft, IRC Annex*
- Traveling Roadshow:** *The Physics of Carnival Games, Michel Hall, Kerry Martin, Jim Jackson, IRC Conference Room 303*
- Wave Your Wand in a CAVE:** *Keith Wilson, CAES CAVE*





My Amazing  
Future

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## *Thank you!*

Thank you to all the individuals and organizations who helped make the 6th annual My Amazing Future event happen, including the My Amazing Future Steering Committee, workshop presenters, and the many sponsors who contributed time and funds.

Thank you, Idaho National Laboratory (INL) for hosting the event and providing buses, T-shirts, safety glasses, and a variety of resources. INL, Portage, Inc., Idaho Department of Environmental Quality (IDEQ), Idaho State University, Walsh Engineering, and Eastern Idaho Technical College all provided people who presented and served as tour guides. Additional funding was provided by INL, Eastern Idaho Engineering Council, the Idaho section of the American Nuclear Society, the Idaho section of the American Society of Mechanical Engineers, and several private donors.

Thank you to IDEQ for the re-useable water bottles! Lastly, thank you to the College of Southern Idaho Girls in Technology Program for initiating this event in 2007 and providing continued inspiration and to the schools and teachers who have partnered with us.

