



SATURDAY, APRIL 28, 2012

8:30AM - 4:30PM

INSTITUTE OF SCIENCE & TECHNOLOGY
AT THE OVERLAND-PRAIRIE CAMPUS
12500 E. JEWELL AVE.
AURORA, CO 80012



Conference Agenda

8:30 AM	Coffee / Registration
9:00 AM	Welcome
9:15 AM	Keynote Address: Brian Jones
10:00 AM	Special session: Chuck Stone / Chris Marchbanks - Science Outreach Catalyst Kits
10:20 AM	Coffee Break / Facility Tour
11:00 AM	Session A1: Chris Nichols - Perimeter Institute : Beyond the Atom: Remodeling Particle Physics Resource Mark Siemens - As stable as a (toy) eagle - how do center-of-mass toys work? Kathleen Hinko - Student Accomplishment in an Inquiry-based Afterschool Science Program
12:15 PM	LUNCH / Business Meeting
1:30 PM	Session B1: Bethany Wilcox: Cell phones in the Classroom: Digital Distraction and Student Performance Danny Caballero: Computational Modeling: A tool we can teach Brian Jones, Nisse Lee, & Cherie Bornhorst: Cool Tools You Can Use in Your Class Next Week
2:30 PM	Make & Take / Open House Cherie Bornhorst & Adamn Pearlstein: QuarkNet @ CSU -- Build a Cloud Chamber LSOP Open House
4:00 PM	Closing Session: Brian Huang: Overview of Cherry Creek Schools Physics, STEM, Robotics, and the Future...

Speaker Abstracts / Descriptions

Keynote: Brian Jones, Colorado State University & the Little Shop of Physics

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The same is true of teaching. We learn by doing, and my work with the Little Shop of Physics program has given me invaluable practice as a physics teacher. For 20 years I have worked with a team of undergraduate students and fellow educators to present this unique hands-on science program to over 250,000 K-12 students. We have worked with students of all ages and all backgrounds, in schools all over the region and the world. Along the way, we have developed effective tools to teach scientific concepts and we have learned useful techniques to engage students. We have traded ideas and insights with thousands of teachers.

In this talk I will share some techniques, some insights, and (of course) some demonstrations that I have developed with my Little Shop colleagues over the past 20 years.

QuarkNet @ CSU -- Join Us For An Exciting Summer Workshop!

Cherie Bornhorst & Adam Pearlstein - Little Shop of Physics

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Join Adam Pearlstein and Cherie Bornhorst for a hands-on workshop where we'll demonstrate how to build simple cloud chambers! You'll also receive information about our upcoming summer Cosmic Ray Workshop (June 13-15, 2012) at CSU, and how to get involved with the QuarkNet program at CSU. QuarkNet is a program out of FermiLab, and networks teachers across the country through exciting professional development opportunities focused on particle physics.

Computational Modeling: A tool we can teach

Danny Caballero - University of Colorado - Boulder

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Computational modeling, using a computer to solve, simulate, visualize a science and engineering problem, is becoming increasingly accessible to our students. In this talk, we will highlight efforts to integrate computational modeling in high school, introductory college, and upper-division physics courses using a variety of platforms and environments. We will discuss the importance of teaching this new tool in our courses (including a call from the National Research Council), the benefits and challenges in doing so (including methods of implementation and currently available resources), and the preliminary outcomes from research currently investigating its effects.

Cool Tools You Can Use in Your Class Next Week

Brian Jones, Nisse Lee, & Cherie Bornhorst - Little Shop of Physics

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Little Shop of Physics will show you some of our favorite demos and experiments and then give you the tools, tips, and materials you need to have some of these ready to go for class on Monday!

Student Accomplishment in an Inquiry-based Afterschool Science Program

Kathleen Hinko - University of Colorado - Boulder

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The Partnerships for Informal Science Education in the Community (PISEC) program at the University of Colorado, Boulder, brings together university and community institutions to create a hybrid space where K-12 students can engage in inquiry-based scientific practices afterschool. Recently, the PISEC program has redesigned its curriculum to encourage more student-directed activity. To compare student accomplishment in the old and new curricula, we analyzed student science notebooks from two semesters. We look at both representations used by students to document their experiments as well as students' choices in the sequence of activities they pursued.

Introducing Perimeter Institute: Beyond the Atom: Remodeling Particle Physics Resource

Christine Nichols - CastleView High School

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Come preview activities to accompany the new Particle Physics video produced by the Perimeter Institute for use in high school physics classes and beyond. How can balloons, marbles and a wine glass be used to explore Rutherford's scattering experiment? Use conservation of charge and momentum to discern particle decay and collision events in two historic images from CERN and Brookhaven. Predict the properties of the omega-minus particle using strategies similar to those used by Mendeleev in organizing the periodic table. Analyze evidence for the existence of the Top Quark from Fermilab's D-Zero detector and extend this analysis to better understand the pursuit of the Higgs particle at the Large Hadron Collider.

As stable as a (toy) eagle - how do center-of-mass toys work?

Mark Siemens - University of Denver

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We've all seen the "center of mass" toys that balance on a tiny and seemingly-precarious contact point (such as a bird perched by its beak on a rock). The standard explanation is that extra weights in the wings (or are they magnets?) move the center of mass to a location directly under the contact point, which allows the toy to be in equilibrium: no net torque and no net force. But why are these toys so stable, able to withstand jiggles and bumps - and return to their equilibrium point? In this workshop, we will see that this surprisingly-stable configuration can be understood using simple physics concepts, and will discuss engineering design principles that can be extended to other problems.

Science Outreach Catalyst Kits (SOCKs) for Demonstrations and Outreach

Chuck Stone & Chris Marchbanks - Colorado School of Mines

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Science Outreach Catalyst Kits, or SOCKs, contain exploratory physics and science activities specifically designed for in class demonstrations or outreach presentations. The kits are created and assembled each summer by interns and staff at the Society of Physics Students (SPS) national office in College Park, MD. In this mini-workshop, three activities will be presented that will allow attendees to learn how to 1) demonstrate the physics of collisions, 2) simulate Ernest Rutherford's gold foil experiment that proved the existence of the atomic nucleus, and 3) illustrate the features of a nuclear fission chain reaction. A collection of SOCK activities from 2001 to 2011 can be downloaded from the SPS website at <http://www.spsnational.org/programs/socks/>.

Cell phones in the Classroom: Digital Distraction and Student Performance

Bethany Wilcox - University of Colorado

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The recent increase in student use of digital devices such as laptop computers, iPads and web-enabled cell phones has generated concern about how such technologies affect student performance. This presentation describes preliminary findings of ongoing research that combines observation, survey and interview data to assess the effects of technology use on student attitudes and learning. Data were gathered in eight introductory science courses at a major university. Results show a significant negative correlation between in-class phone use and final grades, with use of cell phones corresponding to a drop of 0.36 +/- 0.08 on a 4-point scale. These findings are consistent with research (Ophir, Nass & Wagner 2009) suggesting students cannot multitask nearly as effectively as they think they can. While 75% of students reported regular cell phone use, observations suggest undergraduates typically under-report the frequency of their in-class use of digital

American Association of Physics Teacher Colorado \ Wyoming

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Interested in joining the executive board? Want to connect and network with other physics teachers in the area? Contact anyone on the list above! We'd love to meet with you and hear your ideas!