CALL FOR PAPERS, POSTERS, AND WORKSHOPS
2010 Spring Meeting
Colorado/Wyoming Section
of the
American Association of Physics Teachers

Red Rocks Community College
Lakewood, CO 80228
May 1, 2010
Welcome Fellow Physicists!

On behalf of the Executive Board of the CO/WY Section AAPT, I would like to encourage you to join physics colleagues from across the greater Colorado and Wyoming regions for a day of learning, sharing, and experiencing hands-on physics. Our program invites students and teachers at all levels – high school, two- and four-year college, and university ranks – to contribute a paper, present a poster, or just enjoy the invited talks, sessions, and workshops.

We will be featuring three topic strands throughout the meeting: astronomy, renewable energy, and general physics/physics education. Presentations and posters are open to all students and faculty who wish to present. All reasonable topics are welcome; however, we encourage submissions on the topics of astronomy and renewable energy. Students are encouraged to present summaries of undergraduate research projects, summer internships, senior design projects, as well as graduate student thesis or dissertation research. Technical papers from physics faculty and staff are also welcome that address best teaching practices, physics education research, introductory and advanced lab techniques, pedagogical studies, and all varieties of topical physics research.

We will start the morning with registration and a poster session. After a short break, we’ll have a series of contributed and invited paper presentations and workshops during our morning session. Margaret Brinker will present a workshop featuring Box Store Physics. Colleen Jorgensen, Vice President of Instruction at Red Rocks Community College, will be giving a presentation about renewable energy and sustainability programs on campus.

After lunch we will have a keynote talk from Bob Beichner, Alumni Distinguished Professor of Physics at North Carolina State University about SCALE-UP: the Student-Centered Active Learning Environment for Undergraduate Programs project. Educational research indicates that students should collaborate on interesting tasks and be deeply involved with the material they are studying. The SCALE-UP project promotes active learning in a redesigned classroom for 100 students or more. Smaller classes can also benefit. Class time is spent primarily on “tangibles” and “ponderables”—hands-on activities, simulations, and interesting questions. This talk will briefly discuss the classroom environment, describe some of the activities, and review the findings of studies of learning in various SCALE-UP settings.

We will have more talks and workshops available during the afternoon sessions. Brian Jones, the Director of “The Little Shop of Physics” at Colorado State University in Fort Collins, will lead a workshop for teachers, students, and SPS members that wish to learn more about his “Little Shop of Physics” science outreach program. Chris Nichols will present a workshop on teaching about dark matter and quantum topics. Lynette Hoerner will present a workshop on engaging students in the astronomy classroom.

After the afternoon talks and workshops, we will enjoy a BBQ hosted by Red Rocks and the Colorado School of Mines Society of Physics Students. Relax a bit, and take advantage of the opportunity to meet some new faces in physics, and acknowledge their work. To culminate our meeting, we will have a guest speaker and a star party.

Here’s to a great weekend at Red Rocks Community College, one full of physics fun and sharing!

Barbra Maher
Program Host and Vice President, CO/WY Section AAPT
Program Highlights and Campus Parking

All activities are located at the Lakewood campus, west end of the building. For the location of the campus, and campus map: [http://www.rrcc.edu/maps/lakewood.html](http://www.rrcc.edu/maps/lakewood.html)

Parking: Free campus parking is available in the upper and lower west end parking lot.

Saturday May 1, 2010

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<th>Activity</th>
<th>Location</th>
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<td>8:30 am – 10:00 am</td>
<td>Registration and Poster Session</td>
<td>Community Room</td>
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<tr>
<td>10:00 am – 10:15 am</td>
<td>Break</td>
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<tr>
<td>10:15 am – 12:15 pm</td>
<td>Sessions I</td>
<td>Room Schedule TBA</td>
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<tr>
<td>12:15 pm – 1:00 pm</td>
<td>Lunch</td>
<td>Community Room</td>
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<tr>
<td>1:00 pm – 2:00 pm</td>
<td>Keynote Talk</td>
<td>Community Room</td>
</tr>
<tr>
<td>2:00 pm – 3:00 pm</td>
<td>Little Shop of Physics workshop</td>
<td>Room Schedule TBA</td>
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<tr>
<td>2:15 pm – 5:15 pm</td>
<td>Sessions II</td>
<td>Room Schedule TBA</td>
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<tr>
<td>5:30 pm – 6:30 pm</td>
<td>BBQ Dinner</td>
<td>Outdoor Pavilion</td>
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<td>6:30 pm – 7:00 pm</td>
<td>CO/WY AAPT Business Meeting</td>
<td>Community Room</td>
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<tr>
<td>7:00 pm – 8:15 pm</td>
<td>Invited Speaker</td>
<td>Community Room</td>
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<tr>
<td>8:30 pm – 10:30 pm</td>
<td>Star Party</td>
<td>Stone Amphitheater (below activity field)</td>
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Star Party, Great Food, Invited and Contributed Talks, and Workshops!

8:30 am – 10:00 am = Registration and Poster Session
Join us for coffee and a great selection of posters.

10:15 am – 12:15 pm = Sessions (Talks and Workshops)
Choose from our three topic strands: astronomy, renewable energy, and physics.

12:15 pm – 1:00 pm = Lunch

1:00 pm – 2:00 pm = Keynote Talk
SCALE-UP: The Student-Centered Active Learning Environment for Undergraduate Program Project
Bob Beichner, Alumni Distinguished Professor of Physics – North Carolina State University

How do you keep a classroom of 100 undergraduates actively learning? Can students practice communication and teamwork skills in a large class? How do you boost the performance of underrepresented groups? The Student-Centered Active Learning Environment for Undergraduate Programs (SCALE-UP) Project has addressed these concerns.

Educational research indicates that students should collaborate on interesting tasks and be deeply involved with the material they are studying. We promote active learning in a redesigned classroom for 100 students or more. Smaller classes can also benefit. Class time is spent primarily on “tangibles” and “ponderables” – hands-on activities, simulations, and interesting
questions. Nine students sit in three teams at round tables. Instructors circulate and engage in
Socratic dialogues. The setting looks like a banquet hall, with lively interactions nearly all the time.

Hundreds of hours of classroom video and audio recordings, transcripts of numerous interviews
and focus groups, data from conceptual learning assessments (using widely-recognized
instruments in a pretest/posttest protocol), and collected portfolios of student work are part of our
rigorous assessment effort. Our findings (based on data from over 16,000 students collected over
five years as well as replications at adopting sites) can be summarized as the following:

• Female failure rate is 1/5 of previous levels, even though more is demanded of students
• Minority failure rate is 1/4 that seen in traditionally taught courses
• At-risk students are more successful in later engineering courses.
• Top students gain the most, although students at all levels benefit.
• Conceptual learning & problem solving are significantly improved, with same content coverage

For more details see: http://www.ncsu.edu/PER/scaleup.html

2:00 pm – 3:00 pm = Workshop “The Little Shop of Physics”
Brian Jones, Professor & Director of “The Little Shop of Physics” Colorado State Univ, Fort Collins
This workshop will feature numerous “make-and-take” activities that will provide attendees with
ready-to-use demonstrations for their classes. See http://littleshop.physics.colostate.edu/

2:00 pm – 3:00 pm = Workshops: including a Renewable Energy Workshop by Barb Moskal

2:15 pm – 5:15 pm = Sessions
Choose from our three topic strands: astronomy, renewable energy, and physics.

5:30 pm – 6:30 pm = Barbecue Dinner
The fabulous and talented SPS students will oversee a grill that will tantalize the palates of meat
lovers and vegetarians alike.

6:30 pm – 7:00 pm = CO/WY AAPT Business Meeting
Discuss business with the CO/WY Section Officers, and volunteer to host the next CO/WY Section
Meeting at your institution.

7:00 pm – 8:15 pm = Invited Astronomy Talk

8:30 pm – 10:30 pm = Star Party
We will have many telescopes available for night sky viewing. Join us for an evening under the stars
(and hopefully few clouds!) with your fellow physics colleagues.
Call for Papers and Posters Guidelines
Each participant may only present one Contributed Paper or one Poster, co-authorship on multiple presentations is allowed.

General Guidelines: Contributed Papers
- Presented on Saturday May 1, 2010 during 10:15 am – 12:15 pm session or 2:15 pm – 5:15 pm session.
- Contributed Papers are 15 minutes in duration, with 3 minutes for questions included in the 15 minutes.
- All students and faculty who wish to present may contribute a paper. All reasonable topics are welcome.
- Students are encouraged to present summaries of undergraduate research projects, summer internships, senior design projects, as well as graduate student thesis or dissertation research.
- Technical papers from physics faculty and staff are also welcome that address best teaching practices, physics education research, introductory and advanced lab techniques, pedagogical studies, and all varieties of topical physics research.
- Computer projectors will be provided in all presentation rooms. Laptop computers will be available, but all presenters are strongly encouraged to bring their own laptops to avoid hardware and software formatting difficulties, as well as audio and video streaming problems.

General Guidelines: Posters
- Presented on Saturday May 1, 2010 during 9:00 am – 10:00 am.
- Posters must not exceed 4 feet in height and 4 feet in width.
- Posters will be setup between 8:30 am and 9:00 am on Saturday morning.
- All presenters should provide their own poster displays and mounting materials.
- Poster presenters should plan to be available to answer questions during the entire poster session.
- Any graduate, undergraduate, or high school student who has conducted research may present a poster.
- Students are encouraged to present summaries of undergraduate research projects, summer internships, senior design projects, as well as graduate student thesis or dissertation research.

Specific Guidelines: Submit all Contributed Papers and Posters with the following information
1. Indicate Paper or Poster
2. Title
3. Presenter’s full name
4. Presenter’s institution
5. Presenter’s complete mailing address
6. Presenter’s phone number
7. Presenter's email address
8. Abstract (of Paper or Poster)

Submiting Papers and Posters
From the Specific Guidelines, email items 1-8 about your Contributed Paper or Poster to Barbra Maher at

barbra.maher@rrcc.edu

In the Subject line of your email, please state
Submission for 2010 Spring Meeting

Submissions must be received by
5:00 pm MDT on Friday April 9, 2010
Lodging
Overnight accommodations have been reserved for Friday and Saturday at the following two hotels, both located approximately 2 miles (5 minutes) from Red Rocks Community College.

**Comfort Suites**  
11909 West 6th Avenue  
Golden, CO 80401  
Phone: (303) 2319929

**Fairfield Inn**  
11907 West 6th Avenue  
Golden, CO 80401  
Phone: (303) 2319939

**Hotel Parking:** Both hotels have plenty of free on-site parking in their parking lots  
For the location of these hotels, do a map search on 11909 West 6th Avenue Golden, CO 80401

**Common Amenities:** Both are managed by the same agency and offer the same amenities:
- 50 rooms have been reserved for Friday April 30, 2010 and Saturday May 1, 2010.
- Each room (a King Suite or a Double Queen Suite) cost $77.39 per night ($69.00, plus $8.39 tax).
- A first night room & tax deposit, charged to a credit card, must accompany all reservations.
- Free continental breakfast is offered on Saturday & Sunday mornings from 7:00 am – 10:00 am.
- Free high-speed internet service is offered in both hotel lobbies and all rooms.
- Both hotels have an indoor heated pool and a hot tub.
- Both hotels are 100% smoke-free.
- Check-in time is 3:00 pm.
- Check-out time is 11:00 am.

**For Reservations:**
Call the hotel of your choice and refer to the

**AAPT Zone Meeting Room Block**

Reservations must be made on or before **April 10, 2010** to get the **$69.00** room rate
Driving Directions to Red Rocks Community College Lakewood Campus

**From Denver:** Take the Sixth Avenue Freeway west to the Union/Simms Street exit. Turn left (south) on Union to 4th Avenue. Turn right on 4th Avenue (west) and bear right past the Point Athletic Club. Continue west on Sixth Avenue Frontage Road to the entrance sign for the college. Turn left at the sign (Arbutus Drive) and continue to the college, which is located on the west side of Arbutus.

**From C470 and/or South Denver:** Take 470 North/West to 6th Avenue. Take 6th Avenue east and exit at Indiana and take a right. Turn left at the light on to the Frontage Road to the entrance sign to the college. Turn right at the sign (Arbutus Drive) and continue to the college.

**From Golden:** Take the Sixth Avenue Freeway east to the Indiana Street exit. Turn right (south) on Indiana to the first light. Turn left (east) on the Sixth Avenue Frontage Road and continue to the entrance sign for the college. Turn right at the sign (Arbutus Drive) and continue to the college, which is located on the west side of Arbutus.

Campus Map [http://www.rrcc.edu/maps/pdfs/rrccmapoverview.pdf](http://www.rrcc.edu/maps/pdfs/rrccmapoverview.pdf)
Classroom Map [http://www.rrcc.edu/maps/pdfs/classroommap.pdf](http://www.rrcc.edu/maps/pdfs/classroommap.pdf)
Registration Form
2010 Spring Meeting
CO/WY Section AAPT

Name _____________________________________________________________

Institution ____________________________ Circle Type: HS 2-yr Coll 4-yr Coll Univ Other

Mailing Address __________________________________________________________

Phone Number ____________________________ Email Address ____________________________

I am presenting a (circle one): Poster Paper Workshop N/A

Pre - Registration Fees (circle the one single Fee you are paying)

<table>
<thead>
<tr>
<th>Teachers and Scientific Professionals</th>
<th>Graduate Students and First-Year Teachers</th>
<th>High School and Undergraduate Students</th>
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<tbody>
<tr>
<td>$35</td>
<td>$15</td>
<td>Free</td>
</tr>
</tbody>
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Payment may be made by check. Registration at the door will include a $5 increase in cost.

Complete form, endorse check payable to Colorado Wyoming Section, American Association of Physics Teachers and send to the following address:

Dr. Richard J. Krantz
Professor of Physics, NC 3123C
Metropolitan State College of Denver
Department of Physics, CB 69
1201 5th Street
Denver, CO 80204

Registration Forms and Fees must be received by 5:00 pm MDT on Friday April 9, 2010