2005
PHYSICS EDUCATION
RESEARCH
CONFERENCE
## Previous Proceedings in the Series of Physics Education Research Conferences

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Preface

This past summer, 210 Physics Education Researchers came together in Salt Lake City, Utah for the 2005 Physics Education Research Conference. The organizing theme of the conference was, “Connecting Physics Education Research to Teacher Education at All Levels: K-20.” Kastro Hamed, Rebecca Lindell, and N. Sanjay Rebello did a fabulous job arranging this meeting. They gathered some great physics educations researchers to deliver invited talks and lead targeted poster sessions, workshops, and roundtable discussions. And, as always, there was a host of interesting and insightful contributed posters representing a broad range of interests within the field. Many of those presentations are represented in this edition of the Proceedings. Specifically, you will find eight manuscripts from invited sessions and thirty papers that successfully passed our peer-review process.

As always, we want to openly thank PER community members who magnanimously donated their time to review papers. This year sixty-five people deserve our gratitude: Wendy Adams, Brad Ambrose, Gordon Aubrecht, Lei Bao, Joe Beuckman, Scott Bonham, David Brookes, Kerry Browne, Warren Christensen, Eleanor Close, Hunter Close, Edgar Corpuz, Sean Courtney, Andrew Crouse, Karen Cummings, Melissa Dancy, Charles De Leone, Dedra Demaree, Dewey Dykstra, Judith Edgington, Robert Endorf, Eugenia Etkina, Noah Finkelstein, Peter Fletcher, Scott Franklin, Gary Gladding, David Hammer, Danielle Harlow, Kathy Harper, Andrew Heckler, Charles Henderson, Brant Hinrichs, Zdeslav Hrepic, Leon Hsu, Steve Kanim, Yeounsoo Kim, Patrick Kohl, Yuhfen Lin, Rebecca Lindell, Beth Lindsey, Michael Loverude, David Maloney, Sam McKagan, Jeffrey Morgan, Sahana Murthy, Luanna Ortiz, Valerie Otero, K.K. Perkins, Noah Podolefsky, Steven Pollock, Wendell Potter, N. Sanjay Rebello, David Rosengrant, Mel Sabella, Homeyra Sadaghiani, Chandralekha Singh, John Thompson, Jerry Touger, Alan Van Heuvelen, Stamatis Vokos, DJ Wagner, Rasil Warnakulasooriya, Carl Weiman, Gary White, and Michael Wittmann.

Again, it was a great conference, and we look forward to seeing you all next summer in Syracuse, New York.

Jeff Marx
Outgoing Editor
PROGRAM

2005 PHYSICS EDUCATION RESEARCH CONFERENCE
SALT LAKE CITY, UTAH

WEDNESDAY, AUGUST 10TH

5:45 - 6:45  Keynote Address
  Bridging the Gap: Preparing K-12 Teachers to Teach Physics and Physical Science
  Lillian C. McDermott

6:50 - 8:00  Dinner Banquet

8:00 - 10:00  Contributed Poster Session

THURSDAY, AUGUST 11

8:00 - 8:15  Orientation

8:15 - 9:45  Workshops (W) and Targeted Poster Sessions (TP) I
  W-A: Important Issues in Preparing Graduate Teaching Assistants
  Kathleen Harper, The Ohio State University

  W-B: Model Analysis: Theoretical Basis and Methodology for Developing Effective Assessment
  Lei Bao & Neville Reay, The Ohio State University

  W-D: Physics by Inquiry: Preparing K-12 Teachers to Teach Physics and Physical Science
  Donna Messina, Paula Heron, Peter Shaffer, and Lillian C. McDermott, University of Washington

  TP-A: Goals & Assessment in the PhysTEC Project: Drawing from Research and Systematic Self-assessment to Promote Inquiry-Oriented Teacher Education
  Laura Lising, Towson University, Noah Finkelstein, University of Colorado, Bob Poel, Western Michigan University, Ted Hodapp, American Physical Society

  TP-B: Research on Improving Content and Pedagogical Knowledge of Science Teachers
  Chandralekha Singh, University of Pittsburgh

9:45 - 10:15  Break
10:15 - 12:15 Invited Talks & Panel Discussion

Repositioning Ourselves from “Knowers” to “Learners:” Formative Assessment, Vygotsky, and Teacher Preparation
Valerie Otero, University of Colorado

The Physics Teacher Education Coalition: Results, Directions, Initiatives
Ted Hodapp, Hamline University

Evaluating Activity-based Teacher Workshops
Ron Thornton, Tufts University

Panel Discussion
Discussant: Kastro M. Hamed, University of Texas at El Paso

12:15 - 1:45 Luncheon Banquet

Teacher Quality Issues in Science Education and Research Opportunities
Dr. Harold Himmelfarb, U.S. Department of Education

1:45 - 3:15 Workshops (W) and Targeted Poster Sessions (TP) II

W-A: Important Issues in Preparing Graduate Teaching Assistants
Kathleen Harper, The Ohio State University

W-C: Piaget’s Workshop
Dewey Dykstra, Boise State University

W-D: Physics by Inquiry: Preparing K-12 Teachers to Teach Physics and Physical Science
Donna Messina, Paula Heron, Peter Shaffer, and Lillian C. McDermott, University of Washington

TP-A: Goals & Assessment in the PhysTEC Project: Drawing from Research and Systematic Self-assessment to Promote Inquiry-Oriented Teacher Education
Laura Lising, Towson University, Noah Finkelstein, University of Colorado, Bob Poel, Western Michigan University, Ted Hodapp, American Physical Society

TP-C: The Changing Face of Teacher Training: Creating Well-Qualified Physics and Astronomy Educators in the Age of No Child Left Behind
Rebecca Lindell, Southern Illinois University Edwardsville

3:15 - 3:45 Break

3:45 - 5:15 Workshops (W) and Targeted Poster Sessions (TP) III

W-C: Piaget’s Workshop
Dewey Dykstra, Boise State University

TP-B: Research on Improving Content and Pedagogical Knowledge of Science Teachers
Chandralekha Singh, University of Pittsburgh

TP-C: The Changing Face of Teacher Training: Creating Well-Qualified Physics and Astronomy Educators in the Age of No Child Left Behind
Rebecca Lindell, Southern Illinois University Edwardsville
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Maria Zahran and Gordon Aubrecht, II, The Ohio State University

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Building a community for physics education research
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Scott Bonham, Western Kentucky University