CURRICULUM VITAE

I. PERSONAL INFORMATION

David Elliott Meltzer
College of Integrative Sciences and Arts
Arizona State University, Polytechnic Campus
Mesa, AZ 85212
480-727-5215
david.meltzer@asu.edu
https://webapp4.asu.edu/directory/person/1272201

Education

Ph.D. (Physics) S.U.N.Y. at Stony Brook, 1985
M.A. (Physics), S.U.N.Y. at Stony Brook, 1980
B.A. (Physics), Columbia University, 1974

Fields of Research

Physics Education; Condensed Matter Theory; Quantum Fluids; Applied Physiology

Research group home page: http://physicseducation.net/index.php

Professional Experience

Associate Professor, College of Integrative Sciences and Arts, Arizona State University, Mesa, AZ, 2017-present

Honors Faculty (Barrett Honors College), Arizona State University, Mesa, AZ, 2013-present

Associate Professor, Mary Lou Fulton Teachers College, Arizona State University, Mesa, AZ, 2008-2017

Science Teacher (8th grade), Seattle Country Day School, Seattle, WA, 2007-2008

Senior Research Scientist, Physics Teacher Education Coalition, 2007-2008

Research Scientist in Physics, University of Washington, Seattle, 2005-2008.

Lecturer in Physics, University of Washington, Seattle, 2006.

Assistant Professor of Physics, Iowa State University, Ames, Iowa, 1998-2005.

Assistant Professor of Physics, Southeastern Louisiana University, Hammond, Louisiana, 1994-1998.

Visiting Assistant Professor of Physics, Southeastern Louisiana University, Hammond, Louisiana, 1991-1994.

Adjunct Instructor in Physics, University of Florida, Gainesville, Florida, 1991.

Adjunct Post-Doctoral Associate, Quantum Theory Project, University of Florida, Gainesville, Florida, 1991.

Adjunct Instructor in Physical Science, Santa Fe Community College, Gainesville, Florida, 1990.

Adjunct Instructor in Physical Science, Lake City Community College, Lake City, Florida, 1990.

Post-Doctoral Associate, Quantum Theory Project, University of Florida, Gainesville, Florida, 1987-1990.

Guest Scientist, Solid State Division, Oak Ridge National Laboratory, 1985-1987.

Post-Doctoral Research Associate, University of Tennessee, Knoxville, 1985-1987.

Graduate Research Assistant, S.U.N.Y. at Stony Brook, 1982-1985.

Graduate Teaching Assistant, S.U.N.Y. at Stony Brook, 1979-1982.

Instructor, State Civil Service Courses in Elementary Mathematics, Downstate Medical Center, Brooklyn, N.Y., 1974-1975.

Teaching Assistant in Elementary Mathematics, Borough of Manhattan Community College, New York, N.Y. 1974.

Languages

Working knowledge of written and spoken French and German.

Memberships and Long-term Consultantships

American Physical Society (APS)
Executive Committee, Forum on Education, APS: 2005-2008
American Association of Physics Teachers (AAPT)
Council, AAPT (Iowa Section Representative): 2002-2004
Committee on Research in Physics Education, AAPT: 2000-2002
Iowa Association of Physics Teachers, 1998-2005
Committee on Graduate Education, AAPT: 2011-2014
Assessment Consultant, PhysTEC (Physics Teacher Education Coalition): 2007-2011: http://www.phystec.org/webdocs/PastPeople.cfm
Senior Consultant, National Task Force on Teacher Education in Physics: 2008-2012: http://www.phystec.org/webdocs/TaskForce.cfm

II. RESEARCH

SUMMARY

Publications in Refereed Journals: 35
Publications in Conference Proceedings: 21
Books: 7 (+1 in press)
Book Chapters: 5
Other Invited Papers: 11
Invited Presentations: 120
[Conference, international: 11; Conference, national and regional: 63; Seminars and Colloquia: 46]
Contributed Presentations: 151
Contributed Workshops: 8
Other Presentations: 6
Curricular Materials CD-ROM: 1
Curricular Materials Websites: 2

CITATIONS (according to Google Scholar, as of January 3, 2022)

1. **Total:** 4747
2. **h-index:** 24

CURRICULAR MATERIALS

1. Warren M. Christensen, Michael E. Loverude, David E. Meltzer, Donald B. Mountcastle, and John R. Thompson, *Physics Education Research on Thermodynamics and Statistical Mechanics*.
2. David E. Meltzer and Valerie K. Otero, *History of U.S. Physics Education*, https://sites.google.com/site/physicseducationhistory/
3. David E. Meltzer and Kandiah Manivannan, *Workbook for Introductory Physics, Part II: Electricity and Magnetism, Optics, and Modern Physics* [CD-ROM] (2002). Available online at http://physicseducation.net/current/index.php.

HONORS AND AWARDS

1. Fellow of the American Physical Society, elected 2012:
   https://www.aps.org/programs/honors/fellowships/

   Citation: "For his tireless advocacy for the quality of professional preparation of K-12 teachers and for the depth and breadth of his scholarly contributions to research in physics education and the community of physics education researchers."
2. American Physical Society Outstanding Referee, selected 2008:
   http://publish.aps.org/OutstandingReferees
3. 2002-2003 Iowa State University Center for Teaching Excellence Teaching Scholar
4. 1999-2000 Iowa State University Miller Faculty Fellowship
5. 1999-2000 Big 12 Faculty Fellow, Iowa State University (ISU)

LINKS TO MEDIA REPORTS AND EXTERNAL WEBSITES

1. *ASU Now: Access, Excellence and Impact*, August 9, 2016:

   https://asunow.asu.edu/20160809-arizona-impact-relativity-speaking-teachers-gain-new-physics-skills
2. APS Fellowship Award, Spring 2013:

   http://www.aps.org/units/fed/newsletters/spring2013/fellows.cfm

   http://www.aps.org/units/fed/newsletters/spring2013/newfellows.cfm
3. *Arizona Republic*, March 12, 2011 (original article):
   http://physicseducation.net/media/AZ_Republic_3-12-11.pdf

   (abridged version at newspaper website):
   http://www.azcentral.com/community/mesa/articles/2011/03/11/20110311mesa-asu-polytechnic-students0311.html
4. Guest lectures by David E. Meltzer at the University of Jyväskylä, Finland, April 2007:
   http://moniviestin.jyu.fi/ohjelmat/science/fysiikka/meltzer
5. *Physics Central*, Summer 2005:
   http://physicseducation.net/media/physics_central_people_in_physics-David_Meltzer.html
6. *Inside Iowa State*, April 15, 2005: http://physicseducation.net/media/Inside_Iowa_State_4-15-05.html
7. *Physics Education*, September 2004:
   http://physicseducation.net/media/physics_education_09-04.pdf
8. *LAS News*, October 6, 2003: http://physicseducation.net/media/las_news_10-06-03.pdf
9. *Iowa State Daily*, April 18, 2003: http://physicseducation.net/media/Daily_04-18-03.pdf

EXTERNAL FUNDING SUMMARY

Principal Investigator on 11 grants, Co-Principal Investigator on three grants, all funded by the National Science Foundation (Divisions of Undergraduate Education; Research, Evaluation, and Communication; Physics; and Research on Learning), 1993-2019. Total amount awarded: $3,319,918 ($1,482,804 as PI).

EXTERNAL FUNDING: Grants from National Science Foundation

As Principal Investigator:

1. Principal Investigator, National Science Foundation grant, ***Collaborative Research: Math Practice for Physics: Building Math Fluency in an Introductory Undergraduate Physics Context***, Improving Undergraduate STEM Education (IUSE) program, DUE-#1914712, $124,787, 36 months, October 2019. [Additional funding to Collaborating PI: Andrew F. Heckler, Ohio State University, DUE-#1914709, $473,281, 36 months.]
2. Principal Investigator, National Science Foundation grant, ***Identifying and Addressing Mathematical Difficulties in Introductory Physics Courses***, [Co-PIs: Y. Kang and X. Peng], Improving Undergraduate STEM Education (IUSE) program, DUE-#1504986, $250,000, 48 months, August 2015.
3. Principal Investigator, National Science Foundation grant, ***WIDER: EAGER: Recognizing, Assessing, and Enhancing Evidence-Based Instructional Practices in STEM at Arizona State University, Polytechnic***, [Co-PIs: M. Zandieh and Y. Kang], Widening Implementation and Demonstration of Evidence-based Reforms (WIDER) program, DUE-#1256333, $298,352, 48 months, August 2012.
4. Principal Investigator, National Science Foundation grant, ***Collaborative Research: Research on the Learning and Teaching of Thermal Physics***, Education and Interdisciplinary Research (EIR) program, PHY-#0406724, $267,615, 36 months, July, 2004. [Additional funding to Collaborating PI: John R. Thompson, University of Maine, PHY-#0406764, $107,381, 36 months.] *Note: Funds originally awarded for PHY-#0406724 were distributed as follows: PHY-#0406724: $197,003 (PI: David E. Meltzer/T. J. Greenbowe); PHY-0604703: $70,612 (PI: Mark McDermott/Lillian C. McDermott; Co-PI: David E. Meltzer). This was due to my move to the University of Washington.*
5. Principal Investigator, National Science Foundation grant, ***Active-Learning Curricular Materials for Fully Interactive Physics Lectures***, Course, Curriculum, and Laboratory Improvement-Adaptation and Implementation (CCLI-A&I) program, DUE-#0311450, $59,926, 24 months, September 2003. [Cost Share: $603, Iowa State University.] [Note: T.J. Greenbowe assumed PI title in 2005 due to my change in institution.]
6. Principal Investigator, National Science Foundation grant, ***Formative Assessment Materials for Large-Enrollment Physics Lecture Classes***, Course, Curriculum, and Laboratory Improvement-Assessment of Student Achievement (CCLI-ASA) program, DUE-#0243258, $104,914, 36 months, July 2003. [Note: T.J. Greenbowe assumed PI title in 2005 due to my change in institution.]

7. Principal Investigator, National Science Foundation grant, ***Investigation of Diverse Representational Modes in the Learning of Physics and Chemistry*** [Co-PI: T. J. Greenbowe], Research on Learning and Education (ROLE) program, REC-#0206683, $99,949, 24 months, July 2002.
8. Principal Investigator, National Science Foundation grant, ***Development of Active-Learning Curricular Materials in Thermodynamics*** [Co-PI: T. J. Greenbowe], Course, Curriculum, and Laboratory Improvement-Educational Materials Development (CCLI-EMD) program, DUE-#9981140, $149,479, 35 months, May 2000. [Cost Share: $60,935, Iowa State University.]
9. Principal Investigator, National Science Foundation grant, ***Elementary Physics Course Based on Guided Inquiry*** [Co-PI: K. Manivannan], Course and Curriculum Development (CCD) program, DUE-#9653079, $80,153, 36 months, March 1997 [#9653079 ($49,453) continued as #9896264 ($30,700), July 1998]. [Cost Share: $17,519, Southeastern Louisiana University and Iowa State University.]
10. Principal Investigator, National Science Foundation grant, ***Microcomputer-based Curricular Enhancements for Elementary Physics*** [Co-PI: K. Manivannan], Instrumentation and Laboratory Improvement-Instrumentation Projects (ILI-IP) program, DUE-#9650754, $10,396, 24 months, August 1996. [Cost Share: $12,233, Southeastern Louisiana University.]
11. Principal Investigator, National Science Foundation grant, ***Introductory Physics: A Pilot Project for an Elementary Course Based on Guided Inquiry, With the Theme of "Energy,"*** Course and Curriculum Development (CCD) program, DUE-#9354595, $37,233, 18 months, December 1993. [Cost Share: $3,311, Southeastern Louisiana University.]

As Co-Principal Investigator:

12. Co-Principal Investigator, National Science Foundation grant, ***The Physics of Elementary Mathematics*** [Principal Investigator: Terri Kurz; Co-Principal Investigators: David Meltzer, Pamela Harris, and Mi Yeon Lee], Improving Undergraduate STEM Education (IUSE) Program, DUE-#1855891, $299,990, 36 months, June, 2019.
13. Co-Principal Investigator, National Science Foundation grant, ***App Maker Pro (AMP): Motivating STEM Study through App Development*** [Principal Investigator: Carole Greenes; Co-Principal Investigators: Keith Hjelmstad, Lina Karam, Timothy Lindquist, and David E. Meltzer], Innovative Technology Experiences for Students and Teachers (ITEST) Program, DRL-#1509105, $1,199,910, 36 months, June, 2015.
14. Co-Principal Investigator, National Science Foundation grant, ***Collaborative Research: Research and Curriculum Development in Thermal Physics***, [Principal Investigator: John R. Thompson, University of Maine], Course, Curriculum, and Laboratory Improvement-Phase 2 (CCLI-Phase 2) program, DUE-#0817282, $337,214, 48 months, September, 2008 (ASU funding through this grant: $74,132). [Additional funding to Collaborating PI: Michael E. Loverude, California State University, Fullerton, DUE-#0817335, $162,763, 48 months.].

EXTERNAL CONSULTING CONTRACTS

1. External consulting contract (though ASU) with American Physical Society, $29,450, 2 months, June, 2009.

INTERNAL FUNDING

At Arizona State University

1. Principal Investigator, Mary Lou Fulton Teachers College Internal Grant, ***Investigation into Learning and Teaching of Physical-Science Topics in Grades 5-8***, $17,101, 12 months, October, 2010.

At Iowa State University

1. ISU Center for Teaching Excellence, *2002-2003 Teaching Scholar:* ***Active Learning and Critical Thinking in Large-Enrollment Physics Courses***, $15,000, August 2002-June 2003.
2. Principal Investigator, Big XII Faculty Fellowship Program, ***Visit to Kansas State University Physics Education Research Group,*** $2,200, May 2000.
3. Principal Investigator, ISU Miller Faculty Fellowship, ***Development of Active-Learning Curricular Materials in Thermodynamics for Physics and Chemistry*** [Co-PI: Thomas J. Greenbowe], $25,000, 12 months, April 1999.
4. Principal Investigator, ISU Instructional Development grant, ***Hands-On Explorations in Force and Motion for Teachers in Training,*** $2,000, April 1999.

At Southeastern Louisiana University

1. Principal Investigator, Southeastern Louisiana University Faculty Development Technology grant, ***Microcomputer-based Elementary Physics Laboratory*** [Co-PI's: Kandiah Manivannan, Thomas J. Hufstetler, and Archie Moore], $2,000, 1996.
2. Principal Investigator, Southeastern Louisiana University Faculty Development grant, ***Simultaneous Photography of Solar Prominences in H-Alpha and Broadband Visible Light***, $880, 1995.
3. Principal Investigator, Southeastern Louisiana University College of Education grant, ***Inquiry-based Learning in High-School Physics: Trial and Assessment of New Curricular Materials*** [Co-PI's: Kandiah Manivannan and Donna V. Newsham], $2,000, 1995.

PUBLICATIONS IN REFEREED JOURNALS

Physics Education and Science Education:

2021

1. David E. Meltzer, "How should physics teachers be prepared? A review of recommendations," The Physics Teacher **59**, 530-534 (2021).

2017

2. Valerie K. Otero and David E. Meltzer, "The past and future of physics education reform," Physics Today **70**(5), 50-56 (2017).
3. Valerie K. Otero and David E. Meltzer, "A discipline-specific approach to the history of U.S. science education," Journal of College Science Teaching **46**, 34-39 (2017).

2016

4. Valerie K. Otero and David E. Meltzer, "100 years of attempts to transform physics education," The Physics Teacher **54**, 523-527 (2016).

2015

5. David E. Meltzer and Valerie K. Otero, "A brief history of physics education in the United States," American Journal of Physics **83**, 447-458 (2015).
6. Benjamin W. Dreyfus, Benjamin D. Geller, David E. Meltzer, and Vashti Sawtelle, "Resource Letter TTSM-1: Teaching Thermodynamics and Statistical Mechanics in Introductory Physics, Chemistry, and Biology," American Journal of Physics **83**, 5-21 (2015).

2014

7. David E. Meltzer and Valerie K. Otero, "Transforming the preparation of physics teachers" [Guest Editorial], American Journal of Physics **82**, 633-637 (2014).

2012

8. David E. Meltzer and Ronald K. Thornton, "Resource Letter ALIP-1: Active-Learning Instruction in Physics," American Journal of Physics **80**, 478-496 (2012).

2011

9. Warren M. Christensen, David E. Meltzer, and Ngoc-Loan P. Nguyen, "Student understanding of calorimetry in introductory calculus-based physics," American Journal of Physics **79**, 1168-1176 (2011).

2009

10. Warren M. Christensen, David E. Meltzer, and C.A. Ogilvie, "Student ideas regarding entropy and the second law of thermodynamics in an introductory physics course," American Journal of Physics **77**, 907-917 (2009).

2005

11. Ngoc-Loan Nguyen and David E. Meltzer, "Visualization tool for 3-D relationships and the right-hand rule," The Physics Teacher **43**, 155-157 (2005).
12. David E. Meltzer, "Relation between students' problem-solving performance and representational format," American Journal of Physics **73**, 463-478 (2005).
13. Paula R. L. Heron and David E. Meltzer, "Guest Editorial–The future of physics education research: Intellectual challenges and practical concerns," American Journal of Physics **73**, 390-394 (2005).

2004

14. David E. Meltzer, "Investigation of students' reasoning regarding heat, work, and the first law of thermodynamics in an introductory calculus-based general physics course," American Journal of Physics **72**, 1432-1446 (2004).

2003

15. Ngoc-Loan Nguyen and David E. Meltzer, "Initial understanding of vector concepts among students in introductory physics courses," American Journal of Physics **71**, 630-638 (2003).
16. Thomas J. Greenbowe and David E. Meltzer, "Student learning of thermochemical concepts in the context of solution calorimetry," International Journal of Science Education **25**, 779-800 (2003).

2002

17. David E. Meltzer, "The relationship between mathematics preparation and conceptual learning gains in physics: a possible 'hidden variable' in diagnostic pretest scores," American Journal of Physics **70**, 1259-1268 (2002).
18. David E. Meltzer and Kandiah Manivannan, "Transforming the lecture-hall environment: The fully interactive physics lecture," American Journal of Physics **70**, 639-654 (2002).

1997

19. David E. Meltzer and Amy Woodland Espinoza, "Guided inquiry: Let students 'discover' the laws of physics for themselves," Science Scope **21** (2), 28-31 (October 1997).

1996

20. David E. Meltzer and Kandiah Manivannan, "Promoting interactivity in physics lecture classes," The Physics Teacher **34**, 72-76 (1996).

Science:

2021

1. Marianne Huebner, David E. Meltzer, and Aris Perperoglou, "Strength in numbers: Women in Olympic weightlifting," Significance [Royal Statistical Society], **18** (2), 20-25 (April 2021).

2020

2. Marianne Huebner, David E. Meltzer, Wenjuan Ma, and Holly Arrow, "The Masters athlete in Olympic weightlifting: Training, lifestyle, health challenges, and gender differences," PloS one **15** (12), e0243652 (2020): https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0243652

2019

3. Marianne Huebner, David E. Meltzer, and Aris Perperoglou, "Age-associated performance decline and sex differences in Olympic Weightlifting," Medicine and Science in Sports and Exercise **51**, 2302-2308 (2019).

1996

4. David E. Meltzer, "Body-mass dependence of age-related deterioration in human muscular function," Journal of Applied Physiology **80**, 1149-1155 (1996).

1994

5. David E. Meltzer, "Age dependence of Olympic weightlifting ability," Medicine and Science in Sports and Exercise **26**, 1053-1067 (1994).

1993

6. David E. Meltzer, John R. Sabin, S. B. Trickey, and J. Z. Wu, "Density decomposition options in the Orbital Local Plasma Approximation," Nuclear Instruments and Methods B **82**, 493-502 (1993).

1991

7. J. Z. Wu, Samuel B. Trickey, John R. Sabin, and David E. Meltzer, "Stopping of swift projectiles in material thin films: Hydrogen," Nuclear Instruments and Methods B **56/57**, 340-344 (1991).

1990

8. David E. Meltzer, John R. Sabin, and S. B. Trickey, "Calculation of mean excitation energy and stopping cross section in the Orbital Local Plasma Approximation," Physical Review A **41**, 220-232 (1990) [Erratum: **42**, 666 (1990)].

1989

9. S. B. Trickey, D. E. Meltzer**,** and J. R. Sabin, "Calculation of stopping powers in ordered ultra-thin films," Nuclear Instruments and Methods B **40/41**, 321-323 (1989).

1988

10. David E. Meltzer, F. J. Pinski, and G. M. Stocks, "Rare-gas impurities in alkali metals: Relation to optical absorption," Physical Review B **37**, 6011-6018 (1988).

1986

11. Kevin S. Bedell and David E. Meltzer, "Spin waves and spin diffusion in Fermi liquids: Bounds on effective diffusion coefficients," Physical Review B **33**, 4543-4556 (1986) [Erratum: **34**, 3475 (1986)].
12. Kevin S. Bedell and David E. Meltzer, "Spin relaxation in normal liquid ^{3}He: T_1 in the Fermi liquid ($T << T_F$) regime," Journal of Low Temperature Physics **63**, 215-233 (1986).

1985

13. Kevin S. Bedell and David E. Meltzer, "Proposed determination of many-body effects in heavy-fermion systems by CESR," Physical Review B **32**, 1835-1838 [Rapid Communications] (1985).

1984

14. Kevin S. Bedell and David E. Meltzer, "Low temperature spin relaxation time in normal liquid ^{3}He," Physics Letters **106A**, 312-317 (1984).

1982

15. A. D. Jackson, E. Krotscheck, D. E. Meltzer, and R. A. Smith, "Landau parameters and pairing – On the shores of the nuclear Fermi sea," Nuclear Physics A **386**, 122-165 (1982).

PUBLICATIONS IN CONFERENCE PROCEEDINGS

2021

1. Terri L. Kurz, David Meltzer, Marcia Nation, and Mi Yeon Lee, "Teaching algebra in an online, asynchronous environment for the first time: Insight from university mathematics education instructors," in *SITE Interactive Conference*, Association for the Advancement of Computing in Education (AACE) (2021), pp. 421-425: https://www.learntechlib.org/p/220230/

2020

2. Terri L. Kurz, David Meltzer, Mi Yeon Lee, and Pamela Harris, "Converting algebra lessons that emphasize movement into online lessons using a simulation," in *SITE Interactive Conference*, Association for the Advancement of Computing in Education (AACE) (2020), pp. 752-756: https://www.learntechlib.org/primary/p/218258/

2009

3. David E. Meltzer, "Observations of general learning patterns in an upper-level thermal physics course," invited paper in *2009 Physics Education Research Conference [Ann Arbor, Michigan (USA), 29-30 July 2009]*, edited by Mel Sabella, Charles Henderson, and Chandralekha Singh [American Institute of Physics Conference Proceedings **1179**, 31-34 (2009)].

2008

4. David E. Meltzer, "Investigating and addressing learning difficulties in thermodynamics," *Proceedings of the American Society for Engineering Education 2008 Annual Conference and Exposition, July 22-25, 2008:* AC 2008-1515; https://peer.asee.org/3900.

2007

5. David E. Meltzer, "Analysis of shifts in students' reasoning regarding electric field and potential concepts," in *2006 Physics Education Research Conference [Syracuse, New York (USA), 26-27 July 2006]*, edited by Laura McCullough, Leon Hsu, and Paula Heron [American Institute of Physics Conference Proceedings **883**, 177-180 (2007)].
6. David E. Meltzer, "Investigation of student learning in thermodynamics and implications for instruction in chemistry and engineering," invited paper in *2006 Physics Education Research Conference [Syracuse, New York (USA), 26-27 July 2006]*, edited by Laura McCullough, Leon Hsu, and Paula Heron [American Institute of Physics Conference Proceedings **883**, 38-41 (2007)].

7. David E. Meltzer, "Formative assessment materials for large-enrollment physics lecture classes," invited paper in *Proceedings of the National STEM Assessment Conference [Science, Technology, Engineering, and Mathematics]*, October 19-21, 2006, Washington, D.C., edited by Donald Deeds and Bruce Callen [Drury University, Springfield, MO, 2007], pp. 173-189.

2005

8. David E. Meltzer, "How do you hit a moving target? Addressing the dynamics of students' thinking," invited paper in *2004 Physics Education Research Conference [Sacramento, California, 4-5 August 2004]*, edited by Jeffrey Marx, Paula Heron, and Scott Franklin [American Institute of Physics Conference Proceedings **790**, 7-10 (2005)].
9. David E. Meltzer, "Student learning in upper-level thermal physics: Comparisons and contrasts with students in introductory courses," invited paper in *2004 Physics Education Research Conference [Sacramento, California, 4-5 August 2004]*, edited by Jeffrey Marx, Paula Heron, and Scott Franklin [American Institute of Physics Conference Proceedings **790**, 31-34 (2005)].

2004

10. David E. Meltzer, "The questions we ask and why: Methodological orientation in physics education research," invited paper in *2003 Physics Education Research Conference [Madison, Wisconsin, 6-7 August, 2003]*, edited by Jeffrey Marx, Scott Franklin, and Karen Cummings [American Institute of Physics Conference Proceedings **720**, 11-14 (2004)].
11. David E. Meltzer, "Mini-course on physics education research and research-based innovations in physics instruction," invited paper in *Memorias del XII Taller Internacional: Nuevas Tendencias en la Enseñanza de la Física [Proceedings of the XII International Workshop: New Trends in Physics Teaching]*, Puebla, Mexico, May 27-30, 2004, edited by Josip Slisko, Cupatitzio Ramírez, and Adrián Corona (Benemérita Universidad Autónoma de Puebla, Faculdad de Ciencias Físico Matemáticas, Cuerpo Académico de Investigación Educativa, Puebla, Mexico, 2004), pp. 28-35.

2002

12. David E. Meltzer, "Student learning of physics concepts: Efficacy of verbal and written forms of expression in comparison to other representational modes," invited paper in *Conference on Ontological, Epistemological, Linguistic and Pedagogical Considerations of Language and Science Literacy: Empowering Research and Informing Instruction*, University of Victoria, Victoria, British Columbia, Canada, September 13, 2002.
13. David E. Meltzer**,** "Issues related to data analysis and quantitative methods in PER," invited paper in *Proceedings of the 2002 Physics Education Research Conference [Boise, Idaho, August 7-8, 2002]*, edited by Scott Franklin, Karen Cummings, and Jeffrey Marx (PERC Publishing, Rochester, New York, 2002), pp. 21-24.

2001

14. David E. Meltzer, "Student reasoning regarding work, heat, and the first law of thermodynamics in an introductory physics course," in *Proceedings of the Physics Education Research Conference, Rochester, New York, July 25-26, 2001*, edited by Scott Franklin, Jeffrey Marx, and Karen Cummings (PERC, Rochester, New York, 2001), pp. 107-110.
15. Kandiah Manivannan and David E. Meltzer, "Use of in-class physics demonstrations in highly interactive format," in *Proceedings of the Physics Education Research Conference, Rochester, New York, July 25-26, 2001*, edited by Scott Franklin, Jeffrey Marx, and Karen Cummings (PERC, Rochester, New York, 2001), pp. 95-98.
16. Laura McCullough and David E. Meltzer, "Differences in male/female response patterns on alternative-format versions of FCI items," in *Proceedings of the Physics Education Research Conference, Rochester, New York, July 25-26, 2001*, edited by Scott Franklin, Jeffrey Marx, and Karen Cummings (PERC, Rochester, New York, 2001), pp. 103-106.

1998

17. David E. Meltzer, "Iowa State University Physics Education Research Group," in *PERConference 98: Physics Education Research Conference Proceedings, August 1-2, 1998*, compiled by Thomas C. Koch and Robert G. Fuller (University of Nebraska, Lincoln, Nebraska, 1998), p. 173.
18. David E. Meltzer, " 'Hidden Variables' in conceptual diagnostic pretest data?'," in *PERConference 98: Physics Education Research Conference Proceedings, August 1-2, 1998*, compiled by Thomas C. Koch and Robert G. Fuller (University of Nebraska, Lincoln, Nebraska, 1998), p. 212.

1997

19. Kandiah Manivannan and David E. Meltzer, "Increasing Active Student Participation in the Classroom through the use of 'Flash Cards,'" in: *The Changing Role of Physics Departments in Modern Universities: Proceedings of the International Conference on Undergraduate Physics Education*, edited by Edward F. Redish and John S. Rigden (AIP Conf. Proc. **399**, American Institute of Physics, Woodbury, New York, 1997), Part One, pp. 821-822.
20. David E. Meltzer, "Nontraditional Approach to Algebra-based General Physics," in: *The Changing Role of Physics Departments in Modern Universities: Proceedings of the International Conference on Undergraduate Physics Education*, edited by Edward F. Redish and John S. Rigden (AIP Conf. Proc. **399**, American Institute of Physics, Woodbury, New York, 1997), Part One, pp. 823-825.

1996

21. David E. Meltzer and Daniel R. McCarthy, "Broad- and narrow-band optical observation of solar prominences," Proceedings of the Louisiana Academy of Sciences **59**, 8-15 (1996).

OTHER INVITED PAPERS

2021

1. Liz Gire, Randy Knight, Marta McNeese, David Meltzer, Andy Rundquist, and Jennifer Docktor, "Implementing active learning in physics departments," American Physical Society Forum on Education Newsletter, Summer 2021, pp. 4-5: https://higherlogicdownload.s3.amazonaws.com/APS/379bd548-10a1-4054-aec2-911470db8df9/UploadedImages/2021_FED_SummNL.pdf

2020

2. David E. Meltzer, "What does it mean to be a well-prepared physics teacher?" Contribution to Plenary-Table Discussions: Problem-Solving Around Physics Teacher Preparation, at the 2020 Physics Teacher Education Coalition (PhysTEC) Conference, Denver, Colorado, March 1, 2020: https://drive.google.com/file/d/1uoJpVlx5TN-ItqeFriW_ibf5FoW9ar49/view?usp=sharing

2013

3. David E. Meltzer, Monica Plisch, and Stamatis Vokos, "The role of physics departments in high school teacher education," APS News **22**(8), 8 (2013).

2008

4. David E. Meltzer, "Non-traditional methods of publication," American Physical Society Forum on Education Newsletter, Spring 2008, pp. 4-6.

2005

5. David E. Meltzer, "Investigation of student reasoning regarding concepts in thermal physics," American Physical Society Forum on Education Newsletter, Spring 2005, pp. 4-5.
6. Paula R. L. Heron and David E. Meltzer, "Chemical education and physics education: Facing joint challenges and practical concerns," CHED Newsletter [published by the Division of Chemical Education, American Chemical Society], Fall 2005, pp. 35-37.
7. Paula Heron and David Meltzer, "Lobbying for discipline-based education research," American Physical Society Forum on Education Newsletter, Fall 2005, pp. 14-16.

2002

8. David E. Meltzer, "Using active-engagement teaching methods in large-enrollment classes to improve student learning," Teaching at ISU [newsletter of the Iowa State University Center for Teaching Excellence] **15 (2)**, 1-2 (November/December 2002).

2001

9. David E. Meltzer, "Physics education at ISU," Iowa State University Department of Physics and Astronomy [Alumni Newsletter], Fall 2001, pp. 13-14.

1999

10. David E. Meltzer, "'Micro-Document' for National Science Foundation teacher education workshop," paper prepared for the National Science Foundation workshop "Teacher Education: From Preparation to Practice," Washington, D.C., May 7-8, 1999.
11. David E. Meltzer, "Iowa State University is new entrant into physics education research community," American Physical Society Forum on Education Newsletter*,* Summer 1999, pp. 12-13.

BOOK CHAPTERS

1. David E. Meltzer, lead author, "Foundational material I – Historical context," in David E. Meltzer, Monica Plisch, and Stamatis Vokos, editors, *Transforming the Preparation of Physics Teachers: A Call to Action. A Report by the Task Force on Teacher Education in Physics (T-TEP)* (American Physical Society, College Park, MD, 2012), pp. 29-36.

2. David E. Meltzer, lead author, "Foundational material II – Research on physics teacher education," in David E. Meltzer, Monica Plisch, and Stamatis Vokos, editors, *Transforming the Preparation of Physics Teachers: A Call to Action. A Report by the Task Force on Teacher Education in Physics (T-TEP)* (American Physical Society, College Park, MD, 2012), pp. 37-39.

3. David E. Meltzer, lead author, "Resources for the education of physics teachers," in David E. Meltzer, Monica Plisch, and Stamatis Vokos, editors, *Transforming the Preparation of Physics Teachers: A Call to Action. A Report by the Task Force on Teacher Education in Physics (T-TEP)* (American Physical Society, College Park, MD, 2012), pp. 83-123.

4. David E. Meltzer, "Research on the education of physics teachers," in *Teacher Education in Physics: Research, Curriculum, and Practice*, edited by David E. Meltzer and Peter S. Shaffer (American Physical Society, College Park, MD, 2011), pp. 3-14.

5. David E. Meltzer, "Enhancing active learning in large-enrollment physics courses," invited chapter in *Preparing Future Science and Mathematics Teachers*, edited by Diane Smith and Elisabeth Swanson (Science Math Resource Center, Montana State University, Bozeman, MT, 2005), pp. 49-52.

BOOKS

1. Walter M. Imahara and David E. Meltzer, editors, *Jerome and Rohwer: Memories of Japanese American Internment in World War II Arkansas* (University of Arkansas Press, Fayetteville, AR, *in press*).
2. David E. Meltzer, Monica Plisch, and Stamatis Vokos, editors, *Transforming the Preparation of Physics Teachers: A Call to Action. A Report by the Task Force on Teacher Education in Physics (T-TEP)* (American Physical Society, College Park, MD, 2012). http://www.phystec.org/webdocs/TaskForce.cfm
3. David E. Meltzer, Editor, and Peter S. Shaffer, Associate Editor, *Teacher Education in Physics: Research, Curriculum, and Practice* (American Physical Society, College Park, MD, 2011). http://www.phystec.org/webdocs/TeacherEducationBook.cfm
4. Zachary Fisk, Lev Gor'kov, David Meltzer, and Robert Schrieffer, editors, *Proceedings of Physical Phenomena at High Magnetic Fields – II* (World Scientific, Singapore, 1996).
5. Kevin S. Bedell, Ziqiang Wang, David E. Meltzer, Alexander V. Balatsky, and Elihu Abrahams, editors, *The Los Alamos Symposium – 1993: Strongly Correlated Electronic Materials* (Addison-Wesley, Reading, Massachusetts, 1994).
6. George A. Cowan, David Pines, and David Meltzer, editors, *Complexity: Metaphors, Models, and Reality. Proceedings Volume XIX, Santa Fe Institute Studies in the Sciences of Complexity* (Addison-Wesley, Reading, Massachusetts, 1994).
7. Kevin S. Bedell, Masahiko Inui, David E. Meltzer, J. Robert Schrieffer, and Sebastian Doniach, editors, *The Los Alamos Symposium – 1991: Phenomenology and Applications of High-Temperature Superconductors; Proceedings* (Addison-Wesley, Reading, Massachusetts, 1992).
8. K. S. Bedell, D. Coffey, D. E. Meltzer, D. Pines, and J. R. Schrieffer, editors, *The Los Alamos Symposium – 1989: High Temperature Superconductivity; Proceedings* (Addison-Wesley Advanced Book Program, Redwood City, California, 1990).

INVITED CONFERENCE PRESENTATIONS

International

2017

1. ***The Development of Efforts to Address Students' Mathematical Difficulties in Physics***, invited presentation at the XXV International Workshop *New Trends in Physics Teaching [Nuevas Tendencias en la Enseñanza de la Física]*, Benemérita Universidad Autónoma de Puebla, Puebla, Mexico, May 25, 2017.

2013

2. ***A Brief History of Physics Education Research Among University Students***, invited symposium presentation at ESERA 13 Conference, 10th conference of the European Science Education Research Association, Nicosia, Cyprus, September 4, 2013.
3. ***The "Fully Interactive" Physics Lecture: Active-Learning Instruction in a Large-Enrollment Setting***, invited talk at the Canadian Association of Physicists Congress 2013, Université de Montréal, Montréal, Québec, Canada, May 30, 2013 [Session R-TEACH-1].

2009

4. ***Improving Instruction in Thermal Physics through Research on Students' Thinking***, invited keynote presentation at the Annual Symposium of the Finnish Mathematics and Science Education Research Association, Joensuu, Finland, October 22, 2009.
5. ***Strategies and Methods of Research-Based Instruction in Physics Education***, invited presentation and workshop at the 2009 Autumn Seminar of the Finnish Graduate School of Mathematics, Physics, and Chemistry Education, Joensuu, Finland, October 21, 2009.

2008

6. ***Diagnostic Testing***, invited presentation at the PhysTEC TIR [Physics Teacher Education Coalition Teacher in Residence] and Teacher Gathering, Edmonton, Alberta, Canada, July 18, 2008.

2004

7. ***Research-Based Active-Learning Instructional Methods in Large-Enrollment Physics Classes;*** Part III of Mini-Course on ***Physics Education Research and Research-Based Innovations in Physics Instruction***, at the XII International Workshop *New Trends in Physics Teaching*, Faculty of Physical and Mathematical Sciences, Autonomous University of Puebla, Puebla, Mexico, May 30, 2004.

8. ***Developing Improved Curricula and Instructional Methods based on Physics Education Research;*** Part II of Mini-Course on ***Physics Education Research and Research-Based Innovations in Physics Instruction***, at the XII International Workshop *New Trends in Physics Teaching*, Faculty of Physical and Mathematical Sciences, Autonomous University of Puebla, Puebla, Mexico, May 29, 2004.

9. ***Physics Education Research: Laying the Basis for Improved Instruction;*** Part I of Mini-Course on ***Physics Education Research and Research-Based Innovations in Physics Instruction***, at the XII International Workshop *New Trends in Physics Teaching*, Faculty of Physical and Mathematical Sciences, Autonomous University of Puebla, Puebla, Mexico, May 28, 2004.

2002

10. ***Student Learning of Physics Concepts: Efficacy of Verbal and Written Forms of Expression in Comparison to Other Representational Modes***, invited talk at the Conference on Ontological, Epistemological, Linguistic and Pedagogical Considerations of Language and Science Literacy: Empowering Research and Informing Instruction, University of Victoria, Victoria, British Columbia, Canada, September 13, 2002.

2000

11. ***A Perspective on Teaching Physics Courses for Future Elementary-School Teachers***, invited poster at the 2000 Physics Education Research Conference, Guelph, Ontario, Canada, August 3, 2000.

INVITED CONFERENCE PRESENTATIONS (speaker underlined)

National and Regional

Invited Conference Oral Presentations:

2021

1. ***Implementing Active Learning in Physics Departments***, Liz Gire, Randy Knight, Marta McNeese, David Meltzer, Andy Rundquist, and Jennifer Doctor [invited facilitators and speakers], session at 2021 APS Physics Department Chairs Virtual Conference, June 3, 2021: https://www.aps.org/programs/education/conferences/chairs/2021.cfm

2019

2. ***Workshop on Instruction and Assessment in Middle-School Science: Useful Comparisons with College-Level Instruction***, invited workshop at the 2019 RiSE Conference, Integrating Research & Practice: Strategies for Interdisciplinary Teaching and Learning Across the STEM+C Disciplines, Orono, Maine, June 25, 2019.
3. ***Physical Science Instruction and Assessment in the Middle-School: Comparisons and Contrasts with College-Level Instruction***, invited talk at the 2019 RiSE Conference, Integrating Research & Practice: Strategies for Interdisciplinary Teaching and Learning Across the STEM+C Disciplines, Orono, Maine, June 24, 2019.

2018

4. ***Investigating and Addressing Students' Mathematical Difficulties in Introductory Physics Courses***, invited talk at the 2018 Winter Meeting of the American Association of Physics Teachers, San Diego, California, January 8, 2018.

2017

5. ***Historical Sketch of Research on Mathematization in Physics Education***, invited plenary presentation at the Physics Education Research Conference, Covington, Kentucky, July 27, 2017.
6. ***Historical Survey of Research in Physics Teacher Preparation***, invited talk at the April 2017 Meeting of the American Physical Society, Washington, D.C., January 30, 2017.

2016

7. ***Forgetting History and Other Reasons Change is Hard: Structural Barriers***, invited talk at the 2016 Winter Meeting of the American Association of Physics Teachers, New Orleans, Louisiana, January 11, 2016.

2015

8. ***Research on Physics Learning and Research-Based Instructional Strategies***, invited presentation at Annual Meeting of the American Physical Society Four Corners Section, Tempe, Arizona, October 16, 2015.

2014

9. ***Overview: Research on Student Learning of Thermal Physics***, David E. Meltzer, Warren M. Christensen, Michael E. Loverude, and John R. Thompson, invited overview presentation at the Workshop on the Status of the Upper-Division Physics Curriculum, Oregon State University, Corvallis, Oregon, June 7, 2014.
10. ***The Conflict Between Recommendations and Reality: A Short History of U.S. Physics Teacher Education from 1880-2014***, invited plenary presentation at the 2014 Physics Teacher Education Coalition [PhysTEC] Conference, Austin, Texas, May 19, 2014.
11. ***Research on U.S. Physics Teacher Education***, invited presentation at the American Physical Society April Meeting 2014, Savannah, Georgia, April 6, 2014.

2013

12. ***Teaching and Learning of Physics in Grades 5-8***, invited talk at the 2013 Summer Meeting of the American Association of Physics Teachers, Portland, Oregon, July 17, 2013 [Session FC].
13. ***The Development of Physics Education Research and Research-Based Physics Instruction in the United States***, invited plenary talk at the 2013 conference on Foundations and Frontiers of Physics Education Research, Bar Harbor, Maine, June 17, 2013.

2012

14. ***Physics Teacher Education in Perspective: A Century of Constrained Evolution***, invited talk at the 2012 Winter Meeting of the American Association of Physics Teachers, Ontario, California, February 6, 2012 [Session AB].
15. ***Evaluation of Teachers—Or of Teaching?—for Improving Learning Outcomes***, invited talk at the 2012 Winter Meeting of the American Association of Physics Teachers, Ontario, California, February 6, 2012 [Session BH].

2011

16. ***Physics Education Research in Perspective: An Historical and Conceptual Overview***, invited presentation at the 2011 American Physical Society April Meeting, Anaheim, California, May 1, 2011.

2010

17. ***The Value and the Challenge of Interdisciplinary Research in STEM Education***, invited talk at the TRUSE 2010 Conference (Transforming Research in Undergraduate STEM Education), University of Maine, Orono, Maine, June 14, 2010.
18. ***Surveying the Conceptual and Temporal Landscape of Physics Education Research***, invited talk at the 2010 Winter Meeting of the American Association of Physics Teachers, Washington, D.C., February 17, 2010 [Session HC].

2009

19. ***A Brief History of Research on Preparation of Physics Teachers***, invited talk at the 2009 Winter Meeting of the American Association of Physics Teachers, Chicago, Illinois, February 15, 2009 [Session LI].

2008

20. ***Cooperative Learning in an Active-Engagement Instructional Environment***, invited presentation and workshop at the Teaching Effectiveness Colloquium, 2008 Annual Meeting of INFORMS [Institute for Operations Research and the Management Sciences], Washington, D.C., October 11, 2008.
21. ***Investigating and Addressing Learning Difficulties in Thermodynamics***, invited talk at the 2008 American Society for Engineering Education Annual Conference and Exposition, Pittsburgh, Pennsylvania, June 24, 2008.
22. ***What is Teacher Effectiveness and How May It Be Assessed?***, invited workshop at the 2008 PTEC [Physics Teacher Education Coalition] Conference on the Preparation of Physics and Physical Science Teachers, Austin, Texas, March 1, 2008.

2007

23. ***Defining "Conceptual Understanding" Through Appropriate Constraints on a Knowledge Domain***, invited talk at the 2007 Summer Meeting of the American Association of Physics Teachers, Greensboro, North Carolina, July 31, 2007.

2006

24. ***Formative Assessment Materials for Large-Enrollment Physics Lecture Classes***, invited talk and poster at the National STEM [Science, Technology, Engineering, and Mathematics] Assessment Conference: Assessment of Student Achievement [National Science Foundation ASA Program, Principal Investigators' Meeting], Washington, D.C., October 19-21, 2006.
25. ***Investigations into Student Learning of Thermodynamics***, invited talk at the 19th Biennial Conference on Chemical Education, West Lafayette, Indiana, August 2, 2006.
26. ***Improving Instruction through Research on Student Learning: A Perspective from Physics***, invited talk at the 61st Northwest Regional Meeting of the American Chemical Society, Reno, Nevada, June 27, 2006

27. ***Physics Education Research and its Impact on Classroom Instruction***, invited plenary talk at the American Physical Society Northwest Section 2006 Annual Meeting, Tacoma, Washington, May 19, 2006.
28. ***Addressing Students' Reasoning Difficulties in Thermal Physics***, invited presentation at the 2006 American Physical Society April meeting, Dallas, Texas, April 25, 2006.
29. ***Applying Physics Education Research to Teaching Thermodynamics***, invited research talk at the American Physical Society High School Physics Teachers' Day, Dallas, Texas, April 21, 2006.

2005

30. ***Frontiers and Challenges in Physics Education Research***, invited plenary talk at the 2005 conference on Foundations and Frontiers in Physics Education Research, Bar Harbor, Maine, August 18, 2005.
31. ***Evolution of Students' Reasoning Regarding Concepts in Thermal Physics***, invited talk at the 2005 Summer Meeting of the American Association of Physics Teachers, Salt Lake City, Utah, August 9, 2005.

2004

32. ***Research in Physics Education and the Connection to Classroom Teaching***, invited talk at the Fall meeting of the Iowa Section of the American Association of Physics Teachers, Ames, Iowa, November 6, 2004.
33. ***Improving Physics Teaching through Physics Education Research***, invited talk at the Fall Meeting of the Illinois Section of the American Association of Physics Teachers, Peoria, Illinois, October 16, 2004.
34. ***Students' Reasoning Regarding Fundamental Concepts in Thermodynamics: Implications for Instruction***, invited talk at the 129th National Meeting of the American Association of Physics Teachers, Sacramento, California, August 3, 2004.
35. ***Investigation of Students' Reasoning in Thermodynamics and the Development of Improved Curricula***, invited talk at the 2004 National Summer Conference *Integrating Science and Mathematics Education Research into Teaching*, University of Maine, Orono, Maine, June 21, 2004.
36. ***Students' Reasoning Regarding Heat, Work, and the First Law of Thermodynamics***, invited talk at the 2004 American Physical Society April Meeting, Denver, Colorado, May 1, 2004.

2003

37. ***Role of Diverse Representational Modes in the Learning of Physics***, invited panel discussion and poster presentation at the Joint Arkansas-Oklahoma-Kansas and Nebraska American Association of Physics Teachers Section Meeting and Big 12 Physics Education Research Conference, Manhattan, Kansas, November 8, 2003.

38. ***The Questions We Ask and Why: Methodological Orientation in PER***, invited talk at the joint session of the 127th National Meeting of the American Association of Physics Teachers and the 2003 Physics Education Research Conference, Madison, Wisconsin, August 6, 2003.

2002

39. ***Students' Reasoning Regarding Heat, Work, and the First Law of Thermodynamics***, invited talk at the New Approaches to Meteorology Education Course for University Faculty, Cooperative Program for Operational Meteorology, Education & Training (COMET), University Corporation for Atmospheric Research, Boulder, Colorado, August 13, 2002.
40. ***Breakout Session I – Issues Related to Quantitative Methods and Data Analysis in PER***, David E. Meltzer and Richard R. Hake [joint invited presentation], at the 2002 Physics Education Research Conference, Boise, Idaho, August 8, 2002.
41. ***Observation, Measurement, and Data Analysis in PER: Methodological Issues and Challenges***, invited talk at the 125th National Meeting of the American Association of Physics Teachers, Boise, Idaho, August 7, 2002.
42. ***Teaching Thermodynamics: How do Mismatches between Chemistry and Physics Affect Student Learning?***, invited talk at the Iowa General Chemistry Network Meeting, Ames, Iowa, July 12, 2002.

2001

43. ***A New Century for Physics Education: Increased Effectiveness through Research-based Reform***, invited talk at the Iowa State University Physics and Astronomy Council annual meeting, Ames, Iowa, April 28, 2001.
44. ***Active-Learning Curricular Materials in Thermodynamics for Physics and Chemistry***, (David E. Meltzer and Thomas J. Greenbowe), invited talk at the Twelfth International Conference on College Teaching and Learning, Jacksonville, Florida, April 20, 2001.

2000

45. ***Students' Conceptual Difficulties in Thermodynamics for Physics and Chemistry: Focus on Free Energies***, invited talk at the Gordon Research Conference on Physics Research and Education: Statistical and Thermal Physics, Plymouth, New Hampshire, June 14, 2000.

1999

46. ***Elementary Teacher Education: An Assessment Agenda***, Co-chair's Introduction, Elementary Teacher Education session, at the 1999 Physics Education Research Conference, San Antonio, Texas, August 8, 1999.
47. ***Inquiry-Based Instruction for Elementary Physics: Hi-Tech and Low-Tech***, invited talk at the Tenth International Conference on College Teaching and Learning, Jacksonville, Florida, April 17, 1999.

1998

48. ***Effectiveness of Introductory Physics Instruction: The Present Situation, and Pathways Toward Improvement***, keynote address at the 1998 Fall Meeting of the Iowa Association of Physics Teachers Section, Cedar Rapids, Iowa, November 7, 1998.

49. ***Effectiveness of Instruction on Force and Motion in an Elementary Physics Course Based on Guided Inquiry***, invited talk at the 1998 Summer Meeting of the American Association of Physics Teachers, Lincoln, Nebraska, August 9, 1998.

1996

50. ***Guided Inquiry for Elementary Physics: Results and Prospects***, invited talk at the Seventh National Conference on College Teaching and Learning, Jacksonville, Florida, March 22, 1996.

1995

51. ***Elementary Physics Course Based on Guided Inquiry, with the Theme of "Energy,"*** invited talk at the Louisiana Mathematics, Science, and Engineering State-wide Conference "Together We Can Make It Work in Louisiana," convened by The Quality Education for Minorities Network and Xavier University, New Orleans, Louisiana, April 22, 1995.

Invited Conference Poster Presentations:

2019

52. ***Motivation of Physics Students' Self-Checking Behavior***, David E. Meltzer and Dakota H. King, invited poster presentation at panel "PER and Student Motivation," at the 2019 Winter Meeting of the American Association of Physics Teachers, Houston, Texas, January 14, 2019.

2016

53. ***Measurement and Characteristics of Evidence-Based Instruction in Physics***, invited poster at the AAAS/NSF Envisioning the Future of Undergraduate STEM Education: Research and Practice Symposium, Washington, D. C., April 28, 2016.

2012

54. ***The Role of Representations in Research-Based Instructional Practice in Physics***, invited symposium poster at the 2013 Physics Education Research Conference, Portland, Oregon, July 18, 2013.

2011

55. ***Time-dependent Interpretation of Correct Responses to Multiple-Choice Questions***, invited gallery poster at the 2011 Physics Education Research Conference, Session on "Multiple Assessments of Multiple-Choice Assessments," Omaha, Nebraska, August 4, 2011.

2009

56. ***Observations of General Learning Patterns in an Upper-Level Thermal Physics Course***, invited targeted poster [Session TP-A: Cognitive Issues in Developing Curriculum for Upper-Level Physics Courses] at the 2009 Physics Education Research Conference, Ann Arbor, Michigan, July 30, 2009.

2006

57. ***Investigation of Student Learning in Thermodynamics and Implications for Instruction in Chemistry and Engineering***, invited targeted poster [Session TP-C] at the 2006 Physics Education Research Conference, Syracuse, New York, July 27, 2006.

2004

58. ***Diverse Representational Modes in the Learning of Physical Science: Issues and Challenges***, invited poster presentation at the Second Annual Joint Meeting: Evaluation and Research Programs, Division of Research, Evaluation, and Communication (REC), National Science Foundation, Washington, D.C., October 18-19, 2004.

59. ***Student Learning in Upper-Level Thermal Physics: Comparisons and Contrasts with Students in Introductory Courses***, invited targeted poster [Session TP-C] at the 2004 Physics Education Research Conference, Sacramento, California, August 5, 2004.

60. ***How Do You Hit a Moving Target? Addressing the Dynamics of Students' Thinking***, invited targeted poster [Session TP-A] at the 2004 Physics Education Research Conference, Sacramento, California, August 5, 2004.

61. ***Research-based Curriculum Development in Thermodynamics***, David E. Meltzer and Thomas J. Greenbowe, invited poster presentation at *Invention and Impact: Building Excellence in Undergraduate Science, Technology, Engineering and Mathematics (STEM) Education*; A Conference of the Course, Curriculum & Laboratory Improvement (CCLI) Program [National Science Foundation], Crystal City, Virginia, April 16-18, 2004.

2003

62. ***Investigation of Diverse Representational Modes in the Learning of Physics and Chemistry***, invited poster presentation at the Principal Investigators and Contractors Meeting, Division of Research, Evaluation, and Communication (REC), National Science Foundation, Crystal City, Virginia, October 27, 2003.

1999

63. ***Assessment of Instructional Effectiveness in a Physics Course for Preservice Teachers***, invited poster at the National Science Foundation workshop "Teacher Education: From Preparation to Practice," Washington, D.C., May 7, 1999.

INVITED SEMINAR AND COLLOQUIUM PRESENTATIONS (speaker underlined)

2019

1. ***Physics Students' Difficulties with Introductory Mathematics***, David E. Meltzer and Dakota H. King, invited seminar at the University of Washington Physics Education Group, Seattle, Washington, November 15, 2019.
2. ***Physics Students' Familiarity with Mathematical Facts and Procedures***, David E. Meltzer and Dakota H. King, invited live remote video presentation to Noyce Master Teaching Fellows "Streamline to Mastery" group, University of Colorado, Boulder, February 4, 2019.

2015

3. ***Research on Student Learning of Thermal Physics*** [in collaboration with Warren M. Christensen, Michael E. Loverude, and John R. Thompson], invited seminar at University of Colorado Physics Education Research Group meeting, Boulder, Colorado, March 12, 2015.

2014

4. ***A Course on the History of Physics Education in the U.S.***, joint presentation by Valerie K. Otero and David E. Meltzer, invited seminar at University of Colorado Physics Education Research Group meeting, Boulder, Colorado, March 13, 2014.

2012

5. ***The Development of Research-Based Physics Instruction in the United States***, invited talk at Physics Education Research Group meeting, University of Colorado, Boulder, Colorado, July 12, 2012.

2011

6. ***Inquiry-based Physics in Middle School***, invited talk, Learning in Science Group, Department of Educational Sciences, University of Cyprus, Nicosia, Cyprus, November 3, 2011.

2010

7. ***National Task Force on Teacher Education in Physics***, joint presentation by Stamatis Vokos, David Meltzer, Monica Plisch, and Valerie Otero, invited seminar in Discipline-Based Education Research, University of Colorado, Boulder, Colorado, October 12, 2010.

2009

8. ***Research on Student Learning in Thermal Physics***, physics education research seminar, School of Physics, University of Sydney, Sydney, Australia, October 12, 2009.

2008

9. ***Research-Based Perspectives on Science and Mathematics Education***, invited talk at the School of Educational Innovation and Teacher Preparation, Arizona State University, Mesa, Arizona, March 6, 2008.

2007

10. ***A Research-Based Approach to the Learning and Teaching of Physics***, seminar at Indiana University–Purdue University Indianapolis, School of Science, May 7, 2007.
11. ***Detecting and Addressing Students' Reasoning Difficulties in Thermal Physics***, seminar at the University of Jyväskylä, Department of Physics, Jyväskylä, Finland, April 27, 2007.
12. ***Research on the Learning and Teaching of Physics: Overview and Perspective***, seminar at the University of Jyväskylä, Department of Physics, Jyväskylä, Finland, April 26, 2007.
13. ***Multiple Representations in Physics Education: Recent Developments and Questions for Future Work***, seminar/workshop at the University of Jyväskylä, Department of Teacher Education, Jyväskylä, Finland, April 25, 2007.
14. ***Promoting Research-Based Development in Science and Mathematics Education***, seminar at the University of Texas at Dallas, Department of Science and Mathematics Education, Richardson, Texas, April 19, 2007.
15. ***The Role of Research in Improving Science Education***, seminar at California State University, Chico, College of Natural Sciences, Chico, California, March 16, 2007.

2006

16. ***Physics Education Research and the Improvement of Instruction***, seminar at Michigan State University, Division of Science and Mathematics Education, East Lansing, Michigan, March 23, 2006.

2005

17. ***Laying the Basis for Improved Instruction through Physics Education Research***, lecture at Arizona State University, Department of Physics and Astronomy, Tempe, Arizona, April 8, 2005.
18. ***Investigating Student Learning and Improving Instruction through Physics Education Research***, seminar at Florida International University, Department of Physics, Miami, Florida, March 15, 2005.

2004

19. ***Research in Physics Education and the Development of Improved Instruction***, seminar at Southwest Missouri State University, Department of Physics, Astronomy, and Materials Science, Springfield, Missouri, November 18, 2004.

20. ***Research on Student Learning and the Development of Improved Physics Instruction***, colloquium at University of Missouri-St. Louis, Department of Physics and Astronomy, St. Louis, Missouri, March 19, 2004.
21. ***The Link to Improved Physics Instruction through Research on Student Learning***, Physics Education Research Seminar at Purdue University, Department of Physics, West Lafayette, Indiana, February 2, 2004.

2003

22. ***Physics Education Research in Perspective***, colloquium at Iowa State University, Ames, Iowa, October 16, 2003.
23. ***New Directions in Physics Education***, invited talk at the Iowa State University Physics and Astronomy Council annual meeting, Ames, Iowa, May 17, 2003.
24. ***Active Learning in Large Classes***, invited presentation at Iowa State University Center for Teaching Excellence Workshop Series: *Enhancing Learning in Large Classes*, Ames, Iowa, March 6, 2003.
25. ***Investigating and Improving Student Learning through Physics Education Research***, colloquium at the University at Buffalo, State University of New York, Buffalo, New York, February 25, 2003.

2002

26. ***The Process of Physics Education Research: From Investigation of Students' Reasoning to Improved Learning in the Classroom***, Physics Education Research Seminar at Ohio State University, Columbus, Ohio, November 25, 2002.
27. ***The Phases of Physics Education Research: Investigation of Student Reasoning, Curriculum Development, and Assessment of Instruction***, colloquium at South Dakota State University, Brookings, South Dakota, November 21, 2002.
28. ***The Role of Physics Education Research in Undergraduate Education***, colloquium at Iowa State University, Ames, Iowa, September 30, 2002.

2001

29. ***Student Learning in Thermodynamics: Exploring the Physics/Chemistry Connection***, Physics Education Research Seminar at Ohio State University, Columbus, Ohio, February 26, 2001.
30. ***Strengthening the Link between Research and Instruction in Physics Education***, colloquium at Iowa State University, Ames, Iowa, February 19, 2001.

2000

31. ***The Role of Research in the Improvement of Physics Education***, colloquium at Texas Tech University, Lubbock, Texas, November 9, 2000.

32. ***Research in Physics Education: How Can it Help Us Improve Physics Instruction?***, All-day session (presentation/workshop) at the Korean Science Teachers Workshop, University of Iowa, Iowa City, Iowa, September 4, 2000.
33. ***Students' Conceptual Difficulties in Thermodynamics for Physics and Chemistry***, invited presentation at the Modeling Workshops planning meeting, Department of Physics and Astronomy, Arizona State University, Tempe, Arizona, June 22, 2000.

1999

34. ***What Have We Learned From Physics Education Research? And How Can It Help Us Teach Science More Effectively?***, seminar at Northwestern State University of Louisiana, Natchitoches, Louisiana, November 15, 1999.
35. ***Research in Physics Education as a Basis for Improved Instruction***, colloquium at the University of Iowa, Iowa City, Iowa, September 27, 1999.
36. ***Research, Reform and Innovation in Physics Education***, colloquium at the University of Northern Iowa, Cedar Falls, Iowa, February 18, 1999.

1998

37. ***A Small Group Perspective on Physics Education Research***, colloquium at Iowa State University, Ames, Iowa, April 2, 1998.
38. ***Highly Interactive Physics Instruction: Promoting Active Student Participation in the Physics Classroom***, David E. Meltzer and Kandiah Manivannan [joint presentation], colloquium at the University of New Orleans, New Orleans, Louisiana, March 23, 1998.
39. ***A Small Group Perspective on Physics Education Research***, colloquium at Washington State University, Pullman, Washington, February 19, 1998.

1996

40. ***Innovative Methods in the Teaching of Physical Science***, David E. Meltzer and Kandiah Manivannan [joint invited presentation], at the Southeastern Louisiana University Education Association, Hammond, Louisiana, April 10, 1996.

1995

41. ***Innovation and Reform in the Teaching of Scientific Subjects***, invited presentation to students and faculty at the Technical Teachers' Training Institute (Eastern Region), Calcutta, India, October 26, 1995.

1994

42. ***Distinctions in the Learning Approaches Between Mathematics and Physical Science***, presentation delivered as the featured Guest Speaker, Annual Banquet/Award Meeting of Pi Mu Epsilon, Math Honor Society, Southeastern Louisiana University chapter, May 1994.

1993

43. ***Stopping Power Calculations with the Orbital Local Plasma Approximation***, colloquium at East Texas State University, Commerce, Texas, April 1993.

1989

44. ***Calculation of Stopping Cross Sections in the Local Plasma Approximation***, Quantum Theory Project Seminar, University of Florida, Gainesville, Florida, Spring 1989.

1985

45. ***Proposed Determination of Many-body Effects in Heavy Fermion Systems by Conduction Electron Spin Resonance***, Solid State Division Seminar, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Fall 1985.

1984

46. ***Spin Relaxation Time of Normal Liquid ^{3}He***, Solid State Seminar, S.U.N.Y. at Stony Brook, Stony Brook, New York, Spring 1984.

CONTRIBUTED PRESENTATIONS (all authors listed; speaker underlined)

Contributed Oral Presentations:

2021

1. Dakota King and David E. Meltzer, ***Symbolic Manipulation Fluency Predicts Introductory Physics Students' Mathematical Preparedness***, at the 2021 Virtual Summer Meeting of the American Association of Physics Teachers, July 31, 2021 [Session PS.A-SA-9].
2. David E. Meltzer and Dakota H. King, ***Instructional Implications of Findings on Students' Mathematics Difficulties***, at the 2021 Virtual Summer Meeting of the American Association of Physics Teachers, July 31, 2021 [Session PS.A-SA-9].
3. Dakota H. King and David E. Meltzer, ***Introductory Physics Students' Mathematical Preparedness and Conceptual Understanding of Force***, at the 2021 Virtual Winter Meeting of the American Association of Physics Teachers, January 12, 2021 [Session D1.5].
4. David E. Meltzer and Dakota H. King, ***Consistency of Students' Mathematical Difficulties May Allow Reliable Performance Predictability***, at the 2021 Virtual Winter Meeting of the American Association of Physics Teachers, January 12, 2021 [Session D1.5].

2020

5. Dakota H. King and David E. Meltzer, ***Measuring and Predicting the Mathematical Preparedness of Introductory Physics Students***, at the 2020 Virtual Summer Meeting of the American Association of Physics Teachers, July 20, 2020 [Session PAR-D.07].
6. David E. Meltzer and Dakota H. King, ***Response Patterns by Introductory Physics Students on Mathematics Diagnostic Tests***, at the 2020 Virtual Summer Meeting of the American Association of Physics Teachers, July 20, 2020 [Session PAR-D.07].
7. Dakota H. King and David E. Meltzer, ***Physics Students' Mathematical Difficulties with Operations and Algebra***, at the 2020 Winter Meeting of the American Association of Physics Teachers, Orlando, Florida, January 21, 2020 [Session GC].
8. David E. Meltzer and Dakota H. King, ***Developing a Strategy to Address Physics Students' Mathematical Difficulties***, at the 2020 Winter Meeting of the American Association of Physics Teachers, Orlando, Florida, January 21, 2020 [Session GC].

2019

9. Dakota H. King and David E. Meltzer, ***Exploring Student Difficulties in Mathematics Used in Introductory Physics***, at the 2019 Summer Meeting of the American Association of Physics Teachers, Provo, Utah, July 22, 2019 [Session BJ].
10. David E. Meltzer and Dakota H. King, ***Nature of Students' Mathematical Difficulties in Introductory Physics Courses***, at the 2019 Summer Meeting of the American Association of Physics Teachers, Provo, Utah, July 22, 2019 [Session BJ].
11. Dakota H. King and David E. Meltzer, ***Investigating Student Difficulties in Solving Basic Mathematics Problems***, at the 2019 Winter Meeting of the American Association of Physics Teachers, Houston, Texas, January 14, 2019 [Session DG].

12. David E. Meltzer and Dakota H. King, ***Physics Students' Familiarity with Mathematical Facts and Procedures***, at the 2019 Winter Meeting of the American Association of Physics Teachers, Houston, Texas, January 14, 2019 [Session DG].

2018

13. Dakota H. King and David E. Meltzer, ***Exploring Physics Students' Difficulties in Solving Symbolic Algebra Problems***, at the 2018 Summer Meeting of the American Association of Physics Teachers, Washington, D.C., July 30, 2018 [Session AB].
14. David E. Meltzer and Dakota H. King, ***Some Mathematical Aspects of Physics Students' Problem-Solving Difficulties***, at the 2018 Summer Meeting of the American Association of Physics Teachers, Washington, D.C., July 30, 2018 [Session AB].

2017

15. David E. Meltzer and Matthew I. Jones, ***Nature of Students' Mathematical Difficulties and of Potentially Productive Remedies***, at the 2017 Summer Meeting of the American Association of Physics Teachers, Covington, Kentucky, July 24, 2017 [Session AK].
16. David E. Meltzer and Matthew I. Jones, ***Exploring the Factors Underlying Physics Students' Mathematical Difficulties***, at the 2017 Winter Meeting of the American Association of Physics Teachers, Atlanta, Georgia, February 20, 2017 [Session FD].
17. Matthew I. Jones and David E. Meltzer, ***Investigating Student Difficulties Solving Systems of Equations***, at the 2017 Winter Meeting of the American Association of Physics Teachers, Atlanta, Georgia, February 20, 2017 [Session FD].

2016

18. David E. Meltzer and Matthew I. Jones, ***Probing Students' Mathematical Difficulties in Introductory Physics***, at the 2016 Summer Meeting of the American Association of Physics Teachers, Sacramento, California, July 20, 2016 [Session FA].

2015

19. David E. Meltzer, ***Assessment of Evidence-Based Physics Instruction***, at the 2015 Summer Meeting of the American Association of Physics Teachers, College Park, Maryland, July 29, 2015 [Session FA].
20. David E. Meltzer, ***Assessment and Instructional-Element Analysis in Evidence-Based Physics Instruction***, at the 2015 Winter Meeting of the American Association of Physics Teachers, San Diego, California, January 4, 2015 [Session AB].

2014

21. David E. Meltzer, ***Use of Pre-Instruction Tests to Predict Student Course Performance***, at the 2014 Summer Meeting of the American Association of Physics Teachers, Minneapolis, Minnesota, July 29, 2014 [Session DD].

22. David E. Meltzer, ***Implementing, Documenting, and Assessing Evidence-Based Physics Instruction***, at the 2014 Winter Meeting of the American Association of Physics Teachers, Orlando, Florida, January 5, 2014 [Session AB].

2013

23. David E. Meltzer and Ronald K. Thornton, ***Research-based Active-Learning Instruction in Physics***, at the 2013 American Physical Society April Meeting, Denver, Colorado, April 13, 2013 [*Bulletin of the American Physical Society* II, **58 (4)**, Session B15 (2013)].
24. David E. Meltzer and Ronald K. Thornton, ***Research-based Active-Learning Instruction in Physics***, at the 2013 Winter Meeting of the American Association of Physics Teachers, New Orleans, Louisiana, January 7, 2013 [Session AD].

2012

25. David E. Meltzer, ***Students' Ideas in Upper-Level Thermal Physics***, at the 2012 Summer Meeting of the American Association of Physics Teachers, Philadelphia, Pennsylvania, July 31, 2012 [Session DF].

2011

26. David E. Meltzer, ***Adapting PER Strategies for Middle-School Science Classes***, at the 2011 Summer Meeting of the American Association of Physics Teachers, Omaha, Nebraska, August 1, 2011 [Session AE].
27. Sharon E. Osborn Popp, David E. Meltzer, and Colleen Megowan-Romanowicz, ***Is the Force Concept Inventory Biased? Investigating Differential Item Functioning on a Test of Conceptual Learning in Physics***, refereed presentation at the annual meeting of the American Educational Research Association, New Orleans, Louisiana, April 9, 2011.
28. David E. Meltzer, ***Students' Reasoning About Entropy in Chemical and Physical Contexts***, at the 2011 Winter Meeting of the American Association of Physics Teachers, Jacksonville, Florida, January 10, 2011 [Session CG].

2010

29. David E. Meltzer and Warren M. Christensen, ***Evolution of Students' Ideas about Entropy***, at the 2010 Summer Meeting of the American Association of Physics Teachers, Portland, Oregon, July 20, 2010 [Session GC].

2009

30. David E. Meltzer, ***Research Themes in Physics Teacher Preparation***, at the 2009 Summer Meeting of the American Association of Physics Teachers, Ann Arbor, Michigan, July 29, 2009 [Session GF].

31. David E. Meltzer, ***Adaptation of Research-Based Instruction to a Middle School Setting***, at the 2009 Winter Meeting of the American Association of Physics Teachers, Chicago, Illinois, February 15, 2009 [Session LH].

2008

32. David E. Meltzer, ***Adaptation of Research-Based Curricular Materials for Middle-School Use***, at the 2008 Summer Meeting of the American Association of Physics Teachers, Edmonton, Alberta, Canada, July 21, 2008.
33. David E. Meltzer, ***What is Teacher "Effectiveness" and How May It Be Assessed?***, at the 2008 Winter Meeting of the American Association of Physics Teachers, Baltimore, Maryland, January 21, 2008.

2007

34. David E. Meltzer, ***Analysis of Shifts in Students' Reasoning Regarding Electric Field and Potential Concepts***, at the 2007 American Physical Society March Meeting, Denver, Colorado, March 5, 2007.
35. Warren M. Christensen and David E. Meltzer, ***"Is Entropy Conserved?" Student Understanding of Entropy in Introductory Physics***, at the 2007 American Astronomical Society/American Association of Physics Teachers Joint Meeting, Seattle, Washington, January 9, 2007.
36. David E. Meltzer and Warren M. Christensen, ***Pedagogical Landscape in Upper-Level Thermal Physics***, at the 2007 American Astronomical Society/American Association of Physics Teachers Joint Meeting, Seattle, Washington, January 9, 2007.

2006

37. David E. Meltzer and Warren M. Christensen, ***Research-based Pedagogical Strategies in Thermal Physics: Development and Assessment***, at the 2006 Summer Meeting of the American Association of Physics Teachers, Syracuse, New York, July 25, 2006.
38. Warren M. Christensen and David E. Meltzer, ***Student Thinking Regarding Entropy and the Second Law of Thermodynamics***, at the 2006 Summer Meeting of the American Association of Physics Teachers, Syracuse, New York, July 24, 2006.
39. Warren M. Christensen and David E. Meltzer, ***What's Entropy? Student Understanding of Thermodynamics in an Introductory Physics Course***, at the 2006 Winter Meeting of the American Association of Physics Teachers, Anchorage, Alaska, January 24, 2006.
40. David Meltzer, Warren Christensen, and John Thompson, ***Uneven Development of Students' Reasoning Regarding Concepts in Thermal Physics***, at the 2006 Winter Meeting of the American Association of Physics Teachers, Anchorage, Alaska, January 23, 2006.

2005

41. Warren Christensen and David E. Meltzer, ***Students' Reasoning Regarding Entropy and the Second Law of Thermodynamics***, at the 2005 Summer Meeting of the American Association of Physics Teachers, Salt Lake City, Utah, August 8, 2005.
42. David E. Meltzer and Warren M. Christensen, ***Students' Reasoning Regarding Entropy and the Second Law of Thermodynamics in an Upper-Level Thermal Physics Course***, at the 2005 American Physical Society March Meeting, Los Angeles, California, March 23, 2005.
43. Warren M. Christensen and David E. Meltzer, ***Student Understanding of Entropy and the Second Law of Thermodynamics in an Introductory Physics Course***, at the 2005 American Physical Society March Meeting, Los Angeles, California, March 23, 2005.
44. Warren M. Christensen and David E. Meltzer, ***Students' Ideas about Entropy and the Second Law of Thermodynamics***, at the 2005 Winter Meeting of the American Association of Physics Teachers, Albuquerque, New Mexico, January 11, 2005.
45. David E. Meltzer and Warren M. Christensen, ***Development of Student Reasoning in an Upper-Level Thermal Physics Course***, at the 2005 Winter Meeting of the American Association of Physics Teachers, Albuquerque, New Mexico, January 11, 2005.

2004

46. Warren M. Christensen, Ngoc-Loan P. Nguyen, and David E. Meltzer, ***Semi-Intuitive Thinking and Reasoning Inconsistencies in Calorimetry***, at the 129th National Meeting of the American Association of Physics Teachers, Sacramento, California, August 3, 2004.
47. David E. Meltzer, ***Investigations of Student Learning in Thermochemistry and Thermal Physics***, at the 18th Biennial Conference on Chemical Education, Iowa State University, Ames, Iowa, July 20, 2004.
48. David E. Meltzer, ***Students' Reasoning Regarding Electric Field Concepts Pre- and Post-Instruction***, at the 128th National Meeting of the American Association of Physics Teachers, Miami Beach, Florida, January 26, 2004.
49. Warren M. Christensen, Ngoc-Loan P. Nguyen, and David E. Meltzer, ***Intuitive and Rule-based Reasoning in the Context of Calorimetry***, at the 128th National Meeting of the American Association of Physics Teachers, Miami Beach, Florida, January 26, 2004.

2003

50. Ngoc-Loan Nguyen and David E. Meltzer, ***Identifying and Addressing Student Learning Difficulties in Calorimetry and Thermodynamics***, at the 126th National Meeting of the American Association of Physics Teachers, Austin, Texas, January 15,.
51. David E. Meltzer, ***Variability in Student Learning Associated with Diverse Modes of Representation,*** at the 126th National Meeting of the American Association of Physics Teachers, Austin, Texas, January 13, 2003.

2002

52. David E. Meltzer, ***Dynamics of Student Concepts Regarding Electric Field and Potential***, at the 124th National Meeting of the American Association of Physics Teachers, Philadelphia, Pennsylvania, January 22, 2002.

53. Ngoc-Loan Nguyen and David E. Meltzer, ***Initial Understanding of Vector Concepts Among Students in Introductory Physics Courses***, at the 124th National Meeting of the American Association of Physics Teachers, Philadelphia, Pennsylvania, January 22, 2002.

2001

54. Ngoc-Loan Nguyen and David E. Meltzer, ***Student Understanding of Vectors***, at the 2001 Joint Meeting of the Nebraska and Iowa Sections of the American Association of Physics Teachers, Omaha, Nebraska, November 3, 2001.

55. Kandiah Manivannan and David E. Meltzer, ***Use of Interactive Demonstrations to Promote Active Learning in Physics Classes***, at the Missouri Section of the American Association of Physics Teachers, Cape Girardeau, Missouri, October 27, 2001.

56. David E. Meltzer and Thomas J. Greenbowe, ***Recurrent Areas of Confusion in Student Learning of Thermodynamics***, at the 123rd National Meeting of the American Association of Physics Teachers, Rochester, New York, July 23, 2001.

57. Kandiah Manivannan, Cheryl P. Schaefer, and David E. Meltzer, ***Promoting Active Learning in Physics Lecture Classes Using Interaction Demonstrations***, at the Missouri Academy of Sciences, Joplin, Missouri, April 21, 2001.

58. T.J. Greenbowe and D. E. Meltzer, ***One Student's Understanding of the Laws of Thermodynamics and the Role of Chemical Reaction in Calorimetry Experiments: A Case Study***, at the 221st National Meeting of the American Chemical Society, San Diego, California, April 1, 2001.

59. Rebecca S. Lindell Adrian, Melanie S. Bean, Tina Fanetti, and David Meltzer, ***Developing a Concept Inventory to Assess Models of Lunar Phases***, at the 122nd National Meeting of the American Association of Physics Teachers, San Diego, California, January 10, 2001.

60. Kandiah Manivannan, Cheryl P. Schaefer, and David E. Meltzer, ***Promoting Active Learning in Physics Classes Using Interactive Demonstrations***, at the 122nd National Meeting of the American Association of Physics Teachers, San Diego, California, January 8, 2001.

61. David E. Meltzer and Thomas J. Greenbowe, ***Dynamics of Student Learning of Thermodynamics Concepts***, at the 122nd National Meeting of the American Association of Physics Teachers, San Diego, California, January 8, 2001.

2000

62. David E. Meltzer, ***Learning Gains in Physics in Relation to Students' Mathematics Skills***, at the 2000 Fall Meeting of the Iowa Section of the American Association of Physics Teachers, Iowa City, Iowa, November 4, 2000.

63. Tom Greenbowe and David Meltzer [joint presentation], ***Issues in Teaching Science Content to Preservice Elementary Education Majors***, Science Education Seminar, Iowa State University, Ames, Iowa, October 3, 2000.

64. David E. Meltzer, ***Relationship Between Mathematics Preparation and Conceptual Learning Gains***, at the 2000 Summer Meeting of the American Association of Physics Teachers, Guelph, Ontario, Canada, July 31, 2000.

65. Jack A. Dostal and David E. Meltzer, ***Student Concepts of Gravity in Introductory Astronomy and Physics Courses***, at the 2000 Summer Meeting of the American Association of Physics Teachers, Guelph, Ontario, Canada, July 31, 2000.

66. David E. Meltzer, ***Physics Education: An Expanding Research Field within the Physics Department***, at the conference on "Physics and Astronomy at the Millennium," State University of New York at Stony Brook, Stony Brook, New York, June 17, 2000.

67. Kandiah Manivannan and David E. Meltzer, ***Investigating Student Difficulties Using the Problem Dissection Technique***, at the 2000 Winter Meeting of the American Association of Physics Teachers, Kissimmee, Florida, January 18, 2000.

68. Jack A. Dostal and David E. Meltzer, ***Student Concepts of Gravity in Astronomical Contexts***, at the 2000 Winter Meeting of the American Association of Physics Teachers, Kissimmee, Florida, January 17, 2000.

69. David E. Meltzer and Thomas J. Greenbowe, ***Investigation of Learning Difficulties in Thermodynamics for Physics and Chemistry***, at the 2000 Winter Meeting of the American Association of Physics Teachers, Kissimmee, Florida, January 17, 2000.

70. Jack A. Dostal and David E. Meltzer, ***Investigating Student Difficulties with Concepts of Gravitation***, at the 2000 Winter Meeting of the American Association of Physics Teachers, Kissimmee, Florida, January 17, 2000.

1999

71. David E. Meltzer and Thomas J. Greenbowe, ***Active-Learning Curricula for Thermodynamics in Physics and Chemistr*y**, at the 1999 Fall Meeting of the Illinois and Iowa Sections of the American Association of Physics Teachers, Rock Island, Illinois, October 30, 1999.

72. Jack Dostal and David E. Meltzer, ***Investigating Student Difficulties with Concepts of Gravitation***, at the 1999 Fall Meeting of the Illinois and Iowa Sections of the American Association of Physics Teachers, Rock Island, Illinois, October 30, 1999.

73. Jack A. Dostal and David E. Meltzer, ***Investigating Student Difficulties with Concepts of Gravitation, or: "Do You Understand the Gravity of this Situation?,"*** at the 1999 Summer Meeting of the American Association of Physics Teachers, San Antonio, Texas, August 6, 1999.

74. David E. Meltzer, ***Addressing Learning Difficulties with Circuits: An "Aufbau" Approach***, at the 1999 Summer Meeting of the American Association of Physics Teachers, San Antonio, Texas, August 6, 1999.

75. Jack Dostal and David E. Meltzer, ***Investigating Student Difficulties with Concepts of Gravitation, or: "Do You Understand the Gravity of this Situation?,"*** at the 1999 Spring Meeting of the Iowa Section of the American Association of Physics Teachers, Ames, Iowa, April 24, 1999.

76. David E. Meltzer, ***Learning Difficulties and Teaching Strategies Related to Electric Circuits***, at the 1999 Spring Meeting of the Iowa Section of the American Association of Physics Teachers, Ames, Iowa, April 24, 1999.

77. David E. Meltzer, ***Physics Education: Research and the Road to Reform***, Science Education Seminar, Iowa State University, Ames, Iowa, March 12, 1999.

78. Kandiah Manivannan, Monica K. Ballay and David E. Meltzer, ***Use of Interactive Multiple Representations in Promoting Student Understanding of Physics in Active Learning Environments***, at the 73rd Annual Meeting of the Louisiana Academy of Sciences, Monroe, Louisiana, February 5, 1999.

79. Kandiah Manivannan, Monica K. Ballay and David E. Meltzer [joint presentation], ***Use of Multiple Representations in an Active Learning Environment to Increase Student Learning***, at the 1999 Winter Meeting of the American Association of Physics Teachers, Anaheim, California, January 13, 1999.

80. David E. Meltzer, ***Are There "Hidden Variables" in Students' Initial Knowledge State Which Correlate with Learning Gains?***, at the 1999 Winter Meeting of the American Association of Physics Teachers, Anaheim, California, January 12, 1999.

1998

81. David E. Meltzer, ***Active and Inter-Active Learning in the Physics Classroom***, at the 1998 Iowa Science Teachers Section Fall Conference, Des Moines, Iowa, October 22, 1998.

82. David E. Meltzer, ***Physics Education Research: A New Subfield of Physics***, Science Education Seminar, Iowa State University, Ames, Iowa, September 1998.

83. David E. Meltzer, **Iowa State University Physics Education Research Group**, presentation during session on "Research and Development Projects We Are Now Doing" at the 1998 Physics Education Research Conference, Lincoln, Nebraska, August 1, 1998.

84. Kandiah Manivannan and David E. Meltzer, ***Blending Hi-Tech and Low-Tech for Enhancing Student-Faculty Interactivity***, at the 72nd Annual Meeting of the Louisiana Academy of Sciences, Hammond, Louisiana, February 6, 1998.

85. David E. Meltzer and Kandiah Manivannan, ***Creating an Active Learning Environment in Physics Lecture Classes***, at the 72nd Annual Meeting of the Louisiana Academy of Sciences, Hammond, Louisiana, February 6, 1998.

86. Kandiah Manivannan and David E. Meltzer, ***A Low-Tech Method to Increase Interactivity in Large Lecture Classes***, at the 1998 Winter Meeting of the American Association of Physics Teachers, New Orleans, Louisiana, January 5, 1998.

87. David E. Meltzer, ***Individual Student Variability in Conceptual Learning Gains: Search for Determining Factors***, at the 1998 Winter Meeting of the American Association of Physics Teachers, New Orleans, Louisiana, January 5, 1998.

1997

88. Kandiah Manivannan and David E. Meltzer, ***Highly Interactive Large-Enrollment Classes***, at the 1997 Summer Meeting of the American Association of Physics Teachers, Denver, Colorado, August 15, 1997.

89. David E. Meltzer, Kandiah Manivannan, and Tina Tassara, ***Effectiveness of a Microcomputer-based Laboratory Environment for Teaching Force and Motion in an Elementary Physics Course***, at the 1997 Summer Meeting of the American Association of Physics Teachers, Denver, Colorado, August 15, 1997.

90. David E. Meltzer and Kandiah Manivannan [joint participation], ***Issues Related to Reforming Undergraduate Physics Education***, at the First Project Kaleidoscope Telephone Conference with participants from around the nation, moderated by Prof. Robert Hilborn (Amherst College), April 7, 1997.

91. David E. Meltzer, ***Use of Multiple Representations in Introductory Physics Instruction***, at the 71st Annual Meeting of the Louisiana Academy of Sciences, Alexandria, Louisiana, February 7, 1997.

92. Kandiah Manivannan, David E. Meltzer, and Tina Tassara, ***Effectiveness of Various Instructional Techniques for Teaching Force and Motion in an Inquiry-based Elementary Physics Course***, at the 71st Annual Meeting of the Louisiana Academy of Sciences, Alexandria, Louisiana, February 7, 1997.

93. Kandiah Manivannan, David E. Meltzer, and Tina Tassara, ***Analysis of Factors Affecting Conceptual Learning Gains in an Inquiry-based Elementary Physics Course***, at the 1997 Winter Meeting of the American Association of Physics Teachers, Phoenix, Arizona, January 6, 1997.

94. David E. Meltzer, ***Comparative Effectiveness of Conceptual Learning with Various Representational Modes***, at the 1997 Winter Meeting of the American Association of Physics Teachers, Phoenix, Arizona, January 6, 1997.

1996

95. David E. Meltzer and Kandiah Manivannan, ***Transforming General Physics Laboratories on the Inquiry-based Learning Model***, at the 1996 Summer Meeting of the American Association of Physics Teachers, College Park, Maryland, August 9, 1996.

96. Kandiah Manivannan and David E. Meltzer, ***Diverse Instructional Techniques for Teaching Force and Motion***, at the 1996 Summer Meeting of the American Association of Physics Teachers, College Park, Maryland, August 9, 1996.

97. Kandiah Manivannan and David E. Meltzer, ***A Simple Method for Turning Passive Lecture Classes into Interactive Learning Environments***, at the 70th Annual Meeting of the Louisiana Academy of Sciences, Thibodaux, Louisiana, February 2, 1996.

98. David E. Meltzer and Daniel R. McCarthy, ***Broad- and Narrow-Band Optical Observation of Solar Prominences***, at the 70th Annual Meeting of the Louisiana Academy of Sciences, Thibodaux, Louisiana, February 2, 1996.

99. David E. Meltzer, ***New Perspectives on the Elementary Physics Course for Nontechnical Students***, at the 70th Annual Meeting of the Louisiana Academy of Sciences, Thibodaux, Louisiana, February 2, 1996.

100. David E. Meltzer, ***Reform of the Elementary Physics Course: Goals and Assessment***, at the 1996 Winter Meeting of the American Association of Physics Teachers, Reno, Nevada, January 18, 1996.

101. Kandiah Manivannan and David E. Meltzer, ***Interactive Learning in Large Lecture Classes***, at the 1996 Winter Meeting of the American Association of Physics Teachers, Reno, Nevada, January 18, 1996.

1995

102. David E. Meltzer and Kandiah Manivannan [joint presentation], **Promoting Interactivity in Large Lecture Classes**, at the Third Annual Southeastern Louisiana University Faculty Development Conference, Hammond, Louisiana, June 15-16, 1995.

103. David E. Meltzer, **A Pilot Project for an Elementary Physics Course based on Guided Inquiry with the Theme of "Energy,"** at the 69th Annual Meeting of the Louisiana Academy of Sciences, Ruston, Louisiana, February 3, 1995.

104. David E. Meltzer, ***A Pilot Project for an Elementary Physics Course based on Guided Inquiry with the Theme of "Energy,"*** at the 1995 Winter Meeting of the American Association of Physics Teachers, Orlando, Florida, January 18, 1995.

1994

105. David E. Meltzer and Amy Woodland Espinoza, ***Guided Inquiry for Middle School Science: A Model Lesson on the Law of Reflection***, at the 68th Annual Meeting of the Louisiana Academy of Sciences, Lake Charles, Louisiana, February 4, 1994.

1992

106. David E. Meltzer, John R. Sabin, S. B. Trickey, and J. Z. Wu, ***Stopping Power Calculations with the Orbital Local Plasma Approximation***, at the 66th Annual Meeting of the Louisiana Academy of Sciences, Baton Rouge, Louisiana, February 6-8, 1992.

1990

107. David E. Meltzer, John R. Sabin, S. B. Trickey, and J. Z. Wu, ***Density Decomposition Options in the Orbital Local Plasma Approximation***, at the 30th Sanibel Symposia, St. Augustine, Florida, March 17-24, 1990.

108. David E. Meltzer, John R. Sabin, and S. B. Trickey, ***Calculation of Mean Excitation Energy and Stopping Cross Section in the Orbital Local Plasma Approximation***, at the American Physical Society meeting, Anaheim, California, March 12-16, 1990.

1989

109. David E. Meltzer, John R. Sabin, and S. B. Trickey, ***Calculation of Orbital Mean Excitation Energies and Stopping Cross Sections in the Local Plasma Approximation***, at the 29th Sanibel Symposia, St. Augustine, Florida, April 1-8, 1989.

1986

110. David E. Meltzer and Kevin S. Bedell, ***Spin Waves and Spin Diffusion in Fermi Liquids: Bounds on Effective Diffusion Coefficients***, at the American Physical Society meeting, Las Vegas, Nevada, March 31-April 4, 1986.

1984

111. David E. Meltzer, ***Spin Relaxation Time in Normal Liquid ^{3}He***, at the American Physical Society meeting, Washington, D. C., April 23-26, 1984.

Contributed Poster Presentations:

2021

112. David E. Meltzer and Dakota H. King, ***What Should Physics Teachers Know About Students' Math Difficulties?***, poster presentation at the 2021 Physics Teacher Education Coalition (PhysTEC) Virtual Conference, March 5, 2021.

2020

113. David E. Meltzer and Dakota H. King, ***College Physics Students' Mathematical Difficulties Suggest Need for Awareness and Action at the High School Level***, poster presentation at the 2020 Physics Teacher Education Coalition (PhysTEC) Conference, Denver, Colorado, February 29, 2020.

2019

114. David E. Meltzer and Dakota H. King, ***Physics Students' Difficulties with Mathematical Symbols and Operations***, poster presentation at the 2019 conference on Foundations and Frontiers of Physics Education Research, Bar Harbor, Maine, June 19, 2019.
115. David E. Meltzer, ***Physics Teacher Preparation: The Conflict Between Recommendations and Reality***, poster presentation at the 2019 Physics Teacher Education Coalition (PhysTEC) Conference, Boston, Massachusetts, March 2, 2019.

2018

116. David E. Meltzer, ***College Physics Students' Mathematical Difficulties and Their Implications for High School Teachers***, poster presentation at the 2018 Physics Teacher Education Coalition (PhysTEC) Conference, College Park, Maryland, February 9, 2018.

2017

117. David E. Meltzer and Matthew I. Jones, ***Exploration of Physics Students' Mathematical Difficulties***, poster presentation at the 2017 conference on Foundations and Frontiers of Physics Education Research, Bar Harbor, Maine, June 20, 2017.
118. David E. Meltzer, ***Common Themes and Outcomes in Research-Based Physics Teacher Education***, poster presentation at the 2017 Physics Teacher Education Coalition (PhysTEC) Conference, Atlanta, Georgia, February 17, 2017.

2016

119. David E. Meltzer, ***Trends in Physics Teacher Education from the Perspective of Research-Based Instruction***, poster presentation at the 2016 Physics Teacher Education Coalition (PhysTEC) Conference, Baltimore, Maryland, March 11, 2016.

2015

120. David E. Meltzer, ***Early Efforts at Assessment of Learning in Evidence-Based Physics Instruction***, poster presentation at the 2015 conference on Foundations and Frontiers of Physics Education Research, Bar Harbor, Maine, June 17, 2015.
121. David E. Meltzer, ***Evidence-Based Instruction in Physics Teacher Education,*** poster presentation at the 2015 Physics Teacher Education Coalition [PhysTEC] Conference, Seattle, Washington, February 6, 2015.

2013

122. David E. Meltzer, ***Students' Ideas in Upper-Level Thermal Physics***, poster presentation at the 2013 conference on Foundations and Frontiers of Physics Education Research, Bar Harbor, Maine, June 19, 2013.
123. David E. Meltzer, ***Development of Physics Teacher Education in the U.S. and Implications for Present Practice***, poster presentation at the 2013 Physics Teacher Education Coalition (PhysTEC) Conference, Baltimore, Maryland, March 16, 2013.

2011

124. David E. Meltzer and Warren M. Christensen, ***A Window on Student Thinking in the Context of Calorimetry***, poster presentation at the 2011 conference on Foundations and Frontiers in Physics Education Research, Bar Harbor, Maine, June 15, 2011.

2010

125. David E. Meltzer, Warren M. Christensen, and C. A. Ogilvie, ***Student Ideas Regarding Entropy***, poster presentation at the 2010 Winter Meeting of the American Association of Physics Teachers, Washington, D.C., February 16, 2010 [Session PST-2A].

2009

126. Risto T. Leinonen, Pekka Hirvonen, Mervi Asikainen, and David E. Meltzer, ***University Students' Pre-Instruction Knowledge about Temperature and Adiabatic Compression***, poster presentation at the 2009 Summer Meeting of the American Association of Physics Teachers, Ann Arbor, Michigan, July 28, 2009.

2007

127. Warren M. Christensen and David E. Meltzer, ***"Is Entropy Conserved?" Student Understanding of Entropy in Introductory Physics***, poster presentation at the 2007 American Astronomical Society/American Association of Physics Teachers Joint Meeting, Seattle, Washington, January 10, 2007.

2006

128. David E. Meltzer, ***Analysis of Shifts in Students' Reasoning Regarding Electric Field and Potential Concepts***, poster presentation at the 2006 Physics Education Research Conference, Syracuse, New York, July 26, 2006.

129. David E. Meltzer, ***Analysis of Shifts in Students' Reasoning Regarding Electric Field and Potential Concepts***, poster presentation at the Gordon Research Conference on Physics Research and Education: Electromagnetism, Mount Holyoke College, South Hadley, Massachusetts, June 11-16, 2006.

2005

130. Warren M. Christensen, David E. Meltzer, and Thomas A. Stroman, ***Students' Ideas about the State-Function Property of Entrop***y, poster presentation at the 2005 conference on Foundations and Frontiers in Physics Education Research, Bar Harbor, Maine, August 16, 2005.

131. David E. Meltzer and Thomas J. Greenbowe, ***Investigations of Student Reasoning in Thermochemistry***, poster presentation at the 2005 Physics Education Research Conference, Salt Lake City, Utah, August 10, 2005.

132. David E. Meltzer and Thomas J. Greenbowe, ***Investigations of Student Reasoning in Thermochemistry***, poster presentation at the 2005 Gordon Research Conference on Chemistry Education Research & Practice, New London, Connecticut, June 28, 2005.

2004

133. Warren Christensen, Ngoc-Loan Nguyen, and David E. Meltzer, ***Student Difficulties with Graphical Representation of Vector Products: Crossing and Dotting Beyond t's and i's***, poster presentation at the 2004 Physics Education Research Conference, Sacramento, California, August 4-5, 2004.

134. David E. Meltzer, ***Role of Diverse Representational Modes in the Learning of Physics***, poster presentation at the 2004 National Summer Conference *Integrating Science and Mathematics Education Research into Teaching*, University of Maine, Orono, Maine, June 21, 2004.

2003

135. Ngoc-Loan P. Nguyen, Warren M. Christensen, and David E. Meltzer, ***Students' Use of Rule-Based Reasoning in the Context of Calorimetry and Thermal Phenomena***, poster presentation at the 2003 Physics Education Research Conference, Madison, Wisconsin, August 6, 2003.

2002

136. Ngoc-Loan Nguyen and David E. Meltzer, ***Student Learning of Calorimetry Concepts***, poster presentation at the 2002 Physics Education Research Conference, Boise, Idaho, August 7, 2002.

137. Bruna Irene Grimberg and David E. Meltzer, ***Student Understanding of Thermodynamics***, poster presentation at the 114th Annual Meeting of the Iowa Academy of Science, Des Moines, Iowa, April 19, 2002.

2001

138. David E. Meltzer, ***Student Reasoning Regarding Work, Heat, and the First Law of Thermodynamics in an Introductory Physics Course***, poster presentation at the 2001 Physics Education Research Conference, Rochester, New York, July 25, 2001.

139. Laura McCullough and David E. Meltzer, ***Differences in Male/Female Response Patterns on Alternative-Format Versions of FCI Items***, poster presentation at the 2001 Physics Education Research Conference, Rochester, New York, July 25, 2001.

140. Kandiah Manivannan and David E. Meltzer, ***Use of In-class Physics Demonstrations in Highly Interactive Format***, poster presentation at the 2001 Physics Education Research Conference, Rochester, New York, July 25, 2001.

2000

141. David E. Meltzer, ***Relationship Between Mathematics Preparation and Conceptual Learning Gains***, poster presentation at the 2000 Physics Education Research Conference, Guelph, Ontario, Canada, August 2, 2000.

1999

142. David E. Meltzer and Thomas J. Greenbowe, ***Development of Active-Learning Curricular Materials in Thermodynamics for Physics and Chemistry*** (Miller Faculty Fellowship Project), poster presentation at the Iowa State University Faculty Forum, Ames, Iowa, November 15, 1999.

143. David E. Meltzer, ***Addressing Learning Difficulties with Circuits: An "Aufbau" Approach***, poster presentation at the 1999 Physics Education Research Conference, San Antonio, Texas, August 7, 1999.

144. Jack A. Dostal and David E. Meltzer, ***Investigating Student Difficulties with Concepts of Gravitation, or: "Do You Understand the Gravity of this Situation?,"*** poster presentation at the 1999 Physics Education Research Conference, San Antonio, Texas, August 7, 1999.

1998

145. David E. Meltzer, **"Hidden Variables" in Conceptual Diagnostic Pretest Data?**, poster presentation at the 1998 Physics Education Research Conference, Lincoln, Nebraska, August 1, 1998.

146. David E. Meltzer, ***Creating an Active-Learning Environment in Large-Enrollment Physics Classes***, poster presentation at the conference on "Shaping the Future of Undergraduate Science, Math, Engineering, and Technology Education," sponsored by the National Science Foundation, Lincoln, Nebraska, May 28-30, 1998.

1997

147. David E. Meltzer, Kandiah Manivannan, and Tina Tassara, ***Effectiveness of a Microcomputer-based Laboratory Environment for Teaching Force and Motion in an Elementary Physics Course***, poster presentation at the 1997 Physics Education Research Conference, Denver, Colorado, August 9, 1997.

1996

148. David E. Meltzer and Kandiah Manivannan, ***Promoting Student-Faculty Interactivity and Active Student Participation in the Physics Classroom***, poster presentation at the Project Kaleidoscope Workshop "Revitalizing Introductory Physics," Baton Rouge, Louisiana, November 15-17, 1996.

149. David E. Meltzer, ***Nontraditional Approach to Algebra-based General Physics***, poster presentation at the International Conference on Undergraduate Physics Education, College Park, Maryland, August 1, 1996.

150. Kandiah Manivannan and David E. Meltzer, ***Increasing Active Student Participation in the Classroom through the use of "Flash Cards,"*** poster presentation at the International Conference on Undergraduate Physics Education, College Park, Maryland, August 1, 1996.

1985

151. David E. Meltzer and Kevin S. Bedell, ***Spin Waves in Fermi Liquids***, poster presentation at the Gordon Research Conference on Spin Polarized Quantum Systems, Antrim, New Hampshire, July 1985.

CONTRIBUTED WORKSHOPS

International and National

2000

1. David E. Meltzer and Kandiah Manivannan, ***Interactive Methods for Large Classes***, Workshop W11, sponsored by the Committee on Research in Physics Education, at the 2000 Summer Meeting of the American Association of Physics Teachers, Guelph, Ontario, Canada, July 29, 2000.

1999

2. David E. Meltzer and Kandiah Manivannan, ***Interactive Methods for Large Classes***, Workshop W04, sponsored by the Committee on Research in Physics Education, at the 1999 Summer Meeting of the American Association of Physics Teachers, San Antonio, Texas, August 3, 1999.

1998

3. David E. Meltzer and Kandiah Manivannan, ***Interactive Methods for Large Classes***, Workshop W29, sponsored by the Committee on Research in Physics Education, at the 1998 Winter Meeting of the American Association of Physics Teachers, New Orleans, Louisiana, January 4, 1998.
4. David E. Meltzer and Kandiah Manivannan, ***Interactive Methods for Large Classes***, Workshop W36, sponsored by the Committee on Research in Physics Education, at the 1998 Summer Meeting of the American Association of Physics Teachers, Lincoln, Nebraska, August 4, 1998.

Regional and Local

2003

5. David E. Meltzer, (assisted by Ngoc-Loan Nguyen, Larry Engelhardt, and Warren Christensen), ***Learning Through Guided Inquiry***, Iowa State University Center for Teaching Excellence Workshop, Ames, Iowa, February 19, 2003.
6. David E. Meltzer, ***Large-Class Strategies***, Iowa State University Center for Teaching Excellence Workshop, Ames, Iowa, April 17, 2003.

1999

7. David E. Meltzer and Jack Dostal, ***Research on Learning Difficulties in Physics and Curriculum Development to Address Them***, Hands-On Workshop at the 1999 Iowa Science Teachers Section Fall Conference, Des Moines, Iowa, October 14, 1999

1996

8. David E. Meltzer and Kandiah Manivannan, ***Promoting Student-Faculty Interactivity and Active Student Participation in the Classroom***, at the Fourth Annual Southeastern Louisiana University Faculty Development Conference, Hammond, Louisiana, June 13, 1996.

OTHER PRESENTATIONS: Popular and Professional Audiences, and Outreach

1. ***Remembrance of Jerome and Rohwer: Memories of Japanese American Internment in World War II Arkansas***, Walter Imahara and David Meltzer, Live Online Virtual Presentation [Legacies and Lunch], Central Arkansas Library System, December 1, 2021: https://www.youtube.com/watch?v=UOeTL1_Bzys
2. ***Optics and Lenses***, two interactive lecture classes to general physics class (LBS 272) at the Lyman Briggs School, Michigan State University, East Lansing, Michigan, March 24, 2006.
3. ***CTE Teaching Scholar 2002-2003***, presentation to Advisory Board of the ISU Center for Teaching Excellence, Ames, Iowa, December 5, 2002.
4. ***Use Printed Flash Cards to Obtain Instantaneous Responses from Entire Class***, presentation at ISU Center for Teaching Excellence Faculty Forum, "Teaching: Sharing Ideas and Strategies," Ames, Iowa, September 17, 2002.
5. ***Physics of Rocket Flight***, two lecture/demonstrations presented at Alpha Phi Omega workshop on Space Exploration Merit Badge, Ames, Iowa, November 10, 2001.
6. ***Electricity and Electrical Interactions***, interactive presentation to teachers at 20 Iowa public schools (simultaneously) via the Iowa Communications Network, Ames, Iowa, October 16, 2001.

REPORT

David E. Meltzer, Lillian C. McDermott, Paula R. L. Heron, Edward F. Redish, and Robert J. Beichner, ***A Call to the AAPT Executive Board and Publications Committee to Expand Publication of Physics Education Research Articles within the American Journal of Physics***, report to the American Association of Physics Teachers, revised December 29, 2003.

III. TEACHING AND MENTORING

New course created at Arizona State University

SCN 250, Physical Science by Inquiry (4 credits; General Studies: SQ; first incorporated as permanent course listing in ASU catalog 2014-2015). This is the only 4-credit SQ course at ASU that is entirely laboratory-based (no separate lectures). Targeted at both education and liberal arts students, this course involves students in interactive group work and is focused on both qualitative and quantitative understanding, developed through hands-on investigations with simple apparatus.

Courses taught at Arizona State University

1. COE 504, Learning and Instruction (Fall 2008)
2. SED 533, Improving Instruction in Secondary Schools (Fall 2008)
3. BIO 480, Methods of Teaching Biology (Spring 2009; Fall 2011; Spring 2012; Fall 2012)
4. BIO 482, Advanced Methods of Teaching Biology (Spring 2012; Spring 2013)
5. PHY 321, Vectors Mechanics and Vibration (Fall 2009)
6. EED 529, Science in the Elementary School (Fall 2009)
7. PHY 101, Introduction to Physics (Spring 2010; Spring 2014; Fall 2017; Spring 2018; Fall 2018; Spring 2019; Fall 2019; Spring 2020; Fall 2020; Spring 2021)
8. PHY 101, Introduction to Physics Laboratory (Spring 2010)
9. SCN 294, Physical Science by Inquiry (Spring 2011; Fall 2011)
10. SED 482, Science Teaching Methods for Secondary Schools (Spring 2011)
11. PHY 121, University Physics I: Mechanics (Fall 2012; Spring 2013; Fall 2013)
12. PHY 121, Recitation for University Physics I: Mechanics (Fall 2012; Fall 2013)
13. PHY 131, University Physics II: Electricity and Magnetism (Fall 2013)
14. PHY 131, Recitation for University Physics II: Electricity and Magnetism (Fall 2013)
15. EED 411, Science in Elementary Schools (Fall 2014)
16. SED 593, Applied Project (Fall 2014; Spring 2017)
17. DCI 593, Applied Project (Spring 2015; Fall 2015)
18. SCN 250, Physical Science by Inquiry (Spring 2015; Spring 2016)
19. COE 501, Introduction to Research and Evaluation in Education (Fall 2015; Fall 2016)
20. PHY 111, General Physics [I] (Fall 2017; Fall 2018; Fall 2019; Fall 2020; Fall 2021 [2 sections])
21. PHY 112, General Physics [II] (Spring 2018; Spring 2019; Spring 2020; Spring 2021)

Course taught at the University of Colorado

Co-developer and co-instructor (with Valerie K. Otero) of Education 8175, Advanced Topics in Science Education [History of Physics Education in the United States] (Fall 2012)

Course taught at the University of Washington

Physics 224, Thermal Physics (Winter 2006)

Courses taught at Iowa State University (1998-2005)

1. LAS 111, Elementary Physical Science (taught twice, once as co-instructor)
2. Physics 111, General Physics I (taught one recitation section)
3. Physics 112, General Physics II (taught five times)
4. Physics 304, Thermal Physics (taught Fall 2003; Fall 2004)
   Text*:* Sears and Salinger*, Thermodynamics, Kinetic Theory, and Statistical Thermodynamics, 3rd ed.;* Schroeder, *An Introduction to Thermal Physics*
5. Physics 311T, Intermediate Laboratory [for students preparing for high-school teaching] (taught four times)
6. Physics 399, Seminar on Secondary School Physics (taught eight times)
7. Physics 490, Independent Study [undergraduate] (taught Summer 2001; Spring 2004)
8. Physics 501, Oral Communication of Physics Seminar (taught three times as co-instructor)
9. Physics 590D, Special Topics, Physics (taught Fall 2002; Summer 2003)
10. Physics 599, Creative Component (taught Spring 2002; Spring 2004)
11. Physics 699, Research (taught thirteen times)

Courses taught before Fall 1998

(All except #1, #2, and #3 at Southeastern Louisiana University)

1. Elementary Mathematics *(taught twice)* [Downstate Medical Center, Brooklyn, NY]
2. Introduction to Physical Science *(taught twice)* [Santa Fe Community College (Gainesville) and Lake City Community College, Florida]
   Text: Faughn, *Physical Science*
3. Physics with Calculus B [University of Florida, Gainesville; Summer 1991]
   Text: Wolfson and Pasachoff, *Physics Extended with Modern Physics*
4. Dimensional Analysis [Introduction to Physics] *(taught twice)*
   Text: Cole, *So You Want to Take Physics: A Preparatory Course with Algebra and Trigonometry*
5. Elementary Physics *(taught four times)*
   Text: Hewitt, *Conceptual Physics, 7th ed.*
6. Elementary Physics Laboratory *(taught four times)*
   Text: Sokoloff and Thornton, *Tools for Scientific Thinking*
7. General Physics [Algebra-based]: Mechanics, Heat, and Sound
   Text: Cutnell and Johnson, *Physics, 2nd ed.*
8. General Physics [Algebra-based]: Electricity and Magnetism, Light *(taught five times)*
   Text: Bueche and Jerde, *Principles of Physics, 6th ed.*
   Meltzer and Manivannan*, Workbook for Introductory Physics.*
9. General Physics with Calculus: Mechanics *(taught four times)*
   Texts: Serway, *Physics for Scientists and Engineers, 3rd ed.*
   Wolfson and Pasachoff*, Physics Extended with Modern Physics*
10. General Physics with Calculus: Electricity and Magnetism, and Optics *(taught three times)*
    Texts: Serway, *Physics for Scientists and Engineers, 3rd ed.*

11. General Physics Laboratory: Mechanics and Thermodynamics [for algebra-based physics course] *(taught eight times)*
12. General Physics Laboratory: Mechanics and Thermodynamics [for calculus-based physics course] *(taught three times)*
13. General Physics Laboratory: Electricity and Magnetism [for algebra-based physics course] *(taught ten times)*
14. General Physics Laboratory: Electricity and Magnetism [for calculus-based physics course] *(taught three times)*
15. Electricity and Magnetism [junior-level course] *(taught four times)*
    Text: Griffiths, *Introduction to Electrodynamics, 2nd ed.*
16. Electricity and Magnetism Theory Lab [discussion and problem solving, junor-level] *(taught twice)*
    Texts: Davis and Snider, *Introduction to Vector Analysis, 6th ed.*
    Griffiths, *Introduction to Electrodynamics, 2nd ed.*
17. Electromagnetic Wave Theory *(taught twice)*
    Text: Griffiths, *Introduction to Electrodynamics, 2nd ed.*
18. Intermediate Mechanics
    Texts: Marion and Thornton, *Classical Dynamics of Particles and Systems, 3rd ed.*
    Symon, *Mechanics, 3rd ed.*
19. Vibratory Motion [with Lagrangian and Hamiltonian Mechanics]
    Text: Marion and Thornton, *Classical Dynamics of Particles and Systems, 3rd ed.*
20. Thermodynamics *(taught twice)*
    Text: Sears and Salinger, *Thermodynamics, Kinetic Theory, and Statistical Thermodynamics, 3rd ed.*
21. Mathematical Physics
    Texts: Boas, *Mathematical Methods in the Physical Sciences, 2nd ed.*
    Arfken, *Mathematical Methods for Physicists, 3rd ed.*
22. Atomic and Nuclear Physics
    Text: Blatt, *Modern Physics*
23. Modern Physics I [Senior-level Quantum Mechanics, first semester]
    Text: Morrison, *Understanding Quantum Physics: A User's Manual*
24. Modern Physics II [Senior-level Quantum Mechanics, second semester]
    Texts: Morrison, *Understanding Quantum Physics: A User's Manual*
    Morrison, Estle, and Lane, *Understanding More Quantum Physics*
25. Statistical Mechanics
    Text: Reif, *Fundamentals of Statistical and Thermal Physics*

Ph.D. Student

Warren Michael Christensen, Doctor of Philosophy in Physics, Iowa State University, August 4, 2007 (Co-Major Professor: Craig A. Ogilvie). Thesis title: *An Investigation of Student Thinking Regarding Calorimetry, Entropy, and the Second Law of Thermodynamics*. Current position: Associate Professor of Physics, North Dakota State University, Fargo, ND.

M.S. Students *(all at Iowa State University, Ames, Iowa)*

1. Jack Alan Dostal, Master of Science in Physics, May 6, 2005. Thesis title: *Student Concepts of Gravity*. Current position: Associate Teaching Professor, Department of Physics, Wake Forest University, Winston-Salem, North Carolina.
2. Ngoc-Loan Pham Nguyen, Master of Science in Physics, August 9, 2003.
3. Tina Marie Fanetti, Master of Science in Astrophysics, May 4, 2001 (Co-Major Professor: Lee Anne Willson). Thesis title: *The Relationships of Scale Concepts on College Age Students' Misconceptions about the Cause of the Lunar Phases*.

Graduate Research Assistant Directed

Cody Camren, Arizona State University, Fulton School of Engineering: Analysis of mathematics students' performance on calculus diagnostic exams, 2016.

Graduate Research Assistant Supervised

1. Nievita Bueno Watts, Arizona State University, project on teaching and learning of electromagnetism in middle-school science, 2010-2011.
2. Risto T. Leinonen (University of Joensuu, Finland), research on learning of thermal physics (supervised during 6-month visit to Arizona State University: January-June, 2009)

Undergraduate Research Directed

1. John D. Byrd, Arizona State University, Exploring the origins of physics student misconceptions and weakness in mathematics (Barrett Honors College, Honors Thesis), 2021.
2. Dakota H. King, Arizona State University, Investigating and addressing students' mathematical difficulties in introductory physics, four presentations at national professional conferences, 2017-2019.
3. Matthew I. Jones, Arizona State University: Investigating and addressing students' mathematical difficulties in introductory physics (Barrett Honors College, Honors Thesis), 2016; one presentation at national professional conference (2017).
4. Nathan T. Kurtz, Iowa State University, bibliographic research project in thermodynamics, 2001-2003.
5. Eleanor Sayre (Raulerson), Grinnell College (IA) physics major; thermodynamics curriculum development project, 2001-2002. Currently Associate Professor of Physics, Kansas State University, Manhattan, Kansas.

6. Tina Tassara, Southeastern Louisiana University, ***A Student's Perspective on an Inquiry-based Physics Course***, presentation at the 1998 Winter Meeting of the American Association of Physics Teachers, New Orleans, Louisiana, January 7, 1998 [*AAPT Announcer* **27 (4)**, 131 (1997)]. Currently private-school teacher in Hammond, Louisiana.

Graduate Student Committee Membership (Non-Chairman)

[at Iowa State University]

1. Maria Oehler, Department of Zoology and Genetics; M.S., May 5, 2000.
2. Han-Chin Liu, Department of Curriculum and Instruction; M.S., August 10, 2002.
3. Bruna Irene Grimberg, Department of Curriculum and Instruction; M.S., May 9, 2003.
4. Kimberly Nyles-Roque, Department of Curriculum and Instruction, Ph.D. candidate
5. Beth M. Zavala, Department of Curriculum and Instruction, M.S., August 9, 2008.

Graduate Advising *[All except #1 at Iowa State University]*

1. Risto T. Leinonen, U. of Joensuu, Finland [hosted during six-month visit to U.S., 2009]
2. Warren M. Christensen [Ph.D., 2007]
3. Jack A. Dostal [M.S., 2005]
4. Larry P. Engelhardt
5. Tina M. Fanetti [M.S., 2001]
6. Katherine L. McCarey
7. Ngoc-Loan P. Nguyen [M.S., 2003]
8. David A. Oesper
9. Kevin P. Osgerby
10. John R. Upah

Postdoctoral Researchers Supervised

Bruna Irene Grimberg, Iowa State University, thermodynamics project and multiple representations project, Spring 2002-Fall 2003.

Undergraduate Advising

At Southeastern Louisiana University

Advisor to six undergraduate physics/physics education majors, all of whom received B.S. degrees, 1991-1998

At Iowa State University

Advisor to 48 undergraduate physics majors, 1998-2005

Supervised two undergraduate teaching assistants, 1999-2001

IV. SERVICE

University

At Arizona State University

1. Member, Academic Senate Curriculum and Academic Programs Committee (CAPC), 2009-2010.
2. Member, Secondary Science Teacher Education Program Planning Committee, 2009-2010.
3. Member, University-wide Secondary Education Program Alignment Working Group, 2009.
4. Member, Elementary Science Teacher Education Curriculum Planning Group, 2009

At Iowa State University

1. Member of Teacher Education Accreditation Council (TEAC) Committee, formed to help prepare ISU Teacher Education program to seek national accreditation; 2002-2004.
2. Member of Provost's ad-hoc committee to discuss enhancement of student learning, Spring 2000.
3. Member of committee organized by Provost to review and make recommendations on report on Teacher Preparation by American Council on Education; meetings with Provost on January 25 and February 15, 2000; meeting with Provost and President on April 3, 2000.
4. Member, grant planning committee, College of Education NSF proposal on Teacher Preparation, May 1999
5. Member, grant planning committee, Department of Chemistry-College of Education NSF proposal on Teacher Preparation, April 1999.

At Southeastern Louisiana University

1. Member of University Safety Committee, 1995-1996.
2. Member, grant proposal writing team, College of Education proposal to the NSF Teacher Preparation program, 1993.
3. Appointed by SLU President as one of five faculty representatives to serve on the University-wide Academic Planning Committee.
4. Member of faculty committee focused on math-science education reform ("Faculty on Reform and Collaborative Efforts"), formed to meet with and advise the SLU President.

College

At Arizona State University

1. Member, Faculty Sabbatical Review Committee, College of Integrative Sciences and Arts, Polytechnic Science and Math, 2021.
2. Member, Physics Instructor Search Committee, College of Integrative Sciences and Arts, Polytechnic Science and Math, 2021.
3. Member, Science Education Faculty Search Committee, Mary Lou Fulton Teachers College, 2013-2014
4. Co-Chair, Mathematics/Science Education Faculty Search Committee, Mary Lou Fulton Teachers College, 2010-2011
5. Member, Academic Specializations Task Force, College of Teacher Education and Leadership, 2009-2010
6. Member, Content Maximization Working Group, College of Teacher Education and Leadership, 2009
7. Member, Academic Policy and Programs Committee, School of Educational Innnovation and Teacher Preparation, 2008-2009.

At Iowa State University

1. Licensure Coordinator for Secondary Teacher Education, College of Liberal Arts and Sciences, fields of (i) General Science, (ii) Physical Sciences and (iii) Physics; 1999-2005.
2. Member, Anatomy and Physiology Education Faculty Search Committee, Department of Zoology and Genetics, Fall 1999 – Spring 2000.

Departmental

At Iowa State University

1. Advisor for freshman and sophomore physics majors, 1998-2005.
2. Advisor for undergraduate physics majors planning on high-school teaching careers, 1999-2005.
3. Member of Introductory Course Committee, 2002-2004.
4. Participant in orientation for new graduate students and leader, guided recitation practice: 1999-2004.
5. Member of Physics 221-222 textbook committee: Spring 2000, Spring 2003.
6. Member of Graduate Recruitment and Admissions Committee, 2002-2003.

7. Member of Teaching Committee that interviewed candidates for faculty positions: 2002; 2003.
8. Advisor for Incoming (undergraduate) Student Orientation, 1999-2003.
9. Faculty Advisor, ISU Physics and Astronomy Club, 1999-2003.
10. Member of Physics-Engineering Liaison Committee, Spring 2002.
11. Member of Instructional Resources Committee, 1998-2001.
12. Member of Ph.D. Qualifying Exam Committee (Classical Exam), Spring 2000.
13. Faculty Advisor, ISU Physics and Astronomy Club Field Trip to Yerkes Observatory (Williams Bay, Wisconsin) and Adler Planetarium (Chicago, Illinois), October 23-24, 1999.

At Southeastern Louisiana University

1. Member of faculty search committee to hire tenure-track Assistant Professor of Physics, Fall 1997.
2. Academic advisor for physics majors, 1992-1997.
3. Chair of faculty search committee to hire tenure-track Assistant Professor of Physics from over 170 applicants, Fall 1996.
4. Member of search committee to fill position of Head of Department of Chemistry and Physics, March-April 1995.
5. Member and coordinator of three-person faculty search committee that hired three tenure-track Assistant Professors of Physics from among 300 applicants (including the person who has become the present Dean of the College of Science and Technology), May-July 1994.
6. Member of departmental committees dealing with tenure and promotion, summer teaching policies, major field assessment, departmental newsletter, and advanced placement exam credit.

External

National

Consulting

1. Senior Consultant, National Task Force on Teacher Education in Physics [joint project of AIP/APS/AAPT: 2008-2012. http://www.phystec.org/webdocs/TaskForce.cfm
2. Assessment Consultant to PhysTEC (Physics Teacher Education Coalition): 2007-2011. http://www.phystec.org/webdocs/PastPeople.cfm
3. Consultant to Arizona State University Modeling Workshops, Tempe, Arizona, [Host: Prof. David Hestenes, Department of Physics and Astronomy], June 18-26, 2000.

National Professional Committees

4. Member, American Physical Society Forum on Education [FEd] Nominating Committee, 2017.
5. Member, Committee on Graduate Education in Physics, American Association of Physics Teachers, January 2011-January 2014.
6. General Member-At-Large, American Physical Society Forum on Education [FEd] (one of 12 voting members of FEd Executive Committee), 2005-2008.
7. Member, Physics Education Research Election Organizing Committee (PEREOC), 2004. http://www.aapt.org/membership/perlocinfo.cfm
8. Member, Committee on Research in Physics Education, American Association of Physics Teachers, January 2000-December 2002.

Other

2012

9. Member of Physics Focus Group, Science and Mathematics Teacher Imperative, Association of Public and Land-Grant Universities; (http://www.aplu.org/projects-and-initiatives/stem-education/SMTI_Library/APLU-SMTI-Paper-6/file, p. 40).

2009

10. Organizer, Symposium on "Discipline-Based Science Education Research" [Session 180-028], at the 2009 Annual Meeting of the American Association for the Advancement of Science, Chicago, Illinois, February 15, 2009 [http://www.sciencemag.org/cgi/reprint/322/5902/762.pdf, p. 7].
11. Invited presenter, Targeted Sessions on "Building a Research Project from an Anecdote," conference on Foundations and Frontiers of Physics Education Research, Bar Harbor, Maine, June 15 and June 18, 2009. http://perlnet.umaine.edu/~ffper/2009/TargetSession.htm

2007

12. Leader of Working Group, "Non-traditional Methods of Publication in Physics Education Research," conference on Foundations and Frontiers of Physics Education Research, Bar Harbor, Maine, August 6-10, 2007. http://perlnet.umaine.edu/~ffper/2007/WG.htm
13. Invited presenter, Targeted Sessions on "Making Generalizations in the Face of Context Dependence," conference on Foundations and Frontiers of Physics Education Research, Bar Harbor, Maine, August 6 and August 9, 2007. http://perlnet.umaine.edu/~ffper/2007/TargetSession.htm

2006

14. Co-organizer (with P. R. L. Heron and T. J. Greenbowe) of NSF-sponsored cross-disciplinary invited-speaker sessions at 2006 summer meeting of American Association of Physics Teachers (Sessions CI and DJ) and 19th Biennial Conference on Chemical Education (Symposium S46) [Supplementary award of $15,600, May 8, 2006, to DUE-0088840].

2005

15. Co-leader of Working Group [with P. R. L. Heron], "Lobbying for discipline-based education research," conference on Foundations and Frontiers of Physics Education Research, Bar Harbor, Maine, August 15-19, 2005. http://perlnet.umaine.edu/~ffper/2005/WG.htm

2004

16. Invited participant, *Invention and Impact*: Building Excellence in Undergraduate Science, Technology, Engineering and Mathematics (STEM) Education; A Conference of the Course, Curriculum & Laboratory Improvement (CCLI) Program [National Science Foundation], Crystal City, Virginia, April 16-18, 2004.

2003

17. Invited participant, Principal Investigators and Contractors Meeting, Division of Research, Evaluation, and Communication (REC), National Science Foundation, Crystal City, Virginia, October 27-28, 2003.

2002

18. Discussion leader, session on "Student Understanding of Physics Concepts" at the Gordon Research Conference on Physics Research and Education: Quantum Mechanics, Mount Holyoke College, South Hadley, Massachusetts, June 11, 2002.
19. Session Co-Chair and Speaker, "Breakout Session I – Issues related to quantitative methods and data analysis in PER," at the 2002 Physics Education Research Conference, Boise, Idaho, August 8, 2002.
20. Invited instructor, "New Approaches to Meteorology" Education Course for University Faculty, Cooperative Program for Operational Meteorology, Education & Training (COMET), University Corporation for Atmospheric Research, Boulder, Colorado, August 12-15, 2002.

2001

21. Invited member of focus group panel discussion to discuss the algebra-based university physics course, organized by McGraw-Hill Higher Education Division, Rochester, New York, July 21, 2001.

1999

22. Guest Physics Instructor (3^{rd}-4^{th} grade) at the Ricks Center for Gifted Children, University of Denver, Denver, Colorado, May 18-23, 1999.
23. Session Co-Chair and speaker, *Elementary Teacher Education*, at the 1999 Physics Education Research Conference, San Antonio, Texas, August 8, 1999.

1998

24. Instructor, Summer Institute for Pre-college Teachers (*"Physics by Inquiry")*, University of Washington, Seattle, Washington, June-July 1998.
25. Instructor, *Tutorials in Introductory Physics,* University of Washington, Seattle, Washington, June-July, 1998.

1995

26. Invited participant in NSF/Department of Education Invitational Conference on System Reform "Joining Forces: Spreading Successful Strategies," Washington, D. C., February 23-25, 1995.
27. Authored popular article, "The effect of aging on weightlifting ability," published in Weightlifting USA **13 (1)**, 24-25 (1995).

1994

28. Invited participant and contributor to Proceedings at National Science Foundation Teacher Preparation Workshop, Washington, D. C., November 6-8, 1994. Excerpts from invited Commentary Paper are included in the conference review: *Teacher Preparation in Science, Mathematics, Engineering, and Technology: Review and Analysis of the NSF Workshop, November 6-8, 1994*, by Susan B. Millar and Baine B. Alexander (National Institute for Science Education, University of Wisconsin-Madison, March 1996), p. 8 and p. 35.

Regional and Local

2020

1. Lead Instructor for NSF-funded Summer Professional Development project [delivered virtually], "The Physics of Elementary Mathematics," Arizona State University, Mesa, AZ.

2016

2. Judge in Legacy Traditional School Science Fairs, Queen Creek and Gilbert, Arizona, 2013, 2014, and 2016.
3. Co-Lead Instructor for NSF-funded High School project "App Maker Pro (AMP): Motivating STEM Study through App Development," Arizona State University, Mesa, AZ.

2015

4. Co-Lead Instructor for NSF-funded High School project "App Maker Pro (AMP): Motivating STEM Study through App Development," Arizona State University, Mesa, AZ; https://prime.asu.edu/node/49; http://nsf.gov/awardsearch/showAward?AWD_ID=1509105.

2013

5. Science Instructor, 5th and 6th grades: Weekly science classes for all students; ASU Preparatory Academy, Mesa, AZ.

2012

6. Science Instructor, 5th, 6th, 7th, and 8th grades: Weekly science classes for all students; ASU Preparatory Academy, Mesa, AZ.

2011

7. Science Instructor, 5th, 6th, 7th, and 8th grades: Weekly science classes for all students; ASU Preparatory Academy, Mesa, AZ; see http://www.azcentral.com/community/mesa/articles/2011/03/11/20110311mesa-asu-polytechnic-students0311.html

2010

8. Science Instructor, 5th, 6th, 7th, and 8th grades: Weekly science classes for all students; Polytechnic Middle School, Mesa, AZ.

2009

9. Instructor, "Science Wizards" after-school science club (5th/6th grade), Polytechnic Elementary School, Mesa, AZ, January-May 2009. http://community.asu.edu/exchange/2009/10/a-promising-partnership-arizona-state-university-teams-with-university-public-schools-inc/

10. Science Instructor, 5th, 6th, and 7th grades: Weekly science classes for all students; Polytechnic Elementary School, Mesa, AZ.

2002

11. AAPT Section Representative for the Iowa Section, American Association of Physics Teachers, January 2002-2004.

2001

12. Invited panelist for session on *"Predictors of Success: Preparing for College in the High School Curriculum,"* at "Survive AND Thrive: From Senior to Freshman," Articulation Conference sponsored by Regents Committee on Educational Relations and the Division of Community Colleges and Workforce Preparation of the Department of Education, Ames, Iowa, April 30, 2001**.**

2000

13. Vice-President for Universities and Four-Year Colleges, Iowa Section of the American Association of Physics Teachers, 2000-2001.

1999

14. Member of invitational discussion panel, Iowa Department of Education, Des Moines, Iowa, February 4, 1999.

1996

15. Guest teacher at Hammond High School, Hammond, Louisiana; approximately 20 physics classes taught during March-May, 1996.

1993

16. Judge in the Physics Division of the Louisiana Region 8 Science Fair, Hammond, Louisiana (1993-1997).
17. Faculty Intern Participant/Instructor in ***Project Operation Physics***, summer in-service course for elementary and middle-school science teachers, and science class for middle-school students, sponsored by the Louisiana Systemic Initiatives Program and National Science Foundation, Louisiana State University, Baton Rouge, Louisiana, June-July 1993.

REFEREEING, AND SERVICE ON NATIONAL REVIEW PANELS

Reviewer for National Science Foundation

1. Reviewer, 3 grant proposals for Physics Division, National Science Foundation: 2001, 2006.
2. Member of Grant Proposal Review Panels, National Science Foundation, Division of Undergraduate Education
    i. Course, Curriculum, and Laboratory Improvement Program: Arlington, Virginia, July 14-17, 2003.
    ii. Course, Curriculum, and Laboratory Improvement Program: Arlington, Virginia, July 17-20, 2000.
    iii. Course, Curriculum, and Laboratory Improvement Program: Arlington, Virginia, February 11-14, 1999
    iv. Course and Curriculum Development Program: Arlington, Virginia, July 21-24, 1997.

Reviewer for Professional Books and Journals

1. Referee, *Medicine and Science in Sports and Exercise*, 1995.
2. Referee, *Journal of Applied Physiology*, 1997.
3. Referee, *The Physics Teacher* (11 manuscripts, 2001-2021).
4. Referee, *Journal of Geoscience Education*, 2003.
5. Reviewed curricular materials/manuscripts/book prospectus for publishing companies Addison-Wesley (1996), John Wiley (1998; 2001), and W. H. Freeman (1999).
6. Referee, *Proceedings of the Physics Education Research Conference* (nine manuscripts, 2001-2002; 2004; 2006).
7. Referee, *American Journal of Physics*, including the Physics Education Research Supplement/Section (18 manuscripts, 1999-2020).
8. Referee, *Physical Review Physics Education Research* (19 manuscripts, 2006-2021).
9. Referee, *Cognition and Instruction*, 2006.
10. Referee, *Journal of Research in Science Teaching*, 2007.
11. Reviewer, *Proceedings of NSF-ASA STEM Conference* (two manuscripts, 2007).
12. Referee, *Science & Education* (two manuscripts, 2013-2014).
13. Reviewer, *Recruiting and Educating Future Physics Teachers: Case Studies and Effective Practices,* edited by C. Sandifer and E. Brewe (American Physical Society, College Park, MD, 2015), 2013-2014
14. Referee, *Eurasia Journal of Mathematics, Science & Technology Education*, 2016.
15. Referee, *Physical Review X*, 2017
16. Referee, *European Journal of Physics* (two manuscripts, 2017-2018).
17. Reviewer, *Mastering Science Content for Middle School Teaching and the NES General Science Exam*, edited by Peter Rillero and Samantha Eddis (Independent Variable, 2017), 2017.
18. Referee, *International Journal of STEM Education*, 2018.

External Reviewer for University Ph.D. Committees

1. External reader for Department of Physics, University of Maine, Orono, Maine (Ph.D. dissertation of Brandon Russell Bucy), July-August 2007.
2. External reviewer for University of Joensuu, Joensuu, Finland (Ph.D. dissertation of Antti Savinainen), June 2004.

External Program Evaluation

1. External evaluator for NSF *Streamline to Mastery Phase II* project at University of Colorado, Boulder: 2014-2021 (ongoing).