Rachel E. Scherr

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EDUCATION

University of Washington — **Seattle, Washington**

Ph.D., Physics, 2001.

Dissertation: An investigation of student understanding of basic concepts in special relativity

Supervisors: Lillian C. McDermott and Stamatis Vokos

M.S., Physics, 1996.

Reed College — **Portland, Oregon**

B.A., Physics, 1993.

APPOINTMENTS

University of Washington, Bothell, School of STEM — **Bothell, Washington**

Associate Professor of Physics, School of STEM, September 2024 – present

Assistant Professor of Physics, School of STEM, December 2018 – September 2024

Physical Review Physics Education Research — **College Park, Maryland**

Associate Editor, 2025-present

Support the peer review process for 50-70 submitted manuscripts per year, advise and support manuscript workflow and new initiatives, and represent the journal at scientific meetings and events.

Seattle Pacific University, Department of Physics — **Seattle, Washington**

Senior Research Scientist, Department of Physics, July 2012 – December 2018

Project Director and Research Director, Seattle Pacific University Energy Project, and Affiliate, Physics Department, November 2008 – July 2012

University of Washington, Learning in Informal and Formal Environments (LIFE) Center, — **Seattle, WA**

Visiting Scholar, October 2008 – December 2009

University of Maryland, Department of Physics — **College Park, Maryland**

Research Assistant Professor, Physics Education Research Group, July 2004 – January 2010

Postdoctoral Research Associate, Physics Education Research Group, June 2001 – June 2004

The Evergreen State College — **Olympia, Washington**

Visiting faculty, September 2000 – June 2001

University of Washington — **Seattle, Washington**

Research Assistant, Physics Education Group, December 1996 – September 2000

FUNDED RESEARCH

University of Washington — **Bothell, Washington**

Principal investigator, "Community and resources for effective experimentation-focused introductory physics labs" (NSF DUE, $1M), under review (2024)

Support introductory physics lab instructors to revitalize their labs according to best practices in physics education research, including a design workshop and mentored teams for faculty and staff.

Principal investigator, "International collaboration to design and study a pluralist pedagogy for quantum mechanics" (University of Washington Bothell Scholarship, Research, and Creative Practice Seed Grant, $30K), 2025-2026.

Collaborate internationally with historians and philosophers of science to design and study quantum mechanics education in which learners encounter multiple theories and negotiate shared criteria for the quality of theories.

Co-principal investigator, "Training to elicit and leverage ideas about science (TRELLIS): A learning assistant program to make physics teaching more effective, equitable, and engaging" (NSF DUE 2235744, $300K), 2024-2028

Create a model for better and more equitable university physics instruction through the professional development of undergraduate instructional assistants.

Co-principal investigator, "Changing physics and astronomy education culture: A reflective practice model of faculty development to support diversity, equity, inclusion, and excellence" (NSF DUE 2141769, $2.8M), 2022-2027.

Design and implement a national program of professional development for new physics and astronomy faculty, focused on reflective practice and inclusive teaching.

Senior personnel, "Improving the STEM preparation of K-5 pre-service teachers through a project-based, interdisciplinary approach" (NSF DUE 2111261, $1.8M), 2021-2025.

Diversify the elementary teaching workforce, prepare elementary teachers to teach across the breadth of science disciplines, and connect scientific questions to community decision-making processes that can motivate student learning and take advantage of students' ways of knowing.

Senior personnel, "Institute in research methods for Professional Development for Emerging Education Researchers (PEER) Field Schools" (NSF DRL 2025174, $1M), 2020-2023. [Outside work was reviewed and approved with form 1460]

Teach one-week course in advanced qualitative research methods to build individual and community capacity for high-quality STEM education research.

Principal investigator, "Video lessons to support equity education for university instructional assistants in STEM" (University of Washington Bothell Scholarship, Research, and Creative Practice Seed Grant, $20K), 2021-2022.

Enhance pedagogical instruction for university student instructional assistants by creating video lessons supporting equity education in STEM.

Co-principal investigator, "Investigating how to better prepare undergraduate students for physics labs that focus on experimental science" (NSF DUE 7990619, $500K), 2020-2023.

Investigate how students take up authentic scientific practices and develop skills and mindset for experimental physics, instead of using questionable lab practices to reproduce expected findings.

Principal investigator, "Professional development for teaching and learning about energy and equity in high school physics" (NSF DRL 1936601, $3M), 2019-2025.

Create a model for secondary science teacher professional development centered on understanding energy as a historically and politically situated science concept.

Co-principal investigator, "Research and curriculum development to leverage university student conceptual resources for understanding physics" (NSF DUE 1914572, $2M), 2019-2023.

Identify prevalent conceptual resources that students marshal to reason about physics. Develop and test instructional materials that embed a resources orientation toward student thinking.

Principal investigator, "Understanding centrality and marginalization in undergraduate physics teaching and learning to enhance student persistence and success" (NSF DUE 1760761, $500K), 2018-2021.

Explore the extent to which educational strategies in undergraduate physics classrooms center some students and marginalize others. Identify how educators communicate who is welcome and influential in physics and what characteristics are valued and necessary for success in physics.

Co-principal investigator, "A bridge to physics and astronomy doctorates for students with financial need" (NSF DUE 1741863, $4M), 2018-2023; "Cal-Bridge: A California bridge to astronomy and physics PhDs for California State University and community college students" (NSF DUE 1356133, $730K), 2014-2018

Evaluate efforts to create a supported pathway for California State University physics students from underrepresented groups to enter University of California graduate programs.

Principal investigator, "Identifying best practices for inclusive physics learning environments" (NSF DUE 1611318, $300K), 2016-2019.

Identify best practices for supporting underrepresented groups in physics departments. Learn what physics faculty know, believe, and value that could support them in creating inclusive learning environments.

Co-principal investigator, "University student conceptual resources for understanding physics" (NSF DUE 1608510, $155K), 2016-2019.

Identify prevalent conceptual resources that students marshal to reason about physics. Develop instructional materials that embed a resources orientation toward student thinking.

Seattle Pacific University **Seattle, Washington**

Principal investigator, "Video resource for professional development of university physics educators" (NSF DRL 1323699, $396K), 2013-2018.

Create and disseminate *Periscope*, a set of materials for university physics educator development based on compelling classroom video of best-practices university physics instruction. http://physport.org/periscope

Co-principal investigator, "Focus on energy: Preparing elementary teachers to meet the NGSS challenge" (NSF DRL 1418211, $518K), 2014-2018.

Develop and investigate a professional development program for elementary teachers to learn about energy and capitalize on students' productive ideas.

Senior personnel, "Assessing, validating, and developing content knowledge for teaching energy" (NSF DRL 1222777, $821K), 2012-2016.

Develop and validate a set of coherent measures of content knowledge for teaching energy in physics. Support and evaluate teachers through professional development.

Principal investigator, "Video resource for learning assistant development" (PhysTEC, $25K), 2011-2013.

Create a set of thematic video-based workshops that highlight key issues in physics teaching and learning, to serve as a resource for the development of learning assistants.

Co-principal investigator, "Honing diagnostic practice: Toward a new model of teacher professional preparation and development" (NSF DRL 0822342, $3.7M), 2008-2013.

Conduct qualitative research of effective teaching and learning of energy topics. Investigate the evolution of teachers' establishment of a diagnostic learning environment in the science classroom.

Director, Energy Project Summer Research Institute, 2010-2011.
Director, Interdisciplinary Research Institute in STEM Education, 2012-2013.

Lead a multi-institution team of researcher-videographers in documenting professional development courses. Develop collaborations to study conceptual and pedagogical understanding of energy, learning theories, and assessment practices.

University of Maryland, Department of Physics **College Park, Maryland**

Principal investigator, "Technological and educational foundations for understanding and improving large-classroom learning" (NSF IIS 0835394, $80K), 2009-2012.

Conduct qualitative research to investigate the relationship between student behaviors and student views of knowledge and learning in lecture classrooms. Apply the results of small-scale analysis to validate large-scale computer-vision algorithms for automatic recognition of types of behavior.

Principal investigator, "Open-source physics tutorial worksheets with faculty/TA development and implementation resources" (NSF CCLI 0715567, $260K), 2007-2009.

Develop open-source, modifiable physics tutorials focused on both conceptual and epistemological development, linked to annotated video clips of students working on the tutorials in small groups.

Principal investigator, "Developing conceptual and teaching expertise in physics graduate students: An integrated approach" (NSF REC 0529482, $210K), 2006-2009.

Conduct basic research into the teaching practices and epistemologies of physics graduate teaching assistants in collaborative active-learning instructional environments.

Project director and co-principal investigator, "Toward a new conceptualization of what constitutes progress in learning physics, K-16" (NSF REC 0440113, $800K), 2005-2008.

Re-conceptualize what is important for productive scientific thinking based on video case studies, construction of cognitive models, and development and application of a theoretically-grounded, empirically supported organizing framework.

Co-principal investigator, "Helping students learn how to learn: Open-source physics worksheets integrated with TA development resources" (NSF CCLI 0341447, $405K), 2004-2007.

Develop open-source, modifiable physics tutorials focused on both conceptual and epistemological development, linked to annotated video clips of students working on the tutorials in small groups.

Senior personnel, "Learning How to Learn Science: Physics for Bioscience Majors" (NSF REC 0087519, $1M), 2001-2005.

Study college physics students' attitudes, expectations, and epistemologies and demonstrate that they can improve in a large course. Modify existing best-practice materials for introductory university physics to promote epistemological as well as conceptual development.

Senior personnel, "Case Studies of Elementary Student Inquiry in Physical Science" (NSF ESI 9986846, $1M), 2004-2005.

Develop a volume of written and video case studies as material to promote teachers' substantive investigation of student inquiry in physics..

University of Washington, Department of Physics **Seattle, Washington**

Research assistant, "A new model for physics education in physics departments: Improving the teaching of physics from elementary through graduate school" (NSF DUE 9354501, $2.3M), 1996-2001.

Direct and conduct investigations of student understanding of topics in physics. Develop curriculum to address specific student difficulties. Design and perform studies to assess the effectiveness of these materials with university students.

Awardee, National Science Foundation Graduate Research Fellowship, 1995-1997.

TEACHING EXPERIENCE

University of Washington Bothell, School of STEM **Bothell, Washington**

Instructor, BPHYS 117-118 and 121-122-123, Au 2019 – present. Introductory physics labs.

Instructor, BPHYS 121 and 122, Au 2019 – Sp 2024. Introductory calculus-based physics.

Instructor, BPHYS 493/498, Au 2020 – present. Physics pedagogy for instructional assistants.

Instructor, BPHYS 499, Su 2019 – present. Special topics: Research in physics education.

Instructor, BEDUC 491, Wi 2021, Wi 2024. Science methods course for physics teacher candidates.

Instructor, BPHYS 498 & ST MATH 498, Su 2019, Wi 2020, Sp 2024. Special and general relativity.

University of Washington, Department of Physics **Seattle, Washington**

Co-instructor, Essential Readings in Physics Education Research, Spring 2016.

Create and teach a seminar in physics education research to introduce participants to the shared cultural touchstones of the field, including how PER relates to other key disciplinary perspectives.

Seattle Pacific University, Department of Physics **Seattle, Washington**

Instructor, Energy for Secondary Teachers, Summers 2013-2015.

Create and teach a 60-hour summer professional development course for secondary teachers on the teaching and learning of energy, focused on energy conservation, tracking, and degradation; mechanisms of energy transfer and transformation; and representation development.

Instituto Tecnológico de Monterrey, Department of Physics **Monterrey, Mexico**

Instructor, Special Course in Qualitative Research, Spring 2011.

Create and teach a three-day course for faculty, graduate students, and high school teachers, on the theory and practice of interaction analysis as applied to the study of physics learning.

University of Maryland, Department of Physics **College Park, Maryland**

Laboratory and tutorial instructor, Fundamentals of Physics (PHYS 121-122), Fall 2006-Spring 2007; coinstructor, Fall 2002-Spring 2006.

Supervise the laboratory/tutorial portion of a two-semester course in general physics treating the fields of mechanics, heat, sound, electricity, magnetism, optics, and modern physics. Conduct professional development for graduate teaching assistants who are the direct instructors.

Instructor, Graduate seminar in teaching physics, Fall 2006-2007; co-instructor, Fall 2001-2003.

Lead a weekly seminar designed to support and improve the teaching done by graduate teaching assistants in the physics department. Required for all departmental TAs in their first year.

Instructor, Special Problems in Advanced Physics: Physics Education Research for University Teaching (PHYS 798T), Spring 2004.

Create and teach a course for graduate students in physics education research on conducting research and applying the results of such research to classroom teaching.

Instructor, Seminar in Teaching College Physics (PHYS 708), Fall 2002 and 2003.

Lead weekly seminar in current topics in physics education research.

The Evergreen State College **Olympia, Washington**

Visiting faculty, 2000-2001.

Team-teach full-time interdisciplinary programs that include physics, education research, and other subjects including substantial composition experience. Modify research-based physics instructional materials for use with liberal arts students.

University of Washington, Department of Physics **Seattle, Washington**

Lead teaching assistant for Department of Physics, 1998-2000.

Assist in leading weekly graduate teaching seminar for first-year graduate students, post-docs, and undergraduates. Assist faculty in administration of introductory calculus-based course. Assist in departmental and university-wide orientation programs for new TAs.

Head teaching assistant, 1995-2000.

Instruct in tutorial sections, traditional laboratories, and physics study center. Develop, modify, and assess instructional materials used in tutorials and lectures, including exam questions. Supervise teaching assistants in tutorial sections and grading.

Instructor, NSF Summer Institute for K-12 Teachers in Physics and Physical Science, 1995-1999.

Instruct in laboratory-based course to prepare K-12 teachers to teach physics and physical science using the *Physics by Inquiry* curriculum, as part of a team of instructors.

Reed College, Department of Physics **Portland, Oregon**

Lab instructor, September 1992 - May 1993.

Assist with first implementation of *Real Time Physics* in introductory laboratories. Instruct in both traditional and modified laboratories. Modify traditional lab manual.

The Exploratorium **San Francisco, California**

Explainer, Summer 1988 and 1989; Machine shop assistant, Summer 1990.

Oversee activity on the exhibit floor. Serve as a guide and facilitator, initiating contact with visitors to enrich museum experience. Perform scientific demonstrations and engage visitors in exhibits.

CONSULTING EXPERIENCE

American Physical Society **College Park, Maryland**

Facilitator, "Physics and Astronomy Faculty Teaching Institute," jointly offered by American Physical Society and American Association of Physics Teachers, 2020-2024. [2022: Outside work was reviewed and approved with form 1460. 2023: Outside work was reviewed and it was determined that form 1460 was not required.]

Teach a national program of professional development for new physics and astronomy faculty.

Mathematical Association of America **Bangor, Maine**

Instructor, "Improving the preparation of graduate students to teach undergraduate mathematics" (NSF DUE 1432381, $1.1M), 2014-2021. [Outside work was reviewed and it was determined that form 1460 was not required]

Support and mentor university faculty to design teacher assistant professional development programs at their home institution.

American Physical Society **College Park, Maryland**

Evaluator and researcher, "APS Bridge Program" (NSF HRD 1143070, $3M), 2008-2019. [Outside work was reviewed and it was determined that form 1460 was not required]

Offer an independent perspective on the extent to which program is increasing the fraction of physics PhDs awarded to students from underrepresented groups. Conduct research to document physics graduate admissions practices that are designed to increase the number of women and minorities admitted to doctoral programs.

Evaluator, "Inclusive Graduate Education Network" (NSF INCLUDES 1649297, $300K), 2016-2018.

Evaluate efforts to create a national network of physics graduate programs and faculty that take responsibility for reducing gender and racial/ethnic inequalities by building knowledge and practice about effective recruitment, admissions, and retention of underrepresented groups.

Evaluator, "Physics Teacher Education Coalition" (NSF PHY 0808790, $6M) 2009-2018.

Develop evaluation tools for assessing the extent to which physics teacher education programs have the features that support production of large numbers of highly qualified secondary physics teachers.

Evaluator, "Professional Skills Development Workshops" (NSF PHY 1419913, $412K), 2014-2018.

Study the extent to which workshops offered by APS provide women physicists with effective negotiation and communication skills.

Researcher, "Joint Task Force on Undergraduate Physics Preparation" American Physical Society and American Association of Physics Teachers, 2015.

Interview past physics majors who now hold positions in industry, business, the military, and other non-academic professions, as well as their hiring managers, to learn how physics departments may best prepare physics majors for diverse careers.

Sustainability consultant and Formative Assessment Consultant, "Physics Teacher Education Coalition" (NSF PHY 0808790, $6M), 2009-2014.

Observe which teacher education programs at PhysTEC legacy sites have been sustained over the years since funding and determine the mechanisms by which they have been sustained. Obtain feedback from all PhysTEC sites on specific PhysTEC processes and interactions.

Researcher, "Committee on Minorities," 2013.

Interview past APS Minority Scholars to determine the extent to which the Minority Scholars program made a difference for underrepresented minority students in obtaining physics degrees.

University of Colorado **Boulder, Colorado**

Evaluator, "Towards a Center for STEM Education" (NSF DRL 0833364, $1M), 2008-2012.

Explore the potential for establishing a Center for STEM Education by observing departmental and university cultures and practices that may support or constrain the establishment of a future Center. Determine the extent to which stakeholders share the vision and feel value added by the project.

Florida International University **Miami, Florida**

Evaluator, "Center for High Energy Physics Research and Education" (NSF PHY 0802184, $5M), 2008-2012.

Evaluate physics course transformation, learning assistants, physics education research, and teacher professional development as components of an integrated program of research, cyberinfrastructure, and education and outreach.

Evaluator, "HHMI Faculty Scholars Program," (HHMI, $800,000), 2010-2015.

Evaluate a program to support course transformation and faculty development through small faculty grants and mentorship.

PUBLICATIONS

In preparation/under review

- A. Alesandrini, S. Engblom, L. Goodhew, and R. E. Scherr, "Learning assistants' resources for understanding instruction that centers student ideas," in preparation for Phys. Rev. Phys. Educ. Res. (2025)
- T. Huynh, A. D. Robertson, L. C. Bauman, and R. E. Scherr, "Identity and power in physics teachers' discourse about equity," under review with Phys. Rev. Phys. Educ. Res. (2024)

Peer-reviewed publications

1. K. Gray and R. E. Scherr, "Values reflected in energy-related physics concepts," Phys. Teach. 63 (2024) ** Editor's Pick*
2. I. Descamps, S. Jeon, N. G. Holmes, R. E. Scherr, and D. Hammer, "Dynamics of productive confirmation framing in an introductory lab," Phys. Rev. PER 20, 020111 (2024)
3. S. Chasteen, E. Prather, and R. E. Scherr, "Embracing interactive teaching methods," Physics Today 77 (4) 30-36 (2024)

A. R. Daane, L. Wells, R. E. Scherr, and B. W. Harrer, "Energietheater: Eine verkörperte, kollaborative Lernaktivität zur Erforschung von Energie," Plus Lucis (1), 29034 (2023)

4. R. E. Scherr and N. G. Holmes, "Quantifying uncertainty and distinguishing data sets in introductory physics," CourseSource 10 (2023)
5. M. K. Rodriguez Wimberly, A. L. Rudolph, C. Hood, R. E. Scherr, and C. Pfund, "A model of mentorship for students in historically underrepresented groups in physics and astronomy," Understanding Interventions 14(2), (2023)
6. S. Wheeler and R. E. Scherr, "ChatGPT reflects student misconceptions in physics," 2023 Physics Education Research Conference Proceedings, edited by Q. Ryan, D. Jones, and A. Pawl (AIP, College Park, MD, 2021) ** PERC Notable Paper*
7. R. E. Scherr, W. Tali Hairston, S. B. McKagan, and S. Miller, "Centering and marginalization in introductory university physics classrooms," Front. Educ. 8, 964699 (2023)
8. M. Sundstrom, R. Fussell, A. M. Phillips, M. Akubo, R. E. Scherr, and N. G. Holmes, "Instructing nontraditional physics labs: Toward responsiveness in student epistemic framing," Phys. Rev. PER 19, 020140 (2023)
9. R. E. Scherr, T. Huynh, W. T. Hairston, and K. Gray, "A framework for integrating energy and equity in high school physics instruction," The Physics Teacher 61(7), (2023)
10. N. Paul-Schultz, R. E. Scherr, and K. Gray, "Connecting energy and electricity instruction to local environmental justice issues," The Physics Teacher 61(6), (2023) ** Featured article*
11. I. Descamps, S. Jeon, R. E. Scherr, and D. Hammer, "Complex dynamics of epistemic agency in a college physics lab course," Proceedings of the International Conference of Learning Sciences (2023)
12. M. German, R. E. Scherr, and J. Hernandez, "Connecting the science of water to students' communities," The Science Teacher 90(6) (2023)

13. R. E. Scherr, L. Seeley, and K. Gray, "Energy learning in its material and social context: Power plants," The Physics Teacher 61(6), (2023) ** Featured Article*
14. T. Huynh, L. Bauman, A. D. Robertson, and R. E. Scherr, "Physics teachers' conceptions of equity: Access and achievement," Front. Educ. 8, 1-11 (2023)
15. A. D. Robertson, T. Huynh, C. Mathis, L. C. Bauman, and R. E. Scherr, "Teacher learning about the integration of energy and equity: A case study," Phys. Rev. PER 19, 010136 (2023)
16. A. Boudreaux, S. Vokos, and R. E. Scherr, "Research on student learning of foundational concepts in Galilean and relativistic kinematics: the role of operational definitions," International Handbook of Physics Education Research 1(1), M. F. Tasar and P. R. L. Heron, eds. (2022)
17. J. Hernandez, J. Skiba, M. German, R. E. Scherr, T. Huynh, and M. Araya, "Exploring sociopolitical landscapes in physics education," Sustainability and Climate Change 15(4) (2022)
18. T. Huynh, K. Gray, L. C. Bauman, R. E. Scherr, J. Hernandez, and L. Seeley, "Physics teachers integrating social justice with science content," 2022 Physics Education Research Conference Proceedings, pp. 249-254; edited by B. W. Frank, D. Jones, and Q. Ryan (AIP, College Park, MD, 2022)
19. M. Sundstrom, R. Fussell, R. E. Scherr, and N. G. Holmes, "Students' varying responses to instructor prompts for frame shifts in physics labs," 2022 Physics Education Research Conference Proceedings, p. 451-456; edited by B. W. Frank, D. Jones, and Q. Ryan (AIP, College Park, MD, 2022)
20. J. Hernandez, R. E. Scherr, M. German, and R. Horowitz, "Place-based education in high school science: Situating energy and climate change in students' communities," Sustainability and Climate Change 15(1) (2022)
21. J. Hernandez, A. D. Robertson, and R. E. Scherr, "Redefining energy justice in physics classrooms," Env. Justice 15(2) (2022) *** Rosalind Franklin Society Special Award in Science*
22. A. D. Robertson, L. M. Goodhew, R. E. Scherr, and P. R. L. Heron, "Impetus-force-like drawings may be less common than you think," The Physics Teacher 60, 254 (2022)
23. A. D. Robertson, L. M. Goodhew, P. R. L. Heron, and R. E. Scherr, "Impetus-like reasoning as continuous with Newtonian physics," The Physics Teacher 59, 185 (2021)
24. T. Huynh, L. Bauman, A. D. Robertson, and R. E. Scherr, "Physics teachers' framings of the relationship between equity and antiracism," 2021 Physics Education Research Conference Proceedings, pp. 191-196; edited by M. Bennett, B. W. Frank, and R. E. Vieyra (AIP, College Park, MD, 2021) ** PERC Notable Paper*
25. L. M. Goodhew, A. D. Robertson, P. R. L. Heron, and R. E. Scherr, "Students' context-sensitive use of conceptual resources: A pattern across different styles of question about mechanical waves," Phys. Rev. PER 17, 010137 (2021)
26. A. D. Robertson, L. M. Goodhew, R. E. Scherr, and P. R. L. Heron, "University student conceptual resources for understanding forces," Phys. Rev. PER 17, 010121 (2021)
27. R. E. Scherr, M. A. Lopez, and M. Rosario-Franco, "Isolation and connectedness among Black and Latinx physics graduate students," Phys. Rev. PER 16, 020132 (2020)
28. R. E. Scherr, W. Tali Hairston, and S. B. McKagan, "Centering and marginalization in introductory university physics classrooms," 2020 Physics Education Research Conference Proceedings, edited by S. F. Wolf, M. B. Bennett, and B. W. Frank (AIP, College Park, MD, 2020)
29. R. E. Scherr, S. V. Chasteen, and M. Plisch, "Initial findings of the Physics Teacher Education Program Analysis Rubric: What do thriving physics teacher education programs do?" Phys. Rev. PER 16, 010116 (2020)
30. S. V. Chasteen, R. E. Scherr, and M. Plisch, "Developing the Physics Teacher Education Program Analysis Rubric: Measuring features of thriving programs," Phys. Rev. PER 15, 010115 (2020)
31. L. M. Goodhew, A. D. Robertson, P. R. L. Heron, and R. E. Scherr, "Student conceptual resources for understanding mechanical wave propagation," Phys. Rev. PER 15, 020127 (2019) ** Editor's Suggestion*

32. A. D. Robertson, L. M. Goodhew, P. R. L. Heron, and R. E. Scherr, "Pulses as not-objects: Student responses to a new question about the superposition of mechanical waves," Phys. Educ. 54(5) (2019)
33. K. Gray, S. Vokos, M. C. Wittmann, and R. E. Scherr, "Drawings of energy: Evidence of the NGSS model of energy in diagrams," Phys. Rev. PER 15, 010129 (2019)
34. R. E. Scherr and S. V. Chasteen, "Development and validation of the Physics Teacher Education Program Analysis (PTEPA) Rubric," 2018 Physics Education Research Conference, edited by A. Traxler, Y. Cao, and S. Wolf (AIP, College Park, MD, 2019)
35. L. M. Goodhew, A. D. Robertson, P. R. L. Heron, and R. E. Scherr, "Examining the productiveness of students' conceptual resources over the course of a problem-solving interview," 2018 Physics Education Research Conference, edited by A. Traxler, Y. Cao, and S. Wolf (AIP, College Park, MD, 2019)
36. A. D. Robertson, W. Tali Hairston, and R. E. Scherr, "Belonging, success, access, and disruption: Physics faculty goals for inclusive learning environments," 2018 Physics Education Research Conference, edited by A. Traxler, Y. Cao, and S. Wolf (AIP, College Park, MD, 2019)
37. L. Conlin and R. E. Scherr, "Making space to sensemake: Epistemic distancing in small group physics discussions," Cog. and Instr. 36(4), 401-428 (2018)
38. A. R. Daane, J. Haglund, A. D. Robertson, H. G. Close, and R. E. Scherr, "The pedagogical value of conceptual metaphor for secondary science teachers," Sci. Educ. 102(5), 1051-1076 (2018)
39. A. D. Robertson, S. B. McKagan, and R. E. Scherr, "Selection, generalization, and theories of cause in case-oriented physics education research: Connecting paradigms and practices," Reviews in PER 2(5), 1-46 (2018).
40. L. M. Goodhew, A. D. Robertson, P. R. L. Heron, and R. E. Scherr, "Student conceptual resources for understanding wave propagation," 2017 Physics Education Research Conference, edited by L. Ding, A. Traxler, and Y. Cao, 148-151 (AIP, College Park, MD, 2018)
41. A. D. Robertson, L. M. Goodhew, R. E. Scherr, and P. R. L. Heron, "University student conceptual resources for understanding forces," 2017 Physics Education Research Conference, edited by L. Ding, A. Traxler, and Y. Cao, 332-335 (AIP, College Park, MD, 2018)
42. R. E Scherr and R. M. Goertzen, "Periscope: Looking into learning in best-practices physics classrooms," Phys. Teach. 56, 100-103 (2018)
43. R. E. Scherr, M. Plisch, K. Gray, G. Potvin, and T. Hodapp, "Fixed and growth mindsets in physics graduate admissions," Phys. Rev. PER 13 020133 1-12 (2017) ** Editor's Suggestion*
44. R. E Scherr and A. D. Robertson, "Unveiling privilege to broaden participation in physics," Phys. Teach. 55 394-397 (2017)
45. R. E. Scherr, M. Plisch, and R. M. Goertzen, "Sustaining PhysTEC programs in physics teacher education," Phys. Rev. PER 13 010111 1-16 (2017)
46. A. D. Robertson, R. E. Scherr, L. M. Goodhew, A. R. Daane, K. Gray, and L. B. Aker, "Identifying content knowledge for teaching energy: Examples from high school physics," Phys. Rev. PER 13 010105 1-14 (2017)
47. K. Gray and R. E Scherr, "Drawing energy: Evidence of Next Generation Science Standards for energy in diagrams," 2016 Physics Education Research Conference, edited by A. D. Churukian, D. Jones, and L. Ding, 128-131 (AIP, College Park, MD, 2016)
48. R. E Scherr and P. R. L. Heron, "Education metaphors we live by," 2016 Physics Education Research Conference, edited by A. D. Churukian, D. Jones, and L. Ding, 316-319 (AIP, College Park, MD, 2016)
49. L. Tucker, R. E. Scherr, T. Zickler, and E. Mazur, "Exclusively visual analysis of classroom group interactions," Phys. Rev. PER 12, 020142 1-9 (2016)

50. R. E Scherr, M. Plisch, and R. M. Goertzen, "Physics teacher production: Patterns of institutional engagement and faculty theories," 2015 Physics Education Research Conference, edited by A. D. Churukian, D. Jones, and L. Ding, 303-306 (AIP, College Park, MD, 2015)
51. R. E. Scherr, B. W. Harrer, A. R. Daane, H. G. Close, A. R. Robertson. L. Seeley, and S. Vokos, "Energy Tracking Diagrams," Phys. Teach. 54, 96-102 (2015)
52. R. E. Scherr and R. M. Goertzen, "Periscope: Supporting novice university physics instructors in looking into learning in best-practices physics classrooms," in Effective Practices in Preservice Physics Teacher Education: Recruitment, Retention, and Preparation, E. Brewe and C. Sandifer (Eds.), Washington DC: American Institute of Physics (2015)
53. R. E. Scherr and A. D. Robertson, "Productivity of 'collisions generate heat' for reconciling an energy model with mechanistic reasoning: A case study," Phys. Rev. – Spec. Topics: PER 11, 010111 1-16 (2015)
54. A. R. Daane, S. B. McKagan, S. Vokos, and R. E. Scherr, "Energy conservation in dissipative processes: Teacher expectations and strategies associated with imperceptible thermal energy," Phys. Rev. – Spec. Topics: PER 11, 010109 1-15 (2015)
55. H. G. Close and R. E. Scherr, "Enacting conceptual metaphor through blending: Learning activities embodying the substance metaphor for energy," Int. J. Sci. Educ. 37(5-6), (2015)
56. A. R. Daane, S. Vokos, and R. E. Scherr, "Goals for teacher learning about energy degradation and usefulness," Phys. Rev. – Spec. Topics: PER 10, 020111 1-16 (2014)
57. A. R. Daane, L. Wells, and R. E. Scherr, "Energy Theater," Phys. Teach. 52, 291-294 (2014)
58. R. E. Scherr, H. G. Close, E. W. Close, V. J. Flood, S. B. McKagan, A. D. Robertson, L. Seeley, M. C. Wittmann, and S. Vokos, "Negotiating energy dynamics through embodied action in a materially structured environment," Phys. Rev. – Spec. Topics: PER 9, 020105 1-18 (2013) ** Editor's Suggestion*
59. A. Alvarado, A. R. Daane, R. E. Scherr, & G. Zavala (2013). "Responsiveness among peers leads to productive disciplinary engagement," in 2013 Physics Education Research Conference, edited by P. V. Englehardt, A. D. Churukian, and D. L. Jones (AIP, Portland, OR, 2013)
60. R. E. Scherr, A. D. Robertson, L. Seeley, and S. Vokos, "Content knowledge for teaching energy: An example from middle-school physical science," C. Singh, M. Sabella, and Englehardt (Eds.), AIP Conf. Proc. 1513, 114-117 (2013 Physics Education Research Conference)
61. A. R. Daane, S. Vokos, and R. E. Scherr, "Learner Understanding of Energy Degradation," in 2013 Physics Education Research Conference, edited by P.V. Englehardt, A.D. Churukian, and D L. Jones. (AIP, Portland, OR 2013)
62. R. E. Scherr, H. G. Close, S. B. McKagan, and S. Vokos, "Representing energy. I. Representing a substance ontology for energy," Phys. Rev. – Spec. Topics: PER 8(2), 020114 1-11 (2012)
63. R. E. Scherr, H. G. Close, E. W. Close, and S. Vokos, "Representing energy. II. Energy tracking representations," Phys. Rev. – Spec. Topics: PER 8(2), 020115 1-11 (2012)
64. B. W. Frank and R. E. Scherr, "Interactional processes for stabilizing conceptual coherences in physics," Phys. Rev. – Spec. Topics: PER 8(2), 020101 1-9 (2012)
65. A. R. Daane, S. Vokos, and R.E. Scherr, "Conserving energy in physics and society: Creating an integrated model of energy and the second law of thermodynamics," AIP Conf. Proc. 1513, 114-117 (2012 Physics Education Research Conference)
66. R. E. Scherr, H. G. Close, and S. B. McKagan, "Intuitive ontologies for energy in physics," C. Singh, M. Sabella, and Englehardt (Eds.), AIP Conf. Proc. 1413, 343-346 (2011 Physics Education Research Conference) – Finalist for 2011 PERC Paper Award
67. H. G. Close and R. E. Scherr, "Differentiation of energy concepts through speech and gesture in interaction," C. Singh, M. Sabella, and Englehardt (Eds.), AIP Conf. Proc. 1413, 151-154 (2011 Physics Education Research Conference)

68. B. W. Harrer, R. E. Scherr, M. C. Wittmann, H. G. Close, and B. W. Frank, "Elements of formative assessment in learners' discourse about energy," C. Singh, M. Sabella, and Englehardt (Eds.), AIP Conf. Proc. 1413, 203-206 (2011 Physics Education Research Conference)
69. S. B. McKagan, R. E. Scherr, E. W. Close, and H. G. Close, "Criteria for creating and categorizing forms of energy," C. Singh, M. Sabella, and Englehardt (Eds.), AIP Conf. Proc. 1413, 279-282 (2011 Physics Education Research Conference)
70. R. E. Scherr, H. G. Close, and S. B. McKagan, "Promoting proximal formative assessment with relational discourse," C. Singh, M. Sabella, and Englehardt (Eds.), AIP Conf. Proc. 1413, 347-350 (2011 Physics Education Research Conference)
71. E. W. Close, R. E. Scherr, H. G. Close, and S. B. McKagan, "Development of proximal formative assessment skills in video-based teacher professional development," C. Singh, M. Sabella, and Englehardt (Eds.), AIP Conf. Proc. 1413, 19-22 (2011 Physics Education Research Conference)
72. R. E. Scherr, H. G. Close, S. B. McKagan, and E. W. Close, "'Energy Theater': Using the body symbolically to understand energy," C. Singh, M. Sabella, and S. Rebello (Eds.), AIP Conf. Proc. 1289, 293-296 (2010 Physics Education Research Conference)
73. E. C. Kahle, R. E. Scherr, and H. G. Close, "An evolving model for seeing colored objects; A case study progression," C. Singh, M. Sabella, and S. Rebello (Eds.), AIP Conf. Proc. 1289, 185-188 (2010 Physics Education Research Conference)
74. H. G. Close, L. S. DeWater, E. W. Close, R. E. Scherr, and S. B. McKagan, "Using the Algebra Project method to regiment discourse in an energy course for teachers," C. Singh, M. Sabella, and S. Rebello (Eds.), AIP Conf. Proc. 1289, 9-12 (2010 Physics Education Research Conference)
75. E. W. Close, H. G. Close, S. B. McKagan, and R. E. Scherr, "Energy in action: The construction of ideas in multiple modes," C. Singh, M. Sabella, and S. Rebello (Eds.), AIP Conf. Proc. 1289, 105-108 (2010 Physics Education Research Conference)
76. R. E. Scherr and H. G. Close, "Transformative professional development: Cultivating concern with others' thinking as the root of teacher identity," Proceedings of the International Conference of the Learning Sciences (2010)
77. R. M. Goertzen, R. E. Scherr, and A. Elby, "Respecting TAs' beliefs and experiences: A case study of a physics teaching assistant," Phys. Rev. – Spec. Topics: PER 6(020125), 1-11 (2010)
78. R. M. Goertzen, R. E. Scherr, and A. Elby, "Tutorial TAs in the classroom: Similar teaching behaviors are supported by varied beliefs about teaching and learning," Phys. Rev. – Spec. Topics: PER 6(010105), 1-15 (2010)
79. R. M. Goertzen, R. E. Scherr, and A. Elby, "Accounting for tutorial teaching assistants' buy-in to reform instruction," Phys. Rev. – Spec. Topics: PER 5(020109), 1-20 (2009)
80. R. E. Scherr, "Video analysis for insight and coding: Examples from tutorials in introductory physics," Phys. Rev. – Spec. Topics: PER 5(020106), 1-10 (2009)
81. R. E. Scherr and D. Hammer, "Student behavior and epistemological framing: Examples from collaborative active-learning activities in physics," Cog. & Instr. 27(2), 147–174 (2009)
82. D. Hammer, R. S. Russ, R. E. Scherr, and J. Mikeska, "Identifying inquiry and conceptualizing students' abilities," in R.A. Duschl and R.E. Grandy (Eds.), Teaching scientific inquiry: Recommendations for research and application (Sense Publishers, Rotterdam, NL), 138-156 (2008)
83. R. M. Goertzen, R. E. Scherr, and A. Elby, "Indicators of understanding: What TAs listen for in student responses," in C. Henderson, M. Sabella, and L. Hsu (Eds.), AIP Conf. Proc. 1064, 119-122 (2008 Physics Education Research Conference)
84. R. S. Russ, R. E. Scherr, D. Hammer, and J. Mikeska, "Recognizing mechanistic reasoning in scientific inquiry: A framework for discourse analysis developed from philosophy of science," Sci. Educ. 92(3), 499-425 (2008)

85. R. E. Scherr, "Gesture analysis for physics education researchers," Phys. Rev. – Spec. Topics: PER 4(010101), 1-9 (2008)
86. L. D. Conlin, A. Gupta, R. E. Scherr, and D. Hammer, "The dynamics of students' behaviors and reasoning during collaborative physics tutorial sessions," in L. Hsu, C. Henderson, and L. McCullough (Eds.), AIP Conf. Proc. 951, 69-72 (2007 Physics Education Research Conference)
87. R. E. Scherr, "Modeling student thinking: An example from special relativity," Am. J. Phys. 70(3), 272-280 (2007)
88. R. E. Scherr and A. Elby, "Enabling informed adaptation: Open-source physics worksheets integrated with implementation resources," in P. R. L. Heron, L. McCullough, and J. Marx (Eds.), AIP Conf. Proc. 883, 46-49 (2006 Physics Education Research Conference)
89. R. E. Scherr, R. S. Russ, T. J. Bing, and R. A. Hodges, "Initiation of student-TA interactions in tutorials," Phys. Rev. – Spec. Topics: PER 2, 020108-020116 (2006)
90. E. F. Redish, R. E. Scherr, and J. Tuminaro, "Reverse-engineering the solution of a 'simple' physics problem: Why learning physics is harder than it looks," Phys. Teach. 44, 293-300 (2006)
91. R. E. Scherr and E. F. Redish, "Newton's zeroth law: Learning from listening to our students," Phys. Teach. 43, 41-45 (2005)
92. D. Hammer, A. Elby, R. E. Scherr, and E. F. Redish, "Resources, framing, and transfer," in J. P. Mestre (Ed.), Transfer of learning: Research and perspectives (IAP, Greenwich, CT) (2005)
93. R. E. Scherr, "An implementation of Physics by Inquiry in a large-enrollment class," Phys. Teach. 41(2), 113-118 (2003)
94. R. E. Scherr, "Gestures as evidence of student thinking in physics," in J. Marx, K. Cummings, and S. Franklin (Eds.), AIP Conf. Proc. 720, 61-64 (2003 Physics Education Research Conference)
95. M. C. Wittmann and R. E. Scherr, "Student epistemological stance constraining researcher access to student thinking: An example from an interview on charge flow," in S. Franklin, K. Cummings, and J. Marx (Eds.), Physics Education Research Conference Proceedings 2002
96. R. E. Scherr, P. S. Shaffer, and S. Vokos, "The challenge of changing deeply-held student beliefs about the relativity of simultaneity," Am. J. Phys. 70(12), 1238-1248 (2002)
97. R. E. Scherr and M. C. Wittmann, "The challenge of listening: The effect of researcher agenda on data collection and interpretation," in S. Franklin, K. Cummings, and J. Marx (Eds.), Physics Education Research Conference Proceedings 2002
98. R. E. Scherr, P. S. Shaffer, and S. Vokos, "Student understanding of time in special relativity: Simultaneity and reference frames," Phys. Educ. Res., Am. J. Phys. Suppl. 69, S24-S35 (2001)

Instructional resources

99. R. E. Scherr and R. M. Goertzen, Periscope: Looking into learning in best practices university physics classrooms. www.physport.org/periscope, released 2015
100. A. Elby, R. E. Scherr, T. McCaskey, R. Hodges, E. F. Redish, D. Hammer, & T. Bing, Maryland Open Source Tutorials in Physics Sensemaking: Suite I (2007). R. E. Scherr, A. Elby, R. M. Goertzen, & L. D. Conlin, Open Source Tutorials in Physics Sensemaking: Suite II (2010). www.spu.edu/depts/physics/tcp/tadevelopment.asp
101. Contributions to Physics by Inquiry, L. C. McDermott and the Physics Education Group at the University of Washington (John Wiley and Sons, Inc., New York, 1996)
102. Contributions to Tutorials in Introductory Physics, L. C. McDermott, P. S. Shaffer, and the Physics Education Group at the University of Washington (Prentice-Hall, Upper Saddle River, NJ, 1998)

Books and other publications

103. S. V. Chasteen, R. E. Scherr, and M. Plisch, "A study of thriving physics teacher education programs: Development of the Physics Teacher Education Program Analysis (PTEPA) Rubric" (American Physical Society, College Park, MD, 2018)

104. R. E. Scherr, "Physics faculty mindsets in graduate admissions," APS Forum on Education Newsletter (Fall 2018)
105. D. Robertson, R. E. Scherr, and D. Hammer, Eds., "Responsive Teaching in Science and Mathematics," Routledge Press (2015)
106. R. E. Scherr, M. Plisch, and R. M. Goertzen, "Sustaining programs in physics teacher education: A study of PhysTEC supported sites" (American Physical Society, College Park, MD, 2014)
107. R. E. Scherr, "What keeps girls from studying physics and STEM," opinion piece for The Seattle Times (September 14, 2014)
108. R. E. Scherr, "Tackling energy head on," Physics World (August 2014)
109. R. E. Scherr and R. M. Goertzen, "Periscope: Looking into learning in best-practices physics classrooms," APS Forum on Education Newsletter (Spring 2014)
110. M. C. Wittmann, P. R. L. Heron, and R. E. Scherr, "Overview of the Foundations and Frontiers in Physics Education Research Conference," APS Forum on Education Newsletter (Fall 2005)

SELECTED PRESENTATIONS

Conf of the European Science Educ. Research Association, August 2025. **Copenhagen, Denmark**

(Symposium talk) "Pluralism-oriented pedagogy: An example from spacetime physics," J. Steeger and R. E. Scherr.

APS Global Physics Summit, March 2025. **Los Angeles, California**

(Contributed talk) "Teaching theory-building in physics," R. E. Scherr and J. Steeger.

(Contributed poster) "How do physics concepts harm and heal?" R. E. Scherr and J. Steeger.

(Contributed talk) "Pluralism-oriented pedagogy: An example from spacetime physics," J. Steeger and R. E. Scherr

AAPT Winter National Meeting, January 2025. **Washington, District of Columbia**

(Contributed talk) "Studying iterations of physics teachers' professional learning: Uncovering design principles to support the integration of equity in physics instruction," H. Lakhani, K. Gray, and R. E. Scherr.

Philosophy of Science Association Biennial Meeting, November 2024. **New Orleans, Louisiana**

(Contributed poster) "Liberation in and through physics pedagogy," R. E. Scherr and J. Steeger.

APS April Meeting, April 2024. **Sacramento, California**

(Invited) "Energy in its material and social context: Power plants," R. E. Scherr, L. Seeley, and K. Gray.

Conf of the European Science Education Research Association, August 2023. **Cappadocia, Turkey**

(Invited) "Research on student learning of foundational concepts in Galilean and relativistic kinematics: The role of operational definitions," S. Vokos, A. Boudreaux, and R. E. Scherr.

Conference for Undergraduate Women in Physics, January 2023. **Seattle, Washington**

(Invited workshop) "Applying to physics graduate school," R. E. Scherr.

International Learning Assistant Conference, November 2022. **Boulder, Colorado**

(Invited workshop) "What belongs in your pedagogy course?" R. E. Scherr, L. Goodhew, and V. Otero.

AAPT Summer National Meeting, July 2022. **Grand Rapids, Michigan**

(Invited) "Inviting undergraduates into the art and science of teaching," R. E. Scherr.

(Contributed) "Physics teachers integrating social justice with science content," T. Huynh, K. Gray, L. C. Bauman, R. E. Scherr, J. Hernandez, and L. Seeley.

(Contributed) "Place-based education in high school physical science," M. German, R. E. Scherr, and J. Hernandez.

(Contributed) "Engaging students in energy learning by practicing community decision-making," V. Augustine, J. Hernandez, and R. E. Scherr.

International Learning Assistant Conference, October 2021 **Virtual**

(Workshop) "No wrong ideas: Supporting learning assistants to see the science in students' thinking," R. E. Scherr and L. M. Goodhew

AAPT Summer National Meeting, July 2021. **Virtual**

(Contributed) "Toward more dyslexic-friendly physics teaching," R. E. Scherr and J. H. Scherr.

Physics Teacher Education Coalition Annual Meeting, March 2021 **Virtual**

(Workshop) "Periscope: Looking into learning in best-practices physics classes," R. E. Scherr.

AAPT Summer National Meeting, July 2020. **Virtual**

(Workshop) "Periscope: Looking into learning in best-practices physics classes," R. E. Scherr.

Physics Teacher Education Coalition Annual Meeting, March 2020. **Denver, Colorado**

(Workshop) "Periscope: Looking into learning in best-practices physics classes," R. E. Scherr.

Gordon Research Seminar, June 2018. **Smithfield, Rhode Island**

(Keynote) "Approaches to energy instruction and education research," R. E. Scherr.

APS Northwest Section Annual Meeting, June 2018. **Tacoma, Washington**

Pacific Northwest Assoc. for College Physics Annual Meeting, April 2018. **Bothell, Washington**

(Invited) "Physics faculty mindsets in graduate admissions," R. E. Scherr, M. Plisch, K. E. Gray, G. Potvin, and T. Hodapp.

APS National Meeting, April 2018. **Columbus, Ohio**

(Invited) "Fixed and growth mindsets in graduate admissions," R. E. Scherr, M. Plisch, K. E. Gray, G. Potvin, and T. Hodapp.

AAPT Summer National Meeting, July 2017. **Cincinnati, Ohio**

(Invited) "Fixed and growth mindsets in graduate admissions," R. E. Scherr, M. Plisch, K. E. Gray, G. Potvin, and T. Hodapp.

(Invited) "Physics faculty knowledge and beliefs about equity and inclusion," R. E. Scherr, A. D. Robertson, W. T. Hairston, S. B. McKagan, and A. R. Daane.

Foundations and Frontiers of Physics Education Research, June 2017. **Bar Harbor, Maine**

(Contributed poster) "Fixed and growth mindsets in graduate admissions," R. E. Scherr, M. Plisch, K. E. Gray, G. Potvin, and T. Hodapp.

Gordon Research Conference, June 2016. **Newport, Rhode Island**

(Invited) "Special relativity: Learners' ideas about time and space, and researchers' ideas about learning," R. E. Scherr.

AAPT Summer National Meeting, July 2015. **College Park, Maryland**

(Contributed) "Periscope: Looking into learning in best-practices physics classrooms," R. E. Scherr and R. M. Goertzen.

PhysTEC Conference, February 2015. **Seattle, Washington**

AAPT Summer National Meeting, July 2014. **Minneapolis, Minnesota**

AAPT Winter National Meeting, January 2014. **Orlando, Florida**

APS National Meeting, April 2014. **Savannah, Georgia**

(Invited) "Sustaining programs in physics teacher education," R. E. Scherr, M. Plisch, and R. M. Goertzen.

European Science Education Research Association, September 2013. **Nicosia, Cyprus**

(Invited) "Understanding energy with a social embodied learning activity," R. E. Scherr, H. G. Close, A. R. Daane, and S. Vokos.

AAPT Winter National Meeting, January 2013. **New Orleans, Louisiana**

(Invited) "Piagetian and ethnographic influences in physics education research," R. E. Scherr.

Foundations and Frontiers of PER – Puget Sound, June 2012. **Diablo, Washington**

(Invited) "One physics education researcher's foundations and frontiers: Piaget and ethnography," R. E. Scherr.

APS March Meeting, April 2012. **Atlanta, Georgia**

(Contributed) "Preparing learning assistants for university instruction and beyond," R. E. Scherr.

AAPT Winter National Meeting, February 2012. **Ontario, California**

(Contributed) "Representing energy transfers and transfomations," R. E. Scherr, H. G. Close. L. Seeley, and S. B. McKagan.

(Contributed) "Learners' understanding of energy: Conservation of amount, decrease of value," A. R. Daane, L. Seeley, A. D. Robertson, S. Vokos, and R. E. Scherr.

(Contributed) "A conceptual blending theory analysis of Energy Theater," H. G. Close, E. W. Close, R. E. Scherr, and S. B. McKagan.

AAPT Summer National Meeting, August 2011. **Omaha, Nebraska**

(Contributed) "Intuitive ontologies for energy in phyiscs," R. E. Scherr, S. B. McKagan, and H. G. Close.

(Contributed) "Elements of formative assessment in learners' discourse about energy," B. W. Harrer, R. E. Scherr, M. C. Wittmann, H. G. Close, and B. W. Frank.

Foundations and Frontiers of Physics Education Research, June 2011. **Bar Harbor, Maine**

(Plenary) "Student-centered learning, teacher-centered professional development, and scholar-centered research," R. E. Scherr, H. G. Close, and S. B. McKagan.

Congreso de Investigación, Innovación, y Gestión Educativas, May 2011. **Monterrey, Mexico**

(Plenary) "Student behavior and epistemological framing: Examples from collaborative active-learning activities in physics," R. E. Scherr.

Oregon State University Department of Physics, October 2010. **Corvallis, Oregon**

(Colloquium) "Using the body symbolically to understand physics," R. E. Scherr, H. G. Close, E. W. Close, and S. B. McKagan.

AAPT Summer National Meeting, July 2010. **Portland, Oregon**

(Invited) "Thinking about energy with bodies and objects: Cognition as a sensorimotor and material activity," R. E. Scherr, H. G. Close, and S. B. McKagan.

(Invited) "Cultivating concern with others' thinking as the root of teacher identity," H. G. Close and R. E. Scherr.

(Invited) "A new perspective on teaching assistants: Respecting TAs' beliefs and experiences," R. M. Goertzen, R. E. Scherr, and A. Elby.

International Conference of the Learning Sciences, June 2010. **Chicago, Illinois**

(Contributed) "Thinking about energy with bodies and objects: Cognition as a sensorimotor and material activity," H. G. Close and R. E. Scherr.

(Contributed) "Cultivating concern with others' thinking as the root of teacher identity," H. G. Close and R. E. Scherr.

C. Wieman Science Educ. Initiative, Univ of British Columbia, November 2009. **Vancouver, BC**

(Colloquium) "Building partnerships between tutorial reformers and teaching assistants," R. E. Scherr, R. M. Goertzen, and A. Elby.

University of Colorado Physics Education Research Group, August 2009. **Boulder, Colorado**

(Seminar) "Enriching the intellectual life of teachers," H. G. Close and R. E. Scherr.

Foundations and Frontiers of Physics Education Research, June 2009. **Bar Harbor, Maine**

(Invited) "Qualitative analysis of video-recorded interaction," R. E. Scherr.

AERA Annual Meeting, April 2009. **San Diego, California**

(Contributed) "Novice teachers of university classes: Understanding physics graduate teaching assistants," R. E. Scherr, R. M. Goertzen, A. Elby, and D. Hammer.

AAPT Winter National Meeting, February 2009. **Chicago, Illinois**

(Invited) "Preparing perceptive teachers, K-20," R. E. Scherr, R. M. Goertzen, A. Elby, and D. Hammer.

University of Colorado Physics Education Research Group, January 2009. **Boulder, Colorado**

(Seminar) "Informal science talk in tutorials: Challenges for research and instructional design," R. E. Scherr.

International Conference of the Learning Sciences, June 2008. **Utrecht, The Netherlands**

(Contributed) "Student behavior and epistemological framing: Examples from collaborative active-learning activities in physics," R. E. Scherr and D. Hammer.

AAPT Winter National Meeting, January 2008. **Baltimore, Maryland**

(Invited) "Student behavior and epistemological framing: Examples from tutorials," R. E. Scherr and D. Hammer.

(Invited) "Integrating mathematical and physical reasoning: The role of mechanistic explanation," B. W. Frank, R. E. Scherr, and D. Hammer.

New Jersey AAPT Section Meeting, March 2007. **Princeton, New Jersey**

(Invited) "Recognizing valuable student thinking in physics," R. E. Scherr, D. Hammer, A. Elby, and E. F. Redish.

Gordon Conference on Physics Research and Education, June 2006. **S. Hadley, Massachusetts**

(Plenary) "Student resources for problem-solving in electricity and magnetism: Implications of a model of learning," R. E. Scherr.

NARST Annual Meeting, April 2006. **San Francisco, California**

(Contributed) "How do students frame collaborative active learning activities?" R. E. Scherr.

AAPT Summer National Meeting, August 2005. **Sacramento, California**

(Invited) "Resources, framing, and transfer," D. Hammer, A. Elby, R. E. Scherr, and E. F. Redish.

AAPT Winter National Meeting, January 2005. **Syracuse, New York**

(Invited) "Einsteinian thinking among ordinary students: Examples from special relativity," R. E. Scherr.

Gordon Conference on Physics Research and Education, June 2004. **S. Hadley, Massachusetts**

(Plenary) "Properties of student reasoning in special relativity," R. E. Scherr and S. Vokos.

International School of Physics "Enrico Fermi," July 2003. **Varenna, Italy**

(Invited) "Gestures as evidence of student thinking in physics," R. E. Scherr.

AAPT Winter National Meeting, January 2003. **Austin, Texas**

(Invited) "Questioning the questions: Playing with constraints in physics education research," R. E. Scherr.

(Invited) "The challenge of listening: Selective attention in clinical interviews," R. E. Scherr and M. C. Wittmann.

Department of Physics, University of Maine, May 2002. **Orono, Maine**

(Colloquium) "Modeling student reasoning in physics: An example from special relativity," R. E. Scherr.

AAPT Winter National Meeting, January 2002. **Philadelphia, Pennsylvania**

(Invited) "Coordinating theoretical models of student reasoning with evidence: An example from special relativity," R. E. Scherr.

AAPT Summer National Meeting, August 2001. **Rochester, New York**

(Invited) "An implementation of *Physics by Inquiry* in a large-enrollment class," R. E. Scherr.

PROFESSIONAL SERVICE AND DEVELOPMENT

National Science Foundation proposal review panels: 2020, 2022, 2023, 2024 **Virtual**

Review STEM Education proposals to the National Science Foundation.

American Physical Society Northwest Section Meeting, 2024 **Bothell, Washington**

As a member of the Local Organizing Committee, support logistics for regional APS meeting.

College Mathematics Instructor Development Source Summer Workshop, 2021 **Virtual**

Lead the physics-specific strand a multiday summer workshop for university faculty to design and improve the professional development and training they offer to graduate teaching assistants.

Equity Across the Curriculum team, 2020-2021 **Bothell, Washington**

As part of an interdisciplinary team of UWB faculty, shape campus faculty development to increase equity in teaching and learning spaces across campus, using a peer-to-peer model to grow antiracist and liberatory pedagogies across the curriculum.

Physical Sciences Division Search Committee for Assistant Teaching Professor of Physics

Member, 2020; Chair, 2020-2021 **Bothell, Washington**

Lead the design of a hiring process that embraces the advantages of remote-only hiring during the coronavirus pandemic while placing access and equity at the forefront.

Faculty Success Program, 2020-present **Virtual**

Gain skills to increase research and writing productivity while maintaining a healthy work-life balance. Completed training course in 2020; continuous contact with accountability team through the present.

Physics Bachelor of Arts design team, 2019-2020 **Bothell, Washington**

Lead the redesign of the Physics Bachelor of Arts degree to provide the option to obtain a both a physics major and high school teacher certification within four years.

Faculty Learning Community, 2019-2020 **Bothell, Washington**

Organize a group of UWB physics faculty to learn to counter racial microaggressions in the classroom, with instruction from psychology faculty who specialize in this area.

Foundations and Frontiers of Physics Education Research, 2005-2019. **Bar Harbor, Maine**

Co-founder and co-organizer (with P.R.L. Heron and M.C. Wittmann)

Design and plan a conference for specialists who are active researchers in the field of physics education. The week-long residential intensive meeting is the premier forum for examining and articulating the current state of the field and identifying promising avenues for future research.

APS Inclusion, Diversity, and Equity Alliance, 2020-present.

Work in a professional network of physicists to deepen knowledge of research and effective practices, develop or improve strategic plans, learn about theories of change, and plan programs.

APS Education Policy Committee, 2017-2018.

Member, 2017-2018.

***Physical Review Special Topics – Physics Education Research,* 2014-2018.**

Editorial board member, 2015-2018; Guest editor, Focused Collection on Preparing and Supporting University Physics Educators, 2016

APS Topical Group in Physics Education Research, 2013-2017.

Organizing committee, 2013; Vice Chair, 2014; Chair-Elect, 2015; Chair, 2016; Past Chair, 2017

AAPT Physics Education Research Leadership Organizing Council, 2006-2011.

Chair, 2009-2011; Member, 2007-2011; Member ex officio, 2006-2007 (as RiPE chair)

***The Physics Teacher*, 2007-2009.**

Member, Editorial Board

AAPT Research in Physics Education (RiPE) Committee, 2004-2007.

Chair, 2006-2007; Member, 2004-2007

Physics Education Research Conference, 2003-2004.

Co-organizer (with S. Rebello and M.C. Wittmann), 2004; Organizer (with M.C. Wittmann), 2003

Design and plan two-day conference adjoining the Summer National Meeting of the American Association of Physics Teachers, the main annual meeting for physics education researchers.

NSF Summer Institute for Teachers of *CIPS,* August 2002. **San Diego, California**

Participate in a course to prepare middle school teachers to teach physics and physical science using the *Constructing Ideas in Physical Science* curriculum.

Optometry Admissions Test Construction Committee, 2002-2006. **Chicago, Illinois**

Construct and test items for national standardized physics examination.

AWARDS AND FELLOWSHIPS

Univ of Washington Bothell Distinguished Research, Scholarship, and Creative Activities Award, 2021

Recognizing "considerable influence on UW Bothell research communities, distinction in their scholarly field, and significant impact on local, national, and/or global communities."

Fellow of the American Physical Society Physics Teacher Education Coalition, 2019-2020

Cited to recognize and support efforts to enhance high school physics teacher education programs.

Outstanding Referee for the Journals of the American Physical Society, 2019

Lifetime award comparable to Fellowship in the American Physical Society, for exceptional work in the assessment of manuscripts published in the Physical Review journals.

Fellow of the American Physical Society, 2017

Lifetime award by the Topical Group in Physics Education Research "for foundational research into energy learning and representations, application of video analysis methods to study physics classrooms, and physics education research community leadership."

American Physical Society District Advocate of the Year, 2014

Cited for an op-ed about women in STEM for media outlets in the Seattle area, and a faculty letter to Senators Murray and Cantwell on the importance of federal science funding.

Outstanding Teaching Assistant at the University of Washington, 1995 **Seattle, Washington**

American Association of Physics Teachers Outstanding Teaching Assistant

Fellow of the Thomas J. Watson Foundation, 1993-1994 **Worldwide**

Engaged in a year of independent study and travel abroad following college graduation. Directed the construction and presentation of science exhibits at an international school in Botswana. Investigated science museums and other informal science education in south and southeast Asia.

POSTDOCTORAL SCHOLARS

Heena Lakhani, PhD, University of Washington Bothell, 2023-2024; currently Assistant Professor of Education at Florida Gulf Coast University

Jessica Hernandez, PhD, University of Washington Bothell, 2020-2022; currently directing Piña Soul Artisans for Conservation SPC.

Clausell Mathis, PhD, University of Washington Bothell, 2020-2022; currently Assistant Professor in the College of Education at Michigan State University

Trà Huynh, PhD, University of Washington Bothell, 2021-2022; currently Assistant Professor of Physics at Western Washington University

DOCTORAL STUDENTS

Abigail R. Daane, PhD, Seattle Pacific University School of Education, 2015. Professor of Physics at South Seattle College, Seattle, WA.

Benedikt W. Harrer, PhD, University of Maine Department of Physics, 2013. Clinical Associate Professor of Physics at the University of Buffalo, Buffalo, NY.

Renee Michelle Goertzen, PhD, University of Maryland Department of Physics, 2010. Retired; formerly Assistant Director of Programs, American Physical Society, College Park, MD.

Brian W. Frank, PhD, University of Maryland Department of Physics, 2009. Formerly Associate Professor of Physics, Middle Tennessee State University, Murfreesboro, TN; currently faculty at Roland Park Country School, Baltimore, MD.

Rosemary S. Russ, PhD, University of Maryland Department of Physics, 2006. Associate Professor of Science Education, Department of Curriculum and Instruction, University of Wisconsin, Madison, WI.

DOCTORAL COMMITTEE SERVICE

Anne Alesandrini, University of Washington Department of Physics, PhD anticipated 2024.

Elias Euler, PhD, Uppsala University Faculty of Science and Technology, 2020. Research Associate, Colorado School of Mines, Golden, CO.

Lisa Goodhew, PhD, University of Washington Department of Physics, 2020. Assistant Professor of Physics, Seattle Pacific University, Seattle, WA.

Matthew Simon, PhD, Tufts University Department of Education, 2022. Assistant Professor and Program Coordinator Math and Science, Lakes Region Community College, Laconia, NH.

REFERENCES

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