Paula R. L. Heron

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APPOINTMENTS

University of Washington, Department of Physics

Professor	2007 – present
Associate Professor	2003 – 2007
Assistant Professor	1999 – 2003
Research Assistant Professor	1997 – 1999
Postdoctoral Research Associate	1995 –1997

EDUCATION

Ph.D. Physics	1995	University of Western Ontario, London Canada
M.Sc. Physics	1992	University of Ottawa, Ottawa Canada
B.Sc. Physics	1990	University of Ottawa, Ottawa Canada

AWARDS AND OTHER RECOGNITION

ICPE Medal, International Commission on Physics Education of IUPAP, 2021

Homer L. Dodge Citation for Distinguished Service, AAPT, 2022

APS Education Award (with L.C. McDermott, P.S. Shaffer and the UW Physics Education Group), 2008

Fellow of the American Physical Society, 2007

Archie Mahan Prize for best article in *Optics and Photonics News,* OSA (with L.C. McDermott), 2000

PUBLICATIONS

Peer-reviewed journals

1. K. Kellar and P.R.L. Heron, "An Application of Dual-Process Theories in Introductory Physics: Distinguishing between Students' Conceptual Understanding and Reasoning Approaches," *Phys. Rev. Phys. Educ. Res.* **21,** 010141 (2025) ***Editor's Suggestion***.
2. 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. Phys. Educ. Res.* **17,** 010137 (2021).
3. 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* **59**, 185 (2021).
4. A.D. Robertson, L.M. Goodhew, R.E. Scherr, and P.R.L. Heron, "University Student Conceptual Resources for Understanding Forces," *Phys. Rev. Phys. Educ. Res*. **17**, 010121 (2021).
5. A. D. Robertson, L. M. Goodhew, R. E. Scherr, and P. R. L. Heron, "Impetus-like reasoning as consistent with Newtonian physics," *The Physics Teacher* **59**, 185 (2021).
6. M. Kryjevskaia, M.R. Stetzer, B.A. Lindsey, A. McInerny, P.R.L. Heron and A. Boudreaux, "Designing research-based instructional materials that leverage dual-process theories of reasoning: Insight into the testing of specific, theory-driven interventions," *Phys. Rev. Phys. Educ. Res.* **16**, 020140 (2020).

7. K. Zuza, P. Sarriugarte, J. Ametller, P. Heron, and J. Guisasola, "Towards a research program in designing and evaluating teaching materials: An example from DC resistive circuits in introductory physics," *Phys. Rev. Phys. Educ. Res.* **16**, 020149 (2020).

8. L. M. Goodhew, A. D. Robertson, P. R. L. Heron, and R. E. Scherr, "Student conceptual resources for understanding mechanical wave propagation," *Phys. Rev. Phys. Educ. Res.* **15** 020127 (2019). ***Editor's Suggestion***

9. 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," *Physics Education* **54** (5) 055023 (2019).

10. P. R. L. Heron, "Identifying and Addressing Difficulties: Reflections on the empirical and theoretical basis of an influential approach to improving physics education," in *Getting Started in PER,* edited by C. Henderson and K. A. Harper (American Association of Physics Teachers, College Park, MD, 2018), Reviews in PER Vol. 2, <http://www.per-central.org/items/detail.cfm?ID=14724>.

11. C.R. Gette, M. Kryjevskaia, M.R. Stetzer and P.R.L. Heron, "Probing student reasoning approaches through the lens of dual-process theories: A case study in buoyancy," *Phys. Rev. Phys. Educ. Res.* **14,** 010113 (2018).

12. P.R.L. Heron, "Testing alternative explanations for common responses to conceptual questions: an example in the context of center of mass*," Phys. Rev. Phys. Educ. Res.* **13**, 010131 (2017).

13. P.R.L. Heron, "Effect of lecture instruction on qualitative questions," *Phys. Rev. ST Physics Ed. Research* **11** 010102 (2015).

14. M. Kryjevskaia, M.R. Stetzer and P.R.L. Heron, "Is a Simple Measurement Task a Roadblock to Student Understanding of Wave Phenomena?" *Phys. Teach.* **51** (9) 560 (2013).

15. H.G. Close, L.G. Ortiz and P.R.L. Heron, "Student understanding of the application of Newton's second law to rotating rigid bodies," *Am. J. Phys.* **81** (6) 458 (2013).

16. M. Kryjevskaia, M.R. Stetzer and P.R.L. Heron, "Student difficulties measuring distance in terms of wavelength: Lack of basic skills or failure to transfer?" *Phys. Rev. ST Physics Ed. Research* **9** 010106 (2013). ***Editor's Suggestion.***

17. M. Kryjevskaia, M.R. Stetzer and P.R.L. Heron, "Student understanding of wave behavior at a boundary: the relationships among wavelength, propagation speed, and frequency," *Am. J. Phys*. **80** (4) 339-347 (2012).

18. B.A. Lindsey, P.R.L. Heron and P.S. Shaffer, "Student understanding of energy: Difficulties related to systems," *Am. J. Phys.* **80** (2), 154-163 (2012).

19. H.G. Close and P.R.L. Heron, "Student understanding of the angular momentum of classical particles," *Am. J. Phys.* **79** (10) 1068 - 1078, (2011).

20. M. Kryjevskaia, M.R. Stetzer and P.R.L. Heron, "Student understanding of wave behavior at a boundary: The limiting case of reflection from fixed and free ends," *Am. J. Phys.* **79** (5) 508-516 (2011).

21. H.G. Close and P.R.L. Heron, "Research as a guide to improving instruction: An example from momentum conservation," *Am. J. Phys.* **78** (9) 961-969 (2010).

22. M.E. Loverude, P.R.L Heron, and C.H. Kautz, "Identifying and addressing student difficulties with hydrostatic pressure," *Am. J. Phys.* **78** (1) 75-85 (2010).

23. B.A. Lindsey, P.S. Shaffer, and P.R.L. Heron, "Student ability to apply the concepts of work and energy to extended systems," *Am. J. Phys.* **77** (11) 999-1009 (2009).

24. A. Boudreaux, P.S. Shaffer, P. Heron and L.C. McDermott, "Student understanding of control of variables: Deciding whether or not a variable influences the behavior of a system," *Am. J. Phys.* **76** (2) 163-170 (2008).

25. M.J. Cochran and P.R.L. Heron, "Development and assessment of research-based tutorials on heat engines and the second law of thermodynamics," *Am. J. Phys.* **74** (8) (2006).
26. L.C. McDermott, P.R.L. Heron, P.S. Shaffer, and M.R. Stetzer, "Improving the preparation of K-12 teachers through physics education research," *Am. J. Phys.* **74** (9) 763- 767 (2006).
27. C.H. Kautz, P.R.L. Heron, M.E. Loverude, and L.C. McDermott, "Student understanding of the ideal gas law, Part I: A macroscopic perspective," *Am. J. Phys.* **73** (11) 1055-1063 (2005).
28. C.H. Kautz, P.R.L. Heron, P.S. Shaffer, and L.C. McDermott, "Student understanding of the ideal gas law, Part II: A microscopic perspective," *Am. J. Phys.* **73** (11) 1064-1071 (2005).
29. L.G. Ortiz, P.S. Shaffer, and P.R.L. Heron, "Investigating student understanding of static equilibrium: Predicting and accounting for balancing," *Am. J. Phys.* **73** (6) 545-553 (2005).
30. P.R.L. Heron, M.E. Loverude, P.S. Shaffer, and L.C. McDermott, "Helping students develop an understanding of Archimedes' principle, Part II: Development of research-based instructional materials," *Am. J. Phys.* **71** (11) 1188-1195 (2003).
31. M.E. Loverude, P.R.L. Heron, and C.H. Kautz, "Helping students develop an understanding of Archimedes' principle, Part I: Research on student understanding," *Am. J. Phys.* **71** (11) 1178-1187 (2003).
32. M.E. Loverude, C.H. Kautz, and P.R.L. Heron, "Student understanding of the first law of thermodynamics: Relating work to the adiabatic compression of an ideal gas," *Am. J. Phys.* **70** (2) 137–148 (2002).
33. B.S. Ambrose, P.R.L. Heron, S. Vokos, and L.C. McDermott, "Student understanding of light as an electromagnetic wave: Relating the formalism to physical phenomena," *Am. J. Phys.* **67** (10) 891–898 (1999).
34. K. Wosilait, P.R.L. Heron, P.S. Shaffer, and L.C. McDermott, "Addressing student difficulties in applying a wave model to the interference and diffraction of light," *Phys. Educ. Res., Am J. Phys. Suppl.* **67** (S1) S5 – S15 (1999).
35. K. Wosilait, P.R.L. Heron, P.S. Shaffer, and L.C. McDermott, "Development and assessment of a research-based tutorial on light and shadow," *Am. J. Phys.* **66** (10) 906 - 913 (1998).
36. M. Dubé, P.R.L. Heron, and D.G. Rancourt, "Local moment magnetism of fcc Fe-Ni alloys, Part I: Cluster method mean field theory," *J. Magn. Magn. Mater.* **147**, 122 – 132 (1995).
37. D.G. Rancourt, M. Dubé, and P.R.L. Heron, "General method for applying mean field theory to disordered magnetic alloys," *J. Magn. Magn. Mater.* **125**, 39 - 48 (1993).

Peer-reviewed conference proceedings

1. A. K. Snow, P. R. L. Heron, L. C. Bauman, A. D. Robertson, and L. M. Goodhew, "A case in which canonically incorrect ideas do not hinder conceptual progress in introductory physics," 2023 PERC Proceedings [Sacramento, CA, July 19-20, 2023], edited by D. L. Jones, Q. X. Ryan, and A. Pawl, doi:10.1119/perc.2023.pr.Snow.
2. L. M. Goodhew, A. D. Robertson, and P. R. L. Heron, "A case of resources-oriented instruction in calculus-based introductory physics," 2020 PERC Proceedings [Virtual Conference, July 22-23, 2020], edited by Steven F. Wolf, Michael B. Bennett, and Brian W. Frank, 10.1119/perc.2020.pr.Goodhew
3. D. Buongiorno, R.H. Evans, S. Faletic, J. Guisasola, P. Heron, M. Michelini, G. Planinšič, P. Sarriugarte, A. Stefanel, and K. Zuza, "Discipline-based educational research to improve active learning at university," Proceedings of the 2019 European Science Education Research Association conference, Bologna Italy, August 2019.
4. A. T. Alesandrini and P. R. L. Heron, "Types of explanations students use to explain answers to conceptual physics questions," 2019 PERC Proceedings [Provo, UT, July 24-25, 2019], edited by Y. Cao, S. Wolf, and M. B. Bennett, doi:10.1119/perc.2019.pr.Alesandrini.

5. L. M. Goodhew, A. D. Robertson, P. R. L. Heron, and R. E. Scherr, Students' context-sensitive use of two kinds of conceptual resources for mechanical wave reflection, 2019 PERC Proceedings [Provo, UT, July 24-25, 2019], edited by Y. Cao, S. Wolf, and M. B. Bennett, doi:10.1119/perc.2019.pr.Goodhew.
6. L. M. Goodhew, A. D. Robertson, P. R. L. Heron, and R. E. Scherr, Examining the productiveness of student resources in a problem-solving interview," 2018 Physics Education Research Conference Proceedings, doi:10.1119/perc.2018.pr.Goodhew
7. L. M. Goodhew, A. D. Robertson, P. R. L. Heron, and R. E. Scherr, "Student conceptual resources for understanding mechanical wave propagation," 2017 PERC Proceedings [Cincinnati, OH, July 26-27, 2017], edited by L. Ding, A. Traxler, and Y. Cao, doi:10.1119/perc.2017.pr.032.
8. A. D. Robertson, L. M. Goodhew, R. E. Scherr, and P. R. L. Heron, "University Student Conceptual Resources for Understanding Forces," 2017 PERC Proceedings [Cincinnati, OH, July 26-27, 2017], edited by L. Ding, A. Traxler, and Y. Cao, doi:10.1119/perc.2017.pr.078.
9. R. E. Scherr and P. R. L. Heron, "Education Metaphors We Live By," 2016 PERC Proceedings [Sacramento, CA, July 20-21, 2016], edited by D. L. Jones, L. Ding, and A. Traxler, doi:10.1119/perc.2016.pr.074.
10. B. C. Xue, R. L. C. Hazelton, P. S. Shaffer, and P. R. L. Heron, "Improving Student Understanding of Vector Fields in Junior-Level E&M," 2016 PERC Proceedings [Sacramento, CA, July 20-21, 2016], edited by D. L. Jones, L. Ding, and A. Traxler, doi:10.1119/perc.2016.pr.096.
11. R.L.C. Hazelton, P.R.L. Heron and P.S. Shaffer, "Facilitating model-building of electrostatics concepts related to conductors," 2015 PERC Proceedings [College Park, MD, July 29-30, 2015], edited by A. D. Churukian, D. L. Jones, and Lin Ding, doi:10.1119/perc.2015.pr.028.
12. Guisasola, J., Hartlapp, M., Hazelton, R., Heron, P., Lawrence, I., Michelini, M., Peeters, W., Pospiech, G., Stefanel, A., Vercellati, S. and Zuza, K., "Content-focused research for innovation in teaching / learning electromagnetism: approaches from GIREP community," in *Insights from Research in Science Teaching and Learning: Selected Papers from the ESERA 2013 Conference,* Eds. C.P. Constantinou, N. Papadouris, A. Hadjigeorgiou, Springer International, 2016. 10.1007/978-3-319-20074-3_7
13. R.L.C. Hazelton, P.R.L. Heron and P.S. Shaffer, "Assessing the impact of a computer simulation in conjunction with Tutorials in Introductory Physics on conceptual understanding," 2013 PERC Proceedings [Portland, OR, July 17-18, 2013], edited by P. V. Engelhardt, A. D. Churukian, and D. L. Jones, 177-180 (2014).
14. R.L.C. Hazelton, P.R.L. Heron, M.R. Stetzer, "Investigating student ability to apply basic electrostatics concepts to conductors," 2012 PERC, AIP Conf. Proc. **1513,** 166 (2013).
15. P.R.L. Heron, "Student Performance on Conceptual Questions: Does Instruction Matter?," 2012 PERC, AIP Conf. Proc. **1513,** 174 (2013).
16. Stefanel, P.R.L. Heron, and M. Michelini, "Evaluating the pedagogical content knowledge about energy of prospective teachers," *Proceedings of the 2009 GIREP Meeting, Leicester, UK, August 2009*.
17. P.R.L. Heron, A. Stefanel, and M. Michelini, "Teaching and learning the concept of energy in primary school," *Proceedings of the 2008 GIREP Meeting, Nicosia, Cyprus, August 2008.*
18. L.A. Low, P.R.L. Heron, B.C. Fabien, and P.G. Reinhall, "Development and assessment of research-based tutorials for engineering dynamics," *Proceedings of the American Association for Engineering Education Annual Meeting, Salt Lake City, UT, June 2004.*

Non-refereed journals, proceedings, magazines, books, book chapters and newsletters

1. M. Kryjevskaia, A. Heckler, and P. Heron, "Intuitive or rational? Students and experts need to be both," *Physics Today* **74**(8), 28 (2021).
2. P. Heron and L. McNeil, "Preparing Physics Students for 21st-Century Careers," in *3rd Handbook on Connecting Research in Physics Education with Teacher Education,* E. McLoughlin and J. Guisasola, Eds., (International Commission on Physics Education of IUPAP, 2022).
3. P. Heron and L. McNeil, *Phys21: Preparing Physics Students for 21st-Century Careers,* American Physical Society, 2016 http://www.compadre.org/JTUPP/report.cfm.
4. L.C. McDermott, P.S. Shaffer, P.R.L. Heron, M.R. Stetzer, and D.L. Messina, "Preparing teachers to teach physics and physical science effectively through a process of inquiry," in *Effective Practices in Preservice Physics Teacher Education,* C. Sandifer and E. Brewe, Eds., (APS, 2015).
5. P.R.L. Heron and D.E. Meltzer, Guest Editorial: "The future of physics education research: Intellectual challenges and practical concerns," *Am. J. Phys.* **73,** 390 - 394 (2005).
6. P.R.L. Heron, "Empirical investigations of learning and teaching" in *Research on Physics Education, Proceedings of the International School of Physics "Enrico Fermi,"* Course CLVI, Varenna Italy, July 2003, edited by E.F. Redish and Mathilde Vicentini, (Italian Physical Society, 2004) pp 341-363.
7. D. Colonnese, P. Heron, Marisa Michelini, Lorenzo Santi, Alberto Stefanel, "A vertical pathway for teaching and learning the concept of energy," *Review of Science, Mathematics and ICT Education* **6** (1) 21- 50 (2012).
8. P.R.L. Heron, "Empirical investigations of student understanding," in *Proceedings of the 2003 Physics Education Research Conference, Madison WI, August 2003,* edited by K. Cummings, J. Marx, and S. Franklin, AIP Conference Proceedings **720,** 15-18 (2004).
9. P.R.L. Heron and L.C. McDermott, "Bridging the gap between teaching and learning: Examples from geometrical optics," *Optics and Photonics News,* **9,** (9) 30 (1998).
10. P.R.L. Heron and D.E. Meltzer, "Chemical Education and Physics Education: Facing Joint Challenges and Practical Concerns," CHED Newsletter (Division of Chemical Education, American Chemical Society), Fall 2005, pp. 35-37.

Books

Fatih Taşar and Paula Heron, Eds. *International Handbook of Physics Education Research,* American Institute of Physics, 2023

Volume I: Learning Physics https://doi.org/10.1063/9780735425477
Volume II: Teaching Physics https://doi.org//10.1063/9780735425712
Volume III: Special Topics https://doi.org/10.1063/9780735425514.

Research-based curriculum

L.C. McDermott, P.S. Shaffer, P.R.L. Heron and the Physics Education Group at the University of Washington, *Tutorials in Introductory Physics,* (Pearson, Upper Saddle River, NJ, Second Edition, forthcoming).

INVITED PRESENTATIONS (PAST TEN YEARS)

University of Waterloo Faculty of Science Celebration of Teaching	Waterloo Canada, 2024
Fourth World Conference on Physics Education: Keynote Talk	Krakow, PL, 2024
University of Padua: Physics Department Seminar	Padua, IT, 2024
University of Pisa: Physics Department Seminar	Pisa, IT, 2024
April APS Meeting: Invited talk	Sacramento, CA, 2024
Oregon State University: Physics Department Colloquium	Corvallis, OR, 2023

European New Physics Faculty Workshop: Plenary	Ascona, CH, 2023
Conference on Laboratories Beyond The First Year (BFY): Plenary	Chico, CA, 2023
University of British Columbia: Physics Department Colloquium	Vancouver, Canada, 2023
Technical University of Dresden: Physics Department Colloquium	Dresden, Germany, 2022
University of Udine: Physics Education Seminar	Udine, Italy, 2022
Frontiers of Physics 16: Invited talk	(Remote) 2022
Third World Conference on Physics Education: Keynote talk	(Remote) 2021
Education and Training in Optics and Photonics: Invited talk	(Remote) 2021
Nordic Physics Days: Keynote talk, Uppsala, Sweden	(Remote) 2021
Sacramento State Univ.: Physics Department Colloquium	(Remote) 2021
Univ. of Cardiff & University College London STEM Education: Invited Talk	(Remote) 2020
National Conference of Israeli Physics Teachers: Invited talk	(Remote) 2020
Tufts University: Physics Department Colloquium	Boston, MA, 2020
UW: Physics Department Colloquium	Seattle, WA, 2020
UW Bothell: School of STEM seminar	Bothell WA, 2019
ESERA 2019 Conference: invited talk	Bologna, IT, 2019
AAPT Summer Meeting: invited talk	Provo, UT, 2019
APS April Meeting: invited talk	Denver, CO, 2019
University of Kansas: Physics Department Colloquium	Lawrence, KS, 2019
Cornell University: Physics Department Colloquium	Ithaca, NY, 2019
Mexico Section of the AAPT: Keynote talk	Monterrey, Mexico, 2018
GIREP Annual Conference: Invited talk	San Sebastian, Spain, 2018
Technical University of Hamburg-Harburg: Science Education Seminar	Hamburg, Germany, 2018
AAPT/APS Department Chairs Conference: invited talk	College Park, MD, 2018
Ontario Association of Physics Teachers: Keynote talk	London, ON, 2018
University of Western Ontario: Physics Department Colloquium	London, ON, 2018
APS March Meeting: Invited talk	Los Angeles, CA, 2018
AAPT Summer Meeting: Invited talk	Cincinnati, OH, 2017
APS NW Meeting: Plenary Talk	Grove City, OR, 2017
75th Birthday & Golden Jubilee for E.F. (Joe) Redish: Invited talk	College Park, MD, 2017
AAPT Winter Meeting: Invited talk	Washington DC, 2017
Cal Poly San Luis Obispo: Physics Department Colloquium	San Luis Obispo, CA, 2017
University of Minnesota: Physics Department Colloquium	Minneapolis, MN, 2017
Second World Conference on Physics Education: Keynote talk	Sao Paulo, Brazil, 2016
Physics Education Research Conference: Invited talk	Sacramento, CA, 2016
AAPT Summer Meeting: Invited talk	Sacramento, CA, 2016
Canadian Association of Physicists Annual Congress: Invited talk	Ottawa, ON, 2016
APS April Meeting: Invited talk	Salt Lake City, UT, 2016
Institute of Physics: Physics Higher Education Conference 2016: Keynote	Nottingham, UK, 2015
Piano Laure Scientifiche National Conference: Keynote	Rome, Italy, 2015
APS April Meeting: Invited talk	Baltimore, MD, 2015
APS March Meeting: Invited talk	San Antonio, TX, 2015
Whitworth University: STEM Education Colloquium	Spokane, WA, 2015
University of Vienna: PER Group Seminar	Vienna, Austria, 2015
University of Bologna: PER Group Seminar	Bologna, Italy, 2015
University of Udine: PER Group Seminar	Udine, Italy, 2015
Associazione per l'Insegnamento della Fisica National Congress: Keynote	Perugia, Italy, 2014
Int'l Society for Educational Research World Conference: Invited talk	Cappadocia, Turkey, 2014

Horizons in Physics Education (HOPE) Network Forum: Keynote	Helsinki, Finland, 2014
Frontiers of Fundamental Physics 14: Invited talk	Marseille FR, 2014
APS Northwest Section Meeting: Invited talk	Seattle, WA, 2014
Universitat Autònoma de Barcelona, Center for Science Education: Seminar	Barcelona, Spain, 2014
Homi Babha Center for Science Education (HBCSE): Seminar	Mumbai, India, 2014
Centre de Physique des Particules de Marseille (CPPM): Seminar	Marseille, France, 2014
Michigan State University: Physics Department colloquium	East Lansing, MI, 2014

Contributed talks

Co-author of more than 175 contributed talks and posters at regional, national and international meetings.

Professional development workshops

Presenter or co-presenter of more than 100 professional development workshops for faculty, graduate students, and teachers.

MENTORING

Graduate researchers supervised (as Chair of thesis committee)

In progress

Anne Alesandrini

Kristin Kellar

Al Snow

Completed

Dr. Lisa Goodhew, PhD 2020, Assistant Professor, Seattle Pacific University

Dr. Ryan Hazelton, PhD 2015, Lecturer, University of Illinois - Chicago

Dr. Beth Lindsey, PhD 2008, Associate Professor, Penn State University – Greater Allegheny

Dr. Mila Kryjevskaia, PhD 2008, Professor, North Dakota State University

Dr. Hunter Close, PhD 2005, Associate Professor, Texas State University – San Marcos

Dr. Matt Cochran, PhD 2005, Associate Professor, Chaminade University

Kimberly Martell, MS 2019, Edmonds School District

Matt Hahn, MS 2005

Lenore Hernandez, MS 2002, Boeing

Postdoctoral scholars (*jointly with LC McDermott and/or PS Shaffer; **jointly with Amy Robertson)

Dr. Charlotte Zimmerman,* postdoc, Cornell University

Dr. Clausell Mathis,** Assistant Professor, Michigan State University

Dr. Gina Passante,* Associate Professor, California State University – Fullerton

Dr. Ximena Cid,* Associate Professor, California State University – Dominguez Hills

Dr. Mac Stetzer,* Associate Professor, University of Maine

Dr. Homeyra Sadaghiani,* Professor, Cal Poly Pomona

Dr. David Smith,* Associate Teaching Professor, University of Washington

Dr. Mel Sabella,* Professor, Chicago State University

Dr. John Thompson,* Professor, University of Maine

PROFESSIONAL OFFICES, SERVICE, AWARDS (SELECTED)

Journal Editorship

Associate Editor, *Physical Review - Physics Education Research* (2015 - present)

Member, Editorial Board, *The Physics Teacher* (2013 - present)

Member, Editorial Board, *Eurasian Journal of Physics and Chemistry Education* (2015 – present)

Member, Editorial Board, *Physical Review Special Topics – PER* (2010 - 2012)

Co-Editor, *Proceedings of the Physics Education Research Conference* (2004 - 2006)

Selected national and international committees, advisory boards, etc.

Advisory Board Member, NSF project: "Constructing Valid, Equitable, and Flexible Kinematics and Dynamics Assessment Scales with Evidence Centered Design (2023 –)

Advisory Board Member, NSF project "Characterizing Best Practices of Instructors who Have Narrowed Performance Gaps in Undergraduate Student Achievement in Introductory STEM Courses" (2022 –)

Chair line, APS Topical Group on PER ("GPER") Executive Committee (elected, 2016 – 2020)

Member, APS Committee on Education Policy (2018 – 2020)

Co-Chair, APS and AAPT *Joint Task Force on Undergraduate Physics Programs* (J-TUPP)

Chair, GIREP Topical Group on Energy (2014 – 2024)

Member, Search Committee for Editor of *American Journal of Physics* (2020)

Member-at-Large, APS NW Section Executive Committee (elected, 2016 – 2020)

Coordinator, APS Topical Group on PER (GPER) Executive Committee election

Chair, Search Committee for Editor, *Physical Review Special Topics – PER* (2011)

Member, National Research Council "Undergraduate Physics Education" Study (2011–2012)

Member, Science Experts Committee, "Promoting successful outcomes in math and science education," *(PROM/SE),* funded in part by NSF (2006–2011).

Chair (2010) and Member, APS Education Award Committee (2009 & 2010)

Member, APS Topical Group on PER (GPER) Fellowship Committee (2015 & 2018)

Member, APS Forum on Education Fellowship Committee (2009 & 2010)

Chair (2009-2010) and Member, AAPT Committee on Research in Physics Education (2007–2010)

Member, Physics Education Research Leadership and Organizing Committee (2009)

Member (elected), APS Forum on Education Executive Committee (2001–2007)

Member, AAPT Committee on Teacher Preparation (2001–2006, 2010–2013)

Advisory Board Member, "Physics of the 21st Century: From Quasars to Quarks and Quantum Dots," Science Media Group at the Harvard-Smithsonian Center for Astrophysics, (2008-2009).

Advisory Board Member, Physics Teacher Education Coalition of APS, AIP & AAPT (2006)

Member, Critical site-visit teams, NSF Math Science Partnership programs (2004 & 2005)

Selected conference & session organization

Co-founder and co-Chair: *Foundations and Frontiers in PER I - VIII*, Bar Harbor, ME

The premier conference venue in PER in the US occurred every two years from 2005 - 2019.

Co-Strand Chair: European Science Education Research Association conference, Lisbon, Portugal, 2021

Co-Strand Chair: European Science Education Research Association conference, Bologna, IT, 2019

Co-organizer and co-chair: *Physics Education Research Conference,* Portland OR, 2010

Organizer of more than 30 invited sessions at meetings of the APS, AAPT, GIREP, PERC and ESERA

Review of papers for journals, conference submissions, and conference proceedings

American Journal of Physics
Physical Review - Physics Education Research (PR-PER)
Proceedings of the Physics Education Research Conference (PERC)
Science and Education
Science Education
Science Advances
Journal of Science and Technology Education
Journal of STEM Education
Computers in Education
European Science Education Research Association

Review of proposals or individual researchers

Novo Nordisk Foundation
Springer Nature
Institute of Physics, UK
National Science Foundation
Fulbright Specialist Program
Israeli Science Foundation
Social Sciences and Humanities Research Council of Canada
National Research Foundation of South Africa
Research Council, KU Leuven, Belgium
Homi Babha Center for Science Education, India

UNIVERSITY SERVICE

Member, Honors Faculty Council (2020 – 2023)
Member, Faculty Search Committee, UW Biology (2019)
Chair, Search Committee for Department Chair, UW Mathematics (2018)
Member, Ten-Year Review Committee, UW Mathematics (2016)
Chair, Search Committee for Department Chair, UW Applied Mathematics (2011)
Member, Teacher Education Field Committee (2008 - 2011)
Member, Advisory Review Committee, Deanship of the College of Education (2006)
Member, Search Committee for Department Chair, UW Astronomy (2006)
Member, UW College of Education Teacher Education Council (2002 - 2006)
Referee, UW Royalty Research Fund

PHYSICS DEPARTMENT SERVICE (PAST FIVE YEARS)

Executive Committee
Majors Committee
Instructional Quality Committee (Chair)
Introductory Course Organizing Committee
Search Committees (nuclear experiment, theory, AMO experiment)

RESEARCH FUNDING

PI: "Collaborative Research: Research and Curriculum Development to Leverage University Student Conceptual Resources for Understanding Physics," NSF: $902,167 (to UW) 10/2019 – 9/2023. (Collaboration with Seattle Pacific University)

PI: **"**Collaborative Research: Establishing a new model for research-based curriculum development in physics aligned with dual-process theories of reasoning and decision-making." NSF: $370,000 (to UW) 10/2018 – 9/2023. (Collaboration with North Dakota State, Univ. of Maine, Penn State, Western Washington.)

PI: "Next generation research-based and research-validated instructional materials for teaching physics in a wide range of instructional environments." NSF: $1,747,627, 8/2018 – 7/2022.

PI: **"**Collaborative Research: University Student Conceptual Resources for Understanding Physics." NSF: $145,080 (to UW) 09/2016 – 09/2019. (Collaboration with Seattle Pacific University.)

PI: **"**Collaborative Research: Examining the Development of Student Reasoning Skills Through Scaffolded Physics Instruction." NSF: $149,821 (to UW) 01/2015 – 01/2018. (Collaboration with North Dakota State, Univ. of Maine, Penn State, Western Washington.)

Co-PI: "Transforming Instruction and Ensuring Sustainability: Ongoing Evolution of a Model Program to Improve the Learning of Physics." NSF: $3,500,000, 10/2010 – 10/2016.

Co-PI: "Improving teacher preparation and student learning through physics education research." NSF: $1,985,827 09/2007 – 09/2013 2007.

Co-PI: "Evolution of a model program to improve student learning in physics at the undergraduate level and beyond." NSF: $1,843,579 10/2006 – 10/2011.

Co-PI: "Preparing K-12 teachers to teach physics and physical science by inquiry." NSF: $3,193,982 07/2001 – 07/2007.

Co-PI: "Development of research-based curriculum to improve student learning in physics." NSF: $699,910, 03/2001 – 03/2005.

Co-PI: "A new model for physics education in physics departments: Improving the teaching of physics from elementary through graduate school – Accomplishment-based renewal." NSF: $1,500,990, - 07/1997 – 07/2000.