

# Mark Joseph Lattery

625 West Eleventh Avenue, Oshkosh, Wisconsin 54902

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## PROFESSIONAL EXPERIENCE

Professor of Physics, Co-Chair, University of Wisconsin Oshkosh, Department of Physics and Astronomy (1997-present)

Full Professor of Physics (2012-present)

Associate Professor of Physics (2003-2011)

Assistant Professor of Physics (1997-2002)

Member, Proton Antiproton Annihilations at Darmstadt (PANDA) Collaboration at FAIR (2018-present)

Topic Editor, [Focus on Science Education](#), Frontiers in Education (2018-present)

Program Director, Next Generation Modeling Courses: [www.uwosh.edu/phys/ngmc](http://www.uwosh.edu/phys/ngmc) (2018-present)

Presidential Chain, Wisconsin Association of Physics Teachers (2015-2018)

## ACADEMIC BACKGROUND

**Ph.D. Degree:** University of Minnesota (1996)

Cornell University Visiting Research Fellow

Research: Experimental Particle Physics

Doctoral Dissertation: Fully Leptonic Decays of  $B$  Mesons

Thesis Advisor: Dr. Yuichi Kubota

**Master of Education Degree:** University of Minnesota (1997)

Summa Cum Laude

Major: Curriculum and Instruction

Specialization: Physics Education

Advisor: Dr. Fred Finley

**Bachelor of Arts Degree:** Gustavus Adolphus College and Bethel University (1988)

Major: Physics

Edith L. Larson Scholarship

Research Assistant: 3M Company, St. Paul, MN

## TEACHING EXPERIENCE

Over twenty (20) years of physics teaching experience at a mid-sized university (11,000 students)

## Undergraduate-level physics courses

Physical science (modeling method of instruction), astronomy (lab), algebra-based general physics (lecture, lab, and discussion), calculus-based general physics (lab), modern physics (lecture and lab), history and philosophy of physics, quantum mechanics, and physics teaching methods

## Graduate-level physics courses

Physics content-pedagogy courses for in-service teachers, history of physics, and philosophy of science

## TEACHING AWARDS

Center for Scholarly Teaching, Scholar Spotlight Recognition (2008). *University of Wisconsin Oshkosh*.

University of Wisconsin System Teaching Scholar (2006-2007). *University of Wisconsin System (UTIC)*. Award given to “faculty who demonstrated success in implementing and disseminating teaching and learning innovations, and a record of campus leadership on issues of teaching and learning.”

Wisconsin Association of Physics Teachers Service Award (2006). *Wisconsin Association of Physics Teachers*. Award given for the “advancement of physics and physical science through a continuous teaching program of activities designed to promote physics and physics education.”

University of Wisconsin System Teaching Fellow (2000-2001). *University of Wisconsin System (OPID)*. Award given to “faculty who show exceptional promise as a college teacher.”

Teaching Innovation Award (1998). *University of Wisconsin Oshkosh*. Based on the Workshop Physical Science course.

(A description of the Workshop Physical Science course was published in *The Physics Teacher*, March 2001.)

## PEER-REVIEWED PUBLICATIONS (\*book or book chapter)

1. \*Lattery, M. & Kalman, C., eds. (2020). *Development of Student Understanding: Focus on Science Education*. Switzerland: Frontiers in Education.
2. Kalman, C., El-Helou, J., & Lattery, M. (2019). Improving high school students’ understanding of the concept of force and Newton’s laws through the combination of Laboratories and Reflective Writing. *Proceedings of the National Association of Research in Science Teaching*, Baltimore, MD.
3. Kalman, C. & Lattery, M. (2018). Three active learning strategies to address mixed student epistemologies and promote conceptual change. *Frontiers in ICT*, 5(19).
4. Kalman, C., Lattery, M., and Sobhanzadeh, M. (2018). Impact of Reflective Writing and Laboratories on Student Understanding of Force and Motion in Introductory Physics. *Creative Education*, 9, 575-596.
5. Lattery, M. (2018). An alternative model of free fall. *Phys. Educ.* 53 (2018) 023007.
6. \*Lattery, M. (2017). *Deep Learning in Introductory Physics: Exploratory Studies of Model-Based Reasoning*. NC: Information Age Publishing.

7. \*Lattery, M. (2016). *University Physics*. (D. Chelton, Ed.). TX: OpenStax, Rice University. Five chapters: Quantum Mechanics, Atomic Structure, Condensed Matter, Nuclear Physics, and Particle Physics and Cosmology.
8. Lattery, M. (2011). Steps toward learning mechanics. *Physics Education*, 46(1), 73-79.
9. Lattery, M. (2011). What happens when force vanishes? *Teaching Science*, 57(3).
10. \*Lattery, M. (2009). Signature pedagogies in introductory physics. In *Exploring Signature Pedagogies: Approaches to Teaching Disciplinary Habits of Mind* (R. Gurung, Ed.). VA: Stylus Publishing.
11. Lattery, M. (2008). The long decay model of one-dimensional projectile motion. *Science & Education*, 17, 779-798.
12. Lattery, M. (2005). Student understanding of the primitive spring concept: Effects of prior classroom instruction and gender. *Electronic Journal of Science Education*, 9(3), 1-23.
13. Lattery, M., Lemberger, J., and Herzog, B. (2001). Impact of the STC curriculum in the Oshkosh Area School District. *School Science and Mathematics*, 101(3), 124-136.
14. Lattery, M. (2001). Thought experiments in physics education. *Science & Education*, 10(2), 485-492.
15. Lattery, M. (2001). Student-directed projects: A full-immersion experience of science. *The Physics Teacher*, 39(3), 166-171.
16. Lattery, M. (2000). A simple and surprising experiment. *Physics Education*, 35(2), 130-131.
17. Lattery, M. & CLEO Collaboration (1997). Searches for  $B$  to  $e\nu\gamma$  and  $B$  to  $\mu\nu\gamma$  decays, *Physical Review Letters D*, 56, 11-16.
18. Lattery, M. & CLEO Collaboration (1995). Radiative leptonic beauty-meson decays. *Proceedings of the European Physical Society and Beijing Lepton-Photon Conference*.
19. Lattery, M. & CLEO Collaboration (1994). Searches for  $B$  to  $lv$  decays, *Physical Review D*, 50, 1405-1410.

### PROFESSIONAL PRESENTATIONS (\*undergraduate student)

1. Lattery, M. (2019). Next Generation Modeling Courses for Teachers. *Wisconsin Association of Physics Teachers*. Wisconsin Dells, WI.
2. Kalman, C., Lattery, M. & Sobhanzadeh, M. (2018). Impact of reflective writing and laboratorials on student understanding of force and motion in introductory physics. *7<sup>th</sup> Annual SALTISE Conference*, McGill University.
3. Kalman, C. & Lattery, M. (2018). Issues in science education informed by history and philosophy of science and psychology. *International History and Philosophy in Science Teaching (IHPST) meeting*. Ankara, Turkey. [talk]
4. Lattery, M. (2017). Scientific discovery and elementary particles of understanding. *Texas Tech University*. [plenary]
5. Lattery, M. (2017). Wisconsin survey of physics and physical science teachers. Joint meeting of the *Wisconsin Association of Physics Teachers and Illinois Section of the American Association of Physics Teachers*. University of Wisconsin Oshkosh. [talk]
6. Lattery, M. (2017). Air-Pulsed Carts and Modeling Aid: New Instruments for Research on Student Model-Based Reasoning. *Phys-TEC Conference*, Atlanta. [poster]
7. Lattery, M. (2016). Deep Learning in Introductory Physics. Modeling and Model-Based Reasoning in STEM Conference, Purdue University. [poster]

8. Lattery, M. (2016). The digital Newton: Using programmable air-pulsed carts to teaching Newtonian mechanics. *Wisconsin Association of Physics Teachers*. University of Wisconsin Oshkosh. [talk]
9. Lattery, M. & LPEER Group (2016). Regressive-revolutionary modeling behaviors in the history of mechanics and in a physical science classroom. *Wisconsin Association of Physics Teachers*. University of Wisconsin Oshkosh. [poster]
10. Lattery, M. & Christopherson\*, C., & LPEER Group (2016). Air-pulsed carts and *Modeling Aid*: New instruments for research on student model-based reasoning. *Wisconsin Association of Physics Teachers*. University of Wisconsin Oshkosh. [poster]
11. Christopherson, C.\* & Lattery, M. (2015). Deep learning in introductory physics: Exploratory case studies of model-based reasoning. *Wisconsin Association of Physics Teachers*. University of Wisconsin La Crosse. [talk]
12. Pommerening, S.\*, Paschke, C.\*, & Lattery, M. (2015). Teaching for deep learning: Facilitating classroom discourse in a model-centered classroom. *Wisconsin Association of Physics Teachers*. University of Wisconsin La Crosse. [poster]
13. Paschke, C.\* & Lattery, M. (2015). Teaching for deep learning: Facilitating classroom discourse in a model-centered classroom. *American Association of Physics Teachers*. University of Maryland. [poster]
14. Lattery, M. (2015). Deep learning in introductory physics: Exploratory studies of model-based reasoning. *Annual Meeting of the Computer Science, Engineering, Physics and Astronomy (CSEPA) Department of UW Colleges*. [plenary]
15. Lattery, M. (2015). Endangered physics teacher preparation programs. *American Association of Physics Teachers*. Washington, DC. [panelist]
16. Hathaway, C.\*, Sathoff, C.\*, & Lattery, M. (2011), Student model formation and development. *American Association of Physics Teachers*. Jacksonville, Florida. [poster]
17. Hathaway, C.\*, Sathoff, C.\*, & Lattery, M. (2010). Integrating science and mathematics education research into teaching. University of Maine. [talk]
18. Lattery, M. & Hathaway, C.\* (2010). Student model formation. *SoTL Summit for Science and Mathematics Education Researchers*. Oshkosh, Wisconsin. [talk]
19. Lattery, M. & Hathaway, C.\* (2010). Student model formation and development in physics. *Problem-Based Learning UW-Green Bay*. [plenary]
20. Lattery, M. & Hathaway, C.\* (2009). Research on student model formation and development in physics. *International History, Philosophy, and Science Teaching Group Conference*. Notre Dame. [talk]
21. Lattery, M. (2009). A Master's degree for physics and physical science teachers. *Wisconsin Association of Physics Teachers*, UW Whitewater. [talk]
22. Lattery, M. (2009). Research on student model formation and development. *Wisconsin Association of Physics Teachers*, UW Whitewater. [talk]
23. Lattery, M. (2008). The long decay model of one-dimensional projectile motion. *Wisconsin Association of Physics Teachers*, Chippewa Falls, WI. [talk]
24. Lattery, M. (2006). Demonstrations using a fan cart. *Wisconsin Association of Physics Teachers*, UW Marathon. [talk]
25. Lattery, M. (2006). Determining the speed of light with a chocolate bar. *Wisconsin Association of Physics Teachers*, UW Marathon. [talk]

26. Lattery, M. (2006). Impetus, Psychogenesis, and the History of Mechanics. UW Madison, Learning Sciences Brown Bag Seminar.
27. Hipparchus and the Problem of Motion. (2005). *University of Wisconsin Madison, History of Science Brown Bag Seminar.*
28. Lattery, M. (2005). Hipparchus and the Problem of Motion. *UW Oshkosh, Scholarship of Teaching and Learning Seminar.*
29. Lattery, M. (2005). Masters of Physics Education Program. *American Association of Physics Teachers, Albuquerque, NM.*
30. Lattery, M. (2004). Masters of Physics Education Program. *Wisconsin Association of Physics Teachers, UW Oshkosh.*
31. Lattery, M. (2004). Modeling Method and Workshop Physics: A comparison. *American Association of Physics Teachers, Miami Beach, FL.*
32. Lattery, M. (2003). Modeling Physical Science Program. *Wisconsin Association of Physics Teachers, UW La Crosse.*
33. Lattery, M. (2002). Using an internet chat utility to conduct physics education research. *American Association of Physics Teachers, Boise State University, ID.*
34. Lattery, M. (2001). Thought experimentation in physics education research. *Wisconsin Association of Physics Teachers, UW Stevens Point.*
35. Lattery, M. (2001). Galileo's law of chords. *Wisconsin Association of Physics Teachers, UW Stevens Point.*
36. Lattery, M. (2001). Using an internet chat utility to conduct physics education research. *Wisconsin Association of Physics Teachers, UW Stevens Point.*
37. Lattery, M. (2001). Student-directed projects in physics teaching. *University of Wisconsin Oshkosh Summer Colloquium. Joint presentation of the UW Oshkosh and Carthage College.*
38. Lattery, M. (2001). Student understanding of springs and force: A study of college students. *National Association for Research in Science Teaching, St. Louis, MO.*
39. Lattery, M. (2001). An evaluation of the Science and Technology for Children curriculum. *National Association for Research in Science Teaching, St. Louis, MO.*
40. Lattery, M. (2001). Student understanding of the spring model and Newton's third law. *American Association of Physics Teachers, San Diego, CA.*
41. Lattery, M. & Lemberger, J. (2000). The Fox Valley Einstein Assessment Project (FVEAP): Description of study design and research findings. *Association for the Education of Teachers in Science, UW Eau Claire.*
42. Lattery, M. & Lemberger, J. (2000). The Fox Valley Einstein Assessment Project. *Oshkosh Area School District, Oshkosh, WI.*
43. Lattery, M. (1999). Emergent intuitions about springs and force: Child development and gender effects. *Wisconsin Association of Physics Teachers, Edgewood College, WI.*
44. Lattery, M. (1999). The objective test. *Assessment Committee Workshop: Exploring Ways to Assess Student Learning, UW Oshkosh.*
45. Lattery, M. (1999). Review of activity guides for introductory physics. *American Association of Physics Teachers, University of Texas San Antonio, TX.*

46. Lattery, M. (1999). Enhancing science instruction by using computer-based labs and media. *Center for Community Partnerships Tenth Annual Classroom Technology Conference*, Oshkosh, WI.
47. Lattery, M. (1998). Workshop physical science. *College of Education Seminar*, UW Oshkosh.
48. Lattery, M. (1998). Student's preconceptions of classical 1-d interactions: Perspectives from a sensory-based assessment. *Wisconsin Association of Physics Teachers*, Marquette University, WI.
49. Lattery, M. (1998). Workshop physical science at Oshkosh: Does 'real' physics belong in elementary school? *American Association of Physics Teachers*, University of Nebraska, NB.
50. Lattery, M. (1997). Workshop physical science: Workshop physics for pre-service elementary school teachers and non-science majors. *Wisconsin Association of Physics Teachers*, Nicollet College, WI.
51. Lattery, M. & Kubota, Y. (1995). Search for  $B$  to  $l\nu$  decays. *Joint Meeting of the American Physical Society and the Association of American Physics Teachers*, Washington, D.C.
52. Lattery, M. (1994). Search for  $B$  to  $l\nu$  decays. *Joint Meeting of the American Physical Society and the Association of American Physics Teachers*, Arlington, VA.
53. Lattery, M. (1994). Search for  $B$  to  $e\nu$  and  $B$  to  $\mu\nu$  *University of Minnesota High Energy Physics Meeting*, Minneapolis, MN.
54. Lattery, M. (1993). Search for  $B$  to  $l\nu$  decays. *Joint Meeting of the American Physical Society and the Association of American Physics Teachers*, Washington, D.C.

### TEACHER WORKSHOPS (\*undergraduate student)

1. Lattery, M. (2019). Electrostatics and Pivot Interactives. *Cooperative Academic Partnership Program Spring Workshop*. [regional teacher workshop]
2. Lattery, M. (2018). Pivot Interactives. *Wisconsin Association of Physics Teachers*. University of Wisconsin-Whitewater, WI. [state workshop]
3. Lattery, M. (2017). Northeast Wisconsin Science Institute, *University of Wisconsin Oshkosh* [one-week teacher summer workshop, 3-hour workshop during academic school year. [regional workshop]
4. Lattery, M. (2017). Analysis of force and motion using video analysis. *Cooperative Academic Partnership Program Spring Workshop*. [regional workshop]
5. Lattery, M. (2017). How are we to persuade? *Texas Tech University*. [one-hour faculty workshop]
6. Lattery, M., Christopherson, C.\*, Paschke, C.\*, & Pommerening, S.\* (2015). Introduction to the Modeling Method of Instruction. *Wisconsin Association of Physics Teachers*. University of Wisconsin La Crosse. [state workshop]
7. Lattery, M. (2015). Introduction to the Modeling Method of Instruction. *Office of Professional Improvement and Development (OPID) Spring Conference*. Green Lake, WI. [state workshop]
8. Lattery, M. & Christopherson, C.\* (2014). Introduction to the Modeling Method of Instruction. *Wisconsin Association of Physics Teachers*. Marquette University. [state workshop]
9. Tamres, D. & Lattery, M. (2014). Developing animated graphs and diagrams using Excel. *Wisconsin Association of Physics Teachers*. University of Wisconsin Marathon. [state workshop]

10. Lattery, M. (2006). Genius is not immune to persistent misconceptions. *Wisconsin Association of Physics Teachers*, University of Wisconsin Marathon. Three-hour workshop for secondary and college-level physics teachers.
11. Lattery, M., Elmer, J., Westphal, P., Schmitt, J., Wyrembeck, E. (2005). Modeling Physical Science, UW Oshkosh. Three-week summer institute for secondary physics and physical science teachers.
12. Lattery, M. (2004). Modeling Dynamics, Christa McAuliffe Academy. One-week long summer workshop for secondary and middle school physical science teachers.
13. Lattery, M., Elmer, J., Westphal, & Camp, C. (2005). Modeling Physical Science,
14. Lattery, M., Elmer, J., Westphal, P., & Schmitt, J. (2004). Modeling Physical Science, UW Oshkosh. Three-week summer institute for secondary physics and physical science teachers.
15. Lattery, M., Elmer, J., Westphal, & Camp, C. (2003). Modeling Physical Science, UW Oshkosh. Three-week summer institute for secondary physics and physical science teachers.
16. Lattery, M. and Mahajan, S. (2002). Thought experiments in physics teaching. *American Association of Physics Teachers*, Boise State University. Four-hour workshop for secondary and college-level physics teachers.
17. Lattery, M., Elmer, J., Barnard, B., Camp, C., & Laws, P. (2002). Modeling Physical Science, UW Oshkosh. Three-week summer institute for secondary physics and physical science teachers.
18. Lattery, M. (2002). Multiple intelligences: Teaching physics in a diverse classroom. *Oshkosh Area School District*. Two-hour workshop for secondary science teachers.
19. Lattery, M. (2001). A penny for your thoughts: Thought experiments in physics education. *Wisconsin Association of Physics Teachers*, University of Wisconsin River Falls. Three-hour workshop for secondary and college-level physics teachers.
20. Lattery, M. (2001). Science and technology for children: Sound unit. *Oshkosh Area School District*. Three-hour workshop for pre-college teachers.
21. Lattery, M. (2001). Physics for kids: Incorporating instructional technology in the elementary science classroom. *University of Wisconsin Oshkosh Center for Community Partnerships Classroom Technology Conference*. Three-hour workshop for pre-college teachers.
22. Lattery, M. & Lemberger, J. (2000). Physics level I: Epistemological foundations (K-8). *University of Wisconsin Science Outreach Summer Program*. Five-day workshop for elementary and middle-school teachers (four separate sections).
23. Lattery, M. & Lemberger, J. (2000). Physics level II: Prior knowledge as the raw material for new knowledge in physics (K-8). *University of Wisconsin Science Outreach Summer Program*. Five-day workshop for elementary and middle-school teachers (two sections).
24. Lattery, M. (2000). Operation physics: Electricity and magnetism. *University of Wisconsin Science Outreach Summer Science (SUMS) program*. Three-hour workshop for pre-college teachers.
25. Lattery, M. (2000). Operation physics: Sound. *University of Wisconsin Science Outreach Summer Science (SUMS) program*. Three-hour workshop for pre-college teachers.

## GRANT ACTIVITIES (*selected*)

### External

1. \*Lattery, M. (2008-2010). Research on student model formation and development, *Spencer Foundation* (\$37,000).
2. Lattery, M. (2004-2006). Modeling Physical Science. ESEA Title II Professional Development Program (\$108,000).
3. Lattery, M. (2005). Masters of Physics Education. PASCO Scientific & Vernier Software and Technology (\$15,000)
4. Lattery, M. (2002-2004). Modeling Physical Science. WEITQ Title II Development Program, Bruce Yakely Fund, Leach Company, and Bemis-Curwood Inc. (\$106,000).

### Internal

1. Lattery, M. (2018). UW Oshkosh Sabbatical.
2. Lattery, M. (2016-2017). Programmable air-pulsed carts. *University of Wisconsin Oshkosh Faculty Development Program* (\$7,700 plus 7.5% salary).
3. Lattery, M. (2016). Myanmar Physics Education Project (Small Grant Component). UW Oshkosh Faculty Development Board, \$750.
4. Lattery, M. (2015-2016). Student thinking and reasoning with mechanical models in physics. *University of Wisconsin Oshkosh Faculty Development Program* (\$7,700 plus 7.5% salary).
5. Lattery, M. (2009-2014). Research on student model formation and development, *University of Wisconsin Oshkosh External Expansion Program* (\$13,000).
6. Lattery, M. (2008). UW Oshkosh Sabbatical. Visiting scholar at Cornell University, NY.
7. Lattery, M. (2006). Modeling Dynamics Project. *Wisconsin Teaching Scholar Program*. University of Wisconsin System (OPID) and the UW Oshkosh Provost's Office (\$4,000).
8. Lattery, M. (2001-2002). Student understanding of the spring model. *University of Wisconsin Oshkosh Faculty Development Program* (7.5% salary).



## RECENT PROFESSIONAL SERVICE (*selected*)

### External Service

Topic Editor, [Focus on Science Education](#), *Frontiers in Education* (2018-present)

Wisconsin Association of Physics Teachers

—Past President (2017-2018, 2006-2007)

—President (2016-2017, 2005-2006)

—Vice President and Program Chair (2015-2016, 2004-2005)

National Science Foundation (NSF), Panelist (2011-present)

—Science, Technology, Engineering, and Mathematics + Computers (STEM + C)

—Transforming Undergraduate Education in Science (TUES)

—Mathematics and Science Partnerships (MSP)

International History, Philosophy, and Science Teaching Group, Nominating Committee, Member (2008-2011)

American Association of Physics Teachers, Chair, History Philosophy of Physics Committee (2003-2005)

*Physical Review Special Topics-Physics Education Research*, Reviewer

*Science & Education*, Reviewer

### University/College

Faculty Senate, Senator (elected) (2009-2012)

Institutional Review Board (2009-2012)

Scholarship of Teaching and Learning (SoTL)

—Steering Committee (2008-2010)

—Faculty Mentor (2005-present)

### Department of Physics/Astronomy

Department Co-Chair (2017-present)

Department Vice Chair (2015-2017)

Next Generation Modeling Courses, Director (2017-present)

MSE Secondary Education in Physics, Graduate Coordinator (2008-2013)

Department Committee Chair/Member (1997-present)

—Assessment Committee

—Search and Screen

—Student Recruitment

—Tenure, Review, and Promotions

Student Physical Society (SPS), Faculty Advisor (2008-2015)