

Suzanne White Brahmia

Education

Ph.D. Physics, Rutgers University	2014
Dissertation title: Mathematization in Introductory Physics	
Dissertation Advisor: Eugenia Etkina	
M.S. Physics, Rutgers University	2013
<i>ABD</i> ; PhD program, Physics, Cornell University	1993
Thesis title: Premelting in a Li:Al Alloy	
Research Advisor Robert Cotts	
B.S. Physics, University of Washington	1986

Professional Experience

Assistant Professor University of Washington, Department of Physics	2017-Present
Associate Professor of Teaching Director, STEM TRIAD (Transformations, Research, Instructional practices, Assessment and Dissemination) Coalition Rutgers University, School of Arts and Sciences	2015-2016
Director, Physics Gateway Program Rutgers University Physics Department, Piscataway, NJ	1993 - 2016
Associate Director, Math and Science Learning Center Rutgers University Physics Department, Piscataway, NJ	1993 –2015
Teaching Assistant Cornell University Department of Physics, Ithaca, New York.	1990-1993
Peace Corps Volunteer United States Peace Corps, Gabon, Africa.	1987-1989

Funding

Funded Projects

1. University of Washington Curricular Commons Innovation Fund 2020, Facilitating and guiding collaborative group dynamics to help improve students' collective intelligence in the large-enrollment calculus-based introductory physics course, (Grant total award \$27,637, PI)
2. National Science Foundation DUE IUSE-1832836; Collaborative Research: Physics Inventory of Quantitative Literacy; with T.I. Smith and A. Boudreaux 2018-2021 (Grant total award \$340,000, PI 77% at UW)
3. University of Washington Student Technology Fee Winter 2019, Virtual Reality Hardware for VR Education, Outreach, and Education Research, with Jared Canright (Grant total award \$14,938, PI)
4. NJ DOEd Math Science Partnership: NGSS Implementation; with E. Etkina, R. Duncan, C. Chin, D. Shernoff, 2016-2018 (Grant total award \$720,000, Co-PI)

5. National Science Foundation TUES-1045250, 1045227, 1045231 — Collaborative Project: Developing Proportional Reasoning in a Physics Context with Invention Tasks with A. Boudreaux and S. Kanim 2011-2014 (Grant total award \$200,000, PI 33% at Rutgers)
6. National Science Foundation DRL-0733140-- PUM (Physics and Mathematics) Exploration, with E.Etkina, A.Van Heuvelen 2008-2010 (Grant total award \$300,000, Co-PI)
7. National Science Foundation CCLI-EMD DEU-0088906 — ISLE Investigative Science Learning Environment: Science and Cognition Combined, with A.Van Heuvelen, E.Etkina, and X. Zou. 2001-2003 (Grant total award \$500,000, Co-PI)
8. Rutgers Teaching Excellence Center – Laboratory Improvements for Engineering Physics 1998 (Grant award \$10,000, PI)

Pending Proposal

1. Institute of Education Sciences , Collaborative Research — Building a computerized adaptive testing powered diagnostic tool to improve classroom assessment in large college gateway courses; Co-PI with Chun Wang(UW); PI: Hua-Hua Chang (Purdue University) (Co-PI, 2.5% total award of \$833,288)

Proposals in preparation

1. Facebook: Responsible innovation in AR/VR: “Consider Everyone”— Comparing In-headset and Observer Experiences in Challenging Virtual Reality Physics Activities, with J. Canright (UW) *Submission 10/2020*
2. National Science Foundation DUE IUSE; Collaborative Research — AMMPR: Analyzing and Mapping Mathematics-based Physics Reasoning; with T. Smith (Rowan University) *Submission 11/2020*
3. National Science Foundation DUE IUSE — ATIPQL: Adapting Tutorials to Improve Physics Quantitative Literacy; with P. Shaffer (UW) *Submission 01/2021*

Publications

Peer-reviewed Journal articles

1. **White Brahmia, Suzanne**, Olsho, Alexis, Smith, Trevor I., & Boudreaux, Andrew (2020). Framework for the natures of negativity in introductory physics. *Phys. Rev. Phys. Educ. Res.*, 16, 010120, 14 pages.
[doi:10.1103/PhysRevPhysEducRes.16.010120](https://doi.org/10.1103/PhysRevPhysEducRes.16.010120)
<https://link.aps.org/doi/10.1103/PhysRevPhysEducRes.16.010120>
2. **White Brahmia, S.**, Boudreaux, A., & Kanim, S.E. (2020). Developing Mathematization with Physics Invention Tasks. *American Journal of Physics (accepted for publication)*. 14 pages.
<https://arxiv.org/abs/1602.02033>
3. **White Brahmia, S.** (2019). Quantification and its importance to modeling in introductory physics. Invited paper, Focus Collection on Modeling in Physics Instruction, *European Journal of Physics*, 40(4), 044001. 13 pages
[doi:10.1088/1361-6404/ab1a5a](https://doi.org/10.1088/1361-6404/ab1a5a)
<https://iopscience.iop.org/article/10.1088/1361-6404/ab1a5a>
4. Olsho, A., **White Brahmia, S.**, Smith, T.I., & Boudreaux, A. (2019). When negative is not “less than zero”: electric charge as a signed quantity. *The Physics Teacher (in press)*. 6 pages.
<http://arxiv.org/abs/2007.08686>

5. Eugenia Etkina, Alan Van Heuvelen, **Suzanne White Brahmia**, David T. Brookes, Michael Gentile, Sahana Murthy, David Rosengrant, & Aaron Warren (2006). Scientific abilities and their assessment. *Phys. Rev. ST Phys. Educ. Res.*, 2(2). 15 pages.
<https://www.per-central.org/items/detail.cfm?ID=4845>
6. **Suzanne Brahmia**, & Eugenia Etkina (2001). Switching Students ON to Science: An Innovative Course Design for Physics Students. *Journal of College Science Teaching*, 31(3), 183–187.
<http://www.jstor.org/stable/42992220>

Peer-reviewed conference proceedings

7. Zimmerman, C., Olsho, A., Smith, T.I., Eaton, P., Boudreaux, A., & **White Brahmia, S.** (2020). Exploring student facility with “goes-like” reasoning in introductory physics. In *Physics Education Research Conference 2020*, 4 pages. doi:10.1119/perc.2020.pr.Zimmerman
<https://www.compadre.org/per/items/detail.cfm?ID=15549>
8. Smith, T.I., Eaton, P., Boudreaux, A., Zimmerman, C., Olsho, A., & **White Brahmia, S.** (2020). Toward a valid instrument for measuring physics quantitative literacy. In *Physics Education Research Conference 2020*, 4 pages. doi:10.1119/perc.2020.pr.Smith_T
<https://www.compadre.org/per/items/detail.cfm?ID=15531>
9. Olsho, A., **White Brahmia, S.**, Zimmerman, C., Smith, T.I., Eaton, P., & Boudreaux, A. (2020). Online administration of a reasoning inventory in development. In *Physics Education Research Conference 2020*, 4 pages. doi:10.1119/perc.2020.pr.Olsho
<https://www.compadre.org/per/items/detail.cfm?ID=15512>
10. Boudreaux, A., Kanim, S. E., Olsho, A., **White Brahmia, S.**, Zimmerman, C., & Smith, T.I. (2020). Toward a framework for the natures of proportional reasoning in introductory physics. In *Physics Education Research Conference 2020*, 4 pages. doi:10.1119/perc.2020.pr.Boudreaux
<https://www.compadre.org/per/items/detail.cfm?ID=15457>
11. Canright, J.P., Olsen, J.R, **White Brahmia, S.** (2020). Leveraging virtual reality for student development of force models in the introductory lab. In *Physics Education Research Conference 2020*, 4 pages. doi:10.1119/perc.2020.pr.Canright
<https://www.compadre.org/per/items/detail.cfm?ID=154562>
12. **White Brahmia, S.**, Olsho, A., Boudreaux, A., Smith, T.I, & Zimmerman, C. (2020). A Conceptual Blend Analysis of Physics Quantitative Literacy Reasoning Inventory Items. In *Proceedings of the 23rd Annual Conference on RUME* (pp.853-858).
<http://sigmaa.maa.org/rume/RUME23.pdf>
13. Smith, T.I., Eaton, P., **White Brahmia, S.**, Olsho, A., & Boudreaux, A. (2020). Physics Students’ Implicit Connections Between Mathematical Ideas. In *Proceedings of the 23rd Annual Conference on RUME* (940-946).
<http://sigmaa.maa.org/rume/RUME23.pdf>
14. Zimmerman, C., Olsho, A., Loverude, M., & **White Brahmia, S.** (2020). Identifying Covariational Reasoning Behaviors in Expert Physicists in Graphing Tasks. In *Proceedings of the 23rd Annual Conference on RUME* (976-981)
<http://sigmaa.maa.org/rume/RUME23.pdf>
15. Olsho, A., Zimmerman, C., & **White Brahmia, S.** (2020). A framework of covariational reasoning in introductory physics. In *Proceedings of the 23rd Annual Conference on RUME* (pp. 1263-1264).

<http://sigmaa.maa.org/rume/RUME23.pdf>

16. Smith, T.I., Eaton, P., **White Brahmia, S.**, Olsho, A., & Boudreaux, A. (2019). Using psychometric tools as a window into students' quantitative reasoning in introductory physics. In *Physics Education Research Conference 2019*, 4 pages.
<https://www.per-central.org/items/detail.cfm?ID=15219>
17. Zimmerman, C., Olsho, A., **White Brahmia, S.**, Loverude, M., Boudreaux, A., & Smith, T.I. (2019). Towards understanding and characterizing expert covariational reasoning in physics. In *Physics Education Research Conference 2019*, 4 pages.
<https://www.compadre.org/per/perc/2019/Detail.cfm?id=7830>
18. **White Brahmia, S.**, Olsho, A., Smith, T.I., & Boudreaux, A. (2019). A framework for the natures of negativity in introductory physics. In *Proceedings of the 22nd Annual Conference on RUME* (pp. 68-75).
http://sigmaa.maa.org/rume/RUME22_Proceedings.pdf
19. Olsho, A., **White Brahmia, S.**, Boudreaux, A., & Smith, T.I. (2019). The physics inventory of quantitative reasoning: Assessing student reasoning about sign. In *Proceedings of the 22nd Annual Conference on RUME* (pp. 992-997).
http://sigmaa.maa.org/rume/RUME22_Proceedings.pdf
20. **White Brahmia, S.**, Olsho, A., Smith, T.I., & Boudreaux, A. (2018). NoNIP: Natures of Negativity in Introductory Physics. In *Physics Education Research Conference 2018*, 4 pages.
<https://www.per-central.org/items/detail.cfm?ID=14763>
21. **White Brahmia, S.**, & Boudreaux, A. (2017). Signed Quantities: Mathematics Based Majors Struggle to Make Meaning. In *Proceedings of the 20th Annual Conference on RUME* (pp. 1158-1163).
<http://sigmaa.maa.org/rume/RUME20.pdf>
22. **White Brahmia, S.** (2017). Negative quantities in mechanics: a fine-grained math and physics conceptual blend?. In *Physics Education Research Conference 2017*, 4 pages.
<https://www.per-central.org/items/detail.cfm?ID=14570>
23. **Brahmia, S.**, & Boudreaux, A. (2016). Exploring student understanding of negative quantity in introductory physics contexts. In *Proceedings of the 19th Annual Conference of RUME* (pp. 79-83).
<http://sigmaa.maa.org/rume/RUME19v3.pdf>
24. **Brahmia, S.** (2015). Developing expert mathematization in the introductory physics course: an impedance mismatch. In *Proceedings of 2nd International Conference On Research, Implementation And Education Of Mathematics And Sciences (2nd ICRIEMS)*. 10 pages.
https://faculty.washington.edu/brahmia/media/publications/1505ICRIEMS_Keynote.pdf
25. **White Brahmia, S.** (2008). Improving Learning for Underrepresented Groups in Physics for Engineering Majors. In *Physics Education Research Conference 2008* (pp. 7-10).
<https://www.compadre.org/per/items/detail.cfm?ID=7981>
26. **Suzanne White Brahmia**, & Eugenia Etkina (2001). Emphasizing the Social Aspects of Learning to Foster Success of Students at Risk. In *Physics Education Research Conference 2001*, 4 pages.
<https://www.per-central.org/items/detail.cfm?ID=4382>

Articles under review/revision

27. **White Brahmia, S.**, Olsho, A., Smith, T.I., Boudreaux, A., Eaton, P., & Zimmerman, C. The Physics Inventory of Quantitative Literacy: A tool for assessing mathematical reasoning in introductory physics. (preprint). <https://arxiv.org/abs/2009.10865>

Online curricular projects

28. **White Brahmia, S.**, Boudreaux, A., & Kanim, S.E. (2017). Physics Invention Tasks. <http://faculty.washington.edu/pits>
29. Etkina, E., Van Heuvelen, A., **White Brahmia, S.**, Brookes, D., Gentile, M., Murthy, S., Rosengrant, D., & Warren, A. (2017). Scientific Abilities Rubrics. <https://sites.google.com/site/scientificabilities/rubrics>
30. Etkina, E., **White Brahmia, S.**, Zisk, R., Flakker, J., Bugge, D., Robinson, S., & D'Amato, C. and Blackman, M. (2017). Physics Union Mathematics. <http://pum.rutgers.edu>
31. Lancaster, K., Blanco, J., Reid, S., Barbera, J., **White Brahmia, S.**, Loeblein, P., Parson, R., & Perkins, K. (2011). Build an Atom PhET Simulation. <https://phet.colorado.edu/en/simulation/build-an-atom>

Other Publications

32. **White Brahmia, S.** (2014). Mathematization in introductory physics. *Doctoral Dissertation, Rutgers University Department of Physics*.
[doi:10.7282/T3FB51D8](https://doi.org/10.7282/T3FB51D8)
33. National Research Council (2013). *Adapting to a Changing World: Challenges and Opportunities in Undergraduate Physics Education*. Washington, DC: The National Academies Press.
[doi:10.17226/18312](https://doi.org/10.17226/18312)
<https://www.nap.edu/catalog/18312/adapting-to-a-changing-world-challenges-and-opportunities-in-undergraduate>
34. Lindenfeld, P., & **White Brahmia, S.** (2012). *Physics, the First Science*. Rutgers University Press.
<https://www.google.com/books/edition/Physics/gjunMxEgK-gC?hl=en&gbpv=1&printsec=frontcover>
35. Lindenfeld, P., & **White Brahmia, S.** (2012). Is the textbook obsolete?. *APS Forum on Education Newsletter, Spring 2012*.
<https://www.aps.org/units/fed/newsletters/spring2012/lindenfeld.cfm>
36. **White Brahmia, S.**, Docktor, J., & Mestre, J. (2011). FFER Working Group Report: NRC commissioned report on Undergraduate Physics Education. *APS Forum on Education Newsletter, Fall 2011*.
<https://www.aps.org/units/fed/newsletters/fall2011/scherr.cfm>

Articles Under Preparation

37. **White Brahmia, S.**, Olsho, A., Physics Quantitative Literacy, Book Chapter in *Quantitative Reasoning in Mathematics and Science Education* to be published by Springer in their Series "Mathematics Education in the Digital Era" (book submission in 2021).
38. Olsho, A., Zimmerman, C., & **White Brahmia, S.**, A framework for the natures of covariational reasoning in introductory physics.

39. **White Brahmia, S.**, & Boudreaux, A .and Kanim, S.E.. Obstacles to Mathematization in Introductory Physics.
<http://adsabs.harvard.edu/abs/2016arXiv160101235B>
40. Boudreaux, A., Kanim, S.E., & **White Brahmia, S.** . Student facility with ratio and proportion: Mapping the reasoning space in introductory physics.
<https://arxiv.org/abs/1511.08960>

Invited Talks

1. “A conceptual blend analysis of Physics Inventory of Quantitative Literacy (PIQL) items”, Physics Education Research Conference, 2020
2. “Physics quantitative literacy and learning equity”, Frontiers and Foundations in Physics Education Research Conference NW 2020, *PLENARY* – cancelled due to COVID
3. “Assessing the math+physics conceptual blend: A new mathematical reasoning inventory for introductory physics”, Physics Education Research Conference, 2019
4. “PIQL: A New Assessment of Mathematical Reasoning Development in Physics Instruction”, American Physical Society (APS)_ NW Meeting, Bellingham, WA 2019
5. “PIQL: A New Assessment of Mathematical Reasoning Development in Physics Instruction”, Jackson State University, Department of Physics 2019
6. “PIQL: A New Assessment of Mathematical Reasoning Development in Physics Instruction”, Oregon State University, Department of Physics Colloquium 2019
7. “PIQL: A New Assessment of Mathematical Reasoning Development in Physics Instruction”, Ohio State University, Department of Physics Colloquium 2019
8. “PIQL: A New Assessment of Mathematical Reasoning Development in Physics Instruction”, University of Oregon, Department of Physics Colloquium 2019
9. “Assessing physics quantitative literacy development”, American Association of Physics Teachers (AAPT), Winter meeting 2019
10. “NoNIP: Natures of Negativity in Introductory Physics”, Physics Education Research Conference, 2018
11. “Equity and inclusion by design in calculus-based introductory physics “, North Dakota State University, Department of Physics 2018
12. “Student reasoning about signed quantities in introductory-level physics “, APS NW Annual Meeting 2018
13. “Equity and inclusion by design in calculus-based introductory physics”, APS April Meeting 2018
14. “Developing Mathematical Creativity: Physics Invention Tasks”, Yale University, 2017, Helmsley Trust, STEM Education Series *ENDOWED LECTURE*
15. “Physics Invention Tasks: Developing Mathematical Creativity as a Scientific Practice”, University of Bridgeport, 2017, Invited Special Lecture
16. “A tight conceptual blend of physics context, symbols and operations: Example of Negative Work”, Physics Education Research Conference, 2017
17. “Promoting Student Mathematization using Physics Invention Tasks”, Physics Education Research Conference, 2017
18. “Reducing the DFW rate by design in calculus-based physics”, AAPT Summer Meeting, 2017

19. “Mathematization: A tight cognitive blend of content and practices”, Western Washington University, 2017, Irwin L. Slesnick Symposium *KEYNOTE ADDRESS*
20. “Physics Invention Tasks in Introductory Physics”, South Seattle College, 2017, Invited Special Lecture
21. “Quantification with Physics Invention Tasks”, Research in Undergraduate Mathematics Education National Conference 2017
22. “Mathematization: Enhancing learning by fostering physics creativity”, University of Washington, Seattle, Department of Physics Colloquium 2016
23. “Mathematization: Enhancing learning by fostering physics creativity”, Western Washington University, Department of Physics Colloquium 2016
24. “PER efforts to promote diversity: Challenges and opportunities”, APS April Meeting 2015
25. “From Papergirl to Physicist – the Road Less Traveled”, APS Conference for Undergraduate Women in Physics 2015, *PLENARY*
26. “Developing expert mathematization in the introductory physics course: an impedance mismatch.”, Yogyakarta State University, Yogyakarta, Indonesia, 2015, *KEYNOTE ADDRESS*
27. “Physics invention tasks: Development and impact”, Oregon State University, Department of Physics Colloquium 2015
28. “NGSS, CCSS-Math and the new AP: An opportunity to develop physicists’ ways of thinking”, AAPT - New Jersey Section Spring Meeting 2014, *PLENARY*
29. “Mathematization in Physics Through a Socioeconomic Lens”, Purdue University, West Lafayette, Indiana, 2014
30. “Mathematization in Physics Through a Socioeconomic Lens”, AAPT Summer Meeting, 2014
31. “Adapting to a changing world: Building learning equity in physics”, University of California, Irvine, Department of Physics Colloquium 2014
32. “Establishing a path to mathematization in introductory physics”, AAPT Winter Meeting 2014
33. “Building learning equity through mathematization”, Frontiers and Foundations in Physics Education Research Conference 2013, *PLENARY*
34. James Gerhart Memorial Lecture: “Establishing a path to mathematization in introductory physics, Pacific NW Association for College Physics Annual meeting 2013, *KEYNOTE ADDRESS*
35. “Establishing a path to mathematization in introductory physics”, University of Oregon Department of Physics Colloquium 2013
36. “Using invention tasks to promote students’ proportional reasoning in a physics context”, National Science Foundation TUES- PI Conference 2013
37. “Using Mathematics to Make Sense in Undergraduate Physics” , APS March Meeting 2012
38. “Using Invention Tasks to Promote Sense-making and Proportional Reasoning”, APS and AAPT Physics Teachers Education Coalition Conference 2012
39. “Sense-making in physics: What assumptions are we making about the students?”, AAPT Winter Meeting 2011
40. “Developing Mathematical Reasoning within the Physics Curriculum”, Physics Education Research Conference Summer 2010
41. “Gender and Ethnic Equity in Engineering: How Can Physics Help?”, APS March meeting 2010

42. “Improving Learning for Underrepresented Groups in Physics for Engineering Majors”, AAPT Winter 2009
43. “Physics Textbooks: How and Why are They Used?”, AAPT Summer 2007
44. “Improving Learning for Underprepared Students in Physics”, Princeton University Department of Physics, 2005
45. “From Zululand to the Jersey Shore: Comparing Physics Education in Africa and the U.S.”, AAPT Summer 2004
46. “Recruiting and Retaining Underrepresented Populations: How Can We Help? – the Rutgers Story”, APS/AAPT ; Spring Joint Meeting 2004 New York State Section , *PLENARY*
47. “Fostering Success of At-Risk Students in a Large Enrollment Mechanics Course”, Rutgers University Northeast Regional Teaching Workshop 2000

Contributed talks (since 2017)

1. “Physics Invention Tasks”, American Association of Physics Teachers (AAPT), Summer Meeting Covington, KY, 07/23/17
2. “MLOP: Measurable Learning Objectives Project”, AAPT Summer Meeting Covington, KY 07/25/17
3. “Facilitating and Assessing the Development of Scientific Abilities and Habits of Mind: Introductory E&M and Modern Physics Course Transformation around ISLE Labs and Measurable Learning Objectives”, American Physical Society (APS) MidAtlantic Meeting, Newark, NJ 11/03/17
4. “The new AP Physics 1 & 2 exams: three-year update”, APS National Meeting Columbus, OH 04/14/18
5. “Quantification and its importance to modeling”, APS NW Regional Meeting, Tacoma, WA 06/02/18
6. “PIQL Physics Inventory of Quantitative Literacy” AAPT, Washington DC 07/30 /18
7. “Learning Mathematization in Physics”, UW Physics Department: Phys 528 - Introduction to Research for first year grad students 11/02/18
8. “A Framework for the Natures of Negativity in Introductory Physics”, Research in Undergraduate Mathematics Education (RUME), Oklahoma City, OK 03/02/19
9. “The Physics Inventory of Quantitative Reasoning: Assessing student reasoning about sign”, RUME, Oklahoma City, OK 03/01/19
10. “The new AP Physics 1 & 2 exams”, APS Denver, CO, 04/14/19
11. “PIQL: A New Assessment of Mathematical Reasoning Development in Physics Instruction”, APS Denver, CO, 04/14/19
12. “Teaching Gauss' Law using Virtual Reality: Motivation and Implementation”, APS NW, Bellingham, WA 05/18/19
13. “The natures of covariational reasoning in introductory physics”, APS N, Bellingham, WA, 05/18/19
14. “Comparing Covariational Reasoning of Experts in Physics and in Mathematics”, AAPT, Provo, UT 07/23/19
15. “A Method for Measuring Resource Activation in Physics Quantitative Literacy”, AAPT, Provo, UT 07/23/19
16. “A Conceptual Blend Analysis of Physics Quantitative Literacy Reasoning Inventory Items”, RUME, Boston, MA 02/29/20

17. "Identifying Covariational Reasoning Behaviors in Expert Physicists in Graphing Tasks", RUME, Boston, MA, 02/27/20
18. "Physics Students' Implicit Connections Between Mathematical Ideas", RUME, Boston, MA, 02/29/20

Poster Presentations (since 2017)

1. Andres, D., Ruggieri, C., Etkina, E., **White Brahmia, S.** A large-enrollment course transformation centered on ISLE labs: learning objectives help develop a shared vision with non-PER faculty. Poster presented at: Physics Education Research Conference; July 26th-27th, 2017; Covington, KY.
2. Emenike, M., **White Brahmia, S.**, Faerovitch, M., Ruggieri, C., Introductory chemistry and physics: investigating cognitive and affective domains. Poster presented at: Transforming Research in Undergraduate STEM Education (TRUSE) Conference, July 5 - July 9, 2017; University of St. Thomas, Minnesota.
3. Ruggieri, C., **White Brahmia, S.** Catalyzing Sustained Transformations in a Large Enrollment Introductory Electromagnetism Course. Poster presented at: Transforming Research in Undergraduate STEM Education (TRUSE) Conference, July 5 - July 9, 2017; University of St. Thomas, Minnesota.
4. T. I. Smith, **S. W. Brahmia**, A. Olsho, A. Boudreaux, P. Eaton, P. J. Kelly, K. J. Louis, M. A. Nussenbaum, and L. J. Remy, Developing a reasoning inventory for measuring physics quantitative literacy, Poster presented at: American Association of Physics Teachers (AAPT) Conference, July 28 – Aug 1, 2018; Washington, D.C.
5. **White Brahmia, S.**, Olsho, A., Smith, T.I., Boudreaux, A, Natures of Negativity in Introductory Physics (NoNIP), Poster presented at: American Association of Physics Teachers (AAPT) Conference, July 28 – Aug 1, 2018; Washington, D.C.
6. **White Brahmia, S.**, Olsho, A., Smith, T.I., Boudreaux, A, Assessing physics quantitative literacy development, Poster presented at: American Association of Physics Teachers (AAPT) Winter Conference, Jan 12-15, 2019; Houston, TX
7. T. I. Smith, **S. W. Brahmia**, A. Olsho, A. Boudreaux, P. Eaton, Developing a Reasoning Inventory for Measuring Physics Quantitative Literacy, Poster presented at: Research in Undergraduate Mathematics (RUME) Conference, Feb 28-March 3, 2019, Oklahoma City, OK.
8. Olsho, A., **White Brahmia, S.**, Zimmerman, C., A Framework of Covariational Reasoning in Introductory Physics, Poster presented at: Research in Undergraduate Mathematics (RUME) Conference, Feb 27-Feb 29, 2020, Boston, MA.
9. T. I. Smith, P. Eaton, **S. W. Brahmia**, A. Olsho, A. Boudreaux, C. DePalma, V. LaSasso, C. Whitener, and S. Straguzzi, Using psychometric tools as a window into students' quantitative reasoning in introductory physics, Poster presented at: Physics Education Research Conference, July 28 – Aug 1, 2018; Provo Utah.
10. Zimmerman, C., Olsho, A., Loverude, M., Boudreaux, A., Smith, T. I. and **White Brahmia, S.**, Toward Understanding and Characterizing Expert Physics Covariational Reasoning, Poster presented at: Physics Education Research Conference, July 28 – Aug 1, 2018; Provo Utah.

Honors, Awards and Certificates

1. Education Equal Opportunity Fund (EOF) Champion (2004)
State of New Jersey Commission of Higher EOF Fund Board of Directors, awarded for “developing new approaches that have a significant impact on EOF students.”
2. Outstanding Teacher of the Year (2000)
Awarded by Rutgers University chapter of the Society of Physics Students
3. Rutgers University Outstanding Professor (2000)
Rutgers chapter of the Delta Gamma sorority, "for motivating female students to reach their highest potential"
4. US Department of Education GAANN Fellowship (1992-93)
5. Certificate of Secondary School Teacher Preparation (1987)
U.S. Peace Corps Teacher Training Program
6. University of Washington Department of Physics, Departmental Honors (1986)

Professional Service

UW Departmental, College and University Committees

1. Conference for Undergraduate Women in Physics (CUWIP) Co-PI, held at the UW 2019
2. UW Department of Physics Committees:
 - a) Strategic Planning Committee (2020-present)
 - b) First Year Graduate Student Advising Committee (2018-present)
 - c) Physics 12x Committee (2017-present)
 - d) Physics Lab Transformation Sub-Committee (2017-present)
 - e) Physics Colloquium Committee (2016-2019)
 - f) Physics Graduate Admissions Committee (2016-2018)
3. Dissertation Committees *ongoing*
 - a) Department of Physics (Lisa Goodhew, Sheh Lit Chang) (2018-2020)
 - b) Department of Applied Mathematics (Charles Fieseler) (2019-2020)
 - c) Outside Committee member:
 - Eugene Geiss in the Department of Psychometrics in the Graduate School of Education , Rutgers University (2017-2020)
 - Trevor Volkwyn in the Department of Physics and Astronomy, Uppsala University (2020-present)
4. Research Advisor
 - a) Graduate students
 - Yasmene Elhady, University of Washington, Dept of Physics, 2020-present
 - Charlotte Zimmerman, University of Washington, Dept of Physics, (2018-present)
 - Jared Canright, University of Washington, Dept of Physics, (2018-present)
 - b) Post docs
 - Alexis Olsho, University of Washington, Dept of Physics, (2017-present)
 - Chaz Ruggieri , Rutgers, Dept of Physics and Astronomy, (2016-2018)

National Committees

1. Physics Education Research Conference *Organizing Committee (2020-present)*
2. American Physical Society Topical Group on Physics Education Research
Executive Board Member-at-large, (2019-present)
3. American Association of Physics Teachers - Diversity and Inclusion
Website Task Force(2019-present)
4. College Board Advanced Placement(AP)

- a) AP Physics 1 - Development Committee *Higher Education Co-Chair (2017-present)*
- b) AP Physics 1&2 — Special Articulation Committee (2017-2018)
- c) AP Physics 1 - Development Committee *Higher Education Representative (2016-2017)*
- d) AP Physics 2 — Standards Setting Committee for new AP physics *Higher Education Representative (2015)*
5. Physics Education Research Conference *Organizing Committee (2016-2017)*
6. Project Evaluator: Foundational Research on Problem Mathematization in Undergraduate Physics; NSF-DUE #1430967 (2015-2017)
7. National Research Council *Committee on Undergraduate Physics Education (2010-2013)*
8. Next Generation Science Standards
New Jersey representative for college readiness in physics and for NGSS implementation. (2012-2016)
9. Reviewer
 - a) Book reviewer - *Springer*
 - b) Grant proposal reviewer - *National Science Foundation*
 - c) Manuscript reviewer - *Physical Review-Physics Education Research, American Journal of Physics, American Physical Society - Physics Education Research Conference Proceedings, The Physics Teacher, European Journal of Physics, Research for Undergraduate Mathematics Education Conference Proceedings*

Professional Development Workshops (leader)

1. Jackson State University, Jackson, MS, 2019, Workshop, “Problem Solving Readiness: Linking Disparate Knowledge to Expedite Undergraduate Transitions from STEM Aspirations to STEM Learning.”
2. University of Bridgeport, Bridgeport, CT, November 2017, Workshop, “Physics Invention Tasks”
3. AAPT (American Association of Physics Teachers) Workshop, Summer 2017
“Physics Invention Tasks: Developing Mathematical Creativity as a Scientific Practice”
4. Western Washington University, Bellingham, WA, April 2017, Irwin L. Slesnick Symposium
“Physics Invention Tasks”
5. Research in Undergraduate Mathematics Education National Conference, San Diego, CA, Feb 2017,
“Education Research at the Interface of Mathematics and Physics: Mathematization of Introductory Physics”
6. NJ_DOEd MSP July 2016 “Mathematization and NGSS”
7. FFPER Puget Sound July 2016 “Physics Invention Tasks”
8. AAPT Workshop, Summer 2015 “Strengthening Mathematical Sensemaking in Physics”
9. Yogyakarta State University, Yogyakarta, Indonesia, May 2015 “Using Invention Instruction to Develop Mathematical Sensemaking”
10. AAPT Workshop Summer 2014 “Strengthening Mathematical Sensemaking in Physics”
11. AAPT Workshop Summer 2014 “Physics Union Mathematics (PUM)”
12. PUM Workshop 2014 For Nj Middle School And High School Teachers “Invention Instruction To Develop Proportional Reasoning”
13. University of California, Irvine 2014 “Reducing the Achievement Gap Using Invention Instruction”
14. AAPT Workshop Winter 2014 “Using Invention Tasks to Promote Mathematical Thinking”

15. AAPT Workshop Summer 2013 “Using Invention Tasks to Promote Sensemaking and Proportional Reasoning”
16. PUM Workshop 2013 for NJ middle school and high school teachers “Invention instruction to develop proportional reasoning”
17. AAPT Workshop Winter 2013 “Reducing the Achievement Gap Using Invention Instruction”
18. Physics Teachers Education Coalition Workshop 2012, “Using Invention Tasks to Promote Sense-making and Proportional Reasoning”
19. PUM Workshop 2012 for NJ middle school and high school teachers “Invention instruction to develop proportional reasoning” PUM Workshop 2011 for NJ middle school and high school teachers “Invention instruction to develop proportional reasoning”
20. PUM Workshop 2010 for NJ middle school and high school teachers “Invention instruction to develop proportional reasoning”

Teaching Experience

2019-present	Introduction to Experimental Physics– University of Washington
2019	Graduate Ind. Study: Mathematization in introductory physics - University of Washington
2019	Graduate Ind. Study: Learning with Virtual Reality in E&M - University of Washington
2018	Graduate Ind. Study: Student Design in Introductory Labs - University of Washington
2017	Graduate Ind. Study: Affective measures in introductory physics - University of Washington
2018-present	Introductory Physics Laboratory – University of Washington
2017-2018	Introductory Physics: mechanics – University of Washington
2014-2016	Intro. Physics: mechanics, thermodynamics, waves, E&M, Modern Physics - Rutgers Univ.
2010-2012	High school Physics – Noor Ul Iman School, NJ
2009-2010	High school Physical Science – Noor Ul Iman School, NJ
2008-2009	7 th grade physical science – Noor Ul Iman School, NJ
1993-2016	Gateway Physics course: introductory mechanics, thermodynamics, waves - Rutgers Univ.
1992 (spring)	Intro. Physics for Scientists: Mechanics and Thermo. – Cornell University
1991 (spring)	Intro. Physics for Engineers: Waves and Modern Physics – Cornell University
1990 (fall)	Intro. Physics for Engineers: Electricity and Magnetism – Cornell University
1987-1989	Middle School Physical Science– Lycee d’Etat Makokou Gabon
1987-1989	High school Physics– Lycee d’Etat Makokou Gabon
1987-1989	High school Chemistry – Lycee d’Etat Makokou Gabon
1986-1987	Electronics Lab – University of Washington