

Zosia Krusberg

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Education

Ph.D. Physics

University of Chicago, 2011

M.S. Physics

University of Chicago, 2007

Ed.M. Mind, Brain, and Education/Physics Education

Harvard University, 2006

S.M. Physics and Astronomy

Dartmouth College, 2005

A.B. Physics and Astronomy, *summa cum laude*

Dartmouth College, 2004

Professional Experience

Associate Professor of Instruction

Department of Physics and Astronomy
Weinberg College of Arts and Sciences
Northwestern University
2016 – present

Helmsley Postdoctoral Teaching Scholar

Department of Physics and
Center for Teaching and Learning
Yale University
2015 – 2016

Visiting Assistant Professor

Department of Physics and Astronomy
Vassar College
2011 – 2015

Graduate Research Assistant

Enrico Fermi Institute and
Department of Physics
University of Chicago
2007 – 2011

Undergraduate and Graduate Research Assistant

Department of Physics and Astronomy
Dartmouth College
2002 – 2005

Fields of Research Interest

Theoretical particle physics and cosmology; mind, brain, and education; physics and astronomy education; educational technologies; contemplative practice in higher education.

Grants and Fellowships

NASA Space Grant Award (\$5,000), Northwestern University, Spring 2018.
Vera Rubin '48 Fund Award (\$2,000), Vassar College, Spring 2016.
Vera Rubin '48 Fund Award (\$1,000), Vassar College, Summer 2015.
Ford Scholar Fellowship (\$5,000), Vassar College, Summer 2015.
Undergraduate Research Summer Institute Fellowship (\$5,000), Vassar College, Summer 2015.
Carolyn Grant '36 Endowment Award (\$3,000), Vassar College, Spring 2015.
Dean of the Faculty Grant (\$1,000), Vassar College, Fall 2014.
Carolyn Grant '36 Endowment Award (\$1,000), Vassar College, Fall 2014.
Dean of the Faculty Grant (\$1,000), Vassar College, Fall 2013.
Vera Rubin '48 Fund Award (\$1,000), Vassar College, Fall 2013.
Carolyn Grant '36 Endowment Award (\$1,000), Vassar College, Summer 2013.
Diving Into Research Fellowship (\$3,000), Vassar College, Summer 2013.
Undergraduate Research Summer Institute Fellowship (\$10,000), Vassar College, Summer 2013.
Robert G. Sachs Fellowship (\$10,000), University of Chicago, June 2007.
NASA Space Grant Award (\$5,000), Dartmouth College, May 2003.

Honors and Awards

Scientific Teaching Mentor, Summer Institutes on Scientific Teaching, HHMI, 2016 – 2017.
Wayne C. Booth Prize for Excellence in Teaching Finalist, University of Chicago, 2007 – 2010.
Leadership in Education Award, Harvard University, September 2005.
Hazeltine Chemistry-Physics Prize, Dartmouth College, June 2004.
Phi Beta Kappa, Dartmouth College Chapter, June 2004.
Sigma Xi Scientific Research Society, Dartmouth College Chapter, June 2004.
Presidential Scholar, Dartmouth College, 2002 – 2004.
Sigma Xi/Christopher Reed Science Competition Winner, May 2004.
Rockefeller Leadership Fellow, Dartmouth College, 2003 – 2004.
Golden Key National Honour Society, Dartmouth College Chapter, May 2002.
National Society of Collegiate Scholars, Dartmouth College Chapter, May 2001.

Research

Preprints

Zosia A. C. Krusberg and Meredith Jane Ward. Classical physics and human embodiment: The role of contemplative practice in integrating formal theory and personal experience in the undergraduate physics curriculum. Submitted to *The Journal of Contemplative Inquiry*, arxiv.org/1804.05748.

Peer-Reviewed Publications

Maria Beltrán, Dan Hooper, Edward W. Kolb, Zosia A. C. Krusberg, and Tim M. P. Tait. Maverick dark matter at colliders. *Journal of High Energy Physics* **1009**, 037 (2010).

Maria Beltrán, Dan Hooper, Edward W. Kolb, and Zosia A. C. Krusberg. Deducing the nature of dark matter from direct and indirect detection in the absence of collider signatures of new physics. *Physical Review D* **80**, 043509 (2009).

Zosia A. C. Krusberg. Emerging technologies in physics education. *Journal of Science Education and Technology* **16**, 401 (2007).

Zosia A. C. Krusberg and Brian Chaboyer. UBVI CCD Photometry of the old open cluster Berkeley 17. *Astronomical Journal* **131**, 1565 (2006).

Other Publications

Zosia A. C. Krusberg. The phenomenology of maverick dark matter. *Doctoral Dissertation*. University of Chicago (2011).

Zosia A. C. Krusberg. A chronology of galaxy formation: The ages of high-metallicity globular clusters and old open clusters of the Milky Way. *Master's Thesis*. Dartmouth College (2005).

Zosia A. C. Krusberg. VI CCD Photometry of old open clusters NGC 188, Berkeley 12, Berkeley 17, and Berkeley 31 and the formation of the Milky Way. *Undergraduate Honors Thesis*. Dartmouth College (2004).

Conference and Workshop Participation

Conference for Undergraduate Women in Physics, American Physical Society, Northwestern University, January 2019.

International Symposium for Contemplative Studies, Mind and Life Institute, October 2018.

TEACHx, Northwestern University, May 2018.

Conference for Undergraduate Women in Physics, American Physical Society, Iowa State University, January 2018.

Winter Meeting, American Association of Physics Teachers, January 2018.

Partnership for Integration of Computation into Undergraduate Physics (PICUP) Departmental Development Workshop, Northwestern University, November 2017.

April Meeting, American Physical Society, January 2017.

Integrating Computation into the Undergraduate Physics Curriculum Workshop, American Physical Society, January 2017.

Learning, Teaching, and Assessment Forum, Northwestern University, November 2016.

STEM Summer Institute, Howard Hughes Medical Institute, University of Chicago, August 2016.

STEM Summer Institute, Helmsley Charitable Trust, Louisiana State University, July 2016.

Valuing Diversity in Teaching and Learning, Yale University, May 2016.

Mindfulness, MOOCs, and Money in Higher Education: Contemplative Possibilities and Promise, Naropa University, March 2016.

International Symposium for Contemplative Studies, Mind and Life Institute, October 2014.

5th Annual Conference, Association for Contemplative Mind in Higher Education, Amherst College, November 2013.

Contemplative Pedagogy Summer Session, Center for Contemplative Mind in Society, Smith College, August 2013.

Indirect and Direct Detection of Dark Matter, Aspen Center for Physics, February 2011.

Dark Matter in the Universe and Universal Properties of Galaxies: Theory and Observations, École Internationale Daniel Chalonge, Observatoire de Paris, June 2010.

Dark Matter Annihilation and the Interstellar Medium, Fermi National Accelerator Laboratory, September 2009.

Cosmic Cartography: Mapping the Universe from the Big Bang to the Present, Kavli Institute for Cosmological Physics, December 2007.

The Hunt for Dark Matter: A Symposium on Collider, Direct, and Indirect Searches, Fermi National Accelerator Laboratory, May 2007.

Research Presentations and Talks

Contemplative practice in physics education: Reimagining the classical mechanics curriculum

TEACHx, Northwestern University, May 2018.

Northwestern University, Department of Physics and Astronomy, October 2017.

Center for Teaching and Learning, Yale University, Spring 2016.

Academic Center for Excellence in Research and Teaching, Hunter College, March 2016.

International Symposium for Contemplative Studies, Mind and Life Institute, October 2014.

Association for Contemplative Mind in Higher Education, Amherst College, November 2013.

Illuminating dark matter: Cosmology and particle physics

Northwestern University, Society of Physics Students, February 2017.

Yale University, Department of Physics, May 2016.

Vassar College, Modern Science Talk, April 2015.

Vassar College, New Student Orientation, August 2014.

Arlington Library, Poughkeepsie Public Library District, May 2014.

Vassar College, Vassar Science Scholars Program, March 2014.

Vassar College, Physics 116 Guest Lecture, October 2013.

Vassar College, A Day at Vassar, October 2013.

Vassar College, New Student Orientation, August 2013.

Vassar College, Physics 116 Guest Lecture, November 2012.

Vassar College, Astronomy 101 Guest Lecture, October 2012.

Vassar College, Physics 116 Guest Lecture, November 2011.

Whitman College, Department of Astronomy, April 2011.

Vassar College, Department of Physics and Astronomy, February 2011.

The phenomenology of maverick dark matter

Trinity College, Department of Physics, December 2014.

Williams College, Department of Physics, November 2011.

University of Chicago, Department of Physics, July 2011.

Complexity and emergence

The Helix Center for Interdisciplinary Investigation, November 2014.

Space: A dialogue between contemporary physics and Tibetan Buddhism

Vassar College, Religion/Asian Studies 250 Guest Lecture, March 2014.

Vassar College, Raymond House Lecture, November 2013.

Metacognition and physics problem solving

Vassar College, Physics 116 Guest Lecture, November 2013.

Teaching with technology: Educational technologies in the introductory physics curriculum

Vassar College, Diving Into Research Lecture, July 2013.

Constraints on maverick dark matter from direct detection and collider experiments

Aspen Center for Physics, February 2011.

CEA-Saclay, Institut de Physique Théorique, October 2010.

Université Paris 7, Laboratoire Astroparticule et Cosmologie, September 2010.

Physics education research: Implications for instruction

University of Chicago, Department of Physics, November 2010.

University of Chicago, Department of Physics, November 2009.

University of Chicago, Department of Physics, November 2008.

University of Chicago, Department of Physics, November 2007.

University of Chicago, Department of Physics, November 2006.

Illuminating the dark cosmos: Dark matter, particle physics, and cosmology

Milwaukee Astronomical Society, November 2010.

Whitman College, Department of Astronomy, October 2009.

Maverick dark matter: Direct detection, indirect detection, and the LHC

University of Chicago, Enrico Fermi Institute, November 2009.

Fermi National Accelerator Laboratory, September 2009.

University of Chicago, Department of Astronomy and Astrophysics, September 2009.

Cosmology: The new standard model

Whitman College, Department of Astronomy, October 2009.

Dark matter: Evidence, candidates, experiments

University of Chicago, Ryerson Astronomical Society, October 2008.

Loyola College in Maryland, Department of Physics, September 2008.

Milwaukee Astronomical Society, September 2008.

Research Advising

Alara Ozsan (Engineering/Psychology, Northwestern University '19): Winter 2017.

Luke Mansour (Applied Mathematics/Physics, Northwestern University '20): Winter 2017.

Calais Larson (Cognitive Science, Vassar College '17): Summer 2015.

Project: *Contemplative practice in physics education: Reimagining the classical mechanics curriculum*

Nadav Handel (Physics, Vassar College '17): Summer 2015.

Meredith Ward (Psychological Science, Vassar College '18): Fall 2014 – Summer 2015.

Project: *Contemplative practice in physics education: Reimagining the classical mechanics curriculum*

Zachary Nasipak (Physics/Astronomy, Vassar College '15): Spring 2015.

Thesis: *Constraining maverick dark matter with direct detection experiments*

Currently in the Department of Physics at the University of North Carolina.

Austin Rau (Physics, Vassar College '15): Fall 2014 – Spring 2015.

Thesis: *Knowledge structure coherence and conceptual change classical mechanics*

Currently in the Department of Aerospace Engineering at Iowa State University.

Timothy Serkes (Physics, Vassar College '14): Spring 2014.

Thesis: *Polarized reflection of electromagnetic waves from nonconducting surfaces*

Currently at LUNAR Design.

Benjamin Wills (Cognitive Science, Vassar College '14): Summer 2013 – Spring 2014.

Thesis: *Metacognitive development in physics education*

Currently at The University of Melbourne

Alexander Stas (Mathematics, Vassar College '15): Summer 2013.

Project: *Space—A dialogue between Tibetan Buddhism and contemporary physics*

Currently in the Department of Mathematics at the Graduate Center of CUNY.

Caitlin Rose (Physics/Astronomy, Vassar College '17): Summer 2013.

Project: *Flipping the undergraduate physics classroom*

Currently in the Department of Astrophysical Sciences and Technology at Rochester Institute of Technology.

Professional Associations

American Association of Physics Teachers

American Physical Society

Association for Contemplative Mind in Higher Education

Undergraduate Teaching

Northwestern University

Fundamentals of Physics III (Physics 140-3): Spring 2019.
Fundamentals of Physics II (Physics 140-2): Winter 2019.
Fundamentals of Physics I (Physics 140-1): Fall 2018.
General Physics III (Physics 135-3): Spring 2017, Spring 2018, Summer 2018, Spring 2019.
General Physics II (Physics 135-2): Winter 2017, Fall 2017, Winter 2018, Winter 2019.
General Physics I (Physics 135-1): Fall 2016, Summer 2017, Fall 2017, Summer 2018, Fall 2018.

Yale University

University Physics II (Physics 181): Spring 2016.
University Physics I (Physics 180): Fall 2015.

Vassar College

Cosmology (Astronomy 375/Physics 375): Fall 2014.
Elementary Particle Physics (Physics 375): Spring 2012, Spring 2013.
Thermodynamics and Statistical Mechanics (Physics 245): Spring 2015.
Electrodynamics (Physics 240): Fall 2012.
Planetary and Space Science (Astronomy 230): Spring 2014.
Classical Mechanics (Physics 210): Spring 2012, Spring 2013, Spring 2014, Spring 2015.
Fundamentals of Physics II (Physics 114): Spring 2012, Spring 2013, Spring 2014, Spring 2015.
Fundamentals of Physics I (Physics 113): Fall 2011, Fall 2012, Fall 2013, Fall 2014.
Solar System Astronomy (Astronomy 101): Fall 2013.

University of Chicago

Electricity and Magnetism (Physics 132): Winter 2009 (Teaching Assistant and Laboratory Instructor).
Waves, Optics, and Heat (Physics 133): Spring 2007, Spring 2009, Spring 2010 (Teaching Assistant and Laboratory Instructor).
Foundations of Modern Physics II (Physical Sciences 112): Winter 2007 (Teaching Assistant).
Foundations of Modern Physics I (Physical Sciences 111): Fall 2006 (Teaching Assistant).

Dartmouth College

Exploring the Universe: Fall 2004 (Teaching Assistant and Laboratory Instructor).
Introductory Mechanics: Fall 2003 (Teaching Assistant and Laboratory Instructor).

Selected Teaching Evaluation Scores: Northwestern University

Averages over all courses taught at Northwestern University from Fall 2016 to present. Representative averages (Winter 2015 to present), when available, for all instructors teaching the same courses shown in parentheses.

Overall rating of the instruction: 5.76/6.00 (4.14/6.00)

Overall rating of the course: 5.55/6.00 (3.94/6.00)

Effectiveness of the instructor in stimulating your interest in the subject: 5.72/6.00 (3.92/6.00)

Preparation of the instructor for class: 5.88/6.00

Effectiveness with which the instructor communicated course content and ideas: 5.81/6.00

Instructor enthusiasm: 5.95/6.00

Selected Teaching Evaluation Scores: Vassar College

Averages over all courses taught at Vassar College from Fall 2011 to Spring 2015. Representative averages (Spring 2014) for all instructors in the Division of Natural Sciences at Vassar College shown in parentheses.

Course organization: 4.9/5.0 (4.4/5.0)

How well course met its objectives: 4.8/5.0 (4.4/5.0)

Effectiveness of lecture or presentation: 4.7/5.0 (4.1/5.0)

Ability to illuminate difficult material: 4.7/5.0 (4.1/5.0)

Ability to guide discussion: 4.7/5.0 (4.1/5.0)

Openness to students' point of view: 4.9/5.0 (4.4/5.0)

Helpfulness on coursework and individual consultation: 4.8/5.0 (4.3/5.0)

Overall effectiveness of instructor: 4.8/5.0 (4.3/5.0)

Institutional and Community Service

Diversity and Inclusion

Co-Chair, Organizing Committee, 2019 Conference for Undergraduate Women in Physics (CUWiP), Northwestern University, 2017 – present.

Founder, Mentorship Program, The Society of Women in Physics and Astronomy, Northwestern University, 2017 – present.

Founder, The Society of Women in Physics and Astronomy, Northwestern University, 2016 – present.

Society of Women Engineers HeforSWE Initiative Panelist, Northwestern University, Spring 2017

Society of Women Engineers Spring Banquet Faculty Guest, Northwestern University, Spring 2017.

Association of Undergraduate Women in Science Speaker, Northwestern University, Spring 2017.

FemininiTea Speaker, Women's Center, Yale University, Spring 2016.

Undergraduate Women in Science at Yale Speaker, Yale University, Fall 2015.

Advisory Council Member, Women's Power Space, Poughkeepsie, New York, Spring 2015.

Teaching Artist, Women's Power Space, Poughkeepsie, New York, Spring 2015.

Student Advising

Student Advisor, Department of Physics and Astronomy, Northwestern University, 2016 – present.

Student Advisor, Department of Physics, Yale University, 2015 – 2016.

Student Advisor, Department of Physics and Astronomy, Vassar College, 2012 – 2015.

Learning and Teaching Assistant Training and Coordination

Pilot Program Participant, Learning Assistantship Program, Searle Center for Advancing Learning and Teaching, Northwestern University, Spring 2018 – present.

Developer and Instructor, The Teaching and Learning of Physics, Department of Physics and Astronomy, Northwestern University, 2018 – present.

Developer and Instructor, Teaching Assistant Training Program, Department of Physics and Astronomy, Northwestern University, 2017 – present.

Mentored Discussions of Teaching Mentor, Searle Center for Advancing Learning and Teaching, Northwestern University, Spring 2017 – present.

Teaching Fellow Coordinator, Department of Physics, Yale University, 2015 – 2016.

Teaching Assistant Coordinator, Department of Physics and Astronomy, Vassar College, Fall 2013.

Committee Membership

Climate and Diversity Committee, Department of Physics and Astronomy, Northwestern University, 2018 – present.

Undergraduate Curricular Review Committee, Weinberg College of Arts and Sciences, Northwestern University, 2017 – present.

Professor of Instruction Hiring Committee (chair), Department of Physics and Astronomy, Northwestern University, 2017 – present.

Laboratory Renovations Committee, Department of Physics and Astronomy, Northwestern University, 2017 – present.

Teaching Assistantship Committee, Department of Physics and Astronomy, Northwestern University, 2017 – present.

Undergraduate Curriculum Committee, Department of Physics and Astronomy, Northwestern University, 2016 – present.

Lectureship Hiring Committee, Department of Mathematics, Northwestern University, 2016 – 2017.

Climate and Diversity Committee, Department of Physics, Yale University, 2015 – 2016.

Committee on Undergraduate Physics Education, Department of Physics, Yale University, 2015 – 2016.

Outreach Committee, Department of Physics, Yale University, 2015 – 2016.

Contemplative Studies Development Project, Vassar College, Spring 2015.

Carolyn Grant '36 Endowment Steering Committee, Vassar College, 2014 – 2015.

Teaching Activities Committee, Department of Physics, University of Chicago, Fall 2008 – Spring 2009.

Seminar, Workshop, and Journal Club Organization

Science Education Seminar Series, Northwestern University, 2017 – present.

Kelly Roos (Bradley University), PICUP Workshop, Northwestern University, Fall 2017.

Science Education Seminar Series, Center for Teaching and Learning, Yale University, 2015 – 2016.

Science Education Journal Club, Center for Teaching and Learning, Yale University, 2015 – 2016.
 Michele di Pietro (Kennesaw State), Center for Teaching and Learning, Yale University, Spring 2016.
 Noah Finkelstein (CU Boulder), Center for Teaching and Learning, Yale University, Fall 2015.
 John Carlstrom (University of Chicago), Vassar College, Spring 2013.
 Sau Lan Wu (UW Madison), Vassar College, Fall 2012.

Other Teaching and Outreach

Advisory Board Member, Academic Support & Learning Advancement, Searle Center for Advancing Teaching and Learning, Northwestern University, Fall 2017 – present.
 Faculty Fellow, Slivka Science and Engineering Residential College, Northwestern University, Fall 2017 – present.
 Faculty Open Classroom Initiative Participant, Searle Center for Advancing Learning and Teaching, Northwestern University, Winter 2017 – present.
 Society of Physics Students Faculty Speaker, Northwestern University, Winter 2017.
 STEM Summer Institute Instructor, Louisiana State University, July 2016.
 Bulldog Days Participant, Yale University, Spring 2016.
 Scientific Teaching Workshop Instructor, Center for Teaching and Learning, Yale University, Spring 2016.
 Modern Science Speaker, Vassar College, Spring 2015.
 Vassar Science Scholars Program Instructor, Vassar College, Spring 2014.
 A Day at Vassar Instructor, Vassar College, Fall 2013.
 Young Scholars Instructor, Department of Mathematics, University of Chicago, Summer 2010.
 SMART Outreach Program Instructor, Department of Physics, University of Chicago, 2009 – 2010.
 Chicago Academic Achievement Program Instructor, University of Chicago, Summer 2009.
 Seminars for Elementary Specialists and Mathematics Educators Instructor, Department of Mathematics, University of Chicago, Winter 2009.
 Space Explorers Instructor, Kavli Institute for Cosmological Physics, University of Chicago, 2008 – 2009.
 Yerkes Institute Instructor, Kavli Institute for Cosmological Physics, University of Chicago, 2007 – 2009.
 English High School Teaching Fellow, Boston, Massachusetts, Fall 2005.
 Cambridge-Harvard Summer Academy Instructor, Cambridge, Massachusetts, Summer 2005.
 Prison Project Instructor, Woodstock Correctional Facility, Woodstock, Vermont, 2000 – 2002.

Meditation Instruction

Meditation Instructor, Northwestern University, Fall 2017 – present.
 Meditation Instructor, Dharma Ocean Foundation, Fall 2012 – present.
 Meditation Instructor, Yale University, 2015 – 2016.
 Meditation Instructor, Vassar College, 2012 – 2015.
 Meditation Instructor, Dutchess County Jail, Poughkeepsie, New York, Fall 2012.

Press Appearances

Committing to Diversity, The Yale Herald, 13 November 2015.

Racial Controversies Derail Academic Life, The Yale Daily News, 11 November 2015.

Complexity and Emergence, The Helix Center for Interdisciplinary Investigation, November 2014.

Lights on the Lake, Vassar Stories, May 2014.

How Writing Matters, Vassar College Writing Center, April 2013.

Plagiarism Occupies Gray Area, The Miscellany News, 27 February 2013.

The Joy of Discovery: Sau Lan Wu '63, The Vassar Quarterly, Winter 2013.

Naming the God Particle, The BioLogos Forum, July 2012.

Languages

Fluent: English, Swedish.

Advanced: French, Italian.

Intermediate: Egyptian Arabic, Levantine Arabic, Modern Standard Arabic, Moroccan Arabic, Spanish.

Elementary: Russian.

Professional References

Debra M. Elmegreen
Professor of Astronomy on the Maria Mitchell Chair
Vassar College
124 Raymond Avenue
Poughkeepsie, NY 12604, USA
elmegreen@vassar.edu

Elizabeth Morse Luoma
Director, Helmsley STEM Education Program
Center for Teaching and Learning
Yale University
320 York Street
New Haven, CT 06520, USA
elizabeth.morse@yale.edu

Jennifer Frederick
Executive Director, Center for Teaching and Learning
Yale University
301 York Street
New Haven, CT 06511, USA
jennifer.frederick@yale.edu

Michael Schmitt
Chair, Department of Physics and Astronomy
Professor of Physics
Northwestern University
2145 Sheridan Road
Evanston, IL 60208, USA
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Bennett Goldberg
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