



## Zosia A. C. Krusberg

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## Research Interests

Theoretical cosmology; high energy particle physics phenomenology; physics education.

## Education

University of Chicago, Chicago, IL, USA — Ph.D., Physics, 2011 (expected)

University of Chicago, Chicago, IL, USA — M.S., Physics, 2007

Harvard University, Cambridge, MA, USA — Ed.M., Physics Education, 2006

Dartmouth College, Hanover, NH, USA — S.M., Physics and Astronomy, 2005

Dartmouth College, Hanover, NH, USA — A.B., Summa cum Laude, Physics and Astronomy, 2004

## Research Experience

### PH.D. THESIS RESEARCH, UNIVERSITY OF CHICAGO — 2007-PRESENT

Investigated various aspects of dark matter and high energy particle physics phenomenology.

Advisor: Edward W. Kolb

### ED.M. RESEARCH, HARVARD UNIVERSITY — 2005-2006

Investigated numerous issues related to high school and university physics education, including cognitive models of problem solving, educational technologies, and the challenges of urban education in the United States.

Advisors: Howard Gardner, Chris Dede, Laura Hsu, John Collins

### S.M. THESIS RESEARCH, DARTMOUTH COLLEGE — 2004-2005

Determined the ages of high-metallicity globular clusters and old open clusters in the Milky Way to establish a chronology of galaxy formation.

Advisor: Brian Chaboyer

### A.B. HONOR'S THESIS RESEARCH, DARTMOUTH COLLEGE — 2002-2004

Obtained BVI CCD photometric data of oldest known open cluster Berkeley 17 to establish a lower age limit to the Galactic disk.

Advisor: Brian Chaboyer

## Honors and Awards

Robert G. Sachs Fellowship, Department of Physics, University of Chicago — June 2007

Leadership in Education Award, Harvard University — September 2005

Hazeltine Chemistry-Physics Prize, Dartmouth College — June 2004

Rockefeller Leadership Fellow, Dartmouth College — 2003-2004

NASA Spacegrant Award, Dartmouth College — May 2003

## Refereed Publications

“Maverick Dark Matter at the LHC,” Maria Beltran, Dan Hooper, Edward W. Kolb, Zosia A. C. Krusberg, Tim Tait, in preparation

“Toward a curriculum in physics problem solving: A cognitive model and educational implications,” Zosia A. C. Krusberg, in preparation

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

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

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

## Invited Talks and Seminars

“Maverick Dark Matter: Direct detection, indirect detection, and the LHC,” University of Chicago, November 2009

“Physics education research: Implications for instruction,” University of Chicago, November 2009

“Illuminating the dark cosmos: Dark matter, particle physics, and cosmology,” Whitman College, September 2009

“Cosmology: The new standard model,” Whitman College, September 2009

“Dark matter: Evidence, candidates, experiments,” Ryerson Astronomical Society, October 2008

“Dark matter: Evidence, candidates, experiments,” Loyola College in Maryland, September 2008

“Dark matter: Evidence, candidates, experiments,” Milwaukee Astronomical Society, September 2008

“Physics education research: Implications for instruction,” University of Chicago, November 2007

“Physics education research: Implications for instruction,” University of Chicago, November 2006

“Toward a curriculum in problem solving: A cognitive model and educational implications,” Graduate School of Education, Harvard University, May 2006

“Implications of physics education research for the urban high school physics curriculum,” Graduate School of Education, Harvard University, December 2005

## Conference Presentations

“Maverick Dark Matter: Direct detection, indirect detection, and the LHC,” *Dark Matter Annihilation and the Interstellar Medium*, Fermilab, September 2009

“BVI CCD Photometry of old open clusters NGC 188, Berkeley 12, Berkeley 17, and Berkeley 31,” *AAS 203rd Meeting*, Atlanta, Georgia, January 2004

## Teaching and Outreach Experience

**ADVISOR AND INSTRUCTOR; SCIENCE, MATHEMATICS, AND RESEARCH TRAINING (SMART) PROGRAM — 2008-PRESENT**

Advised the formation and implementation of a physics outreach program for students at Woodlawn High School in the South Side of Chicago, and developed and taught laboratory activities for the program.

**INSTRUCTOR; KICP YERKES SUMMER AND WINTER INSTITUTE OUTREACH PROGRAM — 2007-PRESENT**

Designed and implemented physics and astronomy laboratory activities for week-long science institutes for middle and high school students from the South Side of Chicago.

**INSTRUCTOR; CHICAGO ACADEMIC ACHIEVEMENT PROGRAM (CAAP), UNIVERSITY OF CHICAGO — SUMMER 2009**

Taught introductory physics in a program aimed at incoming University of Chicago students from underperforming high schools needing additional scholastic preparation.

**TEACHING ASSISTANT; DEPARTMENT OF PHYSICS, UNIVERSITY OF CHICAGO — 2006-2007, 2008-2009**

Served as a teaching assistant in a wide range of introductory physics courses, including the Foundations of Modern Physics sequence for humanities and social science concentrators.

**COMMITTEE MEMBER; DEPARTMENT OF PHYSICS TEACHING ACTIVITIES COMMITTEE — 2008-2009**

Served as a graduate student representative on the Department of Physics' Teaching Activities Committee (TAC).

**INSTRUCTOR; SEMINARS FOR ELEMENTARY SPECIALISTS AND MATHEMATICS EDUCATORS (SESAME) PROGRAM — WINTER 2009**

Designed and implemented a quarter-long physics course for elementary and middle school science teachers from the Chicago Public School (CPS) system seeking to obtain State of Illinois Endorsement in the Teaching of Science.

**INSTRUCTOR; KICP SPACE EXPLORERS OUTREACH PROGRAM — 2007-2008**

Designed and implemented a year-long physics and astronomy curriculum for middle and high school students from the South Side of Chicago.

**ASSISTANT; KICP COSMOLOGY SHORT COURSE FOR MUSEUM AND PLANETARIUM STAFF — AUTUMN 2007**

Evaluated and provided feedback on participants' proposals for cosmology-themed presentations at museums and planetaria across the United States.

**ASSISTANT TEACHER; RASSIAS FOUNDATION ACCELERATED LANGUAGE PROGRAMS — 2003-2006**

Taught ten-day intensive summer language programs in Arabic, English as a Second Language (ESL), French, and Spanish.

**INSTRUCTOR; ENGLISH HIGH SCHOOL, BOSTON PUBLIC SCHOOLS — AUTUMN 2005**

Co-taught high school physics, engineering, and AP biology classes.

**INSTRUCTOR; CAMBRIDGE-HARVARD SUMMER ACADEMY — SUMMER 2005**

Designed and implemented a high school physics curriculum for a summer academy at Cambridge Rindge and Latin School in Cambridge, Massachusetts.

**ASSISTANT TEACHER; DEPARTMENT OF ASIAN AND MIDDLE EASTERN LANGUAGES AND LITERATURES, DARTMOUTH COLLEGE — 2003-2005**

Taught daily speaking-intensive drill sessions for a year-long introductory Arabic curriculum.

**TEACHING ASSISTANT; DEPARTMENT OF PHYSICS AND ASTRONOMY, DARTMOUTH COLLEGE — 2002-2004**

Served as a teaching assistant, tutor, and study group leader in a wide range of introductory physics and astronomy courses.

**INSTRUCTOR; WOODSTOCK REGIONAL CORRECTIONAL INSTITUTE — 2000-2002**

Designed and implemented a mathematics, physics, and astronomy curriculum for inmates.