

KATHERINE SHIREY

EDUCATION

University of Maryland PhD in Curriculum and Instruction May 2017
Dissertation: *“How do we make this happen?” Teacher challenges and productive resources for integrating engineering design into high-school physics*
Chair: Dr. Andy Elby

University of Virginia Masters of Teaching-Secondary Science Education May 2007
Certification in Secondary Physics
BA double major-Physics and Studio Art. Minor-Art History May 2004

PUBLICATIONS

Shirey, K. (2017) Don't panic: Fostering student engagement with engineering design. *The Source AdvancED*. In press

Shirey, K. (2017) Teacher Productive Resources for Engineering Design Integration in High School Physics Instruction (Fundamental). In *Proceedings of the 2017 ASEE Annual Conference*, Columbus, OH, June 2017. 2017

Shirey, K. (2017) *“How do we make this happen?” Teacher challenges and productive resources for integrating engineering design into high-school physics* (Doctoral dissertation). 2017

Shirey, K. (2016) Epistemological Alignment in Implementation of High School Engineering Instruction. In *Proceedings of the 2016 AERA Annual Conference*, Washington, DC, April 2016. 2016

Shirey, K. (2015) The engineering education epistemology of a science teacher. In *Proceedings of the 2015 ASEE Annual Conference*, Seattle, WA, June 2015. 2015

Johnson, K., Murphy, S., O'Hara, C., & Shirey, K. (2015). The four phases of engineering design. *Kaleidoscope: Educator Voices and Perspectives*, 1(2). 2015

PROFESSIONAL EXPERIENCE

Program Manager	Knowles Science Teaching Foundation Lever Engineering Group	Moorestown, NJ	February 2017 - present
Substitute Teacher	Arlington County Public Schools	Arlington, VA	Spring 2016-present
Teacher of Record	University of Maryland Park, MD Taught EDCI 470: Science Teaching Methods to undergraduate education double majors in Teaching Learning Policy and Leadership at the University of Maryland Education Department.	College	Fall 2014, Fall 2015
Teacher Intern Supervisor	University of Maryland Park, MD Supervised Maryland Science Mathematics Resident Teacher (MSMaRT) Program and Masters Certification (MCERT) program candidates.	College	Spring 2014-Spring 2015
Fellow Assistant	Knowles Science Teaching Foundation Worked with Team 1 (First and Second-Year Fellow Directorate) on planning and execution of physics tasks at Fall, Spring, and Summer meetings, application review, and analysis.	Moorestown, NJ	2013-2014
Physics Teacher	Upward Bound at Univ. of Wisconsin-River Falls Falls, WI Developed and executed engineering, physics and math curriculum to teach high school students about neutrino physics related to the IceCube Neutrino Observatory at the South Pole.	River Falls, WI	Summers 2009-2014
Physics Teacher	Washington-Lee High School Taught IB, standard, and conceptual-level Physics classes.	Arlington, VA	Fall 2007-Spring 2012
Teaching Assistant	Univ. of Virginia, McIntire Dept. of Art Assisted with instruction, critique, and supervision of two university sculpture classes. Used problem solving strategies to aid students; led critiques; and gave class lectures and presentations.	Charlottesville, VA	2004-2005
Teaching Assistant	Univ. of Virginia, Women's Center Instructed a team of students on InDesign and magazine layout design, solicited works, critiqued and graded work.	Charlottesville, VA	2004-2005

HONORS AND RECOGNITIONS

University of Maryland, College of Education Dean's Fellowship Award	2013-2016
NASA Astronaut Candidate Finalist (Top 50)	2012-2013
IceCube Teacher/Researcher Partner U. of Wisconsin, River Falls Selected to participate as teacher liaison to researchers at the IceCube Project, a neutrinos study project at the South Pole Research Station, Antarctica. Developed curriculum to tie polar science to the classroom (summer 2009) and travel to the South Pole in November 2010. Presented at National NSTA (Spring 2012) conference on work completed with Upward Bound IceCube program. Funded fully by the Knowles Science Teaching Foundation, NSF, PolarTREC (formerly TEA) and IceCube (including substitute.)	2009-2012
Knowles Science Teaching Foundation Moorestown, NJ Physical Science Teaching Fellow 2006 Cohort kstf.org Selected for teaching potential and exceptional Physics knowledge, the fellowship is an exclusive award. Benefits include tuition payment and stipend, funding for professional development including a mentor, and classroom improvement materials, involves three yearly meetings, and a nationwide electronic discussion board. Renewable for up to five years.	2006-2011
U.Va. Curry School of Education Scholarship Award	2006
U.Va. Aunspaugh Fellow in the McIntire Art Department Fellowship awarded based on artistic achievement and leadership. Included yearlong seminar, studio space, and job as a sculpture class teaching assistant, wages, and stipend.	2004-2005

SERVICE & INVITED TALKS

Global Grand Challenges Summit <i>Education/Public Engagement Panel</i> July 20, 2017 Sponsors: US National Academy of Engineering (NAE), the UK Royal Academy of Engineering, and the Chinese Academy of Engineering.	Washington, DC July 2017
American Society for Engineering Education <i>Introduction to Engineering Integration</i>	Washington, DC June 2017

June 3, 2017		
National Science Foundation	Arlington, VA	April 2017
Guest Speaker: <i>Science at the South Pole</i>		
Guest Instructor	Greenbelt, MD	October 2015
University of Maryland STEM Leadership Course		
Reviewer	Washington, DC	Fall 2015
Association for Engineering Education Research Conference		
Knowles Science Teaching Foundation	Cherry Hill, NJ	July 2014
Panelist: National Conference Book Panel		
Washington, DC Public Libraries	Washington, DC	Summer 2011
Guest speaker series in DCPL: <i>South Pole Stories</i>		
National Science Foundation	Arlington, VA	March 2011
Guest speaker: <i>South Pole Stories</i>		
Rotary Club	Fairfax, VA	March 2011
Guest speaker: <i>South Pole Stories</i>		
Knights of Columbus	Arlington, VA	March 2011
Guest speaker: <i>South Pole Stories</i>		
WPFW Radio Pacifica	Washington, DC	April 2010
“Our Voices” on April 16, 2010		

PROFESSIONAL INVOLVEMENT

Univ. of Maryland Graduate Assistant	College Park, MD	Fall 2015- Fall 2016
Assisted in coordinating the edTPA educative teacher performance assessment at UMd. Revamped online course presence, recruited local evaluators, managed evaluation of over 300 teacher candidates.		
Math For America	New York, NY	Fall 2016
Course Instructor: <i>Engineering in Science and Math</i>		
Knowles Science Teaching Foundation	Moorestown, NJ	2015 - present
Lever Engineering Leadership Team member		
Knowles Science Teaching Foundation	Fairfax, VA	August 2016 - present
Professional Development Facilitator, Curriculum Planner, Instructional Coach		
<i>FCPS Global STEM Challenges Program at Edison Academy</i>		
Knowles Science Teaching Foundation	Moorestown, NJ	July 2016

Professional Development Facilitator <i>KSTF Signature Program for Engineering in High School Science and Math</i>		
American Education Research Association	Washington, DC	April 2016
National conference roundtable presentation: <i>Epistemological Alignment in Implementation of High School Engineering Instruction</i>		
Presenter	Moorestown, NJ	September 2015
<i>Engineer-ize your classroom</i>		
American Society for Engineering Education	Seattle, WA	June 2015
National conference presentation: <i>The Engineering Education Epistemology of a Science Teacher</i>		
University of Maryland	College Park, MD	April 2015
Graduate Student Organization Poster Session Presentation		
National Science Teacher Association	Chicago, IL	March 2015
National meeting presentations: <i>Engineering Project Slices: How to Use Class Period-Length Physics-Based Engineering Tasks</i> , and <i>Implementing Engineering Practices in a Physics Classroom</i>		
Knowles Science Teaching Foundation	Moorestown, NJ	February 2015
Professional Development Facilitator <i>Engineering Task Force Teacher Developer Professional Development</i>		
University of Maryland	College Park, MD	November 2014
Scribe: <i>Engineering the Education Enterprise</i> Conference		
Knowles Science Teaching Foundation	Cherry Hill, NJ	July 2014
National Conference Presentations: <i>Using Engineering to Authentically Drive Science and Math Instruction</i> , and <i>Kaleidoscope: KSTF's New Online Journal</i>		
Mount de Sales Academy	Baltimore, MD	March 2014
Professional Development Facilitator <i>Engineering Design Principles</i>		
Knowles Science Teaching Foundation	Moorestown, NJ	2013-2014
Team 1 (first and second year Fellows) professional development planner, facilitator, scribe, and application reader. Attendance at three Team 4 meetings: Indianapolis,		

IN, San Francisco, CA, and Cherry Hill, NJ.		
National Science Teachers Association	Indianapolis, IN	March 2012
Presented a workshop for teachers on bringing neutrino physics and cutting edge science to high school students through a “narrative arc” approach.		
IceCube Collaboration Meeting Teacher PD	Madison, WI	April 2011
Collaborated on and presented activities at a workshop on teaching polar science in high schools.		
Student Teacher Mentor VA	Arlington,	Fall 2011
Virginia Association of Science Teachers VA	Richmond,	November 2006
Co-developed and presented a seminar on inquiry and the Nature of Science in secondary science education at the association’s annual meeting.		
International Baccalaureate (IB) Training in Physics Savannah, GA		Fall 2007

Member of:

- Lever Engineering Group Leadership Team at the Knowles Science Teaching Foundation
- Knowles Science Teaching Foundation Senior Fellows
- Physics Education Research Group at the University of Maryland (PERG)
- Engineering Education Research Group at the University of Maryland (EERG)
- The Center for Science and Technology in Education (CSTE)
- American Society for Engineering Education (ASEE)
- American Education Research Association (AERA)

Past member of:

- *Kaleidoscope: Educator Voices and Perspectives* Editorial Board
- Founding member of the Knowles Science Teaching Foundation IB Physics SL planning group (KSTFIBSL)
- American Association of Physics Teachers
- Virginia Association of Science Teachers
- National Science Teachers Association
- The National Scholars Honors Society

RELATED UNIVERSITY OF VIRGINIA EMPLOYMENT

Athletics Tutor 2005-2006
Conducted mini-lectures and homework help for about 15 student athletes in Physics courses.

Layout Editor for Iris Magazine, UVA Women's Center Spring 2005
Directed and designed layout for Iris issue #50. Headed committee of 5 student layout contributors, including managing assignments and grading.

University Recreation employee at Swimming's Cool 2004
summer camp and Poplar Ridge Ropes Course.
Taught swimming to youth and adults, and facilitated team building/ leadership experiences at Poplar Ridge Ropes Course.