

Current Position

Associate Professor of Physics at Shippensburg University

Specialty – Condensed matter physics, materials science engineering

Education

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| Ph.D. | Materials Science Engineering. Purdue University,
West Lafayette, IN.
Thesis Title: <i>Generation of Colloidal Granules and Capsules from Double Emulsion Drops.</i> | 2012 |
| B.S. | Electrical Engineering. The Pennsylvania State University, University
Park, PA. | 2005 |
| B.S. | Applied Physics. Shippensburg University of Pennsylvania, Shippensburg,
PA. | 2005 |

Teaching Experience

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| Associate Professor at Shippensburg University | August 2017 – Present |
| Assistant Professor at Shippensburg University | August 2013 – July 2017 |
| Temporary Full-Time Faculty at Shippensburg University | August 2012 – August 2013 |
| Lead Graduate Assistant, Summer Undergraduate Research Fellowship
Program, Purdue University | January – August 2011 |
| Graduate Assistant Instructor, Structure and Properties of Materials
(MSE230), Purdue University | Spring 2009 |
| Graduate Assistant Instructor, Materials Properties Laboratory (MSE235),
Purdue University | Fall 2007 |
| Materials Engineering Teaching Experience Course, Purdue University | Spring 2009 |

Additional Professional Experience

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| Graduate Research Assistant, Soft Materials Lab (Dr. Carlos Martinez),
Purdue University – <i>trained to operate Purdue University Department of
Materials Science Engineering suite of transmission electron microscopes and
scanning electron microscopes.</i> | 2007 - 2012 |
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Research Mentor, Summer Undergraduate Research Fellowship Program, Purdue University	2009, 2010
Leadership Team, Graduate Mentoring Program, Women in Engineering Program, Purdue University	June 2008 – June 2011
Senior Consultant, Booz Allen Hamilton	May 2005 – July 2007
Intern - Nanofabrication Process Engineer, The National Security Agency – <i>trained scanning electron microscope user; cleanroom laboratories.</i>	June 2004 – August 2004

Teaching Responsibilities at Shippensburg University

UNIV 101 – First Year Seminar	Fall 2019, Spring 2021
PHY 107 Physics First Year Seminar	Fall 2018
PHY 108 Astronomy	Fall 2012, '13, '14; Spring 2017
PHY 110 Physics for Society	Fall 2013
PHY 121 Introductory Physics I	Fall 2012, '13, '16
PHY 123 or 124 Physics I Laboratory	Fall 2015, '16, '17, '18, '20, '21
PHY 125 or 126 Physics II Laboratory	Spring 2013, '14, '16, '17, '18, '19, '20, '21, '22
PHY 205 Intermediate Physics I	Fall 2014, '20, '21
PHY 206 Intermediate Physics II	Spring 2014, '15, '16, '18, '19, '20, '22
PHY 222 Fundamentals of Physics II	Fall 2015
PHY 301 Math & Numerical Techniques	Spring 2015
PHY 311 Quantum I	Spring '13, '14, '15, '17, '22
PHY 321 Electricity & Magnetism I	Fall 2016, '17, '18, '19, '20, '21
PHY 331 Mechanics I	Fall 2019
PHY393 Special Topics – Introduction to Materials	Fall 2015 (Individual Instruction), Spring 2021
PHY 398 Research	Fall 2014
PHY 411 Quantum II	Spring 2016, '18, '19, '20
PHY 421 Electricity and Magnetism II	Spring 2022 (Individual Instruction)
Special Topics – Individual Instruction: Introduction to Fluid Dynamics	Spring 2016; Fall 2017
Special Topics – Individual Instruction: Advanced Quantum Dynamics	Fall 2018
ENGR 300 Engineering Seminar III	Spring 2022

Honors, Awards, Fellowships

Ross Fellowship 2007 - 2008

The Ross Fellowships are for the recruitment of outstanding, Ph.D.-track students to graduate programs at Purdue University.

Women in Engineering Travel Grant 2010

Estus H. and Vashti L. Magoon Award for Excellence in Teaching. College of Engineering, Purdue University. 2008 and 2010

This award recognizes outstanding teaching assistants and instructors through funds generated by a trust established by Estus H. and Vashti L. Magoon.

Outstanding Graduate Student Teacher. Committee for the Education of Teaching Assistants, Purdue University. 2010

This award recognizes graduate teaching assistants for their current teaching efforts at the graduate and undergraduate level.

Professional Societies

American Physical Society 2011 – Present

Materials Research Society 2010 – 2011

American Chemical Society 2008 – 2009

Society of Women Engineers 2000 – 2009, 2018 - Present

Sigma Pi Sigma Physics Honor Society Inducted 2010

Eta Kappa Nu Honor Society Inducted 2004

Phi Kappa Phi National Honor Society Inducted 2003

Ph.D. Thesis

Hess, Kathryn Shirk. 2012. *Generation of Colloidal Granules and Capsules from Double Emulsion Drops.*

Peer-Reviewed Publications

*Indicates Shippensburg University undergraduate student researcher co-author.

1. Collette, Robyn*; Novak, Eric*; Rosen, Daniel*; and **Shirk, Kathryn** (2017). Developing a Protocol for Creating Microfluidic Devices with a 3D Printer. *International Journal of Undergraduate Research and Creative Activities*, 9(1). <http://dx.doi.org/10.7710/2168-0620.1088>

2. Ye, Congwang; Kennedy, Lauren; **Shirk, Kathryn**; Córdova-Figueroa, Ubaldo M.; Youngblood, Jeffrey; and Martinez, Carlos J. (2015). CNC-loaded hydrogel particles generated from single- and double-emulsion drops. *Green Materials*, 3(1), 25-34.
3. **Shirk, Kathryn**; Steiner, Colton; Kim, Jin Woong; Marquez, Manuel; and Martinez, Carlos J. (2013). Assembly of Colloidal Silica Crystals Inside Double Emulsion Drops. *Langmuir* 29(38), 11849-11857.

Peer-Reviewed Presentations at International/National Meetings and Conferences

*Indicates Shippensburg University undergraduate student researcher co-author.

1. American Physical Society (APS) March (National) Meeting, 2018.
Poster: *Direct Comparison of 3D Printed and Conventionally Produced Microfluidic Devices*. Daniel Rosen*, Nathan Bishop*, and **Kathryn Shirk**.
2. American Physical Society (APS) March (National) Meeting, 2018.
Poster: *Computer Simulation of Fluid Flow in microfluidic Devices*. Adam Yosua* and **Kathryn Shirk**.
3. American Physical Society (APS) March (National) Meeting, 2017.
Poster: *Microfluidics Device Simulation in MATLAB*. Michael Foreman* and **Kathryn Shirk**.
4. American Physical Society (APS) March (National) Meeting, 2017.
Poster: *3D Printed Emulsion and Janus Particle Microfluidic Devices*. Daniel Rosen* and **Kathryn Shirk**.
5. American Physical Society (APS) March (National) Meeting, 2017.
Poster: *3D Printed Multi-layer Microfluidic Devices*. Nathan Bishop* and **Kathryn Shirk**.
6. American Physical Society (APS) March (National) Meeting, 2016.
Poster: *Fabrication of a three dimensional particle focusing microfluidic device using a 3D printer, PDMS and glass*. Robyn Collette*, Daniel Rosen*, and **Kathryn Shirk**.
7. American Physical Society (APS) March (National) Meeting, 2015.
Poster: *Developing a protocol for creating microfluidic devices with a 3D printer, PDMS, and glass*. Robyn Collette*, Eric Novak*, and **Kathryn Shirk**.
8. 13th IACIS International Conference on Surface and Colloid Science and the 83rd ACS Colloid & Surface Science Symposium, 2009.
Poster: *Modeling the Osmotically Driven Crystallization Inside Double Emulsion Drops*. **Kathryn S. Hess** and Carlos J. Martinez

Peer-Reviewed Presentations at Regional/Local Meetings and Conferences

“Faculty Development Book Club: *How Learning Works*.” Innovations in Faculty Development Symposium, Shippensburg University, Shippensburg, PA. 2 June 2015

Invited Lectures

“Building Lines of Communication” Advisor Track, Phi Sigma Pi National Convention, Orlando, FL. August 2019

“Colloidal Crystals and Granules Via Double Emulsion Drops.” Championship Competition Seminar, Franklin County Science Fair, Chambersburg, PA. 18 April 2015

“Materials Fabrication – from Metamaterials to Research on a Shoestring.” Rush Hour Seminar Series, Dickinson College, Carlisle, PA. 25 Feb. 2014

“Truth Values” panelist, Shippensburg University 2013

“Generation of Colloidal Crystals Via Double Emulsion Drops.” Sigma Pi Sigma Lecture, Shippensburg University 2010

International and National Professional Development Meetings Attended

American Physical Society (APS) March (National) Meeting, Los Angeles, CA. 2018

American Physical Society (APS) March (National) Meeting, New Orleans, LA. 2017

American Physical Society (APS) March (National) Meeting, Baltimore, MD. 2016

American Physical Society (APS) March (National) Meeting, San Antonio, TX. 2015

Center for Undergraduate Research Institute, “Beginning a Research Program in the Natural Sciences at a Predominantly Undergraduate Institution” North Carolina. 2014

Regional and Local Professional Development Meetings Attended

STEM UP PA – NSF funded multi-institution mentorship program 2013 - 2019

STEM UP PA – OASIS <i>Leadership for Academic Women Professional Development Program</i>	Spring 2015
Innovations in Faculty Development Symposium	2 June 2015
Safe Zone Training, Shippensburg University	2013

Grants Awarded

Undergraduate Research Grant Program, Shippensburg University <i>Awarded \$3930 for undergraduate research project in the design and development of microfluidic devices to create Janus particles, and undergraduate travel to APS (March) meeting.</i>	2016-17
Center for Faculty Excellence in Scholarship and Teaching (CFEST) Faculty Travel Grant, Shippensburg University <i>Awarded up to \$800 to accompany undergraduate researchers to the international APS March meeting and mentor them as they presented our research.</i>	2017
College of Arts and Sciences, Student/Faculty Research Engagement Grant, Shippensburg University <i>Awarded \$1687.50 for students' stipends.</i>	Fall 2016
Center for Faculty Excellence in Scholarship and Teaching (CFEST) Faculty Travel Grant, Shippensburg University <i>Awarded up to \$800 to accompany undergraduate researchers to the international APS March meeting and mentor them as they presented our research.</i>	2016
Undergraduate Research Grant Program, Shippensburg University <i>Awarded \$1655.41 for undergraduate research project in the design and development of microfluidic devices.</i>	2015-16
Center for Faculty Excellence in Scholarship and Teaching (CFEST) Faculty Travel Grant, Shippensburg University <i>Awarded up to \$1270 to accompany undergraduate researchers to the international APS March meeting and mentor them as they presented our research.</i>	2015
Undergraduate Research Grant Program, Shippensburg University <i>Awarded \$1821 for undergraduate research project in the design and development of microfluidic devices.</i>	2014-15

Co-investigator with a biology professor on a second project awarded \$1425 for herpetological studies using radio-telemetry.

College of Arts and Sciences, Student/Faculty Research Engagement Grant, Shippensburg University 2014

Awarded \$3133.87 for the purchase of a 3D printer to be used for microfluidics research.

Summer Undergraduate Research Experience Grant, Shippensburg University 2014

Awarded \$750 for student stipend.

Professional Development

University Service

Leadership Positions

Faculty Liaison/Program Committee Chair, General Education Council 2020 - 2021

Faculty Chair: Program Committee, General Education Council 2018 - 2019

Faculty Co-Chair: APSCUF Enrollment Management Committee 2016 - 2020

Faculty Co-Chair: Welcome Week Planning Committee 2016 - 2020

Faculty Co-Chair: APSCUF Adjunct Committee 2014 - 2016

Faculty Co-Chair: Welcome Week Service-Learning Subcommittee 2015

CFEST Teaching Team Leader (Book Discussion) 2014 - 2015

Committee Membership

Legislative Assembly Delegate, Association of Pennsylvania State College and University Faculties – Shippensburg University (APSCUF-SU) 2017 – 2021

Council on Student Research and Creative Activities 2016 – Present

General Education Council, Shippensburg University 2014 – Present

- Liaison to University Curriculum Committee 2014 – 2015, 2020 – 2021

- Member of Assessment Subcommittee 2014 – 2015

- Member of Program Subcommittee 2015 – 2021

- Member of Budget Subcommittee 2021 - Present

Library Advisory Committee, Shippensburg University 2013 – 2014

Scholarship Committee, Shippensburg University 2013

Bookstore Advisory Committee, Shippensburg University 2013

Activities

Participated in Fall Welcome Week <i>Move-in day, Faculty-Student Soccer Match, Academic Success Conference, Convocation</i>	2012 – 2019, 2021, 2022
Faculty House Calls (residence life volunteer opportunity)	2018, '19
Teaching Team Leader – Book Club, <i>How Learning Works</i> .	2014 - 2015
Faculty Advisor, Phi Sigma Pi National Honor Fraternity, Omicron Chapter, Shippensburg University	2015 - Present
Panelist, Graduate School Information Session, Chemistry Department, Shippensburg University	2013
Judge, Biochemistry Poster Session	2014, '15, '19

Physics Department Service

Faculty Co-Advisor, Physics Club	2013 - Present
Summer Orientation/Scheduling of Incoming Transfer Students	2016
Kresge Grant Proposal Co-Author	
DPAC Committee	2012 - Present
University Open House	

Community Service and Outreach

Judge, Cards Against Humanity's Science Ambassador Scholarship (National Scholarship)	2015 - 2019
Science Night, Nancy Grayson Elementary School	2017-2019
ESTEEM science outreach event – physics lesson/project	2014 - 2019
Chemistry camp – physics demonstration, Shippensburg University	2013 - 2019
STEM camp – physics demonstration, Shippensburg University	2013 - 2016
Judge, Franklin County Science Fair Championship	2013
Women in Engineering Program, Introduce a Girl to Engineering Day	2008 - 2012

Service at Other Institutions

Women in Engineering Program, Graduate Mentoring Program, Purdue University	2007 - 2012
College of Engineering, Graduate School Recruiter, Purdue University	2009 - 2010
Student member of search committee for Associate Director, Women in Engineering Program, Purdue University	Spring 2009

Mentored Student Research

<i>Student, Project</i>	<i>Period</i>
Briana Paey, Application of electron-beam physical vapor deposition of ceramic coatings (co-advising with Dr. John Richardson, Shippensburg University Chemistry Dept.)	Fall 2020
Nathan Bishop, 3D printed templates for multi-layer microfluidic devices.	Fall 2016 – Spring 2018
Michael Foreman, Computer modeling of fluid dynamics	Spring 2016 - Spring 2018
Daniel Rosen, 3D printed templates for flow-focusing microfluidic device	Fall 2015 - Spring 2018
Robyn Collette, Developing a protocol for creating microfluidic devices with a 3D printer and shrinking silicone	Fall 2014 – Spring 2016
Erik Novak, Developing a protocol for creating microfluidic devices with a 3D printer, PDMS, and glass	Fall 2014 – Spring 2015
Jordan Unger, Radio telemetry – electromagnetism tutorial for biology student-researchers	Fall 2014 – Spring 2015
Justin Wright, Ideal acoustic chambers	Summer 2014

Student Presentations on Shippensburg University Campus

*Indicates Shippensburg University undergraduate student researcher co-author

- Minds @ Work: Celebration of Student Research Conference, 2018.
Poster: *Direct Comparison of 3D Printed and Conventionally Produced Microfluidic Devices*. Daniel Rosen*, Nathan Bishop*, and **Kathryn Shirk**.
- Minds @ Work: Celebration of Student Research Conference, 2018.
Poster: *Computer Simulation of Fluid Flow in microfluidic Devices*. Adam Yosua* and **Kathryn Shirk**.
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Poster: *Developing a protocol for creating microfluidic devices with a 3D printer, PDMS, and glass*. Robyn Collette*, Eric Novak*, and **Kathryn Shirk**.
8. SNEexpo 2014.
Presentation: *The Ideal Acoustical Chamber*. Justin Wright* and **Kathryn Shirk**.