KRISTEN MARIE BURSON

Physics Department, Hamilton College
198 College Hill Rd. Clinton, NY 13323

EDUCATION

Ph.D. in Physics, University of Maryland, College Park **2013**
Dissertation: "Surface Studies of Graphene and Graphene Substrates"
M.S. in Physics, University of Maryland, College Park **2011**
B.A. in Physics, *Magna Cum Laude*, Gustavus Adolphus College, St. Peter, MN **2008**

PROFESSIONAL EXPERIENCE

Assistant Professor, Hamilton College **2016-present**
Lead a robust surface physics research program involving undergraduates. Teach upper and lower level physics lectures and laboratories, supervise senior theses and summer research projects for physics majors. Advise students on curricular choices and degree planning.

Alexander von Humboldt Postdoctoral Fellow
Chemical Physics Department, Fritz-Haber Institute of the Max Planck Society **2014-2016**
Advisors: Markus Heyde, Hans-Joachim Freund
Performed structural studies of model catalysts using ultra-high vacuum, ambient, and liquid scanning probe microscopy techniques. Performed supervisory and mentoring responsibilities for graduate students. Developed laboratory experiences for master's students from Humboldt University. Maintained and improved ultra-high vacuum systems.

Visiting Assistant Professor, Gettysburg College, Gettysburg, PA **2013-2014**
Taught upper and lower level physics lectures and laboratories.

Nanotechnology Course Instructor, Institute for Academic Challenge **Fall 2012**
Developed curriculum and co-taught 12 week nanotechnology enrichment course for motivated high-school students.

Graduate Research Assistant, Surface Physics Group University of Maryland **2009-2013**
Advisors: Michael S. Fuhrer, William G. Cullen, and Ellen D. Williams
Designed and conducted experiments towards fundamental understanding of novel materials for nanoelectronics employing surface physics techniques, especially Atomic Force Microscopy. Managed ambient AFM facility, training student and postdoctoral researchers and maintaining the instrument. Mentored two undergraduate research students.

Private Physics Tutor **2009-2013**
Worked one-on-one with high school and college students for a variety of physics courses.

Teaching Assistant, University of Maryland-College Park **2008-2009**
Developed lesson plans for lab and recitation sections for introductory physics geared at engineers and pre-med students. Met with students upon request and during office hours, and graded all written work, including final exams.

Undergraduate Research Assistant (REU), University of Maryland **Summer 2007**
Conducted experimental research fabricating and characterizing graphene transistors

GRANTS

Awarded

Fellowship, *Investigating Temperature-Induced Transitions in Crystalline and Amorphous Bilayer Silica*, Alexander von Humboldt Foundation, June 2019 – August 2019, Awarded ~$10700 // 9,450 €

Principle Investigator, *Physics Faculty Journal Club: Building a More Inclusive Department*, Autonomous Hamilton Affinity (AHA!) Group Grant, Hamilton College, January 2019 – May 2019, Awarded $2850

Principle Investigator, *Building a Framework for Expert Thinking in the First Semester of Physics*, The Class of 1966 Career Development Award, Hamilton College, August 2018, Awarded $5200

Fellowship, *Model Catalyst Characterization Beyond Ultra High Vacuum*, Alexander von Humboldt Foundation, June 2017 - July 2017, Awarded ~$6000 // 5,300 €

AWARDS AND MEMBERSHIPS

Sigma Xi	**inducted 2017**
Alexander von Humboldt Postdoctoral Fellowship	**2014**
National Research Councils Postdoctoral Fellowship	
Awarded, declined in favor of Fritz-Haber Institute postdoctoral position	**2013**
Best Speaker Honorable Mention, Center for Nanotechnology and Advanced Materials	**2013**
Nottingham Prize Finalist, Physical Electronics Conference	**2013**
Best Speaker Award, Center for Nanotechnology and Advanced Materials, UMD – CP	**2012**
Best Speaker in 'Pushing the Boundaries of Science' Section	
Graduate Research Interaction Day Conference Travel Award, UMD – CP	**2011**
Outstanding Volunteer Award (40+ hours)	
Materials Research Science and Engineering Center, UMD – CP	**2011**
Conference Travel and Education Award ($4000)	
Institute for Research in Electronics and Applied Physics, UMD – CP	**2008 – 2011**
Sigma Pi Sigma	**inducted 2008**
Phi Beta Kappa	**inducted 2008**
American Physical Society	**present**

COURSES TAUGHT

Hamilton College

PHYS 370 Statistical Mechanics and Thermodynamics (F16, F17); PHYS 190 The Mechanical Universe (F17, F18); PHYS 190L The Mechanical Universe Lab (F16, F17, F18); PHYS 105/105L Survey of Physics II and Lab (S17, S18, S19)

Gettysburg College

PHY 255 Math Techniques for Physicists (S14); PHY 121 Elementary Physics (F13); PHY 112L Introductory Physics II Lab (S14); PHY 107L Physics of Music Lab (S14); PHY 101 The Evolving Universe (F13)

PUBLICATIONS

*indicates undergraduate co-author

1. A Lewandowski, P Schlexer, S Tosoni, L Gura, P Marschalik, C Büchner, H Burrall*, **K M Burson**, W-D Schneider, M Heyde, G Pacchioni, H-J Freund, "Determination of Silica and Germania Film Network Structures of Ru(0001) at the Atomic Scale," Journal of Physical Chemistry C, 13, 7889-7897 (2019)
2. J M Larson, E Gillette, **K M Burson**, Y Wang, S-B Lee, J E Reutt-Robey, "Pascalammetry with Operando Microbattery Probes: Sensing High Stress in Solid-State Batteries," Science Advances, **4**, eeas8927 (2018)
3. A Lewandowski, P Schlexer, C Büchner, E Davis, H Burrall*, **K M Burson**, W-D Schneider, M Heyde, G Pacchioni, H-J Freund, "Atomic Structure of a Metal-Supported Two-Dimensional Germania Film," Physical Review B, **97**, 115406 (2018)
4. M Smith, R Berndtson, **K Burson**, Y Chen, W Griffin, "Office Hours are Kind of Weird: Reclaiming Office Hours as a Resource for Student-Faculty Interaction," InSight: A Journal of Scholarly Teaching, **12**, 14-29 (2017)
5. Invited Review Article: **K M Burson**, M Heyde, H-J Freund, "Looking into the Structure of Glass by Designing a New 2D Material," Bunsenmagazine (Jan 2017)
6. **K M Burson**, C Büchner, M Heyde, H-J Freund, "Assessing the Periodicity and Order of Crystalline, Amorphous and Boundary Structures in Bilayer Silica," Journal of Physics: Condensed Matter 29 (3), 035002 (2016)
7. C Büchner, Z-J Wang, **K M Burson**, M G Willinger, M Heyde, R Schlögl, H-J Freund, "A Large-Area Transferable, Wide Band Gap 2D Silicon Dioxide Layer", ACS Nano, **10** (8), 7982 (2016)
8. **K M Burson**, L Gura, B Kell, C Büchner, A L Lewandowski, M Heyde, H-J Freund, "Resolving amorphous solid-liquid interfaces by atomic force microscopy," Applied Physics Letters **108** (20), 201602 (2016)
9. C Büchner, L Liu, S Stuckenholz, **K M Burson**, L Lichtenstein, M Heyde, H-J Gao, H-J Freund, "Building block analysis of 2D amorphous networks reveals medium range correlation," Journal of Non-Crystalline Solids **435**, 40-47 (2016)
10. **K M Burson**, P Schlexer, C Büchner, L Lichtenstein, M Heyde, H-J Freund, "Characterizing Crystalline-Vitreous Structures: From Atomically Resolved Silica to Macroscopic Bubble Rafts," Journal of Chemical Education **92** (11) 1896-1902 (2015)
11. W Griffin, S Cohen, *R Berndtson*, **K Burson**, M Camper, Y Chen, M Smith, "Starting the Conversation: An Exploratory Study of Factors That Influence Student Office Hour Use," College Teaching, **62** (3), 94-99 (2014)
12. **K M Burson**, C R Dean, P Kim, K Watanabe, T Taniguchi, S Adam, W G Cullen, M S Fuhrer, "Direct Imaging of Charged Impurity Density in Common Graphene Substrates," Nano Letters **13** (8), 3576 (2013)
13. **K M Burson**, Y Wei, W G Cullen, M S Fuhrer, J E Reutt-Robey, "Potential Steps at C_{60}-TiOPc-Ag(111) Interfaces: Noncontact Scanning Probe Metrology," Nano Letters **12** (6), 2859 (2012)
14. **K M Burson**, M Yamamoto, and W G Cullen, "Modeling NC-AFM Resolution on Corrugated Surface," Beilstein Journal of Nanotechnology **3**, 230 (2012)
15. W G Cullen, M Yamamoto, **K M Burson**, "High Resolution Microscopy of SiO_2 and the Structure of SiO_2-Supported Graphene", Am. Soc. of Mech. Eng. Computers and Information in Eng. Conference Proceeding (2011)
16. W G Cullen, M Yamamoto, **K M Burson**, J H Chen, C Jang, L Li, M S Fuhrer and E D Williams, "High-fidelity conformation of graphene to SiO_2 topographic features" Phys Rev Letters **105** (21), 215504 (2010).

INVITED PRESENTATIONS

Seminar, Carleton College	**2020**
Conference Talk, Session: Success Stories of Female Physicists, AAPT Winter Meeting	**2019**
Seminar, Wesleyan University	**2019**
Conference Talk, Pennsylvania Young Women in Physics Conference, Bucknell University	**2018**
Seminar, Mount Holyoke College	**2018**
Seminar, Reed College	**2017**
Seminar, Hastings College	**2016**
Seminar, Union College	**2016**
Seminar, Hamilton College	**2015**
Seminar, Williams College	**2015**
Conference Talk, Energy Materials Nanotechnology Conference, San Sebastian, Spain	**2015**
Seminar, Washington and Lee University	**2015**
Seminar, National Institute of Standards and Technology, Gaithersburg, MD	**2015**
Seminar, Naval Research Lab, Washington, DC	**2013**
Seminar, Fritz-Haber Institute, Chemical Physics Division, Berlin, Germany	**2013**
Seminar, Gettysburg College, Gettysburg, PA	**2013**

SELECTED CONTRIBUTED TALKS

Amorphous Networks at the Atomic-Scale: Comparing Two-Dimensional Silica and Germania
K M Burson, A Lewandowski, P Schlexer, C Büchner, H Burrall, W-D Schneider, G Pacchioni, M Heyde, H-J Freund, APS March Meeting, Los Angeles, CA **2019**

Incorporating a Physics Engagement Assignment into First-Year Physics
K M Burson, AAPT Winter Meeting **2019**

Comparing the Atomic Structure of Two-Dimensional Amorphous Network Formers: Silica and Germania
K M Burson, A Lewandowski, P Schlexer, C Büchner, H Burrall, W-D Schneider, G Pacchioni, M Heyde, H-J Freund, Physical Electronics Conference, Durham, NH **2018**

Domain Boundaries and Defect Structures in 2D Insulating Silica Bilayers
K M Burson, C Büchner, M Heyde, H-J Freund
APS March Meeting, New Orleans, LA **2017**

Resolving 2D Amorphous Materials with Scanning Probe Microscopy
K M Burson, C Büchner, A Lewandowski, M Heyde, H-J Freund,
APS March Meeting, Baltimore, MD **2016**

Resolving 2D Amorphous Materials with Atomic Force Microscopy
K M Burson, C Büchner, A Lewandowski, M Heyde, H-J Freund,
Multifrequency Atomic Force Microscopy Conference, Madrid, Spain **2016**

Bridging the Gap between UHV and liquid AFM on 2D Silica Structures
K M Burson, C Büchner, S Stuckenholz, M Heyde, H-J Freund, NC-AFM, Cassis, France **2015**

Student Use of Office Hours: An Exploratory Survey-based Study
K Burson and W Griffin
American Association of Physics Teachers (AAPT) Meeting, Orlando, FL **2014**

Come Right In: What Students Want from Office Hours
K Burson, E *Picciuto*, S C*ohen*, R *Berndtson*, M *Smith*, *M Camper*, Lilly DC, Bethesda, MD **2013**

Come Right In: What Students Want from Office Hours
Facilitators: R Berndtson, **K Burson**, M Camper, Y Chen, W Gaches, and M Smith
Workshop: Center for Teaching Excellence, University of Maryland **2013**

Direct Imaging of Charged Impurities in Substrates used for Graphene Devices
K M Burson, C R Dean, P Kim, K Watanabe, T Taniguchi, S Adam, A E Curtin,
W G Cullen, M S Fuhrer, APS March Meeting, Boston, MA **2012**

Scanning Kelvin Probe Microscopy for C_{60}/TiOPc Molecular Interfaces
K M Burson, Y Wei, W G Cullen, M S Fuhrer, J E Reutt-Robey
NC-AFM Conference, Lindau, Germany **2011**

Investigation of the Potential Difference between C_{60} and TiOPc on Ag(111) by Local Probe Techniques
K M Burson, Y Wei, W G Cullen, M S Fuhrer, J E Reutt-Robey
APS March Meeting, Dallas, TX **2011**

UNDERGRADUATE RESEARCH PRESENTATIONS

National/International

Establishing Monomer vs. Aggregate Composition of Squaraine-Based Organic Photovoltaics Using Atomic Force Microscopy
A Cruz*, C Ryczek*, Z Hooshangi, S Gupta, C Collison, K Burson
APS March Meeting, Boston, MA **2019**

Assessing Monomer and Aggregate Populations in Squaraine-Based Organic Solar Cells
C Ryczek*, A Cruz*, Z Hooshangi, S Gupta, K Burson, C Collison
APS March Meeting, Boston, MA **2019**

Regional

NY6 Undergraduate Research Conference, Union College
3 contributions: Adriana Cruz, Catherine Ryczek, and Dan Wall **2018**

NY6 Undergraduate Research Conference, Saint Lawrence College
Clare Munroe **2017**

RESEARCH STUDENT MENTORSHIP

Goldwater Scholar Recipient Research Mentor **2019**
Catherine Ryczek ‘21

Hamilton College, Senior Program Thesis Advisor **2017-present**
Kevin Carey ’17, Clare Munroe ’18, Anna Mowat ’18, Justin Bower ’19, Dan Wall ’19, Bryan Edwards ‘19

Hamilton College, PHYS 298: Undergraduate Research, Research Advisor **2017-present**
Fall 2017, 5 students (2 juniors, 3 sophomores); Spring 2018, 5 students (2 first-years, 3 sophomores); Fall 2018, 2 students (2 sophomores); Spring 2019, 9 students (1 first year, 8 sophomores, 1 junior)

Graduate Student Mentorship, Fritz-Haber Institute **2015-2016**

Surface Physics Lab, University of Maryland-College Park
2 undergraduate students **2011-2012**

TEACHING PROFESSIONAL DEVELOPMENT

STEM Engaged and Active Learning (SEAL) Lunch Group **Spring 2019**
Read articles on active learning techniques and discuss classroom implementation

Council for Undergraduate Research Workshop **2018**
"Beginning a Research Program in the Natural Sciences at a Primarily Undergraduate Institution" held at Skidmore College

"An Inclusive Learning Community" Workshop **2017**
with Becky Wai-Ling Packard held at Hamilton College

Faculty Online Learning Community from the AAPT New Faculty Workshop **2018**
Year-long biweekly online meetings with 6-8 junior physics professors nationally to discuss research-based teaching approaches and effective implementation of active learning strategies. Developed and implemented a project to improve my own teaching in introductory physics (physics engagement activity).

American Association of Physics Teachers New Faculty Workshop **2016**

Lilly Teaching Fellow, Center for Teaching Excellence, University of Maryland **2011-2013**
Collaborated with a cross-disciplinary team of graduate researchers to study student use of virtual and traditional office hour

University Teach and Learn Program, University of Maryland **2011-2013**

INSTITUTIONAL SERVICE

Department
Department Search Committee (2018, 2019), attended "Building a Thriving Undergraduate Physics Program" workshop on behalf of department, co-organized speaker series (2017-2018), Society of Physics Students faculty advisor (2017-present), Women in Physics club faculty advisor (2017- 2019)

College
Chemical Physics committee (2017-present), Phi Beta Kappa membership committee (2018-present), Sigma Xi membership committee (2018), Junior Faculty Caucus leadership team (2018-2019)

PROFESSIONAL SERVICE

Physical Electronics Conference General Committee **2019-present**

APS March Meeting Program Committee, CSWP Representative **2017-present**

Committee for the Status of Women in Physics, APS, Member **2017-present**
Selected for a three-year term. The committee is involved in promoting and supporting women in physics at all career levels through programs and policy advice to the American Physical Society. During my term, I will be especially involved in efforts for undergraduates, graduate students, and early career physicists such as evaluating proposals for women in physics group grants and the conference series for undergraduate women in physics.

Reviewer, Angewandte Chemie **2019**

Climate Site Visit External Review Team Member, Princeton University **2018**

APS March Meeting Society of Physics Students Session Judge **2017-2019**

Reviewer, Physical Review B **2017**

Reviewer, Nature Communications **2016**

APS March Meeting Session Co-organizer **2016**
Co-organized a session for the American Physical Society March Meeting entitled "Surface Science of Organic Molecular Solids, Films, and Nanostructures."

UMD Physics Graduate Advisor Award Selection Committee, Alumni Rep. **2015**

OUTREACH AND LEADERSHIP

Professional Development Skills for Women Workshops, Trained Facilitator **2019**

Conferences for Undergraduate Women in Physics Involvement **2014, 2017-2019**

2019: APS Representative, Led STEP-UP for Women Workshop, U-Mass-Amherst
2018: Poster judge, session moderator, Rochester Institute of Technology
2017: Served on physics careers panel, Harvard University
2014: Local Organizing Committee, ~100 attendees, moderated "Careers in Physics" panel and served as condensed matter research representative in "Worlds of Physics" session, University of Maryland

GIRLS DAY, Fritz-Haber Institute, Berlin, Germany **2015, 2016**

Engaged 6^{th}-10^{th} grade girls in hands-on science activities pertaining to catalysis and atomic force microscopy during city wide event.

Society of Physics Students Advisor, Gettysburg College **2013-2014**

Public Seminar, *Graphene: An All-Surface Wonder Material*

Community Seminar Series, Institute for Academic Challenge, Bethesda, MD **2013**

Women in Physics Outreach Chair, Social Chair **2011-2013**

Served as advisor for newly formed undergraduate women in physics group. Spearheaded a new undergraduate/graduate mentoring program with participation by 25% of the undergraduate female physics majors. Recruited panelists, promoted, and organized a physics career panel attended by over 100 students, working with leadership team.

Nano-fabulous Development Team, Port Discovery Children's Museum **2012**

Proposed and built a hands-on scanned probe station as part of a larger exhibit. Worked with an interdisciplinary team of scientists to develop and install exhibit. Museum attendance increased 10% after installation.

Educational Outreach Volunteer **2009-2013**

Participated in a variety of educational outreach activities for physics and materials science. Received 40+ hour volunteer award.

Society of Physics Students, Gustavus Chapter, Executive Board **2005-2008**

LANGUAGES

English, Native Speaker
Spanish, Conversational
German, Very Good Command (B1 Level)