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Ph.D. in Physics, *Rice University*, May 2001

Thesis Topic: Molecular Spectroscopy of Bose-Einstein Condensates (Randall G. Hulet)

B.S. (Cum Laude) in Engineering Physics, *University of Arizona*, May 1994

PROFESSIONAL EXPERIENCE

<u>University of Utah</u>	Associate Professor of Physics	2011 – present
	Assistant Professor of Physics	2004 – 2011
	Adjunct Assistant Professor of Bioengineering	2005 – 2016
<u>Caltech</u>	Beckman Senior Research Fellow	2003 – 2004
	Postdoctoral Scholar	2001 – 2003
<u>Smith College</u>	Molecular Biology Summer Workshop	2003
<u>Pomona College</u>	Visiting Physics Instructor	2002
<u>Rice University</u>	Welch Fellow and Graduate Research Assistant	1995 – 2001

HONORS AND AWARDS

<u>University of Utah</u>	John R. Park Fellowship	2018
	Distinguished Teaching Award	2017
	NSF CAREER Award	2009
	Early Career Teaching Award	2009
	Cottrell Scholar Award	2007
<u>Caltech</u>	Beckman Senior Research Fellowship	2003
<u>Rice University</u>	Wilson Thesis Prize	2001
<u>University of Arizona</u>	Team Captain, Swimming	1993
	Outstanding Male Student Athlete	1993
	NCAA Division I All-American in Swimming	1991

ACADEMIC LEADERSHIP

- Director, Center for Science and Math Education, University of Utah 2014 – present
- Associate Chair, Department of Physics & Astronomy, University of Utah 2016 – 2018
- Co-Founder and Co-Chair, Cottrell Scholars Collaborative National Graduate Teaching Assistant Workshop (Atlanta, GA) 2014 – present
- Co-Chair, Cottrell Scholars Collaborative Workshop on Building Authentic Partnerships between Minority Serving Institutions and Primarily White Institutions 2017 – present
- Science Advisory Committee, Research Corporation for Science Advancement 2012 – 2018
- Chair, Crocker Science Center Design Committee 2013 – 2017
- Chair, Crocker Science Center Curriculum Committee 2013 – 2017
- Organizer and Chair, 13th International Conference for Near-Field Optics and Related Techniques (Snowbird, UT) 2014
- Editorial Board Member, Nature Scientific Reports 2015 – 2016

CURRENT AND RECENT PROJECTS

- Using photon self-interference to improve super-resolution optical microscopy. This project involves two graduate students in my lab (Jason Martineau and Sanduni Fernando) and also Profs. Erik Jorgensen in Biology and Rajesh Menon in ECE. We are investigating how to improve image resolution and speed, while simultaneously obtaining spectral signatures of fluorescence markers, by leveraging the phase information of collected fluorescence photons using phase-plates and interferometry. We have validated our approach using fluorescent nanospheres and have obtained preliminary data with biological samples. Our next step is to perform multi-color, nano-scale imaging on live cells and to publish this work in a high-profile journal. Jason is scheduled to defend his thesis in Spring 2019, and Sanduni is taking over for him on the project.
- Investigating novel optical properties of gallium nitride nanowires. This project involves two graduate students in my lab (Lauren Simonsen and Maoji Wang) and also collaborators at Lawrence Berkeley National Lab (Tev Kuykendal, Shaul Aloni, and Jim Schuck – now at Columbia). We have demonstrated strong surface-associated fluorescence emission from these nanowires and have developed a simple qualitative model to explain our measurements. More recently, we have begun to use a combination of electrodynamic simulations and experimental measurements to investigate various waveguide and cavity effects that lead to complicated optical behavior. Lauren Simonsen defended her thesis in late November and Maoji has been taking over the reins over the last year.
- Collaborative Around Research Experiences for Teachers (CARET). CARET is a research collaborative formed in 2016 to conduct a meta-review of the literature on teacher research experiences, develop common assessment metrics across programs, and pool evaluation data for national-scale research studies that contribute to the body of knowledge around teacher research experiences. Together with Jessica Dwyer from the CSME, I participate in the core CARET leadership group that includes John Keller from CU Boulder, Stamatis Vikis from Cal Poly San Luis Obispo, and others from several additional institutions. This work is expected to result in articulation of best practices for teachers to translate their mentored research experiences into classrooms that consistently engage students in authentic applications of science and engineering practices. <https://csme.utah.edu/caret/>
- Reforming Intro Physics for the Life Sciences (IPLS) courses. This project involves one Physics Education PhD student (Jason May) working with me and Profs. Claudia De Grandi and Lauren Barth-Cohen (College of Education). We are developing a more authentic scientific approach in PHYS 2015/25, the intro lab sequence for life/health-science majors. We piloted a new version of PHYS 2015 for 55 students in Spring 2018 in the Crocker Science Center and in Fall 2018 we have about 230 students in 2015 and 60 students in our first pilot of PHYS 2025. This is the beginning of a multi-year reform cycle that will likely also include the lecture sequence (PHYS 2010/20), and is the subject of my Park Teaching Fellowship award.
- Building a faculty research cluster in science and math education. This project involves the coordinated multi-department search for 3-4 faculty members in science and math education research. The search began in Fall 2018, and involved three of the four departments in the College of Science (Chemistry, Math, P&A) and also representatives from the College of Education. I am leading this effort and chairing the central Executive Committee for the search. <https://csme.utah.edu/2018-search/>
- Building a Learning Assistant program in Physics and the College of Science: This project involves several faculty and staff in the CoS and CSME. We are building a sustainable

Learning Assistant (LA) program where undergraduate students will receive specialized pedagogical training and serve as peer mentors in gateway science and math courses. I led the pilot of the LA program in Physics & Astronomy during the 2017-18 academic year, and am the PI on the college-scale project, which was funded by the CoS Dean as a two-year pilot. This pilot project will also involve faculty support and professional development and program evaluation with help from the College of Education. <https://csme.utah.edu/la/>

- **Utah Pathways to STEM program (UPSTEM):** This project involves Holly Godsey from the CSME (Project Director), Craig Caldwell (Dean of Science, Math and Engineering at Salt Lake Community College), myself and others. UPSTEM is funded by a \$1 million grant from the Howard Hughes Medical Institute (HHMI) Inclusive Excellence initiative. UPSTEM supports faculty learning communities, inclusive curricula, and improved degree pathways for pre-transfer and post-transfer students from Salt Lake Community College (SLCC). <https://csme.utah.edu/upstem/>
- **Building an internship program for the College of Science:** Together with Emily Gaines in the Center for Science and Mathematics Education, we built an internship program that connects employers with eligible University of Utah undergraduate student interns who have a declared major in one of the departments of the College of Science. Duration of internships vary depending upon employer needs, but all internships begin at the start of the semester and generally last at least 10 weeks. To promote equitable participation of all students, students who are selected for unpaid internship opportunities (e.g., with non-profits or government agencies) receive a \$1,000 stipend from the Dean's office. <https://csme.utah.edu/internships/>
- **Research Experiences for Undergraduates.** This project involves myself (PI) and Tino Nyawelo (co-PI) in addition to Pearl Sandick, Dave Kieda, and Vikram Deshpande. Our REU site grant was funded by the NSF in 2017 after a one-year gap. In this embodiment, we aim to recruit a very diverse cohort of students and provide a supportive and inclusive environment. Tino and I are also helping to coordinate a multi-program consortium, which shares resources and some program elements. <http://www.physics.utah.edu/index.php/research/reu-opportunities>
- **FLAMEnet: Failure as a Part of Learning: A Mindset Education network.** This project is led by Jen Heemstra from Emory (formerly UU Chemistry) and involves other physics, chemistry, and biology faculty at various institutions around the US. We are developing, deploying, and assessing various classroom "interventions" to help students learn how to recognize short-term failure as an important component of learning and growth. <https://twitter.com/failuremindset>
- **National Graduate Teaching Assistant Workshop.** This project was co-founded in 2012 by myself and Mike Schatz at Georgia Tech, and also involves Ken Heller (U of Minnesota) and Melanie Cooper (Michigan State). We run an annual summer workshop where physics and chemistry departmental teams composed of one experienced TA and one faculty member create an action plan for improving the graduate TA professional development program in their home department. Teams are supported through their initial implementation stage and generally report good outcomes. The U has sent both Chemistry and Physics & Astronomy teams to this workshop multiple times, which has led to significant improvements in our TA development programs. http://www.physics.utah.edu/~jgerton/CSC_TA_Workshop/
- **National Workshop on Building Authentic Partnerships between Minority Serving Institutions and Predominantly White Institutions.** This project was co-founded in 2017 by

myself, Lisa Manning (Syracuse) and Michael Denin (UC Irvine). We led a team of faculty from a diverse group of institutions to develop the workshop program, which was run in June 2018. The goal of the workshop was to explore various partnership models for MSIs and PWIs, and to seed some new collaborations across these diverse institutions. Several seed projects were funded and are just underway.

http://www.physics.utah.edu/~jgerton/MSI_PWI_Workshop/

- Architectural and Curriculum Design for an Integrated Science Center: I was the Chair of the Architectural and Curriculum Design Committee for the Crocker Science Center, a new integrated science research and education facility on campus. The CSC opened in January 2018, and houses the Center for Cell and Genome Science, the Center for Statistical Science, and the Center for Science and Mathematics Education along with state-of-the-art, highly flexible science classrooms and teaching laboratories. The building houses robust student support services such as interdisciplinary advising and tutoring, and a technology incubator accessible to students.
- Reforming Undergraduate Introductory Physics: This project involved Prof. Brian Saam (now at Washington State) and several undergraduate and graduate TAs. I led this group's efforts to reform the calculus-based introductory physics sequence to utilize a student-centered approach incorporating peer-instruction, context-rich cooperative group problem-solving, and novel assessment strategies.

PENDING AND PLANNED GRANTS

- Scholarships to Support Refugees and First-Generation College Students in Science and Math at the University of Utah. Co-PI with Tino Nyawelo (PI) and Holly Godsey (in prep - due March 27, 2019)
\$1M: NSF Scholarships in STEM (S-STEM) 2020-25
- Collaborative Research: A GRAssroots, Department-centered Team Approach for PPropagating Evidence-based Pedagogy (GRAD-TA PREP). PI (pending)
\$137k: NSF IUSE 2019-22
- Collaboration to Build Capacity for a Streamlined BS/MEd Program in Science Teacher Preparation, Induction and Mentoring. Co-PI with Holly Godsey (PI) and others (pending)
\$123k: NSF Noyce program 2019-20
- Cosmic Rays to Establish STEM Positive Identities in Refugees (CRESPIR). Co-PI with Tino Nyawelo (PI) and others (pending)
\$1,179,959: NSF Advancing Informal STEM Learning (AISL) 2019-22

CURRENT FUNDING

- REFUGES afterschool Program. Co-PI with Tino Nyawelo (PI).
\$638k: USBE 21st Century Community Learning Centers (CCLC) Grant 2018-23
- Transforming Instruction in the College of Science through Learning Assistants. PI with Holly Godsey (CSME) and others.
\$200k: Course and Curriculum Transformation grant, CoS @ The U 2018-20
- Research Experiences for Teachers supplement on REU site grant. PI.
\$57k: *National Science Foundation (RET Supplement)* 2018
- Integrating Computation and Biology into Introductory Physics.
\$10k: *John R. Park Teaching Fellowship*, University of Utah 2018-19

- Utah Pathways to STEM (UPSTEM) Initiative. With Holly Godsey (UU CSME) and others.
\$1M: *Howard Hughes Medical Institute* 2017-22
- Building Coherence in STEM Learning Opportunities for Pre-Service Elementary Teachers across Disciplinary Boundaries. Co-PI with Lauren Barth-Cohen (UU CoEd), and Aaron Bertram (UU Math).
\$300k: *National Science Foundation (IUSE Program)* 2017-20
- REU Site: An Inclusive REU Program in Physics and Astronomy at the University of Utah. PI with Tino Nyawelo.
\$286k: *National Science Foundation (REU Program)* 2017-20
- Alliance to Strengthen the STEM Tapestry (ASSisT): Motivating Critical Identity Shifts to Weave the STEM Disenfranchised into Science and the Sustainability Workforce. Co-PI with Nalini Nadkarni (UU Biology) and others.
\$300k: *National Science Foundation (INCLUDES Program)* 2017-19
- Learning to Build Authentic Minority Serving Institution/Primarily White Institution Partnerships. Co-lead with Lisa Manning, Syracuse University.
\$31k: *Research Corporation for Science Advancement* 2017-19
- Development of practical tools for an inclusive STEM learning environment based on student views and recommendations. Collaborator. Lead: Linda Columbus (U Virginia).
\$25k: *Research Corporation for Science Advancement* 2017-19
- Graduate Teaching Assistant Professional Development Workshop. Co-PI with Mike Schatz (Georgia Tech Physics).
\$34k: *National Science Foundation (IUSE Program)* 2016-19

EXPIRED FUNDING

- Promoting Adoption of Research and Inquiry-Based Lab Curricula. Collaborator with Jen Heemstra (UU Chemistry), Rory Waterman (Vermont Chemistry) and others.
\$25k: *Research Corporation for Science Advancement* 2016-18
- Collaborative Around Research Experiences for Teachers (CARET). Co-PI with John Keller (Cal Poly Physics) and others.
\$30k: *Network of STEM Education Centers (NSF)* 2016-18
- Mobilizing the Forgotten Army: Equipping TAs with Inquiry-Based Instruction Methods. Co-PI with Mike Schatz (Georgia Tech Physics).
\$30k: *Research Corporation for Science Advancement* 2012-17
- The “Goldilocks” Platform for Efficient H₂ Fuel Generation: Enhanced Solar-Matched Photocatalysis of H₂O using GaN Surface States. Co-PI with M. Bartl (UU Chemistry).
\$250k: *Research Corporation for Science Advancement* 2013-16
- Coherent Super-Resolution Optical Microscopy for Enhanced Image Resolution and Speed. Co-PI with R. Menon (UU ECE) and E. Jorgensen (UU Biology).
\$396k: *National Science Foundation* 2013-16
- CAREER: Tip-Enhanced Fluorescence Microscope for Resolving Single Molecules Within Dense Biomolecular Networks. Sole PI.
\$732k: *National Science Foundation* 2009-14

- Probing and Manipulating Individual Surface States on GaN Nanowires: Implications for Solar-Driven, Plasmon-Enhanced Water Splitting. Co-PI with P.J. Schuck (LBNL).
\$30k: *UU MRSEC Seed Grant* 2012-13
- Nanostructure of Chondritic Meteorites. Co-PI with B. Bromley (UU Physics) and I Ivans (UU Astronomy).
\$28k: *UU Funding Incentive Seed Grant* 2012-13
- Toward Nanoscale Microscopy and Manipulation of Functional Biomolecular Networks. Sole PI.
\$100k: *Research Corporation for Science Advancement* 2007-10
- Pressure-Induced Changes in the Optical Properties of Quantum Dots. Sole PI.
\$35k: *UU Funding Incentive Seed Grant* 2008-09
- High Resolution Spectroscopy and Microscopy Studies of the ESCRT Machinery Reconstituted on Planar Membranes. Co-PI with M. Babst (UU Biology) and J. Conboy (UU Chemistry).
\$100k: *UU Synergy Interdisciplinary Research Grant* 2006-07
- Nanoscience: Where Physics, Biology, and Chemistry Intersect. Co-PI with D. Goldenberg (UU Biology) and J. Shumaker-Parry (UU Chemistry).
\$8k: *UU Interdisciplinary Teaching Award* 2006-07
- Optical Nano-Imaging System. Sole PI.
\$161k: *UU Research Instrumentation Fund* 2005-06

PROFESSIONAL ACTIVITIES

Recent Conferences/Workshops – Education Focused

- American Association of Physics Teachers Summer Meeting
Workshop organizer and presenter: *Provo, UT* JULY 2019
- Cottrell Scholars Conference annual meeting
Member of organizing committee: *Tucson, AZ* JULY 2019
- Annual National Graduate Teaching Assistant Workshop
Co-Chair and facilitator: *Atlanta, GA* MAY 2019
- Physics Teacher Education Coalition (PhysTEC) annual meeting
Invited Panelist: *Boston, MA* MAR 2019
- American Association of Physics Teachers Winter Meeting
Presenter: *Houston, TX* JAN 2019
- American Association of Physics Teachers Summer Meeting
Presenter and session Chair: *Washington, DC* JULY 2018
- Cottrell Scholars Conference annual meeting
Member of organizing committee: *Tucson* JULY 2018
- Network of STEM Education Centers (NSEC) National Conference
Participant: *Columbus, OH* JUNE 2018
- Howard Hughes Medical Institute Inclusive Excellence Kickoff Meeting
Invited Team Member: *Chevy Chase, MD* AUG 2017
- American Association of Physics Teachers Summer Meeting
Participant: *Cincinnati* JULY 2017
- Cottrell Scholars Conference annual meeting

- Participant:** *Tucson* JULY 2017
- Network of STEM Education Centers (NSEC) National Conference
Participant: *New Orleans* JUNE 2017
- Accelerating Systemic Change Network workshop
Participant: *New Orleans* JUNE 2017
- Annual National Graduate Teaching Assistant Workshop
Co-Chair and facilitator: *Atlanta, GA* MAY 2017
- Faculty as Designers of Student Success: A Symposium on Teaching and Learning
Invited panelist: *Salt Lake City* SEPT 2016
- American Association of Physics Teachers Summer meeting
Participant: *Sacramento* JULY 2016
- Physics Education Research Conference Summer meeting
Participant: *Sacramento* JULY 2016
- Cottrell Scholars Conference annual meeting
Participant: *Tucson* JULY 2016
- STEM Center Toolkit Workshop - Network of STEM Education Centers (NSEC)
Invited panelist: *San Antonio* JUNE 2016
- STEM Best Practices Conference
Invited panelist: *Salt Lake City* JUNE 2016
- Implementing Effective Evaluation of Teaching Workshop
Invited participant: *Laguna Beach* MAY 2016
- Cottrell Scholars Collaborative Academic Leadership Training workshop
Invited participant: *Washington, DC* JAN 2016

Conference/Workshop Organizing and Program Committees

- 15th International Conference on Near-Field Optics and Related Techniques
International Advisory Committee: *Troyes, France* AUG 2018
- 14th International Conference on Near-Field Optics and Related Techniques
International Advisory Committee: *Hamamatsu, Japan* SEPT 2016
- 12th International Conference on Near-Field Optics and Related Techniques
Program Committee, Session Chair: *Donostia-San Sebastian, Spain* SEPT 2012
- 11th International Conference on Near-Field Optics and Related Techniques
Program Committee, Session Chair: *Beijing, China* SEPT 2010
- 10th International Conference on Near-Field Optics and Related Techniques
Program Committee, Session Chair: *Buenos Aires, Argentina* SEPT 2008
- NanoUtah 2012
Program Committee, Session Chair: *Salt Lake City, Utah* OCT 2012
- Microscopy and Microanalysis Annual Meeting
Symposium Chair: *Nashville, Tennessee* AUG 2011
- APS Four-Corners Regional Meeting
Organizing Committee, Session Chair: *Ogden, Utah* OCT 2010
- IEEE-LEOS Summer Topical Meeting on Advanced Nanobiophotonics
Organizing Committee, Session Chair: *Acapulco, Mexico* JUL 2008

Grant Review Committees/Panels

- Member, Proposal Review Board: Molecular Foundry, Lawrence Berkeley Lab
- Member, NSF Review Panel: Instrument Development for Biological Research
- Member, NSF Review Panel: Major Research Instrumentation
- Member, DOE Review Panel: Early Career Award in Basic Energy Sciences
- Ad Hoc Reviewer: ACS Petroleum Research Fund
- Ad Hoc Reviewer: DOE SBIR Subtopic on Instrumentation for Scanning Probe Microscopy

Selected Science Literacy and Outreach Activities

- The Physics of Slopestyle Skiing: NBC Learn video for Winter Olympics, 2014
- Science of Skiing: Google Hangout on Air with NBC Learn, 2014
- Physics Behind the Olympics - Slopestyle Skiing: two-hour event at The Leo, SLC, 2014
- The Physics of Freestyle: panel discussion in Park City, 2014
- Science Night: three-hour interactive event at Emerson Elementary, SLC, 2008 – 2014
- Phonographs and Lightning Rods: Old Tools for New Nanoscience: Science Night Live talk, SLC, 2010
- The Physics of SCUBA: Teaching What You Love. Cottrell Scholar Conference, Tucson, 2009
- The Lens: The Infinite and the Infinitesimal. Utah Symposium in Science and Literature, SLC, 2008
- Physics of SCUBA: 50-minute video produced in Hawaii for Gen Ed Physics class, 2007
- Seeing into the Nanoworld: Keynote lecture at the Salt Lake Valley Science and Engineering Fair, 2007

RECENT DEPARTMENT AND UNIVERSITY SERVICE

- Co-Chair, Student Success Work Group, UU Educational Futures Taskforce: 2018-present
- Chair, Science and Math Education faculty cluster search: 2018-present
- Member, Undergraduate Program Committee, P&A: 2018-present
- Chair, Masters of Science for Secondary School Teachers committee: 2017-present
- Chair, Professor of Educational Practice search committee, P&A: 2017-18
- Math and Science Education faculty search committees, CoEd: 2015-2018
- College of Science Council: 2015-present
- LEAP Policy Board 2017-present
- Chair, REU Committee, Physics and Astronomy 2016-present
- Policy Board, Physics and Astronomy 2009-12; 13-14; 16-
- General Education Curriculum Committee: 2016-present
- Sustainability Education Advisory Committee: 2016-2018
- Center for Cell and Genome Science Review Committee: 2014
- College of Science Dean's Search Committee: 2013-2014
- Physics & Astronomy Undergraduate Advisor Search Committee: 2013-2014
- University Academic Calendar Committee: 2013-2014

- Academic Senate: 2013–2016
 - Director of Undergraduate Studies, Physics and Astronomy: 2010–12; 2013–14
 - Chair, Futures Committee, Physics and Astronomy: 2012–2013
 - Member, Executive Committee, Physics and Astronomy: 2009–12; 13–14; 16–18
 - Chair, REU Committee, Physics and Astronomy: 2008–2011; 16–present
 - Director of Graduate Studies, Physics and Astronomy: 2008–2009
 - Co-Chair, Biophysics Faculty Search Committee: 2007–2009
 - Director, Science Instrumentation Track, PMST: 2005–2012
 - Chair, Articulation and Curriculum Committee, COS: 2009
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MENTORING

Current Graduate Students and Postdocs

- Jason Martineau Physics PhD candidate – Nanophotonics
- Jason May Physics PhD candidate – Physics Education
- Maoji Wang Physics PhD candidate – Nanophotonics
- Sanduni Fernando Physics PhD candidate – Nanophotonics

Former Graduate Students and Postdocs

- Lauren Simonsen Physics PhD – defended in November 2018. Now a new mom in New York since December 2018.
- Yuchen Yang: Physics MS awarded March 2015. Now a Research Associate at UMass Medical School
- Carl Ebeling: Physics PhD awarded December 2014. Now an R&D Scientist at Bruker Nanosurfaces in Salt Lake City
- Anil Ghimire: Physics PhD awarded August 2014. Now an R&D Scientist at Keysight Technologies (formerly Agilent) in San Jose
- Analia G. "Yanil" Dall'Asén: Postdoc (2010-2012). Now faculty at Minnesota State University Mankato
- Eyal Shafran: Physics PhD Awarded July 2011. Now a Data Scientist at Alces Technology in Park City.
- Ben Mangum: Physics PhD Awarded March 2010. Now an R&D scientist at Pacific Light Technologies in Portland, OR.
- Chun Mu: Physics MS Awarded August 2010
- Ben Martin: Physics MS Awarded December 2009
- Jonathan Cox: Physics MS Awarded December 2006
- Changan Xie: Postoc (June 2005 – June 2007)

High-School Students

- Michael Palmer Rowland Hall student, June 2016 – June 2018

Recent Undergraduate Students

- Abigail Ambrose REU student (Wooster) Summer 2018
- Brianna Montoya Physics student (post-bac) September 2017 – July 2018
- Nina Filippova REU student (Princeton) Summer 2017
- Tim Allen Physics student July 2015 – June 2017
- Sophia Dimas Mahoney: Physics student January 2012 – June 2015
- Mary Harges: Physics student June 2013 – June 2014
- Laurel Anderson: Physics REU student (Dartmouth) Summer 2013

- Sarah Tyler: Chemistry student October 2012 – August 2013
 - Abigail Krueger: Physics REU student (Purdue) Summer 2013
 - Sara Mitchell: Physics student October 2012 – May 2013
 - Jason Martineau: Physics student January 2011 – May 2012
 - Cassandra Hammons: Physics student May 2010 – May 2012
 - Benjamin Tessler: MRSEC REU student (U. of Florida) Summer 2012
 - Jessica Johnston: Physics student December 2008 – July 2012
 - Charles McGuire: Physics student December 2008 – July 2012
 - Bhuwan Ghimire: Physics REU student (Westminster U.) Summer 2011
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TEACHING

- PHYS 2015: General Physics I laboratory (Spring 2018, Fall 2018, Spring 2019)
 - PHYS 2210: Introductory Physics for Scientists and Engineers (Spring 2012, Spring 2013, Spring 2014, Fall 2015, Spring 2017)
 - PHYS/ECE 3740: Introduction to Relativity and Quantum Mechanics (Fall 2010, Fall 2011)
 - PHYS/BIOL 5285: Biological Microscopy Laboratory (Spring 2011)
 - PHYS 7910/BIOL 7406: Single Molecule Biophysics Seminar (Fall 2008)
 - PHYS 5810/CHEM 5810/BIOL 5810: Nanoscience: Where Biology, Chemistry, and Physics Intersect (Spring 2007, Spring 2008, Spring 2009, Spring 2010)
 - PHYS 1010: The Way Things Work: Elementary Physics (Spring 2006, Fall 2006, Fall 2007, Fall 2008)
 - PHYS 3719: Advanced Undergraduate Modern Physics Laboratory (Fall 2004, Fall 2005)
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PUBLICATIONS

- Interference based localization of single emitters. A. Meiri, C.G. Ebeling, J. Martineau, Z. Zalevsky, J.M. Gerton, and R. Menon, *Optics Express*. **25** 17174-17191 (2017).
- Investigating Surface Effects of GaN Nanowires Using Confocal Microscopy at Below-Band Gap Excitation. L. Richey-Simonsen, N. Borys, T. Kuykendall, P.J. Schuck, S. Aloni, and J.M. Gerton, *Journal of Materials Research*. (2017).
- Mapping the composition of chondritic meteorite Northwest Africa 3118 with micro-Raman spectroscopy. A.G. Dall'Asén, S.I. Dimas, S. Tyler, J.S. Johnston, T.R. Anderton, I.I. Ivans, J.M. Gerton, B.C. Bromley, and S.J. Kenyon, *Spectroscopy Letters*. (2017).
- Increased localization precision by interference fringe analysis. C. G. Ebeling, A. Meiri, J. Martineau, Z. Zalevsky, J.M. Gerton and R. Menon, *Nanoscale*. **7** 10430-10437 (2015).
- Using a Sharp Metal Tip to Control the Polarization and Direction of Emission from a Quantum Dot. A. Ghimire, E. Shafran, and J.M. Gerton. *Nature Scientific Reports*. **4** 6456 (2014).
- Hyper-spectral imaging in scanning-confocal-fluorescence microscopy using a novel broadband diffractive optic. P. Wang, C.G. Ebeling, J.M. Gerton and R. Menon. *Opt. Commun.* **324** 73-80 (2014).
- Improved localization accuracy in stochastic super-resolution fluorescence microscopy by K-factor image deshadowing. T. Ilovitsh, A. Meiri, C.G. Ebeling, R. Menon, J.M. Gerton, E.M. Jorgensen, Z. Zalevsky. *Biomed. Opt. Exp.* **5** 244-258 (2014).

- Asymmetric packaging of polymerases within vesicular stomatitis virus. J. Hodges, X. Tang, M.B. Landesman, J.B. Ruedas, A. Ghimire, M.V. Gudheti, J. Perrault, E.M. Jorgensen, J.M. Gerton, S. Saffarian. *Biochem. and Biophys. Res. Comm.* **440** 271-276 (2013).
- Effect of magnetic Gd impurities on the superconducting state of amorphous Mo-Ge thin films with different thickness and morphology. H. Kim, A. Ghimire, S. Jamali, T.K. Djidjou, J.M. Gerton, and A. Rogachev. *Physical Review B* **86** 024518 (2012).
- Using the Near-Field Coupling of a Sharp Tip to Tune Fluorescence-Emission Fluctuations during Quantum-Dot Blinking. E. Shafran, B.D. Mangum, and J.M. Gerton. *Physical Review Letters* **107** 037403 (2011).
- Enhancing Long-Range Exciton Guiding in Molecular Nanowires by H-Aggregation Lifetime Engineering. D. Chaudhuri, D.B. Li, Y. Che, E. Shafran, J.M. Gerton, L. Zang, and J.M. Lupton. *Nano Letters* **11** 488 (2011).
- Energy Transfer From an Individual Quantum Dot to a Carbon Nanotube. E. Shafran, B.D. Mangum, and J.M. Gerton. *Nano Letters* **10** 4049 (2010).
- Near-Field Scanning Optical Microscopy. B.D. Mangum, E. Shafran, J. Johnston, and J.M. Gerton. Chapter within the book *Optical Techniques for Solid State Materials Characterization*. Taylor & Francis, 2011.
- Three-Dimensional Mapping of Near-Field Interactions Via Single-Photon Tomography. B.D. Mangum, E. Shafran, C. Mu, and J.M. Gerton. *Nano Letters* **9** 3440–3446 (2009).
- Scattering of plasmons at the intersection of two metallic nanotubes: Implications for tunneling. V.V. Mkhitarian, Y. Fang, J.M. Gerton, E.G. Mishchenko, and M.E. Raikh. *Physical Review Letters* **101** 256401 (2008).
- Resolving Single Fluorophores Within Dense Ensembles: Contrast Limits of Tip-Enhanced Fluorescence Microscopy. B.D. Mangum, C. Mu, and J.M. Gerton. *Optics Express* **16** 6183 (2008).
- Contrast Mechanisms in Near-Field Fluorescence Microscopy. B.D. Mangum, C. Mu, Z. Ma, and J.M. Gerton. Chapter within the book *Nano-Optics and Near-Field Microscopy*. Artech House Publishers, November 2008.
- Nanoscale Fluorescence Microscopy Using Carbon Nanotubes. C. Mu, B.D. Mangum, C. Xie, and J.M. Gerton. *IEEE Journal of Selected Topics in Quantum Electronics* **14** 206 (2008). Invited Paper.
- Fluorescence Near-Field Microscopy of DNA at Sub-10 nm Resolution. Z. Ma, J.M. Gerton, L.A. Wade, and S.R. Quake. *Physical Review Letters* **97** 260801 (2006).
- Tip-Enhanced Fluorescence Microscopy of High Density Samples. C. Xie, C. Mu, J.R. Cox, and J.M. Gerton. *Applied Physics Letters* **89** 143117 (2006).
- Tip-Enhanced Fluorescence Microscopy at 10 nm Resolution. J.M. Gerton, L.A. Wade, G.A. Lessard, Z. Ma, and S.R. Quake. *Physical Review Letters* **93** 180801 (2004).
- Macroscopic Quantum Tunneling in Bose-Einstein Condensates. C.A. Sackett, J.M. Gerton, M. Welling, and R.G. Hulet. In *Exploring the Quantum/Classical Frontier: Recent Advances in Macroscopic and Mesoscopic Quantum Phenomena*. J.R. Friedman and S. Ham, eds. (Nova Science, 2003).
- Quantum Degeneracy in Lithium Gases. R.G. Hulet & J.M. Gerton. In *Trapped Particles and Fundamental Physics*. S. N. Atutov, R. Calabrese, and L. Moi, eds. (Kluwer, 2002).
- Photoassociative Frequency Shift in a Quantum Degenerate Gas. J.M. Gerton, B.J. Frew, & R.G. Hulet. *Physical Review A* **64** 053410 (2001).

- Direct Observation of Growth and Collapse of a Bose-Einstein Condensate with Attractive Interactions. J.M. Gerton, D. Strelakov, I. Prodan & R.G. Hulet. *Nature* **408** 692 (2000).
- Laser-Free Slow Atom Source. B. Ghaffari, J.M. Gerton, W.I. McAlexander, K.E. Strecker, D.M. Homan, & R.G. Hulet. *Physical Review A* **60** 3878 (1999).
- Dipolar Relaxation Collisions in Magnetically Trapped ^7Li . J.M. Gerton, C.A. Sackett, B.J. Frew, & R.G. Hulet. *Physical Review A* **59** 1514 (1999).
- Measurements of Collective Collapse in a Bose-Einstein Condensate with Attractive Interactions. C.A. Sackett, J.M. Gerton, M. Welling, & R.G. Hulet. *Physical Review Letters* **82** 876 (1999).
- Probing a Bose-Einstein Condensate by Near-Resonant Light Scattering. C.A. Sackett, J.M. Gerton, M. Welling, & R.G. Hulet. *Spectral Lineshapes: Proceedings of the Fourteenth International Conference on Spectral Lineshapes.* R. Herman, ed., Volume 10 (1999).
- Collective Collapse of a Bose-Einstein Condensate with Attractive Interactions. C.A. Sackett, J.M. Gerton, M. Welling, & R.G. Hulet. In *Atomic Physics 16.* W. E. Baylis and G. W. F. Drake, eds. (1999).
- Triplet s-Wave Resonance in ^6Li Collisions and Scattering Lengths of ^6Li and ^7Li . E.R.I. Abraham, W.I. McAlexander, J.M. Gerton, R.G. Hulet, R. Côté, & A. Dalgarno. *Physical Review A* **55** R3299 (1997).
- Singlet s-Wave Scattering Lengths of ^6Li and ^7Li . E.R.I. Abraham, W.I. McAlexander, J.M. Gerton, R.G. Hulet, R. Côté, & A. Dalgarno. *Physical Review A* **53** R3713 (1996).

SELECTED TALKS

- Building Educational Programs at the University of Utah. Physics Colloquium at UT Austin (April 2019).
- Supplemental Activities to Transform Traditional Exams Into Powerful Learning Experiences. Contributed talk at the AAPT Winter Meeting, Houston, TX (January 2019).
- The Academic Life – a New Adventure Around Every Corner, MUSE Lunchtime Lecture, UofU (December, 2018).
- Mobilizing the Forgotten Army: Improving Undergraduate Math and Science Education through Professional Development of Graduate Teaching Assistants. APS March Meeting, Baltimore, MD (March 2016).
- Using Sharp Tips to Control Optical Properties of Single Emitters. University of New Mexico, Albuquerque, NM (February 2016).
- Manipulating light with sharp tips and nanowires. Hefei National Laboratory for Physical Sciences at the Microscale, University of Science and Technology of China, Hefei, China (March, 2015).
- Manipulating light with sharp tips and nanowires. Xidian University, Xian, China (March, 2015).
- Manipulating Light in 3+1 Dimensions using Sharp Tips. AAAS Annual Meeting (February 2015).
- Manipulating Light in 3+1 Dimensions Using Sharp Tips. Materials Research Society spring meeting, San Francisco, CA (April 23, 2014).
- Measurement and Control of Fluorescence Emission from Single Emitters Using Sharp Tips. Physics Colloquium, University of Victoria, Victoria, British Columbia (October, 2012).

- *Ibid.* Physics Colloquium, University of British Columbia, Vancouver B.C. (November 1, 2012).
- *Ibid.* Physics Colloquium, Simon Fraser University, Vancouver B.C. (November 2, 2012).
- Single-Particle Measurements of Energy Transfer in Nanocomposite Materials. NanoUtah 2010, Salt Lake City (October 2010).
- Energy Transfer From an Individual Quantum Dot to a Carbon Nanotube. 11th International Conference on Near-Field Optics (NFO-11), Beijing (September 2010).
- Energy Transfer Between Individual Quantum Dots and Carbon Nanotubes. University of Utah Condensed Matter Seminar, Salt Lake City (April 2010).
- Measuring Energy Transfer on the Nanometer Scale: Implications for High Resolution Microscopy and the Design of Novel Photovoltaic Materials. Nano-optics Seminar, Institut de Ciències Fotòniques (ICFO), Barcelona (October 2009).
- *Ibid.* Condensed Matter Physics Seminar, Swedish Royal Institute of Technology (KTH), Stockholm (October 2009).
- *Ibid.* Condensed Matter Physics Seminar, Sheffield University, Sheffield UK (October 2009).
- Energy Transfer Between Quantum Dots and Carbon Nanotubes. Physics Seminar, Los Alamos National Laboratory (August 2009).
- Exploring the Limits of Tip-Enhanced Fluorescence Microscopy. Condensed Matter Physics Seminar, University of California Irvine (March 2009).
- Can tip-enhanced microscopy be used to resolve the molecular architecture of extended protein networks? California Institute of Technology (March 2009).
- Toward Molecular-Scale Chemical Imaging of Protein Networks. Physics Colloquium, Brigham Young University (February 2008).
- Phonographs and Lightning Rods: Old Tools for New (nano)Science. NAKAMA seminar, University of Utah (January 2008).
- Nanoscale Optical Microscopy with Carbon Nanotubes. IEEE Summer Topical Meeting on Advanced Nanobiophotonics, Acapulco, Mexico (July 2008).
- Nano-Optics with Carbon Nanotubes. Physics Colloquium, Idaho State University (February 2008).
- Toward Molecular-Scale Fluorescence Imaging of Protein Networks. Biology Seminar, University of Utah (November 2007).
- Toward Nanoscale Imaging of Biomolecular Systems. APS Four Corners Annual Meeting, Utah State University, Logan UT (October 2006).
- Molecular Scale Fluorescence Microscopy. Physics Colloquium, Utah State University, Logan, UT (January 2006).
- *Ibid.*, Biochemistry Seminar, University of Utah, Salt Lake City, UT (September 2005).
- *Ibid.*, Physical Chemistry Seminar, University of Utah, Salt Lake City, UT (September 2005).
- *Ibid.*, Whitaker Nanobioengineering Symposium, Rice University, Houston, TX (October 2005).
- Playing with Lightning: Tip-Enhanced Fluorescence Microscopy at 10 nm Resolution. Physics Colloquium, Washington State University, Pullman, WA (April 2004).