

Curriculum Vitae

David J. Starling

Penn State University • 76 University Drive • Hazleton, PA 18202 • (570) 450-3081
starling@psu.edu • www.david-starling.com

ACADEMIC POSITIONS

2019 (Fall) ROCHESTER INSTITUTE OF TECHNOLOGY - MICROSYSTEMS ENGINEERING
Visiting Faculty (Sabbatical)
2018 - present PENNSYLVANIA STATE UNIVERSITY - HAZLETON CAMPUS
Associate Professor of Physics
2012 - 2018 PENNSYLVANIA STATE UNIVERSITY - HAZLETON CAMPUS
Assistant Professor of Physics

EDUCATION

2008 - 2012 UNIVERSITY OF ROCHESTER
Ph.D., Physics
Thesis: *Precision Measurement in Quantum Optics*
Advisor: John C. Howell
2006 - 2008 UNIVERSITY OF ROCHESTER
M.A., Physics
2002 - 2006 STATE UNIVERSITY OF NEW YORK (SUNY) AT FREDONIA
B.S., Physics and Mathematics (2006), *summa cum laude*
Thesis: *Connecting the 3-d $O(4)$ Heisenberg Spin Model to the 4-d $SU(2)$ Lattice Gauge Theory*
Advisor: Michael Grady

RESEARCH

Interests

Quantum Silicon Photonics	Physics Education Research
Quantum Information	Low-light imaging
Optical four-wave mixing	Entanglement and entanglement measures
Weak Values and Weak Measurement	Compressive Sensing
Metrology and interferometry	Spectroscopy
Fast and slow light	Detection Electronics
Partial coherence (quantum and classical)	Two-photon absorption
Gravimetry	Solar Power and Shading

Experience

2019 Rochester Institute of Technology - Microsystems Engineering
Visiting Faculty (Sabbatical)
Quantum Silicon Photonics
2012 - present Pennsylvania State University - Hazleton Campus
Principal Investigator
Experimental quantum optics
2007 - 2012 John Howell's research lab, University of Rochester, Rochester, NY

- Graduate student, research assistant
Experimental, theoretical and computational quantum optics research
- 2005 Lorenza Viola's research group, Dartmouth College, Hanover, NH
Research experience for undergraduate students
- 2004 - 2006 *Theoretical and computational quantum research on disordered Heisenberg models*
 Independent study with Michael Grady, Fredonia State, Fredonia, NY
Undergraduate, research assistant
Computational lattice gauge theory research

Selected Undergraduate Projects

- 2018 *Kinematic Analysis of a Baseball Bat Swing*
 Students: Charles Karchner and Ty Shaffer
- 2016 Accuracy and Uncertainty in Shading Calculations for Solar Power
 Students: Robert Vitagliano and Mauro Notaro
- 2015 *3D Printed Computer-Controlled Rotation Optical Polarizer Mount*
 Student: Mari Magabo
- 2015 *Visible Spectroscopy using Compressive Sensing*
 Student: Ian Storer
- 2014 *Compressive Sensing for Spatial and Spectral Flame Diagnostics*
 Student: Scott Gauer
- 2013 **LED-Based Active Quenching Single Photon Detection**
 Students: Richard Michael, Thomas Klein, Edward Miller, Blake Burger, Janak Jethva and Joseph Zolnowski

TEACHING

Interests

Electricity and Magnetism	Mathematical Methods
Circuits	Quantum Mechanics
Electronics Lab	Introductory Physics
Optics and Quantum Optics	Modern Physics

Experience

- 2012-present Pennsylvania State University - Hazleton Campus
 Assistant and Associate Professor of Physics
 Standard 3-3 load (nine contact hours per semester)
*General Physics: Mechanics (PHYS 211), **Electricity & Magnetism with Circuits (PHYS 212)**, Fluids & Thermal Physics (PHYS 213) and Wave Motion & Quantum Physics (PHYS 214); Dynamics (E MCH 212); Independent Studies (ENGR 296 and PHYS 296).*
- 2012 Physics Department, University of Rochester
 Lecturer, PHY 121, "Mechanics"
Six week summer course on introductory physics for scientists and engineers.
- 2011-2012 Kearns Center, University of Rochester
 Science and math tutoring
Expanding the educational pipeline through the doctoral degree for low-income, first-generation college, and underrepresented minority students.
- 2008 - 2010 Physics Department, University of Rochester

- Guest Lectures, PHY 407 - 408, "Quantum Mechanics I - II"
Graduate quantum mechanics lectures from "Quantum Mechanics" by Claude Cohen-Tannoudji, focusing on fine and hyperfine structure of hydrogen, the Zeeman effect and perturbation theory.
- 2008 Physics Department, University of Rochester
 Teaching Assistant, PHY 143, "Waves and Modern Physics (Honors)"
Weekly workshops and grading.
- 2007 Physics Department, University of Rochester
 Laboratory Assistant, PHY 250, "Advanced Lab"
Assisted students with labs on NMR, Barry's phase, Faraday rotation, sonoluminescence, photoelectric effect, quantum hall effect, Stern-Gerlach and radiation.
- 2007 Physics Department, University of Rochester
 Teaching Assistant, PHY 122, "Electricity and Magnetism"
Weekly workshops and grading.
- 2006 Physics Department, University of Rochester
 Teaching Assistant, PHY 121, "Mechanics"
Weekly workshops and grading.
- 2003 - 2005 The Learning Center, SUNY Fredonia
 Physics and Mathematics Tutor
Tutor for all math and physics course offerings and supplemental instructor for the introductory physics courses.

PUBLICATIONS

Total citations: 1374

Journal Articles [google scholar link]

22. "Nonlinear Photon Pair Generation in a Highly Dispersive Medium," **David J. Starling**, Jacob Poirier, Michael Fanto, Jeffrey A Steidle, Christopher C Tison, Gregory A Howland and Stefan F Preble. *Physical Review Applied* **13** 41005 (2020).
21. "Viewpoint: Directly Measuring an Entangled State," **David J. Starling**, *Physics* **12** 110 (2019). [this journal publishes "(c)ommentaries by experts that explain why a paper is important to the field"]
20. "Effect of a part-hour shading methodology on the sensitivity of shading calculations to horizon uncertainty," Joseph Ranalli, **David J. Starling**, *Solar Energy* **170** 217 (2018).
19. "Compressive sensing for spatial and spectral flame diagnostics," **David J. Starling**, Joseph Ranalli, *Scientific Reports*, **8**, 2556 (2018).
18. "Sensitivity of Shading Calculations to Horizon Uncertainty," Joseph Ranalli, Robert Vitagliano, Mauro Notaro, **David J. Starling**, *Solar Energy* **144**, 399 (2017).
17. "Tie goes to the runner: the physics and psychology of a close play," **David J. Starling** and Sarah J. Starling, *The Physics Teacher* **55**, 200 (2017).
16. "Compressive sensing spectroscopy with a single pixel camera," **David J. Starling**, Ian Storer and Gregory A. Howland, *Appl. Opt.* **55**, 5198 (2016).
15. "An actively quenched single photon detector with a light emitting diode," **David J. Starling**, Blake Burger, Edward Miller, Joseph Zolnowski and Joseph Ranalli, *Modern Applied Science* **10**, 114 (2016).
14. "Amplifications in Chiroptical Spectroscopy, Optical Enantioselectivity, and Weak Value Measurement," Hanju Rhee, Joseph S. Choi, **David J. Starling**, John C. Howell and Minhaeng Cho, *Chem. Sci. Lett.* **4**, 4107 (2013).
13. "Efficacy of weak measurement reversal for stochastic disturbances," **David J. Starling** and Nathan

- S. Williams, Phys. Rev. A **88**, 024304 (2013).
12. “Null Values and Quantum State Discrimination,” Oded Zilberberg, Alessandro Romito, **David J. Starling**, Gregory A. Howland, Curtis J. Broadbent, John C. Howell, and Yuval Gefen, Phys. Rev. Lett. **110**, 170405 (2013).
 11. “Rapidly reconfigurable optically induced photonic crystals in hot rubidium vapor,” Bethany Little, **David J. Starling**, John C. Howell, Raphael Cohen, David Shwa and Nadav Katz, Phys. Rev. A **87**, 043815 (2013).
 10. “A double Lorentzian atomic prism,” **David J. Starling**, Steven M. Bloch, Praveen K. Vudyaetu, Joseph S. Choi, Bethany Little and John C. Howell, Phys. Rev. A **86**, 023826 (2012).
 9. “Extracting an entanglement signature from only classical mutual information,” **David J. Starling**, Curtis J. Broadbent and John C. Howell, Phys. Rev. A **84**, 032305 (2011).
 8. “Precision frequency measurements with interferometric weak values,” **David J. Starling**, P. Ben Dixon, Andrew N. Jordan and John C. Howell, Phys. Rev. A **82**, 063822 (2010).
 7. “Heralded single-photon partial coherence,” P. Ben Dixon, Gregory Howland, Mehul Malik, **David J. Starling**, R. W. Boyd, and John C. Howell, Phys. Rev. A **82**, 023801(R) (2010).
 6. “Continuous phase amplification with a Sagnac interferometer,” **David J. Starling**, P. Ben Dixon, Nathan S. Williams, Andrew N. Jordan, and John C. Howell, Phys. Rev. A **82**, 011802(R) (2010).
 5. “Interferometric weak value deflections: Quantum and classical treatments,” John C. Howell, **David J. Starling**, P. Ben Dixon, Praveen K. Vudyaetu, and Andrew N. Jordan, Phys. Rev. A **81**, 033813 (2010).
 4. “Optimizing the signal-to-noise ratio of a beam-deflection measurement with interferometric weak values,” **David J. Starling**, P. Ben Dixon, Andrew N. Jordan, and John C. Howell, Phys. Rev. A **80**, 041803(R) (2009).
 3. “Ultrasensitive beam deflection measurement via interferometric weak value amplification,” P. Ben Dixon, **David J. Starling**, Andrew N. Jordan, and John C. Howell, Phys. Rev. Lett. **102**, 173601 (2009).
 2. “All Optical Waveguiding in a Coherent Atomic Rubidium Vapor,” Praveen K. Vudyaetu, **David J. Starling**, and John C. Howell, Phys. Rev. Lett. **102**, 123602 (2009).
 1. “Quantum chaos, delocalization, and entanglement in disordered Heisenberg models,” Winton G. Brown, Lea F. Santos, **David J. Starling**, and Lorenza Viola, Phys. Rev. E **77**, 021106 (2008).

In Progress

- “Measuring weak values of mode occupation in a polarization interferometer,” **David J. Starling**, Nathan S. Williams and P. Ben Dixon, work in progress.
- “Visible single photon generation from an etched nanowire quantum well at room temperature,” Gregory A. Howland, **David J. Starling**, Bryan Melanson, Matthew Hartensveld, Jing Zhang, work in progress.
- “Number-resolving detection of entangled photon pairs with a room temperature CCD,” Gregory A. Howland and **David J. Starling**, work in progress.
- “Undemolition measurements in Ising spin chains,” **David J. Starling** and Nathan S. Williams, work in progress.
- “Entanglement revival via weak values: the entanglement roller coaster,” **David J. Starling** and Justin Dressel, work in progress.

PROFESSIONAL PRESENTATIONS

Published Conference Proceedings

7. "Narrow Linewidth Photoluminescence from Top-Down Fabricated 20 nm InGaN/GaN Quantum Dots at Room Temperature," Bryan Melanson, David Starling, Matt Hartensveld, Gregory Howland, Stefan Preble and Jing Zhang, May 2020, CLEO, Virtual.
6. "TM Polarized Photon Pair Generation in Linearly Uncoupled Silicon Resonators," David J Starling, Jacob Poirier, Michael Fanto, Jeffrey A Steidle, Christopher C Tison, Gregory A Howland and Stefan F Preble, May 2020, CLEO, Virtual.
5. "Experimental Evolutionary Optimization of an Active Multimode Interferometer," Matthew van Niek-erk, **David J Starling**, Gregory A Howland, Gerald Leake, Alin Antohe, Siti Binti, Daniel Coleman, A Matthew Smith, Christopher C Tison, Michael L Fanto and Stefan F Preble, May 2020, CLEO, Virtual.
4. "Spatially Resolved Raman Spectra of Diffusion Flame via Compressive Sensing," **David J. Starling** and Joseph Ranalli, May 2018, CLEO, San Jose, CA.
3. "Testing a Method for De-energizing Solar Panels for Firefighting," **David J. Starling**, Joseph Ranalli, Kenneth Dudeck and Ron Steber, July 2014, ASES SOLAR Conference, San Francisco, CA.
2. "Extracting an entanglement signature from only classical mutual information," **David J. Starling**, Curtis J. Broadbent and John C. Howell, May 2011, Conference on Lasers and Electro-Optics (CLEO), Baltimore, MD.
1. "Near Quantum Limited Optical Phase Measurements on a Dark Fringe," **David J. Starling**, P. Ben Dixon, Nathan S. Williams, Andrew N. Jordan and John C. Howell, October 2010, Frontiers in Optics, Rochester, NY.

Conference Presentations

15. "TM Polarized Photon Pair Generation in Linearly Uncoupled Silicon Resonators," David J Starling, Jacob Poirier, Michael Fanto, Jeffrey A Steidle, Christopher C Tison, Gregory A Howland and Stefan F Preble, May 2020, CLEO, Virtual.
14. "Spatially Resolved Raman Spectra of Diffusion Flame via Compressive Sensing," **David J. Starling** and Joseph Ranalli, May 2018, CLEO, San Jose, CA.
13. "Simulating errors in annual energy production from a shaded photovoltaic system," **David J. Starling**, Robert Vitagliano, Mauro Notaro and Joseph Ranalli, October 2016, APS Mid Atlantic Meeting, Newark, DE.
12. "3D Printing Opto-Mechanics," **David J. Starling**, Mari Magabo, Kenneth Dudeck, Joseph Ranalli, January 2016, American Association of Physics Teachers Winter Meeting, New Orleans, LA.
11. "Solar Charging Station for Electric Vehicles," Angelo DeLuca, Joseph Ranalli and **David J. Starling**, July 2015, Solar 2015, University Park, PA.
10. "Fast spectrophotometry with compressive sensing," **David J. Starling**, Ian Storer, March 2015, APS March Meeting, San Antonio, TX.
9. "Tie Goes to the Runner: The Physics and Psychology of a Close Play," **David J. Starling**, Sarah Starling, October 2015, APS Mid Atlantic Meeting, Morgantown, WV.
8. "Single photon detection with an actively quenched light emitting diode," **David J. Starling**, Blake Burger, Edward Miller, Joseph Zolnowski, Joseph Ranalli, October 2014, APS Mid Atlantic Meeting, University Park, PA.
7. "Testing a Method for De-energizing Solar Panels for Firefighting," **David J. Starling**, Joseph Ranalli, Kenneth Dudeck and Ron Steber, July 2014, ASES SOLAR Conference, San Francisco, CA.
6. "Compressive sensing for spatial and spectral flame diagnostics," **David J. Starling**, Joseph Ranalli,

Scott Gauer, March 2014, APS March Meeting, Denver, CO.

5. "Efficacy of weak measurement reversal for stochastic amplitude damping," **David J. Starling** and Nathan S. Williams, March 2013, American Physical Society March Meeting, Baltimore, MD.
4. "Extracting an entanglement signature from only classical mutual information," **David J. Starling**, Curtis J. Broadbent and John C. Howell, June 2011, Cross Border Workshop, Rochester, NY (poster).
3. "Weak Value Deflection Measurement," **David J. Starling**, P. Ben Dixon, Andrew N. Jordan and John C. Howell, October 2009, Symposium on Optical Interactions and Quantum Systems (poster).
2. "Test of Ladder-Track Design for Inductrack Magnetic Levitation," **David J. Starling**, Becky Lindstrom, Michael Grady and Peter Mattocks, April 2004, Rochester Symposium for Undergraduate Physics Students.
1. "Connecting the 3-d $O(4)$ Heisenberg Spin Model to the 4-d $SU(2)$ Lattice Gauge Theory," **David J. Starling** and Michael Grady, April 2006, Rochester Symposium for Undergraduate Physics Students.

Invited Talks

11. "Single Photon Generation and Manipulation in Silicon Photonic Integrated Circuits," Photonics for Quantum 2, Rochester Institute of Technology (July 22 2020).
10. "Telescopes 101," Local Library Lecture Series, Dimmick Memorial Library (August 2019).
9. "Compressive Sensing, Quantum State Discrimination, and On-Chip Applications," IEEE Electron Device Society Conference, Rochester Institute of Technology (November 2018).
8. "Utilizing a Makerspace for Undergraduate Research," Annual PSU Physics Meeting, Penn State Lehigh Valley (November 2018).
7. "Electric Cars and Sustainability," Annual Science Meeting, Penn State University (April 2015).
6. "The State of Electric Vehicles," Brown Bag Presentation, Penn State Hazleton (April 2015).
5. "When two plus two isn't four (and other quantum weirdness)," Physics Colloquium, Juniata College (November 2014).
4. "Getting undergraduates involved in research: engineers getting their hands dirty," Physics Alumni Event, State University of New York at Fredonia (October 2014).
3. "When two plus two isn't four (and other quantum weirdness)," Physics Colloquium, Willamette University (March 2013).
2. "Weak Values in Quantum Optics (updated)," Math Seminar, Institute for Quantum Computing at the University of Waterloo (February 2012).
1. "Weak Values in Quantum Optics," Physics Colloquium, State University of New York at Fredonia (March 2009).

HONORS

2018	Faculty Scholar Award, PSU Hazleton
2018	Butler Technology and Teaching Award, PSU Hazleton
2015	SGA Outstanding Faculty Member of the Year, PSU Hazleton
2007	Graduate Student Teaching Award
2006	Hack Arrow Physics Award
2005 - present	Sigma Pi Sigma
2005 - present	Pi Mu Epsilon
2005	Arthur Danese Award
2005	John J. Connelly Physics Peer Recognition Award

2004	Department of Physics Scholarship
2004	Department of Mathematical Sciences Award
2003	Society for Industrial and Applied Mathematics Award
2002	Scholar Incentive Award

PROFESSIONAL DEVELOPMENT

External Grants in Progress

- *Quantum Photonic Institute*
NSF - Quantum Leap Challenge Institute
- *TM polarized quantum photonic devices for on-chip filtering and hyper entanglement*
NSF - Electronics, Photonics and Magnetic Devices
- *Direct measurements of high dimensional nonlocal quantum wavefunctions*
Army Research Office - Quantum Information Science
- *Noise reduction in long-range LIDAR via high-dimensional entanglement*
National Geospatial-Intelligence Agency

Internal Grants

2019	\$1,054	Teaching Development Grant
2019	\$1,820	Research Development Grant
2018	\$1,054	Teaching Development Grant
2018	\$1,280	Research Development Grant
2018	\$263	Undergraduate Research Support
2017	\$688	Teaching Development Grant
2017	\$898	Butler Teaching Grant
2016	\$1,000	Butler Teaching Grant
2015	\$992	Undergraduate Research Support
2015	\$1,995	Research Development Grant
2014	\$1,440	Undergraduate Research Support
2014	\$1,762	Teaching Development Grant
2014	\$2,067	Research Development Grant
2014	\$885	Butler Teaching Grant
2013	\$2,000	(NSF) Engaging students: everyday examples in engineering
2013	\$476	Undergraduate Research Support
2013	\$2,180	Research Development Grant
2013	\$950	Butler Teaching Grant
2012	\$450	Undergraduate Research Support
2013	\$1,190	Research Development Grant
2012	\$2,046	Research Development Grant

Attended Workshops and Coursework

2015	Teaching and Learning Activities Showcase <i>Presentation of hybrid and online classroom projects and activities in a science-fair like exhibition, followed by a keynote address surveying different technologies.</i>
2014	Summer Seminar in Proposal Writing

The month-long summer seminar in proposal writing is an annual opportunity to help Penn State faculty to improve their proposal writing skills by taking advantage of already existing resources. Acceptance into the program is competitive and the culmination of the seminar is to submit a completed proposal to an organization.

- 2014 Finding Funders Workshop
A short workshop on how to find funding agencies for your research presented via Polycorn.
- 2013 Does the Classroom Flip Increase Student Motivation to Succeed
In this COIL Conversation, we explored the question: Does the flipped model increase student motivation to succeed?
- 2013 Thrill Ride Simulations in Physics classes
Dr. Michael Gallis, Associate Professor of Physics at PSU Schuylkill, discusses his use of interactive Java simulations of amusement park rides.
- 2013 Course on College Teaching
A course on college teaching designed for Penn State faculty.
- 2013 Using Doceri: Best Practices for Use in Penn State Classrooms
This workshop focused on using Doceri in Penn State classrooms and strategies for improving a class through student participation.
- 2013 Preparedness Prevention and Contingency Training
Regularly attend the annual Preparedness Prevention and Contingency (PPC) and lab safety training.
- 2012 Engaging Students in STEM Courses
Douglas Duncan, director of the Fiske Planetarium and faculty member in the Department of Astrophysical and Planetary Sciences at the University of Colorado, described his department's strategies and initiatives in teaching STEM curriculum to undergraduates
- 2012 Teaching with Clickers
Topics included: why the success of clicker use varies so much from class to class, dos and don'ts when implementing clickers, writing good clicker questions, using "peer instruction" and other types of questions, giving points for answering questions.
- 2012 Field Guide to Teaching Sustainability at Penn State
This is an online field guide that is a resource for faculty who want to incorporate sustainability into their coursework. The teaching strategies run the gamut from what one might consider traditional courses for sustainability, like science and engineering, to courses like psychology and business.
- 2012 Peer Review Training
A peer review training session open to all faculty.
- 2012 Clickers in the Classroom
Learning how to use clickers for instruction and feedback here at PSU Hazleton.
- 2012 Sustainability Initiatives
Learning the importance of sustainability at the Penn State campuses.
- 2012 What is a Mentor and What Good is Having One?
A future faculty seminar on mentoring in the university environment, how one can learn to be a mentor or to be mentored, and the art of matching mentors and mentees.
- 2012 Opportunities in Diversity: Tapping the Multiplicity of Experience
A future faculty seminar showing what can be gained from consciously tapping multiple perspectives, and how to make the differences a rich and equally shared learning experience.
- 2012 Assessing Learning in the Classroom

A future faculty seminar covering formative assessment practices for low risk, high yield results in the classroom.

- 2003 Introduction to Contemporary Education (for Scientists) at SUNY Fredonia
A course that gives students experience in the science classroom, with an emphasis on teaching styles and instructional materials.

Professional Service and Leadership

- 2010 - present Peer reviewer of over 30 articles in leading journals (detailed below)
2019 Reviewer for Optics Letters and Physical Review Applied
2018 Conference Program Committee member for the 2018 Quantum Communication, Measurement and Computing conference at LSU
2017 Conference Organizer, PSU Eastern Regional Research Symposium
2017 - present Parliamentarian and executive council member of the faculty senate
2017 - 2018 Search committee member for tenure track engineering job search
2017 - present Reviewer for Physical Review X
2016 - 2017 Search committee member for tenure track physics job search
2016 - present Reviewer for Applied Optics
2016 - present Reviewer for Applied Physics Letters
2015 - 2016 Search committee member for tenure track engineering job search
2014 - present Honors Committee member
2014 - present Observatory Liaison
2014 - 2016 Faculty Affairs Committee member
2013 - 2014 Educational Technology Committee member
2013 - 2014 Search committee member for tenure track engineering job search
2012 Conference Organizer, PSU Eastern Regional Research Symposium
2012 - present Conference Organizer, Local Research Symposium
2012 - present Research Committee member (**chair 2015-2018**)
2012 - present Science and Engineering Club Adviser
2010 - present Reviewer for Physical Review Letters, Physical Review A
2011 Conference Organizer, Cross Border Workshop 2011
2008 - 2012 Lab mentor, John Howell lab, University of Rochester
2003 - 2006 President and Vice President, Engineering and Physics Society at SUNY Fredonia
2003 - 2004 President and Member, National Science Teacher Association at SUNY Fredonia

Professional Affiliations

- 2015 - present American Association of Physics Teachers (AAPT)
2013 - present Advanced Laboratory Physics Association (ALPhA)
2008 - present Optical Society of America (OSA)
2005 - present American Physical Society (APS)
2005 - present Society for Physics Students (SPS)