

Robert L. Draham

223 W Marion St
Homestead, PA 15120
443-624-7056
rdraham@gmail.com

Education

University of Rochester, Rochester, NY

PhD in Optics (2020)

Thesis: Phase-Sensitive Angular Light-Scattering Microscopy of Single Cells

Juniata College, Huntingdon, PA

Bachelor of Science, Physics major with Mathematics minor (2014)

Summa Cum Laude

Distinction in Major

Research and Work Experience

ChemImage Corporation

Oct 2020 – Jan 2023

Senior Scientist

- Tested and developed both laser- and filter-based hyperspectral medical imaging devices in a cross-functional environment
- Gained expertise in and trained new personnel on instrument operation
- Prepared and revised training documents on instrument operation
- Refined data collection methodology for IACUC-approved program with multi-million-dollar annual budget
- Created and executed test plans, including for factory acceptance testing of instruments as well as applications in pre-clinical surgery
- Contributed to processing and labeling of anatomic data for algorithm development
- Prepared and presented summary-level results and conclusions for internal and external key opinion leaders

University of Rochester

May 2015-Aug 2020

PhD Research, Advisor: Dr. Andrew Berger

- Performed angular scattering measurements on cells to estimate the mean size of organelles within
- Designed and constructed an angular scattering microscope system to obtain field-based measurements using phase-shifting interferometry
- Performed intensity-based angular scattering and Raman spectroscopy measurements on cells
- Interfaced with lab equipment, performed data analysis, and simulated experiments in MATLAB
- Learned and performed protocols for culturing cells
- Trained new members in sample handling protocols and to use lab equipment

Juniata College

Aug 2013-Dec 2013

Student Optics Research

- Worked with professor on setting up an experiment involving a single photon detector designed for educational purposes

Hampton University

June 2013-July 2013

CREST Undergraduate Research Experience, Advisor: Dr. Kunio Sayanagi

- Studied the Ribbon feature in Saturn's atmosphere and characterized its spatial and temporal characteristics using images from the Cassini orbiters imaging science subsystem camera

Naval Air Warfare Center – Aircraft Division

June 2011-Aug 2011

Technician Aide

- Designed a prototype program in LabView to locate distress signals given off by aircraft

Publications

- **Draham, R. L.**, Dunn, K. J., Berger, A. J., “Phase-sensitive, angle-resolved light-scattering microscopy of single cells,” *Optics Letters*, 45(24), 6775-6778, 2020
- Gunnarson, J. L., Sayanagi, K. M., Blalock, J. J., Fletcher, L. N., Ingersoll, A. P., Dyudina, U. A., Ewald, S. P., **Draham, R. L.**, “Saturn's New Ribbons: Cassini Observations of Planetary Waves in Saturn's 42N Atmospheric Jet,” *Geophysical Research Letters*, 45(15), 7399-7408, 2018

Conference Presentations

- Berger, A. J., **Draham, R. L.**, and Dunn, K. J., "Quantitative Phase-Based Angular Scattering Measurements of Organelle Size Distributions in Single Cells," *OSA Biophotonics Congress: Biomedical Optics*, 2020
- **Draham, R. L.**, Dunn, K. J., Lister, E. A., Pinney, J. J., Elliott, M. R., and Berger, A. J., “Using quantitative phase imaging to acquire angular scattering information from single macrophages”, *SPIE Photonics West*, 2020
- Dunn, K. J., **Draham, R. L.**, and Berger, A. J., “Digital suppression of system background and speckle in Fourier transform light scattering”, *SPIE Photonics West*, 2020
- Kochan, N. S., Xu, D., Iqbal, S., Moon, B., Hrdina, J., Lippman, D., Choudhury, S. A., Banet, M. T., Dunn, K. J., Dewage, A. A. G., **Draham, R. L.**, Takaki, N., and Kruschwitz, J. D. T., "Light and lilacs: an interactive exploration of colorimetry," *OSA Education and Training in Optics and Photonics*, 2019
- **Draham, R. L.**, Dunn, K. J., and Berger, A. J. “Dark-field quantitative phase imaging for angular scattering”, *OSA Biophotonics Congress: Optics in the Life Sciences*, 2019
- **Draham, R. L.** and Berger, A. J. “Angular scattering of induced apoptosis in HeLa cells”, *SPIE Photonics West*, 2018
- **Draham, R. L.**, Cannaday A. E., and Berger, A. J. "Fluctuations in single-cell organelle size estimates from angular scattering measurements", *ECI Advances in Optics for Biotechnology, Medicine and Surgery XV*, 2017
- Cannaday, A. E., Sorrells, J., **Draham, R. L.**, and Berger, A. J., “Angular scattering analysis of single cells,” *Gordon Research Conference on Lasers in Medicine and Biology*, 2016
- Cannaday, A. E., **Draham, R. L.**, and Berger, A. J. “Robust organelle size extractions from elastic scattering measurements of single cells”, *SPIE Photonics West*, 2016

Teaching Experience

Teaching Assistant, Instrumental Optics, University of Rochester Spring 2016

- Hold office hours
- Grade assignments

Teaching Assistant, Electromagnetic Theory, University of Rochester Fall 2015

- Sit in on classes and assist with small-group problem solving and discussion
- Hold office hours
- Grade assignments and generate solutions sets
- Lead lecture when instructor is unavailable

Head Teaching Assistant, Physics, Juniata College Fall 2013-Spring 2014

- Perform regular duties of TA
- Review handouts for upcoming labs
- Act as a liaison between TAs and professors and answered TA's questions

Group Tutor, Physics, Juniata College Fall 2013-Spring 2014

- Review introductory-level algebra and calculus-based physics content
- Assist students with homework and reviewing for exams
- Fill out follow-up reports, informing professors of student progress

Teaching Assistant, Physics, Juniata College Fall 2012

- Assist students with their weekly labs
- Grade weekly labs and reported grades to supervising faculty member
- Attend weekly TA meetings to set up and go over upcoming labs

Service and Leadership Experience

University of Rochester, SPIE Student Chapter

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| • Outreach Committee Member | Fall 2014-Spring 2020 |
| • Treasurer | Fall 2016-Spring 2017 |
| • Secretary | Fall 2017-Spring 2018 |
| • Web Admin | Fall 2018-Spring 2019 |

University of Rochester, The Institute of Optics, Graduate Committee

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| • Assistant Graduate Representative | Fall 2015-Spring 2016 |
| • Senior Graduate Representative | Fall 2017-Spring 2020 |

Juniata College, Society of Physics Students

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| • Vice President | 2010-2014 |
| | Fall 2013-Spring 2014 |

Honors and Awards

- Bausch and Lomb Fellowship, University of Rochester, 2014
- Paul R. Yoder Memorial Scholarship, Juniata College, 2013
- Eagle Scout, Boy Scouts of America, 2010
- James Quinter Scholarship, Juniata College, 2010