

Dustin Shipp

Utah Valley University
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EDUCATION AND TRAINING

- 2014 **PhD in Optics**, *University of Rochester*, Rochester, NY.
Dissertation: Holographic angular-domain elastic scattering of single biological cells
- 2008 **BS in Physics, BS in Mathematics**, *Brigham Young University*, Provo, UT.

PROFESSIONAL POSITIONS

- 2018–Present **Assistant Professor**, *Utah Valley University*, Orem, UT.
- 2015–2018 **Research Fellow**, *University of Nottingham*, Nottingham, UK.
- 2014–2015 **Lecturer**, *Rochester Institute of Technology*, Rochester, NY,
School of Physics and Astronomy.

AWARDS

- 2019 **Fellow of the Higher Education Academy**, *Advance HE*.
- 2014 **Advanced Teaching Certificate**, *Center for Excellence in Teaching and Learning*,
University of Rochester.

TEACHING EXPERIENCE

- 2018–Present **Assistant Professor**, *Department of Physics*, Utah Valley University.
- Courses taught:
 - College Physics I and II
 - Physics for Scientists and Engineers I and II
 - Introduction to Experimental Physics I
 - Survey of Physical Science
 - Biophysics
 - Student Research Mentor
 - Mentored several students in biomedical optics research
 - See Research Experience for more details
 - Physics Laboratory Course Sequence
 - Incorporated ideas from Research Skills Development Framework, Colorado Learning Attitudes About Science Survey for Experimental Physics (E-CLASS), and other sources to increase student autonomy and experimental skills training
 - Teaching Development Courses
 - Mentoring Academy
 - Online Teaching Academy
 - Writing Enriched Workshop Series
 - Global Intercultural Training
 - Foundations of Inclusion
 - Community of Practice: Research Skills Development and Information Literacy
 - Learning Circles through Office of Teaching and Learning

- 2014–2015 **Course Instructor**, *School of Physics and Astronomy*, Rochester Institute of Technology.
- University Physics II
 - Honors Contract Course
 - Mentored student in independent research building and evaluating an optical cloaking device
 - Biomedical Optics
 - Short course for students and faculty between semesters
- 2014 **Course Designer**, *Hajim School of Engineering and Applied Sciences*, University of Rochester.
- Short course for freshman physics majors to review their mathematical skills
- 2013 **Program Leader**, *Hajim Engineering Pre-college Program*, University of Rochester.
- One-week course on optics for high school students including guest lectures and hands-on laboratory experiences
- 2009–2013 **Graduate Teaching Assistant**, *The Institute of Optics*, University of Rochester.
- Capstone laboratory course for master's students and undergraduates
 - Shortened labs with participants from industry as part of the Optics Summer School

RESEARCH EXPERIENCE

- 2018–Present **Principal Investigator**, *Center for Imaging and Biophotonics Experiments Advancing Medicine (CIBEAM)*, Utah Valley University.
- Led group of undergraduate student researchers
 - Built device for microscopy and Raman hyperspectral imaging
 - Integrated biotech instrumentation into physics laboratory
- 2015–2018 **Research Fellow**, *Biophotonics Group*, University of Nottingham.
- Identified tumors in breast, lymph nodes, and skin with greater than 90% accuracy using Raman spectroscopy
 - Automated image-guidance to complete measurements for a surgical specimen surface in less than 20 minutes while maintaining high accuracy
 - Developed measurement protocols with clinicians to integrate devices into hospital procedures
 - Participated in design and commercialization of two devices for tumor margin evaluation
 - Managed a multi-center study implementing clinical prototype devices into hospitals
 - Assisted in securing funding from government and non-government sources
- 2014–2015 **Physics Education Researcher**, *Science and Mathematics Education Research Collaborative (SMERC)*, Rochester Institute of Technology.
- Investigated student motivation in introductory physics courses
 - Found statistically significant results showing fear-oriented motivation correlates with lower grades
- 2008–2014 **Graduate Research Assistant**, *Biomedical Spectroscopy Lab*, University of Rochester.
- Measured organelle sizes in single cells with 60 nm accuracy with an amplitude- and phase-sensitive angular scattering system
 - Computationally reduced spatial coherence and speckle in holographic scattering data
 - Collaborated with medical researchers to design experiments measuring structural and molecular changes during T cell activation, platelet degranulation, and apoptosis
 - Supervised undergraduate students and led daily research activities while advisor on sabbatical

LEADERSHIP AND SERVICE

- 2019–2023 **Section Leadership**, *Idaho-Utah Section*, American Association of Physics Teachers.
- 2019 - President Elect
 - 2022 - Vice President
 - 2023 - President
- 2019–2022 **Faculty Senate**, *Department of Physics*, Utah Valley University.
- 2019–2022 **Advisory Board**, *Scholarly and Creative Undergraduate Learning Partnership Team (SCULPT)*, Utah Valley University.
- 2020–present **College Representative**, *Writing Enriched Committee*, Utah Valley University.
- 2020–present **Department Representative**, *College of Science Equity, Diversity, and Inclusion Committee*, Utah Valley University.
- 2018–Present **Other Committee Service**, *Department of Physics*, Utah Valley University.
- Faculty Search Committee
 - Physics Scholarship evaluation
- 2014–2015 **Committee Member**, *Rochester International Year of Light Committee*, Rochester, NY.
- Planned local outreach events celebrating the International Year of Light
 - Coordinated with committee members from local universities, businesses, government offices, and museums
- 2011–2012 **Senior Graduate Student Representative**, *The Institute of Optics*, University of Rochester.
- Represented graduate students on the Graduate Committee
 - Coordinated with the Rochester Institute of Technology to create an inter-university colloquium series, “Photons After Dark”
 - Facilitated mentoring program for incoming graduate students
- 2010–2014 **Student Chapter Leadership**, *SPIE*, University of Rochester.
- Served terms as President, Vice-President, Secretary, and Treasurer
 - Coordinated annual Summer Colloquium Series
 - Organized several community outreach events
 - Arranged visits to local optics companies
- 2012–Present **Peer Reviewer**.
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|--------------------------|----------------------------|--|
| ○ Analytical Chemistry | ○ J. Biomedical Optics | ○ Biomedical Physics & Engineering Express |
| ○ J. Biophotonics | ○ Medical Physics | ○ J. Modern Optics |
| ○ Analyst | ○ Applied Optics | |
| ○ Biomed. Optics Express | ○ Measurement Sci. & Tech. | |
| ○ Optics Express | ○ OSA Continuum | |
- 2018–Present **Member**, *American Association of Physics Teachers (AAPT)*.
- 2009–Present **Member**, *SPIE*.
- 2009–Present **Member**, *The Optical Society (OSA)*.

FUNDING RECEIVED

Student Funding through Utah Valley University

- Board of Trustees Engaged Learning Scholarship (BoTS). One student supported for \$6,000 (2019).
- Undergraduate Research Summer Institute Grant (URSIG). Five students supported for \$14,339 total (2019).
- D. Clark and Pam Turner Endowment for Engaged Learning in STEM Research Fellowships (TEELS). Three students supported for \$12,000 total (2019–2021).
- Undergraduate Research Scholarly and Creative Activities (URSCA). Eleven students supported for \$19,921 total (2019–2021).
- Undergraduate Research Scholarly and Creative Activities (URSCA) Dissemination Grant. Two students supported for \$1,210 total (2020–2021).
- College of Science Scholarly Activities Committee. Two students supported for \$990 total (2020).

“Intra-operative spectroscopic sentinel lymph node evaluation in breast cancer.” Nottingham University Hospitals Charity - research grant, £10,000 (\approx \$14,000) (2018).

“Intraoperative spectroscopic evaluation of the sentinel lymph nodes in breast cancer.” Breast Cancer Now - project grant, £196,271 (\approx \$260,000) (2017).

PUBLICATIONS

R. Boitor, C. de Wolf, F. Weesie, **D. W. Shipp**, S. Varma, D. Veitch, A. Wernham, A. Koloydenko, G. Puppels, T. Nijsten, H. C. Williams, P. Caspers, I. Notingher, “Clinical integration of Fast Raman spectroscopy for Mohs micrographic surgery of basal cell carcinoma,” *Biomedical Optics Express* **12**(4):2015-2026 (2021).

M. G. Lizio, Z. Liao, **D. W. Shipp**, R. Boitor, R. Mihai, J. S. Sharp, M. Russell, H. Khout, E. A. Rakha, I. Notingher, “Combined total internal reflection AF spectral-imaging and Raman spectroscopy for fast assessment of surgical margins during breast cancer surgery,” *Biomedical Optics Express* **12**(2):940-954 (2021).

*B. Durrant, *M. Trappett, **D. W. Shipp**, I. Notingher, “Live-cell molecular imaging with Raman microscopy,” *Current Opinion in Chemical Biology* **51**:138-145 (2019).

C. Corden, **D. W. Shipp**, P. Matousek, I. Notingher, “Fast Raman spectral mapping of highly fluorescing samples by time-gated spectral multiplexed detection,” *Optics Letters* **43**(23): 5733-5736 (2018).

D. W. Shipp, E. A. Rakha, A. A. Koloydenko, R. D. Macmillan, I. O. Ellis, I. Notingher, “Intra-operative spectroscopic assessment of surgical margins during breast conserving surgery,” *Breast Cancer Research* **20**(69) (2018).

R. Boitor, K. Kong, **D. W. Shipp**, S. Varma, A. A. Koloydenko, K. Kulkarni, S. Elsheikh, T. Bakker-Schut, P. Caspers, G. Puppels, M. van der Wolf, E. Sokolova, T.E.C. Nijsten, B. Salence, H. Williams, I. Notingher, “Automated multimodal spectral histopathology for quantitative diagnosis of residual tumour during basal cell carcinoma surgery,” *Biomedical Optics Express* **8**(12): 5749-5766 (2017).

†F. Sinjab, G. Sicilia, **D. W. Shipp**, M. Marlow, and I. Notingher, “Label-free Raman hyperspectral imaging of single cells cultured on polymer substrates,” *Applied Spectroscopy* **71**(12): 2595-2607 (2017).

D. W. Shipp, F. Sinjab, and I. Notingher, “Raman spectroscopy: Techniques and applications in the life sciences,” *Advances in Optics and Photonics* **9**(2): 315-428 (2017). Open access at [goo.gl/VpNK1C](https://doi.org/10.1364/AOP.9.000315)

D. W. Shipp, R. Qian, and A. J. Berger, “Angular-domain scattering interferometry,” *Optics Letters* **38**(22): 4750-4753 (2013).

* = Undergraduate UVU Student, † = Editor’s Choice

PATENTS

I. Notingher, C. Corden, **D. W. Shipp**, “Raman spectroscopy method and apparatus,” International Patent No. WO2020/058702 A1, (September 17, 2019).

PRESENTATIONS

Oral Presentation - *J. Hales, *J. Jones, **D. W. Shipp**, “The effect of scattering on spatial resolution of Raman spectroscopy in tissue,” *OSA Biophotonics Congress*, Online, (April 14, 2021).

Poster Presentation - *P. Lagunas, *H. Rivera, **D. W. Shipp**, “Tissue phantom study to characterize detection of cancer cells with Raman spectroscopy,” *Utah Academy of Science, Arts, and Letters*, Online, (March 20, 2021).

Poster Presentation - *B. Durrant, *S. Bennion, **D. W. Shipp**, “Raman spectroscopic analysis,” *Utah Conference for Undergraduate Research*, Online, (February 19, 2021).

Oral Presentation - *E. Walker, *D. Carroll, **D. W. Shipp**, “Making lab classes count,” *Teaching 4 Learning*, Provo, Utah, (March 6, 2020).

Oral Presentation - *E. Ballantyne, **D. W. Shipp**, “Raman imaging of single cellular metabolism,” *Utah Conference for Undergraduate Research*, Logan, Utah, (February 7, 2020).

Poster Presentation - *B. Durrant, *S. Bennion, **D. W. Shipp**, “Building a classifier to discriminate bacteria with Raman spectroscopy,” *Utah Conference for Undergraduate Research*, Logan, Utah, (February 7, 2020).

Oral Presentation - *L. Buck, **D. W. Shipp**, “Differentiating cancer cells using Raman spectroscopy,” *SPIE Photonics West*, San Francisco, California, (February 1–6, 2020).

Poster Presentation - *J. Jones, *J. Hales, **D. W. Shipp**, “The effect of scattering on spatial resolution of Raman spectroscopy in tissue,” *SPIE Photonics West*, San Francisco, California, (February 1–6, 2020).

Poster Presentation - *J. Jones, *J. Hales, **D. W. Shipp**, “The effect of scattering on spatial resolution of Raman spectroscopy in tissue,” *APS Conferences for Undergraduate Women in Physics (CUWiP)*, Spearfish, South Dakota, (January 17–19, 2020).

Poster Presentation - *J. Jones, **D. W. Shipp**, “The effect of scattering on spatial resolution of Raman spectroscopy in tissue,” *UVU Research Showcase*, Orem, Utah, (October 15, 2019).

Invited Talk - **D. W. Shipp**, “Intra-operative detection of residual tumor at lumpectomy surface during breast conserving surgery by Multi-spectral Histopathology,” *Photonics as a Tool for Surgery*, Gustave Roussy Institute - Paris, (November 13, 2017).

Oral Presentation - **D. W. Shipp**, K. Kong, E. Rakha, I. Ellis, I. Notingher, “Multi-spectral histopathology for rapid evaluation of breast tumor margins,” *OSA European Conferences on Biomedical Optics*, Munich, (June 25, 2017).

†*Poster Presentation* - **D. W. Shipp**, K. Kong, E. Rakha, I. Ellis, I. Notingher, “Laser-based tool to help breast cancer surgeons check their work,” *Research Showcase*, University of Nottingham, (June 21, 2017).

†*Poster Presentation* - **D. W. Shipp**, K. Kong, E. Rakha, I. Ellis, I. Notingher, “Speeding up breast cancer margin evaluation using multi-spectral histopathology,” *STEM for Britain*, UK Parliament, (March 13, 2017).

Poster Presentation - **D. W. Shipp**, K. Kong, E. Rakha, I. Ellis, I. Notingher, “Raman spectral histopathology of breast cancer recession margins,” *OSA Frontiers in Optics*, Rochester, NY, (October 19, 2016).

Oral Presentation - **D. W. Shipp**, K. Kong, E. Rakha, I. Ellis, I. Notingher, “Intra-operative assessment of sentinel lymph nodes by selective-scanning Raman spectroscopy,” *Pathological Society*, Nottingham, (June 29, 2016).

Poster Presentation - **D. W. Shipp**, “Motivation in non-major students in an introductory physics class,” *CASTLE Symposium*, Rochester Institute of Technology, (May 20, 2015).

‡*Oral Presentation* - **D. W. Shipp**, “Precise, time-lapsed measurements of organelle sizes in single cells by Holographic Angular Domain Elastic Scattering (HADES),” *SPIE Student Colloquium Series*, University of Rochester, (June 24, 2014).

Poster Presentation - **D. W. Shipp**, R. Qian, and A. J. Berger, “Angular-domain scattering interferometry,” *ECI Advances in Optics for Biotechnology, Medicine, and Surgery*, Tahoe, CA, (June 2-5, 2013).

Oral Presentation - **D. W. Shipp**, S. Mitra, T. H. Foster, and A. J. Berger, “Effect of photodynamic therapy on single cancer cells studied by integrated Raman and angular scattering microscopy,” *SPIE Photonics West*, San Francisco, CA, (January 22, 2012).

Poster Presentation - **D. W. Shipp**, D. C. Davidson, M. Kiebala, S. B. Maggirwar, and A. J. Berger, “Platelet activation studied by Raman and angular scattering microscopy,” *World AIDS Day*, University of Rochester Medical Center, (December 1, 2011).

* = Undergraduate UVU Student, † = Highly selective, ‡ = Winner: Best presentation