
EDUCATION

Duke University, Durham NC

Ph.D., Biomedical Engineering, 2016

B.S.E., in Biomedical Engineering, 2010

RELEVANT RESEARCH EXPERIENCE

Computational Imaging Lab, UC Berkeley, CA

2017-present

- Currently serving as a postdoctoral scholar in the lab of Dr. Laura Waller
- Served key roles in the development of computational imaging systems focusing on high-throughput (gigapixel scale) fluorescence imaging and ultrahigh resolution (<150 nm) 3D refractive-index tomography
- Actively collaborating with the UC Davis Department of Pathology, the Chan Zuckerberg Biohub, and the UC Berkeley Biology department

Biophotonics Lab, Duke, Durham NC (under guidance of Dr. Joseph Izatt)

2011-2016

- Authored 7 peer-reviewed publications with currently one more in revision (all as first-author). First author on 10 conference publications, and 1 patent application.
- Developed fundamental theory for generalized multimodal super-resolution microscopy and showed implementation in custom designed microscope
- Collaborated with biologists and pathologists to demonstrate super-resolution visualization of relevant biological samples, with emphasis on resolving structures at size scales <150nm with multiple forms of contrast.
- Regularly presented unique research at conferences to research groups of 100-200 people.

BIOS Lab, Duke, Durham NC (under guidance of Dr. Adam Wax)

2009-2010

- Co-author on 1 peer-reviewed publication and primary presenter for 1 conference presentation
- Developed OCT imaging to provide a cancer detection scheme based on detecting nucleus-size and hemoglobin-concentration abnormalities.
- Validated theory of measuring nuclear size by accurately sizing beads in agar phantoms
- Determined localized hemoglobin concentration by characterizing absorption spectra of hemoglobin to determine localized hemoglobin

IACL Lab, JHU, Baltimore MD (under guidance of Dr. Jerry Prince)

2006

- Co-author on 1 peer-reviewed publication and 3 conference publications as well as primary author of final project paper that was recognized by the 2006 Intel Science Talent Search.
- Developed JAVA-based software (ViPAR) to allow robust, flexible, and real-time manipulation of diffusion tensor images
- Collaborated with JHU medical school researchers to establish protocol for visualization and analysis of cerebellar peduncles from cerebellar ataxia patients
- Segmented cerebellar peduncles from cerebellar ataxia patients and conducted validation studies to establish measurement consistency

LEADERSHIP

President for Duke OSA/SPIE Student Chapter

2012-2015

- Successfully initiated the Fitzpatrick Institute of Photonics (FIP) corporate showcase as a part of the Duke FIP Annual Symposium series.
 - Brought in nationally renowned optics companies to showcase products and recruit from Duke's large optics community
 - Total funds received from corporate sponsorship totaled to > \$3k
- Wrote grants to OSA and SPIE to bring in funding for the student chapter totaling ~\$2k
 - Money used to fund outreach activities, photonics summer research opportunities for high-schoolers, chapter recruitment events, etc
- Organized outreach events to bring optics awareness to local community schools
 - Set up laser/refraction/spectroscopy demos to demonstrate simple optical principles to middle and high school students
- Helped organize summer research program for high school students in participating FIP labs

Secretary for Duke OSA/SPIE Student Chapter

2011-2012

- Helped organized outreach events to bring optics awareness to under-privileged schools
- Updated and maintained the website for the Student Chapter with news of approaching outreach events, relevant photonics conferences attended by our members, and upcoming speakers for FIP's seminar series
- Helped organize summer research program for high school students in participating FIP labs and personally mentored two high school students

High school tutor

2010-2011

- Helped tutor high-school students in algebra, geometry, and calculus at under-privileged schools in local Durham/Chapel Hill public school districts

FELLOWSHIPS AND AWARDS

2014	Thurstone Medical Imaging Fellowship
2009-present	OSA Student Member
2009-present	SPIE Student Member
2013	OSA Large Student Chapter Excellence Award
2012	Honorable Mention Poster Presentation at 2012 Duke Fitzpatrick Institute for Photonics Annual Symposium
2011	2011-2013 NIH Medical Imaging Predoctoral Training Fellow
2010	2010-2011 Duke Fitzpatrick Institute for Photonics John Chambers Fellows
2009	Duke Pratt Engineering Fellowship
2006-2009	Duke Dean's List of Distinction
2006	Semifinalist in 2006 Intel Science Talent Search

JOURNAL PUBLICATIONS

- 2017 **S. Chowdhury**, W.J. Eldridge, A. Wax, and J.A. Izatt, "Structured illumination microscopy for dual-modality 3D sub-diffraction resolution fluorescence and refractive-index reconstruction," *Biomedical Optics Express*, 8(12), 5776-5793 (2017)
- 2017 **S. Chowdhury**, W.J. Eldridge, A. Wax, and J.A. Izatt, "Refractive index tomography with structured illumination," *Optica*, 4(5), 537-545 (2017).
- 2017 **S. Chowdhury**, W.J. Eldridge, A. Wax, and J.A. Izatt, "Structured illumination multimodal 3D-resolved quantitative phase and fluorescence sub-diffraction microscopy," *Biomedical Optics Express*, 8(5), 2496-2518. (2017).
- 2015 **S. Chowdhury**, W.J. Eldridge, A. Wax, and J. Izatt, "Spatial frequency-domain multiplexed microscopy for simultaneous, single-camera, one-shot, fluorescent, and quantitative-phase imaging." *Optics Letters* 40.21 (2015).
- 2014 **S. Chowdhury** and J. Izatt, "Structured illumination diffraction phase microscopy for broadband, subdiffraction resolution, quantitative phase imaging," *Optics Letters* 39, 1015-1018 (2014).
- 2013 **S. Chowdhury** and J. Izatt, "Structured illumination quantitative phase microscopy for enhanced resolution amplitude and phase imaging," *Biomedical Optics Express* 4, 1795-1805 (2013).
- 2012 **S. Chowdhury**, A. Dhalla, and J. Izatt, "Structured oblique illumination microscopy for enhanced resolution imaging of non-fluorescent, coherently scattering samples," *Biomedical Optics Express* 3, 1841-1854 (2012).
- 2010 F. Robles, **S. Chowdhury**, and A. Wax, "Assessing hemoglobin concentration using spectroscopic optical coherence tomography for feasibility of tissue diagnostics," *Biomedical Optics Express* 1, 310-317 (2010).
- 2009 S.H. Ying, B.A. Landman, **S. Chowdhury**, A.H. Sinofsky, A. Gambini, S. Mori, D.S. Zee, J.L. Prince "Orthogonal diffusion-weighted MRI measures distinguish region-specific degeneration in cerebellar ataxia subtypes". *Journal of Neurology* 1432-1459 (2009)

CONFERENCE PRESENTATIONS

- 2017 **S. Chowdhury**, L. Yeh, L. Waller, "Structured illumination with scattering media," in SPIE BiOS Photonics West (2018, San Francisco, USA), paper 10499-1
- 2017 **S. Chowdhury** and J. Izatt, "Structured illumination for 3D subdiffraction reconstruction of refractive-index and fluorescence," in SPIE BiOS Photonics West (2017, San Francisco, USA)
- 2017 **S. Chowdhury** and J. Izatt, "Structured illumination for combined 3D quantitative phase and fluorescence sub-diffraction microscopy," in SPIE BiOS Photonics West (2017, San Francisco, USA)

- 2016 **S. Chowdhury** and J. Izatt, "Simultaneous fluorescence and phase imaging with extensions toward sub-diffraction resolution via structured-illumination," in SPIE BiOS Photonics West (2016, San Francisco, USA), paper 9713-44
- 2015 **S. Chowdhury** and J. Izatt, "Structured illumination microscopy for sub-diffraction quantitative-phase and multiplexed fluorescent imaging," in SPIE BiOS Photonics West (2016, San Francisco, USA), paper 9713-44
- 2014 **S. Chowdhury** and J. Izatt, " Multiplexed structured illumination microscopy for simultaneous, sub-diffraction resolution fluorescent and quantitative-phase imaging," in Gordon Research Conference: Lasers in Medicine and Biology (Holderness School, NH)
- 2014 **S. Chowdhury** and J. Izatt, " Multiplexed structured illumination microscopy for simultaneous, sub-diffraction resolution fluorescent and quantitative-phase imaging," in Biomedical Optics and 3-D Imaging, OSA Technical Digest (Optical Society of America, 2014, Miami, USA), paper BW2A.2
- 2013 **S. Chowdhury** and J. Izatt, "Speckle-free sub-diffraction resolution quantitative phase imaging via structured illumination," in SPIE BiOS Photonics West (2014, San Francisco, USA), paper 8949-52
- 2013 **S. Chowdhury** and J. Izatt, "Structured Illumination Phase Microscopy for Super Resolution Phase Imaging," in Optics in the Life Sciences, OSA Technical Digest (online) (Optical Society of America, 2013, Hawaii, USA), paper NM2B.3.
- 2013 **S. Chowdhury**, A. Dhalla, and J. Izatt, "Structured oblique illumination microscopy for enhanced resolution imaging of non-fluorescent, scattering samples," in SPIE BiOS Photonics West (2013, San Francisco, USA), paper 8589-17
- 2012 **S. Chowdhury**, A. Dhalla, and J. Izatt, "Coherent Super-Resolution Structured Illumination Microscopy of Non-Fluorescent Samples," in Biomedical Optics and 3-D Imaging, OSA Technical Digest (Optical Society of America, 2012, Miami, USA), paper BSu4B.8.
- 2010 **S. Chowdhury**, F. Robles, and A. Wax, "Detecting Hemoglobin Concentration Using the Dual Window Method for Processing Spectroscopic Optical Coherence Tomography Signals," in Biomedical Optics and 3-D Imaging, OSA Technical Digest (CD) (Optical Society of America, 2010, Miami, USA), paper JMA43.
- 2006 **A. H. Sinofsky**, B. A. Landman, **S. Chowdhury**, A. Gambini, S. Mori, D. S. Zee, J. L. Prince, and S. H. Ying. "Diffusion-weighted MR imaging of the cerebellar peduncles as a surrogate measure of cerebellar degeneration", Organization for Human Brain Mapping, Florence, Italy, June 2006
- 2006 B. A. Landman, **S. Chowdhury**, A. H. Sinofsky, S. Mori, D. S. Zee, J. L. Prince, and S. H. Ying. "s-Image Representation of Diffusion Tensor Contrast and Fiber Geometry: Leukometric Analysis in the Brainstem and Cerebellum", Organization for Human Brain Mapping, Florence, Italy, June 2006
- 2006 Bennett A. Landman, **Shwetadwip Chowdhury**, Alexander H. Sinofsky, Andrew S. K. Liu, Susumu Mori, David S. Zee, Jerry L. Prince, and Sarah H. Ying, "Delineation of Cerebellar Fiber Tracts on Anatomically Aligned Planes with VIPAR, a Novel MRI Visualization and Manipulation Tool", Organization for Human Brain Mapping, Florence, Italy, June 2006