

Lindsey A. Erion Barner, Ph.D.

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Relocating to **Boston, MA** in May 2023

OBJECTIVE

To develop biomedical imaging technology and data analysis tools for the advancement of human health.

EDUCATION AND TRAINING

Doctor of Philosophy, University of Washington

Aug 2017 – June 2022

Mechanical Engineering

Molecular Biophotonics Laboratory (PI: Dr. Jonathan Liu)

Dissertation: Multi-resolution open-top light-sheet microscopy enables 3D pathology of lymph nodes for breast cancer staging

Master of Science, University of Washington

2020

Mechanical Engineering (GPA 3.84/4.00)

Bachelor of Science, Messiah University

2013 – 2017

Mechanical Engineering (GPA 3.98/4.00)

Physics minor

Diagnostics for Viral Diseases Research Group (PI: Dr. Matthew Farrar)

Thesis: A low-cost dynamic light scattering system for detection of viral aggregates

Kryemadhi Research Group (PI: Dr. Abaz Kryemadhi)

Compact particle detector development for dark matter searches

RESEARCH EXPERIENCE

Postdoctoral Scholar, University of Washington

Dec 2022 – May 2023

Research Assistant, University of Washington

Aug 2017 – June 2022

Developed multi-resolution open-top light-sheet microscopy for 3D pathology of clinical specimens

Implemented deep learning techniques for AI-assisted 3D pathology diagnostic workflows

PI: Dr. Jonathan Liu

Visiting Scientist, The Allen Institute for Neural Dynamics

Jan 2023 – May 2023 (contract)

Developing an axially swept light sheet microscope system for spatial transcriptomics in mouse brain

Supervisor: Dr. Adam Glaser

Scientist I, Nanostring Technologies, Inc.

June 2022 – Nov 2022 (position downsized)

Developed light sheet microscope for high-resolution 3D spatial transcriptomics in thick tissue

Supervisor: Dr. Yi Cui

HONORS AND AWARDS

National Science Foundation	GRFP fellowship	2018 – 2021
Seattle ARCS Foundation	ARCS Foundation scholarship	2018 – 2021
University of Washington	Purvis Endowed Fellowship	2018 – 2019
University of Washington	Mamidala Endowed Fellowship	2018 – 2019
ASME IMECE	Poster award	2019

PUBLICATIONS

L.A. Barner, A.K. Glaser, E.A. Susaki, S.M. Dintzis, and J.T.C. Liu, "Multi-resolution non-destructive 3D pathology of whole lymph nodes for breast cancer staging," *Journal of Biomedical Optics* 27, 036501 (2022).

L.A. Barner, A.K. Glaser, H. Huang, L.D. True, and J.T.C. Liu, "Multi-resolution open-top light-sheet microscopy to enable efficient 3D pathology workflows," *Biomed. Opt. Exp.* 11, 6605 (2020).

L.A. Barner, A.K. Glaser, L.D. True, N.P. Reder, and J.T.C. Liu, "Solid immersion meniscus lens (SIMlens) for open-top light-sheet microscopy," *Opt. Lett.* 44, 4451 (2019).

L.A.E. Barner*, G. Gao*, D.M. Reddi, L. Lan, W. Burke, W.M. Grady, and J.T.C. Liu, "Enhanced detection of neoplasia in esophageal biopsies via non-destructive 3D pathology with deep learning triage" (submitted). *equal contribution

D.M. Reddi, **L.A. Barner**, W. Burke, W.M. Grady, and J.T.C. Liu, "Non-destructive 3D pathology image atlas of Barrett esophagus with open-top light-sheet microscopy," *Arch. Path. Lab Med* (in press).

A.K. Glaser, K.W. Bishop, **L.A. Barner**, R.B. Serafin, and J.T.C. Liu, "A hybrid open-top light-sheet microscope for multi-scale imaging of cleared tissues," *Nature Methods* 19, 613 (2022).

W. Xie, N.P. Reder, C. Koyuncu, P. Leo, S. Hawley, H. Huang, C. Mao, N. Postupna, S. Kang, R. Serafin, G. Gao, Q. Han, K.W. Bishop, **L.A. Barner**, P. Fu, J.L. Wright, C.D. Keene, J.C. Vaughan, A. Janowczyk, A.K. Glaser, A. Madabhushi, and J.T.C. Liu, "Prostate cancer risk stratification via non-destructive 3D pathology with deep learning-assisted gland analysis," *Cancer Research* 82, 334 (2022).

L. Horowitz, A. Rodriguez, A. Au-Yeung, K.W. Bishop, **L.A. Barner**, G. Mishra, A. Raman, P. Delgado, J.T.C. Liu, T. Gujral, M. Mehrabi, M. Yang, R. Pierce, and A. Folch, "Microdissected cuboids for microfluidic drug testing of intact tissues," *Lab on Chip* (2020).

A.K. Glaser, N.P. Reder, Y. Chen, C. Yin, L. Wei, S. Kang, **L.A. Barner**, W. Xie, E.F. McCarty, C. Mao, A.R. Halpern, C.R. Stoltzfus, J.S. Daniels, M.Y. Gerner, P.R. Nicovich, J.C. Vaughan, L.D. True, and J.T.C. Liu, "Multi-immersion open-top light-sheet microscope for high-throughput imaging of cleared tissues," *Nature Communications* 10, 2781 (2019).

A.K. Glaser, Y. Chen, C. Yin, L. Wei, **L.A. Barner**, N.P. Reder, and J.T.C. Liu, "Multidirectional digital scanned light-sheet microscopy enables uniform fluorescence excitation and contrast-enhanced imaging," *Scientific Reports* 8, 13878 (2018).

A. Kryemadhi, **L.A. Barner**, A. Grove, J. Mohler, A. Roth, "A LYSO crystal array readout by silicon photomultipliers as compact detector for space applications," *Nuclear Instruments and Methods in Physics Research* (2018).

A. Kryemadhi, **L.A. Barner**, A. Grove, J. Mohler, C. Sisson, A. Roth, "Performance of LYSO and CeBr₃ crystal readout by silicon photomultiplier arrays as compact detectors for space-based applications," *Journal of Instrumentation* 12 (02), C02013 (2017).

PRESENTATIONS

L.A.E. Barner, G. Gao, D. Reddi, L. Lan, W. Burke, W.M. Grady, J.T.C. Liu, "Enhanced detection of neoplasia in esophageal biopsies via non-destructive 3D pathology with deep learning triage" SPIE Photonics West (2023). Oral presentation.

L.A.E. Barner, G. Gao, D. Reddi, W. Burke, W.M. Grady, J.T.C. Liu, "Improved detection of esophageal neoplasia with 3D pathology and deep learning triage" UW Medical Data Science Symposium (2023). Poster presentation.

L.A. Barner, A.K. Glaser, S.M. Dintzis, J.T.C. Liu, "Staging breast cancer metastases with multi-resolution 3D pathology of whole lymph nodes" Optica Biophotonics Congress: Biomedical Optics (2022). Oral presentation, competition finalist.

L.A. Barner, D.M. Reddi, W. Burke, W.M. Grady, J.T.C. Liu, "3D pathology in conjunction with deep learning triage for esophageal dysplasia screening," Optica Biophotonics Congress: Biomedical Optics (2022). Oral presentation.

L.A. Barner, A.K. Glaser, H. Huang, J.T.C. Liu, "Solid immersion lens (SIMlens) enables multi-resolution open-top light-sheet microscopy," SPIE Photonics West 11649- 13 (2021). Oral presentation.

L.A. Barner, A.K. Glaser, J.T.C. Liu, "Multi-resolution open-top light-sheet microscopy enabled by a solid immersion meniscus lens (SIMlens)," Biophotonics Congress: Biomedical Optics (2020). Oral presentation.

L.A. Barner, A.K. Glaser, J.T.C. Liu, "Multi-resolution open-top light-sheet (OTLS) microscopy for rapid 3D pathology," ASME IMECE 13009 (2019). Poster presentation, award winner.

L.A. Barner, A. Grove, J. Mohler, C. Sisson, A. Roth, "Development of compact particle detectors for space-based instruments," APS April meeting E2.003 (2017). Oral presentation.

J.R. Wilson, **L.A. Barner**, A.E. Vladar, K. Klein, "Characterization of helium-ion machined fluidic structures", poster presentation at EIPBN (2018). Poster presentation.

PATENTS

J.T.C. Liu, **L.A. Barner**, A.K. Glaser, "Apparatuses, systems and methods for solid immersion meniscus lenses," WO2020150239A1 (2019).

J.T.C. Liu, **L.A.E. Barner**, G. Gao, "Artificial intelligence identification of 2D regions of interest from 3D datasets of medical images for diagnosis," Provisional App. No. 63/481, 761 (2023).

INDUSTRY EXPERIENCE

Johns Hopkins University Applied Physics Laboratory (JHUAPL) Summer 2017
LIDAR systems and interferometry, Imaging Systems Group (Supervisor: Austin Cox)
Laurel, MD

National Institute of Standards and Technology (NIST) Summer 2016
Helium ion-machined fluidic structures for nanofluidic devices (PI: Dr. Kate Klein)
Gaithersburg, MD

National Aeronautics and Space Administration (NASA) Summer 2015
2015 Next Generation X-Ray Optics
Goddard Space Flight Center, Greenbelt, MD

SKILLS

Programming – Python, MATLAB, LabVIEW, deep learning (PyTorch), GPU acceleration (CUDA)

Software – ZEMAX, SolidWorks, Inventor, Imaris, BigStitcher, KeyShot, LATEX

Hardware – Microscope design and development (light sheet), hardware automation (sCMOS, galvanometers, lasers, spatial light modulators)

Wet Lab – Fixed tissue and antibody labeling, tissue clearing

SERVICE

Graduate Society of Women Engineers Academics Chair 2020 – 2022

UW Mechanical Engineering Biomedical Imaging Cluster Hire Committee 2020 – 2021

UW Mechanical Engineering Graduate Student Association (VP) 2018 – 2019

Biophotonics seminar organizer 2018 – 2019

Graduate student mentor 2018 – 2020