

## **Lindsey A. Erion Barner, Ph.D.**

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### **OBJECTIVE**

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To develop imaging technology and data analysis tools to advance technology and human health.

### **EDUCATION AND TRAINING**

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#### **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**

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#### **Postdoctoral Associate, Molecular Biophotonics Laboratory**

Dec 2022 – present

Developing single-objective light sheet microscope systems for 3D pathology and AI-assisted diagnosis

PI: Dr. Jonathan Liu

#### **Scientist I, Nanostring Technologies, Inc.**

June 2022 – Nov 2022 (position downsized)

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

PI: Dr. Yi Cui

#### **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

## HONORS AND AWARDS

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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

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**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. 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" (in preparation). \*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 CeBr<sub>3</sub> crystal readout by silicon photomultiplier arrays as compact detectors for space based applications," Journal of Instrumentation 12 (02), C02013 (2017).

## PRESENTATIONS

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**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

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

## INDUSTRY EXPERIENCE

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<b>Johns Hopkins University Applied Physics Laboratory (JHUAPL)</b> LIDAR systems and interferometry, Imaging Systems Group (Supervisor: Austin Cox) Laurel, MD	Summer 2017
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<b>National Institute of Standards and Technology (NIST)</b> Helium ion-machined fluidic structures for nanofluidic devices (PI: Dr. Kate Klein) Gaithersburg, MD	Summer 2016
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**National Aeronautics and Space Administration (NASA)**  
2015 Next Generation X-Ray Optics  
Goddard Space Flight Center, Greenbelt, MD

Summer 2015

## **SKILLS**

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**Programming languages** – Python, PyTorch, CUDA, MATLAB, LabVIEW

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

**Hardware** – Light-sheet microscopy development (sCMOS, dual-axis galvanometer, spatial light modulator), GPU acceleration, helium-ion microscopy, electron microscopy

**Wet Lab** – Fixed tissue and antibody labeling, tissue clearing

## **SERVICE**

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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