



## Laura Waller, PhD

Associate Professor

Department of Electrical Engineering/Computer Science  
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**Friday, October 30, 2020**

**12:00-1:00 pm**

**Link: <https://uwmadison.zoom.us/j/97249664921?pwd=SVdmbDZySE04U2hXa0hHRXF3KzRRdz09>**

## Computational 3D Fluorescence Microscopy

**Abstract:** We describe a compact and inexpensive computational microscope that encodes 3D information into a single 2D sensor measurement, then exploits sparsity to reconstruct the volume with good resolution across a large volume. Our system uses simple hardware and scalable software for easy reproducibility and adoption. The inverse algorithm is based on large-scale nonlinear optimization with self-calibration of aberrations and we discuss computational optical design approaches for optimizing the system's performance. We demonstrate applications in whole organism bioimaging and neural activity tracking in vivo.

**Biography:** *Laura Waller is the Ted Van Duzer Associate Professor of Electrical Engineering and Computer Sciences (EECS) at UC Berkeley, a Senior Fellow at the Berkeley Institute of Data Science, and affiliated with the UCB/UCSF Bioengineering Graduate Group. She received B.S., M.Eng. and Ph.D. degrees from the Massachusetts Institute of Technology (MIT) in 2004, 2005 and 2010, and was a Postdoctoral Researcher and Lecturer of Physics at Princeton University from 2010-2012. She is a Packard Fellow for Science & Engineering, Moore Foundation Data-driven Investigator, Bakar Fellow, OSA Fellow and Chan-Zuckerberg Biohub Investigator. She has received the Carol D. Soc Distinguished Graduate Mentoring Award, Agilent Early Career Professor Award (Finalist), NSF CAREER Award and the SPIE Early Career Achievement Award.*



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