"Computational Microscopy in Scattering Media"

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Computational imaging involves the joint design of imaging system hardware and software, optimizing across the entire pipeline from acquisition to reconstruction. Computers can replace bulky and expensive optics by solving computational inverse problems. This talk will describe new microscopes that use computational imaging to enable 3D fluorescence and phase measurement using image reconstruction algorithms that are based on large-scale nonlinear non-convex optimization combined with unrolled neural networks. We further discuss engineering of data capture for computational microscopes by end-to-end learned design.

Bio: 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, AIMBE 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.