

Zack Phillips, PhD

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Overview

I'm a full-stack computational sensing engineer with experience prototyping and scaling fit-for-purpose data creation pipelines suitable for ML, both as a contributor and a leader. Former member of Apple's Exploratory Design Group (XDG) and the Waller Lab at UC Berkeley.

Professional Experience

Cellular Machine Learning Platform, insitro South San Francisco, California	
<i>Director of Imaging, Cellular Machine Learning</i>	September 2025 - Present
<i>Senior Manager, Computational Microscopy</i>	September 2023 - August 2025
<i>Staff Automation Engineer, Microscopy</i>	March 2023 - September 2023
<i>Senior Machine Learning Optical Engineer</i>	November 2021 - March 2023
- Architect, leader, and engineer of insitro's ML-enabled imaging platform for drug discovery	
Exploratory Design Group (XDG), Apple Cupertino, California	
<i>Photonics Engineer</i>	July 2019 - October 2021
- Tech lead and full-stack computational sensing engineer of R&D effort in Biophotonics Group	
Waller Lab, University of California, Berkeley Berkeley, California	
<i>Graduate Student Researcher (PI: Laura Waller)</i>	July 2014 - May 2019
- Developed and published methods for multi-modal and high-throughput optical microscopy	
SCI Microscopy Berkeley, California	
<i>CEO and Co-founder (with Laura Waller) - website</i>	January 2017 - Present
- Waller Lab spin-off company which develops and sells LED illuminators for microscopy	
DISP Lab, Duke University Durham, North Carolina	
<i>Associate in Research (PI: David Brady)</i>	May 2013 - May 2014
- R&D engineer for AWARE Gigapixel camera; Work featured in NPR's <i>All Things Considered</i>	

Education

University of California, Berkeley Berkeley, California	
<i>Ph.D., Applied Science and Technology</i> . GPA 3.56	June 2014 - May 2019
- Dissertation: Quantitative Microscopy Using Coded Illumination	
- Research Advisor: Laura Waller	
University of California, Berkeley Berkeley, California	
<i>M.S., Applied Science and Technology</i> . GPA 3.57	June 2014 - December 2016
- Masters Thesis: Coded Illumination Techniques for Phase Imaging and Motion Blur	
- Research Advisor: Laura Waller	
University of North Carolina, Chapel Hill Chapel Hill, North Carolina	
<i>B.S. with Highest Honors, Applied Science and Engineering</i> . GPA 3.33	August 2009 - May 2013
- Undergraduate Thesis: Designing and building a micro-incubator for cellular motility studies	
- Research Advisor: Amy L. Oldenburg	

Tools and Expertise

Team-building + management, technical leadership, computational imaging and sensing, collaborative software development in python and MATLAB, microscopy fundamentals, hardware prototyping

Awards and Affiliations

AS&T Excellence in Research Award UC Berkeley	2019
Qinf PhD Fellowship Recipient Qualcomm inc.	2016
Eagle Scout Boy Scouts of America	2008

Referances available upon request - please email zack@zackphillips.com

Publications	<p>Sivanandan, S., ... Z.F. Phillips, et al. 19 December 2025. <i>A Pooled Cell Painting CRISPR Screening Platform Enables de novo Inference of Gene Function by Self-supervised Deep Learning</i>. Nat Commun 17, 77 (2026). (doi)</p> <p>Z.F. Phillips, S. Dean, B. Recht and L. Waller 19 December 2019. <i>High-throughput fluorescence microscopy using multi-frame motion deblurring</i>. Biomedical Optics Express, Vol. 11, Issue 1, pp. 281-300. (doi)</p> <p>H. Pinkard, Z.F. Phillips, A. Babakhani, D.A. Fletcher and L. Waller 1 January 2019. <i>Single-shot autofocus microscopy using deep learning</i>. BioRxiv, 587485. (doi)</p> <p>M. Chen, Z.F. Phillips and L. Waller 10 December 2018. <i>Quantitative differential phase contrast (DPC) microscopy with computational aberration correction</i>. Optics Express 26 (25), 32888-32899. (doi)</p> <p>M. Kellman, M. Chen, Z.F. Phillips, M. Lustig and L. Waller 1 December 2018. <i>Motion-resolved quantitative phase imaging</i>. Biomedical optics express 9 (11), 5456-5466. (doi)</p> <p>R. Eckert, Z.F. Phillips, and L. Waller. (1 July 2018). <i>Efficient illumination angle self-calibration in Fourier ptychography</i>. Applied Optics 57(19): 5434-5442. (doi)</p> <p>Z.F. Phillips, M. Chen and L. Waller (13 May 2015). <i>Single-shot quantitative phase microscopy with color-multiplexed differential phase contrast (cDPC)</i>. PLoS ONE 12(2): e0171228. (doi)</p> <p>P. Llull, L. Bange, Z.F. Phillips, K. Davis, D. L. Marks, D.J. Brady (20 December 2015) <i>Characterization of the AWARE 40 wide-field-of-view visible imager</i>. Optica 2 (12), 1086-1089. (doi)</p> <p>Z.F. Phillips, M.V. D'Ambrosio, L. Tian, J. Rulison, H.S. Patel, N. Sadras, A. Gande, N. Switz, D.A. Fletcher and L. Waller (13 May 2015). <i>Multi-Contrast Imaging and Digital Refocusing on a Mobile Microscope with a Domed LED Array</i>. PLoS ONE 10(5): e0124938. (doi)</p> <p>D.L. Marks, P.R. Llull, Z.F. Phillips et.al. (2014). <i>Characterization of the AWARE 10 two gigapixel wide FOV visible imager</i>. Applied Optics 53(14) C54-C63. (doi)</p> <p>R.K. Chhetri, Z.F. Phillips, M.A. Troester, A.L. Oldenburg (2012). <i>Longitudinal study of mammary epithelial and fibroblast co-cultures using optical coherence tomography reveals morphological hallmarks of premalignancy</i>. PLoS ONE 7(11) e49148 (doi)</p>
Conference Proceedings	<p>Z.F. Phillips, S. Dean, B. Recht, and L. Waller (15 April 2019) <i>High-Throughput Fluorescence Microscopy Using Motion Deblurring</i>. Focus on Microscopy 2019.</p> <p>S. Dean, Z. Phillips, L. Waller and B. Recht (25 June 2018). <i>Optimal Path and Illumination Design for Multiframe Motion Deblurring</i>. Imaging Systems and Applications, ITu2B.</p> <p>Z.F. Phillips, S. Dean, B. Recht, and L. Waller (27 March. 2018) <i>Multi-Frame Motion Imaging For Optical Microscopy</i>. Focus on Microscopy 2018.</p> <p>L. Waller, Z.F. Phillips, M. Chen, R. Eckert, L.H. Yeh, L. Waller (7 Nov. 2017) <i>Algorithmic Self-Calibration in Computational Imaging</i>. SIAM Data Driven Approaches in Imaging Science 2017.</p> <p>Z.F. Phillips, R. Eckert, L. Waller (7 June. 2017) <i>Quasi-Dome: A Self-Calibrated High-NA LED Illuminator for Fourier Ptychography</i>. OSA Imaging Systems and Applications, Paper IW4E.5.</p>

- Z.F. Phillips**, M. Chen, L. Waller (7 April. 2017) *Quantitative Differential Phase Contrast Imaging with Pupil Recovery*. OSA Bio-Optics, Design and Application, Paper JTU5A.2.
- Z.F. Phillips**, M. Chen, L. Waller (7 July. 2016) *Single-Shot Quantitative Phase and Amplitude Retrieval Using Color-Multiplexed Differential Phase Contrast Microscopy*. OSA Computational Optical Sensing and Imaging, Paper CT1D.4.
- Z.F. Phillips**, M. Chen, L. Waller (7 April. 2016) *Amplitude and Phase Recovery from Motion Blur Deconvolution*. SPIE DCS Computational Imaging, Paper 9870-17.
- G. Gunjala, **Z.F. Phillips**, L. Waller (7 April. 2016) *Optimal LED illuminator design for Fourier ptychographic microscopy* SPIE DCS Computational Imaging, Paper 9870-13.
- Z.F. Phillips**, G. Gunjala, P. Varma, J. Zhong, L. Waller (7 June. 2015) *Design of a Domed LED Illuminator for High-Angle Computational Illumination*. OSA Imaging Systems, Paper FTu2F.5.
- Z.F. Phillips**, M.V. D'Ambrosio, L. Tian, J. Rulison, H.S. Patel, N. Sadras, A. Gande, N. Switz, D.A. Fletcher, L. Waller (12 April. 2015) *Computational CellScope: Multi-Contrast Imaging on a Smartphone-Based Microscope Using a Domed Programmable LED Array*. OSA Bio-Optics: Design and Application, Paper BM3A.7.
- Z.F. Phillips**, Chhetri, R.K., Cooper, J., Troester, M.A., Oldenburg, A.L. (2 feb. 2013) *Fractals and fluctuations: spatial and temporal correlations in optical coherence tomography of human breast cancer models*. Dynamics and Fluctuations in Biomedical Photonics X (SPIE Photonics West), Paper 8580-2.
- D.L. Marks, J.G. Anderson, **Z.F. Phillips**, S.T. McCain, D.J. Brady (19 oct. 2014) *Gigapixel Whole-Body Microscopy*. Frontiers in Optics, Paper FTu2F.5.
- D.L. Marks, **Z.F. Phillips**, S.D. Feller, D.J. Brady (22 June. 2014) *Multiscale Camera Objective with sub 2 Arcsec Resolution, 36 degree Field-of-View* Computational Optical Sensing and Imaging, Paper CTh1C.3.