

# Zack Phillips, PhD

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Overview	Full-stack computational sensing engineer with experience prototyping and scaling fit-for-purpose data creation pipelines suitable for ML. Former member of Apple's Exploratory Design Group (XDG).	
Professional Experience	<b>Computational Microscopy Group, insitro</b>   South San Francisco, California	
	<i>Senior Manager, Computational Microscopy</i>	September 2023 - Present
	<i>Staff Automation Engineer, Microscopy</i>	March 2023 - September 2023
	<i>Senior Machine Learning Optical Engineer</i>	November 2021 - March 2023
	- Core-team member and full-stack engineer of insitro's ML-enabled drug discovery platform	
	<b>Exploratory Design Group (XDG), Apple</b>   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	
	<b>Waller Lab, University of California, Berkeley</b>   Berkeley, California	
	<i>Graduate Student Researcher (PI: <a href="#">Laura Waller</a>)</i>	July 2014 - May 2019
Education	- Developed and published methods for multi-modal and high-throughput optical microscopy	
	- Spun out hardware development efforts into a commercially successful company (SCI Microscopy)	
	<b>SCI Microscopy</b>   Berkeley, California	
	<i>CEO and Co-founder (with <a href="#">Laura Waller</a>) - <a href="#">website</a></i>	January 2017 - Present
	- Spin-off company focused on developing illuminators for computational microscopy	
	- Designed and delivered over 40+ LED arrays to customers across 7+ countries	
	<b>DISP Lab, Duke University</b>   Durham, North Carolina	
	<i>Associate in Research (PI: <a href="#">David Brady</a>)</i>	May 2013 - May 2014
	- R&D engineer for AWARE Gigapixel camera; Work featured in <a href="#">NPR's All Things Considered</a>	
	<b>University of California, Berkeley</b>   Berkeley, California	
Tools and Expertise	<i>Ph.D., <a href="#">Applied Science and Technology</a>. GPA 3.56</i>	June 2014 - May 2019
	- Dissertation: <a href="#">Quantitative Microscopy Using Coded Illumination</a>	
	- Research Advisor: <a href="#">Laura Waller</a>	
	<b>University of California, Berkeley</b>   Berkeley, California	
	<i>M.S., <a href="#">Applied Science and Technology</a>. GPA 3.57</i>	June 2014 - December 2016
	- Masters Thesis: <a href="#">Coded Illumination Techniques for Phase Imaging and Motion Blur</a>	
	- Research Advisor: <a href="#">Laura Waller</a>	
	<b>University of North Carolina, Chapel Hill</b>   Chapel Hill, North Carolina	
	<i>B.S. with Highest Honors, <a href="#">Applied Science and Engineering</a>. GPA 3.33</i>	August 2009 - May 2013
	- Undergraduate Thesis: <a href="#">Designing and building a micro-incubator for cellular motility studies</a>	
Awards and Affiliations	- Research Advisor: <a href="#">Amy L. Oldenburg</a>	
	<b>AS&amp;T Excellence in Research Award</b>   UC Berkeley	2019
	<b>Qinf PhD Fellowship Recipient</b>   Qualcomm inc.	2016
	<b>Eagle Scout</b>   Boy Scouts of America	2008

References available upon request - please email [zack@zackphillips.com](mailto:zack@zackphillips.com)

## Publications

- S. Sivanandan, B. Leitmann, E. Lubeck, M. M. Sultan, P. Stanitsas, N. Ranu, A. Ewer, J. E. Mancuso, **Z.F. Phillips**, A. Kim, J. W. Bisognano, J. Cesarek, F. Ruggiu, D. Feldman, D. Koller, E. Sharon, A. Kaykas, M. R. Salick, C. Chu 19 August 2023. *A Pooled Cell Painting CRISPR Screening Platform Enables de novo Inference of Gene Function by Self-supervised Deep Learning*. BioRxiv 2023.08.13.553051. (doi)
- Z.F. Phillips**, S. Dean, B. Recht and L. Waller 19 December 2019. *High-throughput fluorescence microscopy using multi-frame motion deblurring*. Biomedical Optics Express, Vol. 11, Issue 1, pp. 281-300. (doi)
- H. Pinkard, **Z.F. Phillips**, A. Babakhani, D.A. Fletcher and L. Waller 1 January 2019. *Single-shot autofocus microscopy using deep learning*. BioRxiv, 587485. (doi)
- M. Chen, **Z.F. Phillips** and L. Waller 10 December 2018. *Quantitative differential phase contrast (DPC) microscopy with computational aberration correction*. Optics Express 26 (25), 32888-32899. (doi)
- M. Kellman, M. Chen, **Z.F. Phillips**, M. Lustig and L. Waller 1 December 2018. *Motion-resolved quantitative phase imaging*. Biomedical optics express 9 (11), 5456-5466. (doi)
- R. Eckert, **Z.F. Phillips**, and L. Waller. ( 1 July 2018). *Efficient illumination angle self-calibration in Fourier ptychography*. Applied Optics 57(19): 5434-5442. (doi)
- Z.F. Phillips**, M. Chen and L. Waller ( 13 May 2015). *Single-shot quantitative phase microscopy with color-multiplexed differential phase contrast (cDPC)*. PLoS ONE 12(2): e0171228. (doi)
- P. Llull, L. Bange, **Z.F. Phillips**, K. Davis, D. L. Marks, D.J. Brady ( 20 December 2015) *Characterization of the AWARE 40 wide-field-of-view visible imager*. Optica 2 (12), 1086-1089. (doi)
- 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). *Multi-Contrast Imaging and Digital Refocusing on a Mobile Microscope with a Domed LED Array*. PLoS ONE 10(5): e0124938. (doi)
- D.L. Marks, P.R. Llull, **Z.F. Phillips** et.al. ( 2014). *Characterization of the AWARE 10 two gigapixel wide FOV visible imager*. Applied Optics 53(14) C54-C63. (doi)
- R.K. Chhetri, **Z.F. Phillips**, M.A. Troester, A.L. Oldenburg ( 2012). *Longitudinal study of mammary epithelial and fibroblast co-cultures using optical coherence tomography reveals morphological hallmarks of premalignancy*. PLoS ONE 7(11) e49148 (doi)

## Conference Proceedings

- Z.F. Phillips**, S. Dean, B. Recht, and L. Waller ( 15 April 2019) *High-Throughput Fluorescence Microscopy Using Motion Deblurring*. Focus on Microscopy 2019.
- S. Dean, **Z. Phillips**, L. Waller and B. Recht ( 25 June 2018). *Optimal Path and Illumination Design for Multiframe Motion Deblurring*. Imaging Systems and Applications, ITu2B.
- Z.F. Phillips**, S. Dean, B. Recht, and L. Waller ( 27 March. 2018) *Multi-Frame Motion Imaging For Optical Microscopy*. Focus on Microscopy 2018.
- L. Waller, **Z.F. Phillips**, M. Chen, R. Eckert, L.H. Yeh, L. Waller ( 7 Nov. 2017) *Algorithmic Self-Calibration in Computational Imaging*. SIAM Data Driven Approaches in Imaging Science 2017.
- Z.F. Phillips**, R. Eckert, L. Waller ( 7 June. 2017) *Quasi-Dome: A Self-Calibrated High-NA LED Illuminator for Fourier Ptychography*. OSA Imaging Systems and Applications, Paper IW4E.5.

**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](#).