Zack Phillips, PhD

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website | github | linkedin | scholar

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 atr UC Berkeley.

Professional Experience

Computational Microscopy Group, insitro | South San Francisco, California
Director of Imaging September 2025 - Present
Senior Manager, Computational Microscopy September 2023 - August 2025
Staff Automation Engineer, Microscopy March 2023 - September 2023
Senior Machine Learning Optical Engineer 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
Photonics Engineer 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
Graduate Student Researcher (PI: Laura Waller) July 2014 - May 2019
- Developed and published methods for multi-modal and high-throughput optical microscopy

SCI Microscopy | Berkeley, California
CEO and Co-founder (with Laura Waller) - website January 2017 - Present
- Waller Lab spin-off company which develops and sells LED illuminators for microscopy

DISP Lab, Duke University | Durham, North Carolina
Associate in Research (PI: David Brady) May 2013 - May 2014
- R&D engineer for AWARE Gigapixel camera; Work featured in NPR's *All Things Considered*

Education

University of California, Berkeley | Berkeley, California
Ph.D., Applied Science and Technology. GPA 3.56 June 2014 - May 2019
- Dissertation: Quantitative Microscopy Using Coded Illumination
- Research Advisor: Laura Waller

University of California, Berkeley | Berkeley, California
M.S., Applied Science and Technology. 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
B.S. with Highest Honors, Applied Science and Engineering. 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

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 1December 2018. *Motion-resolved quantitative phase imaging*. Biomedical optics express 9 (11), 5456-5466. (doi)

R. Eckert, **Z.F. Phullips**, 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.