Fengqiang Li

CONTACT INFORMATION

Computer Science and Engineering, Northwestern University
2233 Tech Drive, Seeley Mudd, Room 3406, Evanston, IL, USA 60208
☏ (224) 427-9086
✉ lifengqiang123@gmail.com

RESEARCH INTERESTS

Computational Photography, Computer Vision, Machine/Deep Learning

EDUCATION

Northwestern University, EVANSTON, IL, USA   06/2015 - PRESENT
- *Ph.D. candidate*, Computer Science

Lehigh University, BETHLEHEM, PA, USA   09/2011 - 12/2014
- *Master of Science*, Electrical Engineering

Huazhong University of Science and Technology, WUHAN, CN   09/2007 - 06/2011
- *Bachelor of Science*, Optoelectronics Information Engineering

RELATED GRADUATE COURSEWORK

Machine Learning, CUDA, Graduate Algorithm, Deep Learning from Scratch, Introduction to Optimization, Introduction to Computational Photographic, Introduction to Computer Vision, Photonic Information Processing.

PROFESSIONAL EXPERIENCE

Northwestern University   EVANSTON, IL, USA
RESEARCH ASSISTANT WITH DR. OLIVER COSSAIRT   06/2015 - PRESENT
Research on Time-of-light camera, Macro 3D imaging, Photo Stereo 3D imaging, Compressive sensing. **Interest** in 3D applications powered with state-of-the-art machine/deep learning methods in high level computer vision problems such as face recognition and SLAM, and machine perceptions in self-driving cars, robots and VR/AR systems.
- Working on superresolution for ToF cameras and use deep learning to reconstruct high resolution depth images [C6].
- Working on fusion system of novel depth camera with low lateral resolution and a high lateral resolution RGB camera using deep learning.
- Working on a deep compressive ToF system to improve the lateral resolution for depth images with the power of compressive sensing and deep learning.
- Built up a Macro 3D imaging system with sub millimeter depth resolution based on optical interferometry [J4], [C5].
- Built up a Mega-pixel ToF camera with compressive sensing [J5].
- Built a linear model for CS reconstruction for complex-value data [J5].
- Photogrammetry and photo-metric stereo and their applications in culture heritage [C2], [C3].

Facebook Inc.   REDMOND, WA, USA
RESEARCH INTERN WITH DR. MICHAEL HALL AND DR. SHUOCHEN SU   05/2019 - 09/2019
Work on machine vision with IR assisted stereo for VR/AR applications.

- Develop a deep learning based fusion of mono and IR images for IR assisted stereo, which is more robust to the rule based methods.

Develop a pipeline for addressable illumination for the IR projector which provides a reasonable depth map for the post processing but greatly reduces the IR illumination power.

Facebook Reality Labs / Oculus   Redmond, WA, USA
Research Intern with Dr. Michael Hall   05/2018 - 09/2018
Model and evaluate a novel depth camera for AR system and RGB-IR crosstalk correction for novel cameras in VR/AR systems.
- Solve the RGB-IR crosstalk correction with optimization and filtering for the novel CMOS camera in AR system.
- Built the radiometry model for a novel active depth camera.
- Modeled and evaluated of the novel depth camera with simulations and experiments.
- Five patents filed after the internship.

Google [X]   Mountain View, CA, USA
Hardware Engineer Intern with Dr. Emily Cooper   06/2016 - 09/2016
Work on machine perception in Robotics.
- Optimize optical system with LightTrans.
- One patent was approved, and another patent filed [P1].

NSF Innovation Corps program (I-Corps).   New York City, NY, USA
Entrepreneur Lead   02/2014 - 04/2014
- Supported by National Science Foundation (NSF).
- Arranged 68 face-to-face or phone interviews with eye doctors, sales, technician, and university researchers in 6 weeks and updated with a weekly presentation.
- Trained to better communicate with customers and team members.

Lehigh University   Bethlehem, PA, USA
Research associate with Dr. Chao Zhou   06/2012 - 08/2014
Research on Biomedical image processing, Optical coherence tomography (OCT) and its biomedical imaging applications [C1], [J2], [J3].
- Hands-on experience to set up a new lab from zero in half a year.
- Designed and set up an ultrahigh-resolution OCM system (include supercontinuum laser, fiber coupler, polarizer, collimator, telescope system, axicon lens, galvo scanner, grating, line-scan camera) with an extended depth of focus of 200, 1.5-axial resolution, and 2.3-transverse resolution.
- Set up three different spectral domain OCM systems with center wavelength of 800 nm and 1300 nm.
- Wrote a neuron counting algorithm for neuron analysis in 3D brain slice sample [J3].

Skills   MATLAB, Python, C++

Journal and Conference Publications

[C6] F. Li, Pablo Ruiz, Oliver Cossairt, Aggelos K. Katsaggelos, **" Multi-frame Superreso-**

lution for Time-of-flight Imaging”, *Proc. ICASSP* 2019.

[C5] <u>F. Li</u>, F. Willomitzer, P. Rangarajan, A. Velten, M. Gupta, O. Cossairt, **“ SH-ToF: Micro Resolution Time-of-Flight Imaging with Superheterodyne Interferometry”**, *Proc. ICCP*, Pittsburgh, 2018.

[J5] <u>F. Li</u>, H. Chen, A. Pediredla, C. Yeh, Ashok Veeraraghavan, Oliver Cossairt, **“ CS-ToF: High-resolution Compressive Time-of-ight Imaging with Phasors”**, *OSA Optics Express* 25(25), 31096-31110, 2017.

[J4] <u>F. Li</u>, J. Yablon, A. Velten, M. Gupta, O. Cossairt, **“High-depth-resolution range imaging with multiple-wavelength superheterodyne interferometry using 1550-nm lasers”**, *OSA Applied Optics* 56(31), H51-H56, 2017.

[C4] <u>F. Li</u>, N. Matsuda, M. Walton, O. Cossairt, **“ Fluorescence Lifetime Estimation Using A Dynamic Vision Sensor**, *Proc. SPIE DCS*, Anthem, 2017.

[C3] C. Yeh, <u>F. Li</u>, Gianluca Pastorelli, Marc Walton, Aggelos K. Katsaggelos, Oliver Cossairt, **“ Shape-from-Shifting: Uncalibrated Photometric Stereo with a Mobile Device**, *e-Science, IEEE 13th International Conference*, Auckland, 2017.

[C2] C. Yeh, N. Matsuda, X. Huang, <u>F. Li</u>, M. Walton and O. Cossairt, **“ A Streamlined Photometric Stereo Framework for Cultural Heritage”**, *Proc. ECCV Workshop*, Amesterdam, 2016

[J3] <u>F. Li</u>, Y. Song, A. Dryer, W. Cogguillo, Y. Berdichevsky, C. Zhou, **“Non-destructive evaluation of seizure-induced neuronal changes in organotypic brain cultures using ultrahigh-resolution optical coherence microscopy”**, *Neurophotonics* 1(2), 2014.

[J2] <u>F. Li</u>, T. Xu, D. Nguyen, X. Huang, C. Chen, C. Zhou, **“Label-free evaluation of angiogenic sprouting in microengineered devices using ultrahigh-resolution optical coherence microscopy”**, *Journal of Biomedical Optics* 19(1), 2014.

[J1] M. Xiao, <u>F. Li</u>, Z. Wan, **“Gaussian beam coupling on a MEMS mirror array”**, *Optik - International Journal for Light and Electron Optics*, 124(24), 2013.

[C1] T. Xu, <u>F. Li</u>, D. Nguyen, C. Chen, C. Zhou, X. Huang, **“Delineating 3D Angiogenic Sprouting in OCT via Multiple Active Contours”**, *In proceedings of Medical Imaging and Augmented Reality*, 2013.

PATENTS	[P1] E. Cooper, <u>F. Li</u>,**“Dynamic range for depth sensing”**, US10277842B1,**Granted**, 2019.
HONORS AND AWARDS	**Dean's Fellowship** from Lehigh University, 2011. **National Scholarship for Encouragement** from Ministry of Education of China, 2010. **National Scholarship** from Ministry of Education of China, 2009.
TEACHING EXPERIENCE	Introduction to Computational Photography, TA, Fall 2018
PAPER REVIEW	CVPR 2015, ICCP 2019, Optics Express, Journal of the Society for Information Display, Remote Sensing, Sensors, Chinese Optics Letter
REFERENCES	Prof. Oliver Cossairt, Northwestern University ollie@eecs.northwestern.edu Prof. Aggelos Katsaggelos, Northwestern University aggk@eecs.northwestern.edu