Lingbo Jin | Curriculum Vitae

Rice University Abercrombie A127 – Houston TX – 77005

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Education

Rice University **Houston, TX**
Graduate Student in Electrical and Computer Engineering, *2018–present*

Carnegie Mellon University **Pittsburgh, PA**
Bachelor of Science in Electrical and Computer Engineering, *2014–2018*
Additional Major in Biomedical Engineering
GPA:3.79/4.0

Research

Extended Depth-of-field Microscopy for rapid surface scanning **Houston, TX**
Research Assistant at Rice Computational Imaging Lab *April 2019-Present*
Microscopes are frequently used in medical examinations to determine if excised tissue have clean, cancer-free margins. The standard pathology procedure requires the tissue to be thinly sectioned. It is a time consuming procedure, and only a small fraction of the tissue can be sampled. Examine the specimen without slicing can avoid the high sampling error. However, the uneven surface of the tissue results in out-of-focus regions that are challenging to deblur in post-processing. We are proposing an extended depth-of-field microscope that adds a phase mask to an existing microscopy system. The phase mask modulates the wavefront and generates similar point spread functions at different defocus. We jointly optimize the phase mask design and the deblurring algorithm and extend the depth-of-field of a fluorescent microscope from 40 μm to 200 μm without sacrificing light throughput or resolution.

Structured Illumination for Low Scattering Imaging in Low-cost Microscopy **Houston, TX**
Graduate Student at Rice Computational Imaging Lab *January 2019-May 2019*
Micro-endoscopy is a GI cancer screening tool that can provide cellular resolution images in real-time. It works in conjunction with endoscopy and can reduce the need for biopsy. However, subsurface tissue scattering creates undesirable background on the image, reducing the contrast. While there are many systems such as point- scanning confocal and 2-photon microscopy that can reject scattering background, these system are typically very slow and expensive due to the optomechanical parts. We are proposing a structured illumination microscopy that is able to reject scattering while acquiring images in real time. We test background rejection ability of our system both theoretically and experimentally and show that it provides low scattering images while costing a fraction of the price of a traditional confocal system.

Vessel Tracking in Ultra-high Frequency Ultrasound Imaging **Pittsburgh, PA**
Research Assistant at Galeotti Group *January 2017-May 2018*
Studied literature and self-taught on Kalman Filter, vessel segmentation methods, and ultrasound speckle models. Implemented an Extended Kalman Filter (EKF) to improve vessel segmentation accuracy in images with high speckle noise and presence of shadow. The project is done under the supervision of Professor Galeotti and its result published in the 2018 MICCAI.

Subcutaneous Blood Flow Imaging using the FLIR system **Pittsburgh, PA**
Recipient of Carnegie Heart Fellowship *May 2016-August 2016*

Performed motion stabilization and variance analysis on FLIR videos to improve flap surgery accuracy. Collaborated with surgeons and nurses to collect video data in operation room. This was a summer research fellowship done under the supervision of Professor Srinivasa Narasimhan and his PhD student Chao Liu.

Projects

Marco: an Indoor Localization Tool **Pittsburgh, PA**
Android Deployment *January 2017-May 2017*
Created an android application that determines indoor location using visual features. In order to actualize SURF feature detection and extraction in real-time, I developed a C++ image processor using custom built OpenCV library and Android NDK. This was a capstone project done in collaboration with two teammates, Ani Sridhar and Nikhil Choudary.

Midsagittal Plane Extraction in MR Images **Pittsburgh, PA**
Personal Project *April 2017*
Implemented the paper by Teverovskiy et.al (2006) to extract midsagittal plane from MR images. The volume was pre-processed using SimpleITK and the extraction algorithm was written in Python3 using the Numpy library. This was a term project for the graduate-level course Medical Imaging Analysis.

Vessel Detection in the Radon Domain **Pittsburgh, PA**
Member *November 2016-December 2016*
Devised a circle recognition algorithm utilizing Radon transform and RANSAC. The algorithm is robust with sampling rate as low as 7 angles and Signal to Noise Ratio as low as 15. This is a term project done in collaboration with Ani Sridhar for graduate-level course Image and Video Processing.

Experience

18-793: Image and Video Processing **Pittsburgh, PA**
Teaching Assistant *August 2017-May 2018*
Work under Professor Aswin Sankaranarayanan to teach recitation sessions, lead office hours, and prepare homework solutions for the graduate level course.

Career and Professional Development Center **Pittsburgh, PA**
Career Peer Mentor *August 2015-May 2018*
Lead workshops in dormitories and introduce first year students to resume writing, career fairs, and networking. Foster peer to peer mentor-ship.

Conference Paper

Mathai, T. S., **Jin, L**., Gorantla, V., & Galeotti, J. (2018, September). Fast Vessel Segmentation and Tracking in Ultra High-Frequency Ultrasound Images. In International Conference on Medical Image Computing and Computer-Assisted Intervention (pp. 746-754). Springer, Cham.

Fellowship

President's Prize **Houston, TX**
granted by Rice University *Fall 2018*

John Clark, Jr. Fellowship Award **Houston, TX**
granted by Rice University *Fall 2018*

Summer Undergraduate Research Fellowship **Pittsburgh, PA**
granted by Carnegie Mellon University Undergraduate Research Office *Summer 2017*

Carnegie Heart Fellowship **Pittsburgh, PA**
granted by Carnegie Mellon Biomedical Engineering Department *Summer 2016*

Skills

Programming Languages: MATLAB, Python, Java, C, LaTeX, JavaScript, HTML/CSS, Assembly

Software: Tensorflow, OpenCV, Android Studio, ITK/SimpleITK, Git

Languages: Mandarin, English

Leadership

Biomedical Engineer Society **Pittsburgh, PA**
Research and Project Chair *August 2015-May 2018*
Organize monthly research seminars that informs students about exciting projects and foster interest in research. Coordinate the annual BMES research fair, providing a platform for students to connect with graduate researchers and professors.

CMU Emergency Medical Service **Pittsburgh, PA**
Responder *September 2014-May 2018*
Coordinate closely with team members to provide the best care in critical time and space limits. Keep a calm patient rapport while communicating with the police department and city paramedics.