Luke A. Pfister

Contact Information

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Education

University of Illinois at Urbana-Champaign, Urbana, IL
P.h.D., Electrical and Computer Engineering — **Expected 2018**
M.S., Electrical and Computer Engineering — **August 2013**

- Thesis: *Tomographic Reconstruction with Adaptive Sparsifying Transforms*
- Advisor: Professor Yoram Bresler
- GPA: 3.91

Bradley University, Peoria, IL
B.S., Electrical Engineering — **August 2010**

- Senior Project: *GPS & IMU Sensor Fusion using the Unscented Kalman Filter*
- GPA: 3.89
- *Magna cum Laude*

Research Experience

University of Illinois at Urbana-Champaign
Research Assistant — **Fall 2013 – Present**

- Developing *Compressive Mid-Infrared Spectroscopic Tomography*- a computationally efficient, chemically specific & label-free optical imaging modality.
- Development of highly computationally efficient adaptive sparsifying transforms.
- Application of adaptive signal models for low-dose tomographic reconstruction.
- Deep learning for histopathology.

Professional Work

Rambus Labs
Computational Imaging Intern — **Summer 2015**

- Developed methods for the design of practical, application-specific diffraction gratings and algorithms for imaging, sensing, feature extraction, and classification with incoherent illumination and low computational cost.

InstaRecon, Inc.
Engineering Intern — **Summer 2013**

- Designed and implemented computationally and memory efficient algorithms for iterative tomographic reconstruction.
- Developed Matlab framework for the exploration of iterative tomographic reconstruction algorithms.

Programming

CUDA, Python, NumPy/SciPy, C, OpenMP, Shell scripting, MATLAB, MEX,

Teaching Experience

University of Illinois at Urbana-Champaign
Teaching Assistant

- ECE 490: Introduction to Optimization — **Spring 2013**
  - Deliver guest lectures, hold office hours, grade homework and exams.
- ECE 210: Analog Signal Processing — **Fall 2010 – 2012**
  - Instruct laboratory sections where students construct an AM demodulator.
  - Supervise 10-12 undergraduate homework graders and hold office hours.

Journal Articles

[1] **L. Pfister** and Y. Bresler, "Estimating Extremal Values of Multivariate Trigonometric Polynomials," submitted to IEEE Transactions on Signal Processing.

[2] **L. Pfister** and Y. Bresler, "Learning Filter Bank Sparsifying Transforms," submitted to IEEE Transactions on Signal Processing.

[3] **L. Pfister** R. Bhargava, Y. Bresler, and P.S. Carney, "Inverse Scattering with Chemical Composition Constraints for Spectroscopic Tomography from Highly Undersampled Measurements", In preparation.

Selected Conference Publications

[4] Wen, B., Li, Y., **Pfister, L.**, & Bresler, Y., "Joint adaptive sparsity and low-rankness on the fly: an online tensor reconstruction scheme for video denoising", in IEEE International Conference on Computer Vision (ICCV), 2017.

[5] **L. Pfister** and Y. Bresler, "Automatic parameter tuning for image denoising with learned sparsifying transforms", presented at International Conference on Acoustics, Speech and Signal Processing, New Orleans, LA, 2017.

[6] **L. Pfister**, Y.Bresler, R.Bhargava, and P.S. Carney, "Inverse Scattering with Chemical Composition Constraints for Spectroscopic Tomography", in Proc. OSA Conference on Mathematics in Imaging, 2016.

[7] **L. Pfister**, R. Bhargava, P.S. Carney, and Y. Bresler, "Mid-Infrared Spectroscopic Tomography", presented at the SIAM Conference on Imaging Science, 2016.

[8] D.Stork, **L. Pfister**, M. Monjur, and P.R. Gill, "Designing application-specific optical gratings for computational diffractive sensing and imaging", presented at the meeting of SPIE Defense + Commercial Imaging, 2016.

[9] **L. Pfister** and Y. Bresler, "Model-based Tomographic Reconstruction with Adaptive Sparsifying Transforms," presented at SPIE Electronic Imaging, San Francisco, CA, 2014.

[10] **L. Pfister** and Y. Bresler, "Adaptive Sparsifying Transforms for Tomographic Reconstruction", presented at International Conference on Acoustics, Speech and Signal Processing, Florence, Italy, 2014.

[11] **L. Pfister** and Y. Bresler, "Linearized ADMM for Tomographic Reconstruction with Adaptive Sparsifying Transforms", presented at Third International Conference on Image Formation in X-ray Computed Tomography", Salt Lake City, UT., 2014.

Awards

Research

- Andrew T. Yang Research Award for *Compressive Mid-Infrared Spectroscopic Tomography.* **2014 – 2016**
- 2nd Place at IEEE Region 4 Student Paper Contest for *Satellite and Inertial Positioning System* **May 2010**
- 2nd Place at Bradley University Student Scholarship Expo for *Satellite and Inertial Positioning System* **May 2010**

Teaching

- Mavis Future Faculty Fellowship **2014 – 2015**
- E.A. Reid Fellowship for Students Pursuing an Academic Career in Engineering **2014 – 2015**
- Olesen Award for Excellence in Undergraduate Teaching **Fall 2012**
- List of Teachers Ranked as Excellent by Their Students
  - Fall 2010, Spring 2011, Fall 2011, Spring 2012, Fall 2012