David Lindell

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Education

Stanford University   Sept 2016 – Present
    Ph.D. Electrical Engineering
Brigham Young University   Sept 2009 – Apr 2016
    M.S. Electrical Engineering
    B.S. Electrical Engineering (4.00/4.00) *Summa Cum Laude*

Research Experience

Ph.D. Candidate   Sept 2016 – Present
Stanford University
Advisor: Prof. Gordon Wetzstein
Area: Computational imaging, time-of-flight sensors, LIDAR systems
○ 3D imaging, machine learning, transient imaging,
   non-line-of-sight imaging

Research Assistant   May 2014 – Apr 2016
Brigham Young University
Advisor: Prof. David Long
Area: Radar image processing, geoscience, remote sensing
○ Arctic sea ice classification and soil moisture estimation

Theses

Master's Thesis
    Title: *Arctic Sea Ice Classification and Soil Moisture Estimation Using Microwave Sensors*
    Supervisor: David G. Long (Brigham Young University)

Publications

Journal Articles

[10]   **D. B. Lindell** and G. Wetzstein, "Three-dimensional imaging through scattering media based on confocal diffuse tomography," *Nature Communications*, 2020, Accepted.

[9]   Z. Sun, **D. B. Lindell**, O. Solgaard, G. Wetzstein, "SPADnet: Deep RGB-SPAD sensor fusion assisted by monocular depth estimation," *Optics Express*, vol. 28, no. 10, pp. 14 948–14 962, 2020.

[8]   **D. B. Lindell**, G. Wetzstein, M. O'Toole, "Wave-based non-line-of-sight imaging using fast f-k migration," *ACM Trans. Graph. (SIGGRAPH)*, vol. 38, no. 4, 2019.

[7]   F. Heide, M. O'Toole, K. Zang, **D. B. Lindell**, S. Diamond, G. Wetzstein, "Non-line-of-sight imaging with partial occluders and surface normals," *ACM Trans. Graph.*, 2019.

[6]   **D. B. Lindell**, M. O'Toole, G. Wetzstein, "Single-photon 3D imaging with deep sensor fusion," *ACM Trans. Graph. (SIGGRAPH)*, vol. 37, no. 4, 2018.

[5]   F. Heide, S. Diamond, **D. B. Lindell**, G. Wetzstein, "Sub-picosecond photon-efficient 3D imaging using single-photon sensors," *Scientific Reports*, vol. 8, no. 17726, 2018.

[4]   M. O'Toole, **D. B. Lindell**, G. Wetzstein, "Confocal non-line-of-sight imaging based on the light cone transform," *Nature*, vol. 555, no. 7696, p. 338, 2018.

[3]   **D. B. Lindell** and D. G. Long, "High-resolution soil moisture retrieval with ASCAT," *IEEE Geosci. Remote Sens. Lett.*, vol. 13, no. 7, pp. 972–976, 2016.

[2]   **D. B. Lindell** and D. G. Long, "Multiyear Arctic ice classification using ASCAT and SSMIS," *Remote Sensing*, vol. 8, no. 4, p. 294, 2016.

[1]   **D. B. Lindell** and D. G. Long, "Multiyear Arctic sea ice classification using OSCAT and QuikSCAT," *IEEE Trans. Geosci. Remote Sens.*, vol. 54, no. 1, pp. 167–175, 2016.

Conference Proceedings

[6] M. Nishimura, **D. B. Lindell**, C. Metzler, G. Wetzstein, "Disambiguating monocular depth estimation with a single transient," in *European Conference on Computer Vision (ECCV)*, 2020.

[5] A. W. Bergman, **D. B. Lindell**, G. Wetzstein, "Deep adaptive LiDAR: End-to-end optimization of sampling and depth completion at low sampling rates," in *IEEE International Conference on Computational Photography (ICCP)*, 2020.

[4] S. I. Young, **D. B. Lindell**, B. Girod, D. Taubman, G. Wetzstein, "Non-line-of-sight surface reconstruction using the directional light-cone transform," in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR, oral)*, 2020.

[3] **D. B. Lindell**, G. Wetzstein, V. Koltun, "Acoustic non-line-of-sight imaging," in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR, oral)*, 2019.

[2] **D. B. Lindell**, M. O'Toole, G. Wetzstein, "Towards transient imaging at interactive rates with single-photon detectors," in *IEEE International Conference on Computational Photography (ICCP)*, 2018.

[1] M. O'Toole, F. Heide, **D. B. Lindell**, K. Zang, S. Diamond, G. Wetzstein, "Reconstructing transient images from single-photon sensors," in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR, spotlight)*, 2017.

Non-refereed Publications

[1] V. Sitzmann, J. N. Martel, A. W. Bergman, **D. B. Lindell**, G. Wetzstein, "Implicit neural representations with periodic activation functions," in *arXiv*, 2020.

Invited Talks

- **TEDxBeaconStreet 2019,** *A camera to see around corners, 11/23/2019.*
- **Boston University Center for Information & Systems Engineering,** *Computational Imaging with Single-Photon Detectors, 11/22/2019.*
- **MIT Research Laboratory of Electronics,** *Efficient Confocal Non-Line-of-Sight Imaging, 11/21/2019.*
- **Berkeley Center for Computational Imaging,** *Computational Imaging with Single-Photon Detectors, 9/4/2019.*
- **Silicon Valley ACM SIGGRAPH Chapter,** *Computational Single-Photon Imaging, 5/30/2019.*
- **Stanford Center for Image Systems Engineering,** *Computational Imaging with Single-Photon Detectors, 5/8/2019.*
- **Carnegie Mellon University Graphics Lab,** *Computational Single-Photon Imaging, 1/23/2019.*

Graduate Coursework

Machine Learning (CS-229), A. Ng	F2018
Convex Optimization (EE-364A), S. Boyd	Sp2017
Convolutional Neural Networks for Visual Recognition (CS-231N), F. Li	Sp2017
Computational Imaging and Display (EE-367), G. Wetzstein	W2017
Information Theory (EE 376), D. Tse	W2017
The Fourier Transform and its Applications (EE-261), B. Osgood	F2016
Linear Dynamical Systems (EE-263), R.N. Mahalati	F2016
Detection and Estimation Theory (EE-672), M. Rice	W2016
Continuous Phase Modulation (EE-682R), M. Rice	W2016
Robotic Vision (EE-631), D.J. Lee	W2016
Math of Signals and Systems (EE-671), B. Jeffs	F2015
Stochastic Processes (EE-670), B. Mazzeo	F2015
Medical Imaging & Image Reconstruction (EE-576), N. Bangerter	F2015
Antennas and Propogation (EE-665), K. Warnick	W2015
Microwave Remote Sensing (EE-568), D. Long	F2014

Honors & Awards

- Stanford Graduate Research Fellowship — 2016 – 2019
- Tau Beta Pi Honor Society — Inducted 2013
- BYU Office of Research & Creative Activities Grant Winner — 2015
- BYU Heritage Scholarship — 2012 – 2015
- Tau Beta Pi Scholarship — 2014

Public Demonstrations

- **Real-time non-line-of-sight imaging**, M. O'Toole, D.B. Lindell, G. Wetzstein, 2018, ACM SIGGRAPH Emerging Technologies.

Service

- **Program Chair**, CVPR Workshop on Computational Cameras and Displays — 2020
- **Program Committee**, Int. Conference on Computational Photography (ICCP) — 2019 – 2020

Mentorship

- Thomas Teisberg, Stanford University — Fall 2019
- Jason Corona, South San Francisco High School CA — Summer-Fall 2019
- Alex Bergman, Stanford University — Summer 2019
- Mark Nishimura, Stanford University — Summer 2019

Teaching Experience

- **Computational Imaging** (EE 367/CS 448i), TA — Winter 2020
- **Computational Time-Resolved Imaging, Single-Photon Sensing, and Non-Line-of-Sight Imaging** (ACM SIGGRAPH 2020 course), organizer and co-instructor — Summer 2020

Industry Experience

Intel Intelligent Systems Lab   June 2018 – September 2018
Intern
- Worked with Vladlen Koltun on acoustic non-line-of-sight imaging.

Software For Hire   March 2016 – June 2019
Computer Vision Consultant
- Developed and shipped computer vision algorithms deployed on a pharmaceutical tablet counter (https://www.eyeconvpc.com/).
- Built neural-net-based algorithm for recognition and counting using PyTorch and MXNet; achieved real-time performance for product deployed on Intel CPUs.
- Designed real-time multithreaded vision algorithm for tablet counting using hand-crafted features with Boost, OpenCV, and Point Cloud Library.

Rincon Research Corporation   June 2016 – July 2016
Electrical Engineering Intern
- Developed a cloud-based digital video recording system to stream and record live video. Integrated live broadcast television demodulation capability using GNU Radio and proprietary signal processing hardware.