David B. Lindell

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Current Appointments

Assistant Professor
Dept. of Computer Science, University of Toronto *2022–present*

Faculty Affiliate
Vector Institute *2022–present*

Education

Stanford University **Stanford, CA**
Ph.D. Electrical Engineering *2016–2021*
Committee: Gordon Wetzstein, Bernd Girod, Mark Horowitz, Vivek Goyal, James Harris

Brigham Young University **Provo, UT**
M.Sc. Electrical Engineering *2015–2016*
Advisor: David G. Long

Brigham Young University **Provo, UT**
B.Sc. Electrical Engineering *2009–2015*
Advisors: David G. Long, Aaron Hawkins

Awards

Google Research Scholar Award	2023
Sony Focused Research Award	2023
Sony Faculty Innovation Award	2023
Marr Prize	2023
Connaught New Researcher Award	2023
ACM SIGGRAPH Outstanding Doctoral Dissertation Honorable Mention	2021
ACM SIGGRAPH Thesis Fast Forward Honorable Mention	2020
CVPR Outstanding Reviewer	2020
Stanford Graduate Research Fellowship	2016–2020
BYU Office of Research & Creative Activities Grant	2015
Tau Beta Pi Scholarship	2014
BYU Heritage Scholarship	2012–2015

Previous Professional Experience

Stanford University **Stanford, CA**
Postdoctoral Scholar *2021–2022*
Advisor: Gordon Wetzstein

Intelligent Systems Lab, Intel Corporation **Santa Clara, CA**
Intern *2018*
Advisor: Vladlen Koltun

Rincon Research Corporation **Tucson, AZ**
Intern *2016*

Conference Organization/Editorial Positions

Associate Editor: IEEE Transactions on Computational Imaging 2023–2024
Technical Papers Committee: SIGGRAPH Asia 2023
Area Chair: Neural Information Processing Systems (NeurIPS) 2023
Area Chair: IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2023, 2024
Finance Co-Chair: Int. Conference on Computational Photography (ICCP) 2022
Program Chair: IEEE Workshop on Computational Cameras and Displays (CCD) 2020,2021,2023
Program Committee: Int. Conference on Computational Photography (ICCP) 2019–2024

Referee Service

CVPR 2020–
ECCV 2020–
ICCV 2021–
ICCP 2019–
ICLR 2021–
NeurIPS 2021–
SIGGRAPH 2020–
SIGGRAPH Asia 2022–
Nature
Nature Communications
Nature Photonics
Optica
Optics Express
Science Advances
IEEE Transactions on Computational Imaging
IEEE Transactions on Pattern Analysis and Machine Intelligence

University Service

AI Curriculum Committee: Computer Science Department, University of Toronto 2023–2024
Undergraduate Affairs Committee: Computer Science Department, University of Toronto 2022–2024
Outreach Committee: Computer Science Department, University of Toronto 2023–2024

Teaching

University of Toronto **Instructor**
CSC2529: Computational Imaging *2022,2023*

University of Toronto **Instructor**
CSC420: Introduction to Image Understanding *2023,2024*

AAAI Conference on Artificial Intelligence **Instructor**
AI for Emerging Inverse Problems in Computational Imaging *2024*

University of Toronto **Instructor**
CSC2529: Computational Imaging *2022*

Stanford University **Instructor**
EE367/CS448i: Computational Imaging *2022*

Stanford University **Teaching Assistant**
EE367/CS448i: Computational Imaging *2020*

ACM SIGGRAPH **Instructor**
Computational Time-Resolved Imaging, Single-Photon Sensing and Non-Line-of-Sight Imaging *2020*

Journal Publications

[J13] C. Shentu, E. Li, C. Chen, P. T. Dewi, **D. B. Lindell**, J. Burgner-Kahrs, "MoSS: Monocular shape sensing for continuum robots," *IEEE Robotics and Automation Letters*, 2023.

[J12] J. N. P. Martel, **D. B. Lindell**, C. Z. Lin, E. R. Chan, M. Monteiro, G. Wetzstein, "ACORN: Adaptive coordinate networks for neural scene representation," *ACM Transactions on Graphics (SIGGRAPH)*, vol. 40, no. 4, pp. 1–13, 2021.

[J11] **D. B. Lindell** and G. Wetzstein, "Three-dimensional imaging through scattering media based on confocal diffuse tomography," *Nature Communications*, vol. 11, no. 4517, 2020.

[J10] C. A. Metzler, **D. B. Lindell**, G. Wetzstein, "Keyhole imaging: Non-line-of-sight imaging and tracking of moving objects along a single optical path at long standoff distances," *IEEE Transactions on Computational Imaging*, vol. 7, pp. 1–12, 2020.

[J9] 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.

[J8] 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 Transactions on Graphics (ToG)*, vol. 38, no. 3, 2019.

[J7] **D. B. Lindell**, G. Wetzstein, M. O'Toole, "Wave-based non-line-of-sight imaging using fast f-k migration," *ACM Transactions on Graphics (SIGGRAPH)*, vol. 38, no. 4, 2019.

[J6] 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.

[J5] **D. B. Lindell**, M. O'Toole, G. Wetzstein, "Single-photon 3D imaging with deep sensor fusion," *ACM Transactions on Graphics (SIGGRAPH)*, vol. 37, no. 4, 2018.

[J4] 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, pp. 338–341, 2018.

[J3] **D. B. Lindell** and D. G. Long, "High-resolution soil moisture retrieval with ASCAT," *IEEE Geoscience and Remote Sensing Letters*, vol. 13, no. 7, pp. 972–976, 2016.

[J2] **D. B. Lindell** and D. G. Long, "Multiyear Arctic ice classification using ASCAT and SSMIS," *Remote Sensing*, vol. 8, no. 4, p. 294, 2016.

[J1] **D. B. Lindell** and D. G. Long, "Multiyear Arctic sea ice classification using OSCAT and QuikSCAT," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 54, no. 1, pp. 167–175, 2016.

Conference Publications

[C24] S. Bahmani, I. Skorokhodov, V. Rong, G. Wetzstein, L. Guibas, P. Wonka, S. Tulyakov, J. J. Park, A. Tagliasacchi, **D. B. Lindell**, "4D-fy: Text-to-4D generation using hybrid score distillation sampling," in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

[C23] P. Mirdehghan, M. Wu, W. Chen, **D. B. Lindell**, K. N. Kutulakos, "TurboSL: Dense, accurate and fast 3D by neural inverse structured light," in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

[C22] R. Rangel, X. Sun, A. Barman, R. Gulve, S. Bajic, J. Wang, H. Wang, **D. B. Lindell**, K. N. Kutulakos, R. Genov, "23,000-exposures/s 360fps-readout software-defined image sensor with motion-adaptive spatially varying imaging speed," in *IEEE Symposium on VLSI Technology and Circuits*, 2024.

[C21] K. Yin, V. Rao, R. Jiang, X. Liu, P. Aarabi, **D. B. Lindell**, "SCE-MAE: Selective correspondence enhancement with masked autoencoder for self-supervised landmark estimation," in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

[C20] R. Gulve, R. Rangel, A. Barman, D. Nguyen, M. Wei, M. A. Sakr, X. Sun, **D. B. Lindell**, K. N. Kutulakos, R. Genov, "Dual-port CMOS image sensor with regression-based HDR flux-to-digital conversion and 80 ns rapid-update pixel-wise exposure coding," in *IEEE International Solid-State Circuits Conference (ISSCC)*, 2023.

[C19] A. Malik, P. Mirdehghan, S. Nousias, K. N. Kutulakos, **D. B. Lindell**, "Transient neural radiance fields for lidar view synthesis and 3d reconstruction," in *Advances in Neural Information Processing Systems* (*NeurIPS*), 2023, (**Spotlight**).

[C18] S. Sinha, J. Y. Zhang, A. Tagliasacchi, I. Gilitschenski, **D. B. Lindell**, "SparsePose: Sparse-view camera pose regression and refinement," in *IEEE Conference on Computer Vision and Pattern Recognition* (*CVPR*), 2023.

[C17] M. Wei, S. Nousias, R. Gulve, **D. B. Lindell**, K. N. Kutulakos, "Passive ultra-wideband single-photon imaging," in *IEEE/CVF International Conference on Computer Vision* (*ICCV*), 2023, (**Marr Prize**).

[C16] A. W. Bergman, P. Kellnhofer, Y. Wang, E. R. Chan, **D. B. Lindell**, G. Wetzstein, "Generative neural articulated radiance fields," in *Advances in Neural Information Processing Systems* (*NeurIPS*), 2022.

[C15] C. Z. Lin, **D. B. Lindell**, E. R. Chan, G. Wetzstein, "3D GAN inversion for controllable portrait image animation," in *ECCV 2022 Workshop on Learning to Generate 3D Shapes and Scenes*, 2022.

[C14] **D. B. Lindell**, D. Van Veen, J. J. Park, G. Wetzstein, "BACON: Band-limited coordinate networks for neural scene representation," in *IEEE Conference on Computer Vision and Pattern Recognition* (*CVPR*), 2022, (**Oral**).

[C13] S. Shekarforoush, **D. B. Lindell**, D. J. Fleet, M. A. Brubaker, "Residual multiplicative filter networks for multiscale reconstruction," in *Advances in Neural Information Processing Systems* (*NeurIPS*), 2022.

[C12] D. Van Veen, R. Van der Sluijs, B. Ozturkler, A. D. Desai, C. Bluethgen, R. D. Boutin, M. H. Willis, G. Wetzstein, **D. B. Lindell**, S. Vasanawala, J. Pauly, A. S. Chaudhari, "Scale-agnostic super-resolution in MRI using feature-based coordinate networks," in *Medical Imaging with Deep Learning*, 2022.

[C11] Q. Zhao, **D. B. Lindell**, G. Wetzstein, "Learning to solve PDE-constrained inverse problems with graph networks," in *International Conference on Machine Learning* (*ICML*), 2022.

[C10] **D. B. Lindell**, J. N. P. Martel, G. Wetzstein, "AutoInt: Automatic integration for fast neural volume rendering," in *IEEE Conference on Computer Vision and Pattern Recognition* (*CVPR*), 2021.

[C9] 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.

[C8] **D. B. Lindell**, M. O'Toole, G. Wetzstein, "Efficient non-line-of-sight imaging with computational single-photon imaging," in *Advanced Photon Counting Techniques XIV*, SPIE, 2020.

[C7] **D. B. Lindell** and G. Wetzstein, "Confocal diffuse tomography for single-photon 3D imaging through highly scattering media," in *Computational Optical Sensing and Imaging* (*COSI*), OSA, 2020.

[C6] M. Nishimura, **D. B. Lindell**, C. A. Metzler, G. Wetzstein, "Disambiguating monocular depth estimation with a single transient," in *European Conference on Computer Vision* (*ECCV*), 2020.

[C5] V. Sitzmann, J. N. P. Martel, A. W. Bergman, **D. B. Lindell**, G. Wetzstein, "Implicit neural representations with periodic activation functions," in *Advances in Neural Information Processing Systems* (*NeurIPS*), 2020, (**Oral**).

[C4] 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*), 2020, (**Oral**).

[C3] **D. B. Lindell**, G. Wetzstein, V. Koltun, "Acoustic non-line-of-sight imaging," in *IEEE Conference on Computer Vision and Pattern Recognition* (*CVPR*), 2019, (**Oral**).

[C2] **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.

[C1] 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*), 2017, (**Spotlight**).

Non-Refereed Publications

[P2] S. Bahmani, X. Liu, Y. Wang, I. Skorokhodov, V. Rong, Z. Liu, X. Liu, J. J. Park, S. Tulyakov, G. Wetzstein, A. Tagliasacchi, **D. B. Lindell**, "TC4D: Trajectory-conditioned text-to-4D generation," *arXiv preprint arXiv:2403.17920*, 2024.

[P1] A. Malik, N. Juravsky, R. Po, G. Wetzstein, K. N. Kutulakos, **D. B. Lindell**, "Flying with photons: Rendering novel views of propagating light," *arXiv preprint arXiv:2404.06493*, 2024.

Public Demonstrations

[D2] M. O'Toole, **D. B. Lindell**, G. Wetzstein, "Real-time non-line-of-sight imaging," in *ACM SIGGRAPH Emerging Technologies*, 2018.

[D1] M. O'Toole, **D. B. Lindell**, G. Wetzstein, "Real-time non-line-of-sight imaging," in *CVPR Demos*, 2018.

Theses

2021: Computational Imaging with Single-Photon Detectors. Ph.D. Thesis.

2016: Arctic Sea Ice Classification and Soil Moisture Estimation Using Microwave Sensors. Master's Thesis.

Invited Talks

2024: Text-to-4D Generation Using Hybrid Score Distillation Sampling, UTMIST Immersion Night, Toronto, ON

2024: Passive Ultra-Wideband Single-Photon Imaging, Stanford EE367 Computational Imaging (Guest Lecture), Virtual

2024: From Pixels to Perception: Artificial Intelligence and Computer Vision, DGP Academy, Toronto, ON

2024: Passive Ultra-Wideband Single-Photon Imaging, Simon Fraser University (GrUVi Lab), Vancouver, BC

2024: Passive Ultra-Wideband Single-Photon Imaging, National Research Council Ultrafast Quantum Photonics Group, Ottawa, ON

2023: Passive Ultra-Wideband Single-Photon Imaging, 3rd International Computational Imaging Conference, Virtual

2023: From Pixels to Perception: Artificial Intelligence and Computer Vision, Leadership by Design Workshop, Toronto, ON

2023: Neural Rendering at One Trillion Frames per Second, UTMIST EigenAI ML Conference, Toronto, ON

2023: Passive Ultra-Wideband Single-Photon Imaging, Photons Canada, Virtual

2023: Neural Rendering at One Trillion Frames per Second, BIRS Workshop on Generative 3D Models, Banff, AB

2023: Passive Ultra-Wideband Single-Photon Imaging, Photonics North, Montreal, QC

2023: Physics-Based Visual Computing for Efficient 3D Vision and Sensing, University of Windsor, Windsor, ON.

2022: Recent Advances in Non-Line-of-Sight Imaging, IEEE Signal Processing Society Webinar, Virtual.

2022: Physics-Based Visual Computing for Efficient 3D Vision and Sensing, Purdue Computational Imaging Seminar, Virtual.

2022: Confocal Non-Line-of-Sight Imaging and Diffuse Tomography Using Single-Photon Sensors, Imaging and Applied Optics Congress, Vancouver, BC.

2022: Physics-Based Visual Computing for Efficient 3D Vision and Sensing, Caltech, Pasadena, CA.

2022: Implicit Neural Representation Networks for Fitting Signals, Derivatives, and Integrals, Silicon Valley ACM SIGGRAPH Chapter, Virtual.

2021: Implicit Neural Representation Networks for Fitting Signals, Derivatives, and Integrals, Samsung AI Centre, Virtual.

2021: Implicit Neural Representation Networks for Fitting Signals, Derivatives, and Integrals, University of Erlangen-Nuremberg, Virtual.

2021: Physics-Based Visual Computing for Efficient 3D Vision and Sensing, University of Michigan, Virtual.

2021: Physics-Based Visual Computing for Efficient 3D Vision and Sensing, MIT RLE, Virtual.

2021: Physics-Based Visual Computing for Efficient 3D Vision and Sensing, University of Chicago, Virtual.

2021: Physics-Based Visual Computing for Efficient 3D Vision and Sensing, University of Toronto, Virtual.

2021: Physics-Based Visual Computing for Efficient 3D Vision and Sensing, Texas A&M, Virtual.

2021: AutoInt: Automatic Integration for Fast Neural Volume Rendering, Google, Virtual.

2020: Implicit Neural Representation Networks for Fitting Signals, Derivatives, and Integrals, Graphics and Mixed Environment Seminar (GAMES), Virtual.

2020: A Camera to See Around Corners, Playground/Akasha Imaging, Palo Alto, CA.

2019: A Camera to See Around Corners, TEDxBeaconStreet, Boston, MA.

2019: Computational Imaging with Single-Photon Detectors, Boston University Center for Information & Systems Engineering (CISE), Boston, MA.

2019: Efficient Confocal Non-Line-of-Sight Imaging, MIT RLE, Cambridge, MA.

2019: Efficient Confocal Non-Line-of-Sight Imaging, MIT Media Lab, Cambridge, MA.

2019: Computational Imaging with Single-Photon Detectors, Berkeley Center for Computational Imaging, Berkeley, CA.

2019: Computational Single-Photon Imaging, Silicon Valley ACM SIGGRAPH Chapter, San Jose, CA.

2019: Computational Imaging with Single-Photon Detectors, Stanford Center for Image Systems Engineering (SCIEN), Stanford, CA.

2019: Computational Single-Photon Imaging, Carnegie Mellon University Graphics Lab, Pittsburgh, PA.

PhD Advising

Sherwin Bahmani — Sep 2023–
PhD Candidate, University of Toronto

Victor Rong — Sep 2023–
PhD Candidate, University of Toronto
Co-advised with Kyros Kutulakos

Anagh Malik — Sep 2022–
PhD Candidate, University of Toronto

Samarth Sinha — Sep 2022–
PhD Candidate, University of Toronto
Co-advised with Igor Gilitschenski

Esther Lin — Sep 2022–
PhD Candidate, University of Toronto
Co-advised with Kyros Kutulakos

Master's Advising

Maxx Wu — Sep 2023–
MSc, University of Toronto
Co-advised with Kyros Kutulakos

Umar Masud — May 2024–Dec 2024
MScAC, University of Toronto
Co-advised with Samsung

Steven Hyun — May 2024–Dec 2024
MScAC, University of Toronto
Co-advised with Samsung

Faraz Ali — May 2024–Dec 2024
MScAC, University of Toronto
Co-advised with Samsung

Carolina Villamizar — May 2024–Dec 2024
MScAC, University of Toronto
Co-advised with DWave

Kartik Kumar — May 2023–Dec 2023
MScAC, University of Toronto
Co-advised with DNEG

Yihan (Nick) Ni — May 2023–Dec 2023
MScAC, University of Toronto
Co-advised with DNEG

Kejia Yin — May 2023–Dec 2023
MScAC, University of Toronto
Co-advised with MODIFACE

Vahid Zehtab — May 2023–Dec 2023
MScAC, University of Toronto
Co-advised with Samsung

EJay Guo — May 2022–Dec 2022
MScAC, University of Toronto
Co-advised with DNEG

Undergraduate Advising

Steven Luo — Jan 2024–
University of Toronto

Weihan Luo — Sep 2023–
University of Toronto

Jason Zhu — Sep 2023–
University of Toronto

Zixin Guo — Jan 2023–
University of Toronto

Zach Salehe — Jan 2023–
University of Toronto

Haojun Qiu — Sep 2022–
University of Toronto

Ariel Chen — Sep 2023–May 2024
University of Toronto

Andrew Qiu — Sep 2023–Dec 2023
University of Toronto

Kevin Vaidyan — May 2023–May 2024
University of Toronto

Noah Juravsky — May 2023–May 2024
University of Toronto

Dorsa Molaverdikhani — Jan 2023–May 2024
University of Toronto

Shahmeer Athar — Jan 2023–May 2024
University of Toronto

Rishit Dagli — Jan 2023–Dec 2023
University of Toronto

Roland Gao — Jan 2023–Sep 2023
University of Toronto

Qing (Amy) Lyu — Jan 2023–May 2023
University of Toronto

Louis Zhang — Jan 2023–May 2023
University of Toronto

Junru Lin — Sep 2022–May 2023
University of Toronto

Justin Tran — Sep 2022–May 2023
University of Toronto
Thesis: Generative 3D shape modeling using latent space diffusion

Skyler Zhang — Sep 2022–May 2023
University of Toronto
Thesis: Towards coded high-speed video acquisition using diffusion models