David B. Lindell

Room BA7228, 40 St. George St. – Toronto, ON M5S 2E4, Canada

📱 +1 507 514 2491 • ✉ lindell@cs.toronto.edu • 🌐 davidlindell.com

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

2023: Marr Prize

2023: Connaught New Researcher Award

2021: ACM SIGGRAPH Outstanding Doctoral Dissertation Honorable Mention

2020: ACM SIGGRAPH Thesis Fast Forward Honorable Mention

2020: CVPR Outstanding Reviewer

2016–2020: Stanford Graduate Research Fellowship

2015: BYU Office of Research & Creative Activities Grant

2014: Tau Beta Pi Scholarship

2012–2015: BYU Heritage Scholarship

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 Service

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

Finance Co-Chair: Int. Conference on Computational Photography (ICCP) 2022

Program Chair: CVPR Workshop on Computational Cameras and Displays (CCD) 2020–2021

Program Committee: Int. Conference on Computational Photography (ICCP) 2019–2023

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

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

Teaching

University of Toronto	**Instructor**
CSC2529: Computational Imaging	*2023*
University of Toronto	**Instructor**
CSC420: Introduction to Image Understanding	*2023*
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

[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

[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)**.

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

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 *PhD Candidate, University of Toronto*	Sep 2023–
Victor Rong *PhD Candidate, University of Toronto* Co-advised with Kyros Kutulakos	Sep 2023–
Anagh Malik *PhD Candidate, University of Toronto*	Sep 2022–
Samarth Sinha *PhD Candidate, University of Toronto* Co-advised with Igor Gilitschenski	Sep 2022–
Esther Lin *PhD Candidate, University of Toronto* Co-advised with Kyros Kutulakos	Sep 2022–

Master's Advising

Maxx Wu *MSc, University of Toronto* Co-advised with Kyros Kutulakos	Sep 2023–
Kartik Kumar *MScAC, University of Toronto* Co-advised with DNEG	May 2023–Dec 2023
Yihan (Nick) Ni *MScAC, University of Toronto*	May 2023–Dec 2023

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