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Education

Harvard-MIT Division of Health Sciences and Technology

Ph.D., Medical Engineering and Medical Physics

Concentration: Computer Science. Advisor: Polina Golland.

Cambridge, MA

2017 – 2023

Massachusetts Institute of Technology

S.B., Electrical Engineering and Computer Science

Cambridge, MA

2013 – 2017

Experience

UC Berkeley

Postdoctoral Associate, Computational Imaging Group

Berkeley, CA

Nov 2023 – Present

- Developing machine learning methods for reconstructing atomic electron tomography (AET) data, enabling direct and robust atomic structure identification of nanoparticles.
- Optimizing a data-driven design of a structured illumination mask for X-ray ptychography, enabling reconstruction from low-dose X-ray that is less damaging to the sample.
- Mentoring six graduate and undergraduate students on computational imaging projects ranging from electron tomography to live-embryo fluorescence imaging to lensless and astronomical imaging.

MIT CSAIL

Graduate Research Assistant, Medical Vision Group

Cambridge, MA

Sep 2017 – Aug 2023

- Developed machine learning methods for correcting corrupted Fourier space data, enabling faster acquisition and motion correction in MRI.
- Mentored two undergraduate students on machine learning projects for correcting undersampled MRI data.

Google, Inc.

Software Engineering Intern/Student Researcher, Google Brain/Health

Mountain View, CA

Jun 2018 – Dec 2019

- Quantified agreement between neural network prediction explanations and human-labeled interest regions for skin condition classification, identifying potential classifier failure modes.

Google, Inc.

Software Engineering Intern, Google Station

Sunnyvale, CA

Jun 2017 – Aug 2017

- Implemented software feature to increase use of public wi-fi at international rail stops; project launched externally at 15 Google Stations in November 2017.

Nihon Kohden Innovation Center

Research Intern

Cambridge, MA

Jun 2016 – Jun 2017

- Developed classifiers predicting bedside alarm relevance as a step toward reduced alarm fatigue in neonatal intensive care units.

Charles Stark Draper Laboratory

Signal Processing, Algorithms, and Software Intern

Cambridge, MA

Jun 2015 – Aug 2015

- Developed and implemented computer vision methods for GPS-free parafoil localization, enabling supply delivery to remote regions.

MIT Media Lab

Undergraduate Researcher, Biomechatronics Group

Cambridge, MA

Apr 2014 – Jun 2017

- Developed biomimetic prosthesis control systems to enable amputee walking across varied terrains.

Awards

MIDL Best Oral Paper (top 0.5% of submissions)	2023
ISMRM AMPC Selected Abstract (2% of submissions)	2023
ICLR Honorable Reviewer	2022
CVPR Outstanding Reviewer	2021
Google PhD Fellowship	2021
National Science Foundation Graduate Fellowship	2018
National Institutes of Health Neuroimaging Training Program Fellowship	2017
Business Insider's 15 Impressive Students at MIT	2015
Intel Science Talent Search Semifinalist	2013

Publications

Full-Length Conference and Journal Publications

- [1] P. Weiser, G. Langs, W. Bogner, S. Motyka, B. Strasser, P. Golland, **N. Singh**, J. Dietrich, E. Uhlmann, T. Batchelor, D. Cahill. "Deep-ER: Deep Learning ECCENTRIC Reconstruction for Fast High-Resolution Neurometabolic Imaging". In: *NeuroImage* (2025).
- [2] **N. Singh**, T. Chien, A. R. C. McCray, C. Ophus, L. Waller. "A Gaussian Parameterization for Direct Atomic Structure Identification in Electron Tomography". In: *International Conference on Computational Photography* (2025).
- [3] R. Boiarsky, **N. Singh**, A. Buendia, A. Amini, G. Getz, D. Sontag. "Deeper Evaluation of a Single-Cell Foundation Model". In: *Nature Machine Intelligence* (2024).
- [4] [Best Oral Paper (0.5% acceptance), Oral Presentation] **N. Singh**, N. Dey, M. Hoffmann, B. Fischl, E. Adalsteinsson, R. Frost, A. Dalca, P. Golland. "Data Consistent Deep Rigid MRI Motion Correction". In: *Medical Imaging with Deep Learning (MIDL)* (2023).
- [5] F. Vasconcelos, B. He, **N. Singh**, Y. Teh. "UncertaINR: Uncertainty Quantification of End-to-End Implicit Neural Representations for Computed Tomography". In: *Transactions on Machine Learning Research* (2023).
- [6] **N. Singh**, J. Iglesias, E. Adalsteinsson, A. Dalca, P. Golland. "Joint Frequency and Image Space Learning for MRI Reconstruction and Analysis". In: *The Journal of Machine Learning for Biomedical Imaging* (2022).
- [7] **N. Singh** et al. "How Machine Learning is Powering Neuroimaging to Improve Brain Health". In: *Neuroinformatics* (2022).
- [8] Y. Liu, A. Jain, C. Eng, D. H. Way, K. Lee, P. Bui, K. Kanada, G. de Oliveira Marinho, J. Gallegos, S. Gabriele, V. Gupta, **N. Singh**, et al. "A Deep Learning System for Differential Diagnosis of Skin Diseases". In: *Nature Medicine* (2020).
- [9] T. Clites, A. Arnold-Rife, **N. Singh**, E. Kline, H. Chen, C. Tugman, B. Billadeau, A. Biewener, H. Herr. "Goats Decrease Leg Stiffness When Walking Over Compliant Surfaces". In: *Journal of Experimental Biology* (2019).
- [10] H. Luo, A. Fokoue-Nkoutche, **N. Singh**, L. Yang, J. Hu, P. Zhang. "Molecular Docking for Prediction and Interpretation of Adverse Drug Reactions". In: *Combinatorial Chemistry & High Throughput Screening* 21.5 (2018). Pp. 314–322.
- [11] C. Dever, T. Dyer, L. Hamilton, P. Lommel, S. Mohiuddin, A. Reiter, **N. Singh**, R. Truax, L. Wholey, K. Bergeron, G. Noetscher. "Guided-Airdrop Vision-Based Navigation". In: *24th AIAA Aerodynamic Decelerator Systems Technology Conference* (2017).

Peer-Reviewed Workshop Publications

- [12] **N. Singh**, K. Lee, D. Coz, C. Angermueller, S. Huang, Y. Liu. "Agreement Between Saliency Maps and Human-Labeled Regions of Interest: Applications to Skin Disease Classification". In: *CVPR ISIC Workshop on Skin Image Analysis* (2020).

Peer-Reviewed Abstracts

- [13] L. Kabuli, **N. Singh**, H. Pinkard, L. Waller. "Information-Theoretic Bayesian Optimization of Imaging Systems". In: *Computational Optical Sensing and Imaging* (2025).

- [14] K. Mani, **N. Singh**, T. Chien, C. Ophus, L. Waller. "AnyAtom: Domain-Randomized Atomic Priors for Electron Tomography". In: *Computational Optical Sensing and Imaging* (2025).
- [15] L. Kabuli, N. Singh, L. Waller. "Estimation-Theoretic Analysis of Lensless Imaging". In: *SPIE Photonics West* (2025).
- [16] **[AMPC Selected Abstract (2% acceptance), Oral Presentation]** **N. Singh**, M. Hoffmann, E. Adalsteinsson, B. Fischl, P. Golland, A. Dalca, R. Frost. "Motion-Aware Neural Networks Improve Rigid Motion Correction of Accelerated Segmented Multi-Slice MRI". In: *ISMRM Annual Meeting* (2023).
- [17] I. Jang, M. Hoffmann, **N. Singh**, Y. Balbastre, L. Chen, M. A. B. C. Rockenbach, A. Dalca, I. Aganj, J. Kalpathy-Cramer, B. Fischl, R. Frost. "Clinical Evaluation of k-Space Correlation Informed Motion Artifact Detection in Segmented Multi-Slice MRI". In: *ISMRM Annual Meeting* (2023).
- [18] **[Oral Presentation]** M. Hoffmann, **N. Singh**, A. Dalca, B. Fischl, R. Frost. "Can We Predict Motion Artifacts in Clinical MRI Before the Scan Completes?" In: *ISMRM Annual Meeting* (2023).
- [19] **N. Singh**, M. Hoffmann, D. C. Moyer, I. Jang, L. Chen, M. Bezerra Cavalcanti Rockenbach, A. Guidon, I. Aganj, J. Kalpathy-Cramer, E. Adalsteinsson, B. Fischl, A. Dalca, P. Golland, R. Frost. "Joint Neural Network for Fast Retrospective Rigid Motion Correction of Accelerated Segmented Multi-Slice MRI". In: *ISMRM Annual Meeting* (2022).
- [20] I. Jang, R. Frost, M. Hoffmann, **N. Singh**, et al. "Automated MRI k-Space Motion Artifact Detection in Segmented Multi-Slice Sequences". In: *ISMRM Annual Meeting* (2022).
- [21] **N. Singh**, J. Iglesias, E. Adalsteinsson, A. Dalca, P. Golland. "A Deep-Learning Framework for Image Reconstruction of Undersampled and Motion-Corrupted k-Space Data". In: *ISMRM Annual Meeting* (2021).
- [22] **[Oral Presentation]** S. Lala, **N. Singh**, B. Gagoski, E. Abaci-Turk, P. E. Grant, P. Golland, E. Adalsteinsson. "A Deep Learning Approach for Image Quality Assessment of Fetal Brain MRI". In: *ISMRM Annual Meeting* (2019).

In Submission

- [23] E. Markley, H. Pinkard, L. Kabuli, **N. Singh**, L. Waller. "Computationally Efficient Information-Driven Optical Design with Interchanging Optimization". In: *arXiv preprint arXiv:2507.07789* (2025).

Press

MIT News, featuring MIDL 2023 MRI motion correction paper

2023

Patents

Singh, N., Hoffmann, M., Frost, S. R., Dalca, A. V., Fischl, B. R., Golland, P., and Adalsteinsson, E. "System and Method for Rigid Motion Correction in Magnetic Resonance Imaging." U.S. Patent App. No. 18/770,330, *pending*.

Invited Talks

STROBE NSF Science and Technology Center Seminar Series	Dec 2025
Rice Nanosystems Imaging Conference	Nov 2025
San Francisco Computer Vision Meetup	May 2023
UC Berkeley Computational Imaging Seminar Series	Mar 2023
Boston Medical Imaging Workshop	Dec 2022
Closing the Gap Between Research & Clinical Application: Neuroimaging Indicators of Brain Structure and Function	Feb 2021

Teaching

Computational Imaging <i>Guest Lecturer</i>	Berkeley, CA Nov 2024, Oct 2025
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- Created and taught "Introduction to Deep Learning" lecture.

6.011: Signals, Systems, and Inference

Teaching Assistant

Cambridge, MA
Feb 2017 – May 2017

- Taught three weekly tutorial sections; assisted students in office hours and electronically.
- Rating: 6.8/7.0.

Mentorship

Mingxuan Cai, EECS PhD, UC Berkeley	07/2025 – Present
Alma Halgren, Bioengineering PhD, UC Berkeley	05/2025 – Present
Leyla Kabuli, EECS PhD, UC Berkeley	06/2024 – Present
Tiffany Chien, EECS PhD, UC Berkeley	05/2024 – Present
David Martinez, EECS Undergrad, UC Berkeley	01/2025 – Present
Krishna Mani, EECS Undergrad, UC Berkeley	09/2024 – Present
Alyssa Unell, EECS Undergrad, MIT	09/2022 – 06/2023
H Savoldy, EECS Undergrad, MIT	04/2021 – 12/2021

Service

Journal Reviewer

Transactions on Computational Imaging	2025
Nature Scientific Reports	2021
The Journal of Machine Learning for Biomedical Imaging (MELBA)	2021

Conference Reviewer

NeurIPS	2021, 2022, 2023, 2025
CVPR	2021, 2022, 2023
ICML	2020, 2021, 2024
ICLR	2022, 2024
MIDL	2022, 2023

Leadership

MEMP Application Assistance Program Organizer	2021 – 2023
Coordinated department program to provide 1-on-1 graduate school application advice to students from underrepresented backgrounds.	

MIT Eta Kappa Nu President	2016 – 2017
Organized department-wide service initiatives, including a free 1-on-1 tutoring program, detailed course evaluation service, social and professional development events, and the construction of a new undergraduate lounge.	

Blueprint Lead Organizer	2013 – 2014
Led a team to organize the first Blueprint, a Boston-area workshop for 300 high school students to learn to code.	