Nalini Singh

<div align="right">Curriculum Vitae</div>

Computer Science and Artificial Intelligence Lab
Department of Health Sciences and Technology
Massachusetts Institute of Technology
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Education

Ph.D., Medical Engineering and Medical Physics 2017 - Present

Harvard-MIT Division of Health Sciences and Technology; Advisor: Polina Golland

S.B., Electrical Engineering and Computer Science 2013 - 2017

Massachusetts Institute of Technology

Experience

MIT Computer Science & Artificial Intelligence Laboratory, Cambridge, MA   Sep 2017 - Present

Graduate Research Assistant, Medical Vision Group
Developing machine learning methods for correcting corrupted Fourier space data, enabling faster acquisition and motion correction in MRI.

Google, Inc., Mountain View, CA   Jun 2018 - Dec 2019

Software Engineering Intern/Student Researcher, Google Brain/Google Health
Quantified agreement between neural network prediction explanations and human-labeled interest regions for skin condition classification, identifying potential classifier failure modes.

Google, Inc., Sunnyvale, CA   Jun 2017 - Aug 2017

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

IBM Research, Cambridge, MA   Jan 2017

Research Intern, Healthcare Analytics Group
Designed and conducted feature analyses to predict proteins involved in adverse drug reactions (ADRs), suggesting future experimental studies to understand ADR mechanisms.

Nihon Kohden Innovation Center, Cambridge, MA   Jun 2016 - Jun 2017

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

Charles Stark Draper Laboratory, Cambridge, MA   Jun 2015 - Aug 2015

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

MIT Media Lab, Cambridge, MA   Apr 2014 - Jun 2017

Undergraduate Researcher, Biomechatronics Group
Developed biomimetic prosthesis control systems to enable amputee walking across varied terrains.

Publications

Conference Publications

[Best Oral Award, Oral Presentation] **Singh, N.**, Dey, N., Hoffmann, M., Fischl, B., Adalsteinsson, E., Frost, R.*, Dalca, A.*, Golland, P.* "Data Consistent Deep Rigid MRI Motion Correction." *Medical Imaging with Deep Learning* (2023).

Journal Publications

Vasconcelos, F.*, He, B.*, **Singh, N.**, Teh, Y. "UncertaINR: Uncertainty Quantification of End-to-End Implicit Neural Representations for Computed Tomography." *Transactions on Machine Learning Research* (2023).

Singh, N., Iglesias, J., Adalsteinsson, E., Dalca, A., Golland, P. "Joint Frequency and Image Space Learning for MRI Reconstruction and Analysis." *The Journal of Machine Learning for Biomedical Imaging* (2022).

Singh, N., Harrod, J., Subramanian, S., Robinson, M., Chang, K., Cetin-Karayumak, S., Dalca, A., Eickhoff, S., Fox, M., Franke, L., Golland, P., Haehn, D., Iglesias, E., O'Donnell, L., Ou, Y., Rathi, Y., Siddiqi, S., Sun, H., Westover, M., Whitfield-Gabrieli, S., Gollub, R. "How Machine Learning is Powering Neuroimaging to Improve Brain Health." *Neuroinformatics* (2022).

Liu, Y., Jain, A., Eng, C., Way, D. H., Lee, K., Bui, P., Kanada, K., de Oliveira Marinho, G., Gallegos, J., Gabriele, S., Gupta, V., **Singh, N.**, et al. "A Deep Learning System for Differential Diagnosis of Skin Diseases." *Nature Medicine* (2020).

Clites, T., Arnold-Rife, A., **Singh, N.**, Kline, E., Chen, H., Tugman, C., Billadeau, B., Biewener, A., and Herr, H. "Goats Decrease Leg Stiffness When Walking Over Compliant Surfaces." *Journal of Experimental Biology* (2019).

Luo, H., Fokoue-Nkoutche, A., **Singh, N.**, Yang, L., Hu, J., and Zhang, P. "Molecular Docking for Prediction and Interpretation of Adverse Drug Reactions." *Combinatorial Chemistry & High Throughput Screening* (2018), 21(5), 314-322.

Dever, C., Dyer, T., Hamilton, L., Lommel, P., Mohiuddin, S., Reiter, A., **Singh, N.**, Truax, R., Wholey, L., Bergeron, K. and Noetscher, G. "Guided-Airdrop Vision-Based Navigation." *24th AIAA Aerodynamic Decelerator Systems Technology Conference* (2017).

Peer-Reviewed Workshop Publications

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

Peer-Reviewed Abstracts

[AMPC Selected Abstract, Oral Presentation] **Singh, N.**, Hoffmann, M., Adalsteinsson, E., Fischl, B., Golland, P.*, Dalca, A.*, Frost, R.* "Motion-Aware Neural Networks Improve Rigid Motion Correction of Accelerated Segmented Multislice MRI." *International Society for Magnetic Resonance in Medicine Annual Meeting* (2023).

[Oral Presentation] Hoffmann, M., **Singh, N.**, Dalca, A., Fischl, B., Frost, R. "Can we predict motion artifacts in clinical MRI before the scan completes?" *International Society for Magnetic Resonance in Medicine Annual Meeting* (2023).

Singh, N., Hoffmann, M., Moyer, D.C., Jang, I., Chen, L., Bezerra Cavalcanti Rockenbach, M., Guidon, A., Aganj, I., Kalpathy-Cramer, J., Adalsteinsson, E., Fischl, B., Dalca, A., Golland, P.*, Frost, R.* "Joint Neural Network for Fast Retrospective Rigid Motion Correction of Accelerated Segmented Multislice MRI." *International Society for Magnetic Resonance in Medicine Annual Meeting* (2022).

Jang, I., Frost, R., Hoffmann, M., **Singh, N.**, Chen, L., Guidon, A., Bezerra Cavalcanti Rockenbach, M., Comeau, D., Bizzo, B., Chang, K., Witham, S., Rettmann, D., Banerjee, S., Brau, A., Reese, T., Aganj, I., Dalca, A., Fischl, B.*, Kalpathy-Cramer, J.* "Automated MRI k-space Motion Artifact Detection in Segmented Multi-Slice Sequences." *International Society for Magnetic Resonance in Medicine Annual Meeting* (2022).

Singh, N., Iglesias, J., Adalsteinsson, E., Dalca, A., and Golland, P. "A Deep-Learning Framework for Image Reconstruction of Undersampled and Motion-Corrupted k-space Data." *International Society for Magnetic Resonance in Medicine Annual Meeting* (2021).

[Oral Presentation] Lala, S. **Singh, N.**, Gagoski, B., Abaci-Turk, E., Grant, P.E., Golland, P., and Adalsteinsson, E. "A Deep Learning Approach for Image Quality Assessment of Fetal Brain MRI." *International Society for Magnetic Resonance in Medicine Annual Meeting* (2019).

Teaching

6.011: Signals, Systems, and Inference, Cambridge, MA   Feb 2017 - May 2017
> *Teaching Assistant*
> Taught three weekly tutorial sections; assisted students in office hours and electronically. Rating: 6.8/7.0.

Service

Journal Reviewer: Nature Scientific Reports, The Journal of Machine Learning for Biomedical Imaging (MELBA)
Conference Reviewer: NeurIPS, CVPR, ICML, ICLR, MIDL

Invited Talks

San Francisco Computer Vision Meetup   May 2023
Boston Medical Imaging Workshop   Dec 2022
Closing the Gap Between Research & Clinical Application: Feb 2021
> Neuroimaging Indicators of Brain Structure and Function (Virtual)

Awards and Honors

MIDL Best Oral Award   2023
ISMRM AMPC Selected Abstract   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