Nikhil Singh

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Academic Positions

	Dartmouth College	*Hanover NH*
2025 (Jan)	ASSISTANT PROFESSOR in *Computer Science*	

	Berklee College of Music	*Boston, MA*
2018	INSTRUCTOR in *Electronic Production and Design*	

Education

	Massachusetts Institute of Technology (MIT)	*Cambridge, MA*
2020–2024	PHD in *Media Arts and Sciences*	
2018–2020	SM in *Media Arts and Sciences*	

	Berklee College of Music *grad. summa cum laude*	*Boston, MA*
2013–2017	BM in *Composition*	
2013–2017	BM in *Electronic Production and Design*	

Industry Research Experience

2023	**Allen Institute for AI** *Research Intern* *Semantic Scholar* team.	*Remote (Seattle, WA)*
2022	**Netflix, Inc.** *Machine Learning Research Intern* *Product Machine Learning Research* team.	*Los Gatos, CA*

Fellowships, Honors, & Awards

2023	***AI for Musical Discovery*: Generative AI Impact Paper Grant** *($50,000)* PI: Tod Machover.	*MIT*
2023	**Gary Marsden Travel Award** *($2,500)*	*SIGCHI*
2020–2022	**LEGO® Papert Graduate Fellowship**	*MIT*
2017	**Earle Browne Award and Scholarship for Music Composition**	*Berklee*
2016	**Max Mathews Award and Scholarship for Music Technology**	*Berklee*
2016–2017	**Achievement Grant**	*Berklee*
2013–2017	**Dean's Award Scholarship**	*Berklee*
2013–2017	**Dean's List** *8 semesters*	*Berklee*

Selected Publications

* denotes equal contribution. For a full list, please see Google Scholar.

PREPRINTS AND WORKING PAPERS

2024	M Cherep*, **N Singh*** Contrastive Learning from Synthetic Audio Doppelgängers Preprint: arXiv:2406.05923 Under Review (ICLR 2025)
2024	S Longpre, **N Singh**, M Cherep, K Tiwary, J Materzynska, W Brannon, R Mahari, M Dey, M Hamdy, N Saxena, AM Anis, EA Alghamdi, VM Chien, N Obeng-Marnu, D Yin, K Qian, Y LI, M Liang, A Dinh, S Mohanty, D Mataciunas, T South, J Zhang, AN Lee, CS Lund, C Klamm, D Sileo, D Misra, E Shippole, K Klyman, LJV Miranda, N Muennighoff, S Ye, S Kim, V Gupta, V Sharma, X Zhou, C Xiong, L Villa, S Biderman, S Pentland, S Hooker, J Kabbara

Bridging the Data Provenance Gap Across Text, Speech, and Video
Under Review (ICLR 2025)

2024   S Chin*, C Fang*, **N Singh**, I Ibrahim, J Paradiso, P Maes
Purrfect Pitch: Exploring Musical Interval Learning through Multisensory Interfaces
Preprint: arXiv:2407.09721
Under Review (CHI 2025)

Journal Articles

2022   **N Singh***, G Bernal*, D Savchenko*, E Glassman
Where to Hide a Stolen Elephant: Leaps in Creative Writing with Multimodal Machine Intelligence
TOCHI: *ACM Transactions on Computer-Human Interaction* (presented at CHI 2023)
ACM DL: [doi:10.1145/3511599](doi:10.1145/3511599)

2024   M Groh*, A Sankaranarayanan*, **N Singh**, DY Kim, A Lippman, RW Picard
Human Detection of Political Speech Deepfakes across Transcripts, Audio, and Video
Nature Communications
Nature OA: [doi:10.1038/s41467-024-51998-z](doi:10.1038/s41467-024-51998-z)

2022   I Drori, S Zhang, R Shuttleworth, L Tang, A Lu, E Ke, K Liu, L Chen, S Tran, N Cheng, R Wang, **N Singh**, TL Patti, J Lynch, A Shporer, N Verma, E Wu, G Strang
A Neural Network Solves and Generates Mathematics Problems by Program Synthesis: Calculus, Differential Equations, Linear Algebra, and More
PNAS: *Proceedings of the National Academy of Sciences*
PNAS OA: doi:10.1073/pnas.2123433119

Peer Reviewed Conference Papers

2024   M Cherep*, **N Singh***, J Shand
Creative Text-to-Audio Generation via Synthesizer Programming
ICML 2024: *International Conference on Machine Learning*
OpenReview: CTAG

2024   **N Singh**, LL Wang, J Brag
FigurA11y: AI Assistance for Writing Scientific Alt Text
IUI 2024: *ACM Intelligent User Interfaces*
ACM DL: FigurA11y

2024   **N Singh**, C Wu, I Orife, M Kalayeh
Looking Similar, Sounding Different: Leveraging Counterfactual Cross-Modal Pairs for Audiovisual Representation Learning
CVPR 2024: *IEEE/CVF Computer Vision and Pattern Recognition*
CVF OA: Looking Similar, Sounding Different

2024   S Longpre, R Mahari, A Lee, C Lund, H Oderinwale, W Brannon, N Saxena, N Obeng-Marnu, T South, C Hunter, K Klynman, C Klamm, H Schoelkopf, **N Singh**, M Cherep, A Anis, A Dinh, C Chitongo, D Yin, D Sileo, D Mataciunas, D Misra, E Alghamdi, E Shippole, J Zhang, J Materzynska, K Qian, K Tiwary, L Miranda, M Dey, M Liang, M Hamdy, N Muennighoff, S Ye, S Kim, S Mohanty, V Gupta, V Sharma, M Vu, X Zhou, Y Li, C Xiong, L Villa, S Biderman, H Li, D Ippolito, S Hooker, J Kabbara, S Pentland
Consent in Crisis: The Rapid Decline of the AI Data Commons
NeurIPS 2024 Datasets & Benchmarks Track (To Appear)
Preprint: [DPI](DPI)

2021   **N Singh**, J Mentch, J Ng, M Beveridge, I Drori
Image2Reverb: Cross-Modal Reverb Impulse Response Synthesis
ICCV 2021: *IEEE/CVF International Conference on Computer Vision*
CVF OA: Image2Reverb

2024	J Cunha, C Renguette, **N Singh**, L Stella, M McMahon, H Jin and R Kleinberger. Ellie Talks About the Weather: Toward Evaluating the Expressive and Enrichment Potential of a Tablet-Based Speech Board in a Single Goffin's Cockatoo **CHI 2024**: *ACM Conference on Human Factors in Computing Systems* ACM DL: Ellie
2023	M Cherep*, **N Singh*** SYNTHAX: A Fast Modular Synthesizer in JAX **AES 2023**: Audio Engineering Society Convention Papers
2021	**N Singh** The Sound Sketchpad: Expressively Combining Large and Diverse Audio Collections. **IUI 2021**: *ACM Intelligent User Interfaces* ACM DL: doi:10.1145/3397481.3450688
2022	R Kleinberger, **N Singh**, A van Troyer, X Xiao Voice at NIME: A Taxonomy of New Interfaces for Vocal Musical Expression **NIME 2022**: *International Conference on New Interfaces for Musical Expression* PubPub OA: doi:10.21428/92fbeb44.4308fb94
2021	S Tran, P Krishna, I Pakuwal, P Kafle, **N Singh**, J Lynch, I Drori Solving Machine Learning Problems **ACML 2021**: *Asian Conference on Machine Learning* (Best Student Paper Award) Preprint: arXiv:2107.01238
2022	L Tang, E Ke, **N Singh**, B Feng, D Austin, N Verma, I Drori Solving Probability and Statistics Problems by Probabilistic Program Synthesis at Human Level and Predicting Solvability **AIED 2022**: *International Conference on Artificial Intelligence in Education* Preprint: arXiv:2111.08267

WORKSHOP PAPERS AND PRESENTATIONS

2024	M Cherep*, **N Singh***, P Maes Superficial Alignment and Subtle Divergence in LLM Decision-Making NeurIPS *Behavioral Machine Learning* Workshop (**Spotlight Talk**) Preprint available by request
2024	L Mo*, M Cherep*, **N Singh***, Q Langford, P Maes Articulatory Synthesis of Speech and Diverse Vocal Sounds via Optimization NeurIPS *Audio Imagination* Workshop Preprint available by request
2023	**N Singh***, M Cherep*, J Shand Creative Text-to-Audio Generation via Synthesizer Programming NeurIPS *Machine Learning for Audio* Workshop Preprint PDF @ mlforaudioworkshop.com
2023	K Lecamwasam, SG Arango, N Singh, N Elhaouij, M Addae, RW Picard Investigating the Physiological and Psychological Effect of an Interactive Musical Interface for Stress and Anxiety Reduction CHI LBW 2023: *Extended Abstracts of the 2023 CHI Conference* ACM DL: doi.org/10.1145/3544549.3585778
2022	**N Singh***, G Bernal*, D Savchenko*, E Glassman A Selective Summary of *Where to Hide a Stolen Elephant: Leaps in Creative Writing with Multimodal Machine Intelligence* ACL 2022 In2Writing Workshop: *The First Workshop on Intelligent and Interactive Writing Assistants* Preprint: PDF @ media.mit.edu
2021	S Chawla, **N Singh**, I Drori Quantifying and Alleviating Distribution Shifts in Foundation Models on Review Classification

NeurIPS 2021 Workshop on Distribution Shifts
Preprint: OpenReview

PUBLIC-FACING WRITING

2024   **N Singh**, M Mishra, T Machover
        AI for Musical Discovery
        Part of *An MIT Exploration of Generative AI: From Novel Chemicals to Opera*
        Preprint: PubPub

THESES AND TECHNICAL REPORTS

2017   N Arner, **N Singh**, R Boulanger, A Petrolati
Rev. 2020 Csound in iOS. In J. Heintz & H. Sigurðsson (Eds.), *The Csound FLOSS Manual*, 7th ed. (pp. 693–726).
2020   **N Singh**. *Sifting Sound: Interactive Extraction, Exploration, and Expressive Recombination of Large and Heterogeneous Audio Collections.* Master's Thesis. Massachusetts Institute of Technology.

Invited Talks and Panels

Sep 2024	**MIT Media Lab Divergent Sectors Event**	*Cambridge, MA*
	Invited talk: Building Precision Tools for the Imagination with AI	
Aug 2024	**Boston AI Music Meetup**	*Cambridge, MA*
	Invited talk: Cross-Modal and Counterfactual Approaches for Enhanced Audio Processing and Creation	
May 2024	**Multimodal Weekly (Twelve Labs)**	*Virtual*
	Invited talk: Multimodal Models for Enhanced Audio Processing and Creation	
Apr 2024	**Imagination in Action: Forging the Future of Business with AI**	*Cambridge, MA*
	Invited lightning and panel talks: Building Precision Tools for the Imagination with AI	
Apr 2024	**MIT Media Lab Cultivating Creativity course**	*Cambridge, MA*
	Creative Text-to-Audio Generation via Synthesizer Programming; with Manuel Cherep	
Feb 2024	**Wang Research Group (University of Washington Information School)**	*Virtual*
	FIGURA11Y: AI Assistance for Writing Scientific Alt Text	
Nov 2023	**MIT Generative AI Week**	*Cambridge, MA*
	Invited lightning talk. Creative Text-to-Audio Generation via Synthesizer Programming; with Manuel Cherep	
Oct 2023	**Audio Engineering Society (AES) Convention**	*New York, NY*
	Invited panelist. Harnessing the Power of AI in Designing Electronic Musical Instruments: Innovation, Interactivity, and Inclusivity	
Apr 2023	**ACM CHI Conference 2023**	*Hamburg, Germany*
	TOCHI journal paper talk. Where to Hide a Stolen Elephant: Leaps in Creative Writing with Multimodal Machine Intelligence	
Mar 2023	**MIT Center for Constructive Communication**	*Cambridge*
	Invited talk at Speaker Series. Creative Writing and Multimodal Machine Intelligence	
Nov 2022	**Netflix Data and Insights Research Seminar**	*Virtual*
	Invited talk. Looking Similar, Sounding Different: Language-Invariant Training for Audiovisual Representation Learning	
May 2022	**Audio Engineering Society (AES) Europe**	*Virtual*
	Panelist and co-host. Audio Production as Research and Development	
May 2022	**MIT Media Lab**	*Cambridge, MA*
	Nominated research talk. Computational Approaches for Interactive Media Production	
Apr 2022	**Columbia University's graduate *Deep Learning* course**	*Virtual*
	Invited talk. Image2Reverb: Cross-Modal Reverb Impulse Response Synthesis	
Oct 2021	**MIT Media Lab's *Reimagining Hyperinstruments* course**	*Cambridge, MA*
	Lecture. Auditory Computation	
Oct 2021	**Berklee's *Machine Learning for Musicians* course**	*Boston, MA*

	Invited talk. Adventures in Audio, Art, and Computation	
Aug 2021	**Columbia University's graduate *Deep Learning* course**	*Virtual*
	Invited talk. Image2Reverb: Cross-Modal Reverb Impulse Response Synthesis	
May 2021	**Car Experience Workshop, MIT Media Lab**	*Virtual*
	Aural Experience for Future Mobility Contexts; with Karsten Schuhl	
Feb 2021	**MIT's graduate *Applied Machine Learning* course**	*Virtual*
	Invited talk. Image2Reverb: Cross-Modal Reverb Impulse Response Synthesis; with Jeff Mentch and Jerry Ng	
Dec 2018	**MIT Senseable City research group**	*Cambridge, MA*
	Invited talk. Making Music from Large Audio Datasets	

Teaching

As Instructor of Record

2018	**Instructor** @ Berklee College of Music
	Audio Programming in C
	Audio Programming for iPad
	Producing Music with Ableton Live ×3

As Teaching Assistant

2020–2021	**Teaching Assistant** @ MIT Media Lab
	Fall 2021: *Reimagining Hyperinstruments* instr. Tod Machover
	Fall 2020: *ARTS@ML: Why Here? What's Next?* instr. Tod Machover
2016–2017	**Teaching Assistant** @ Berklee College of Music
	Audio Programming in C instr. Ben Houge
	Audio Programming for iPad instr. Dr. Richard Boulanger
2016–2017	**Tutor** @ Berklee College of Music
	Audio Programming in C
	Audio Programming for iPad

Guest and Additional Lectures

MIT Media Lab Festival of Learning

2023	How to Put Almost Anything in a Browser (with Manuel Cherep, Kimaya Lecamwasam, and Jessica Shand)
2022	How to Make Almost Any Sound (with Manaswi Mishra and Maxwell Addae)
2021	How to Make Almost Any Sound (with Manaswi Mishra)
2017–2018	*Electroacoustic Composition* instr. Dr. Richard Boulanger; lec. on Spectralism and Spectral Analysis
2018	*Programming in Max* instr. Neil Leonard; substitution and project review
2018	*Video Programming in Jitter* instr. Neil Leonard; substitution and project review

Other Experience

2017–2018	**Freelance Software Developer and Technology Consultant**	*Boston, MA*
	Audiovisual software applications for a variety of arts industry clients.	
2010–2020	**Audio Producer and Engineer**	*Mumbai, India & Boston, MA*
	Producer, recording/mix/mastering engineer on international records and productions: rock, electronic music, opera, and more. Music and sound design for film.	

Academic-Industry Collaborations

2021	**Harman International** *Hyperconnected Concerts*	*Virtual*
	Roles: led concept + technology development, experience design, UX research, technical consulting	
2020	**Kia Corporation** *SoundKUBE*	*Seoul, Korea & Remote*
	Roles: contributed to concept development, experience design, technical consulting	

Advising & Mentoring

2022	Committee Member, *Master in Design Engineering* capstone project, Harvard University
	Maximilian Mueller
2022–2024	Mentor for WiMIR (Women in Music Information Retrieval) Mentoring Program
	Manvi Agarwal (2024)
	Ninon Lizé Masclef (2023–2024)
2023–2024	Mentor for Berklee Mentor Network Program
	Gitaansh Ahluwalia (2024)
	Lanif Azcona (2024)
2018–2024	Within MIT's UROP program, I've worked with several talented undergraduate students including:
	Luke Mo (2024)
	Angela Chen (2024)
	Quinn Langford (2024)
	Joseph Ntaimo (2022)
	Ally Hong (2021)
	Kelly He (2021)
	Samantha D'Alonzo (2021)
	Rachel Liu (2021)
	Jasmine Wu (2020)
	Sebastian Franjou (2018)

Service

COMMITTEES

2024	*Machine Learning & Artificial Intelligence*
	Audio Engineering Society (AES) Technical Committee (Member)
2023,2024	*AI & Human Experience*: Faculty Hiring Committee (Student Representative; 2× searches)
	MIT Media Lab + MIT Schwarzman College of Computing

ORGANIZATION

2022	*Audio Production as Research and Development*: Co-hosted panel (with Dr. Rébecca Kleinberger) at Audio Engineering Society (AES) Europe.

REVIEWING

4× Special Recognition for Outstanding Reviews (2× CHI 2024, 2× DIS 2022,24)

AI/ML	NeurIPS (2024), NeurIPS D&B (2024), CVPR (2024), ECCV (2024), *ACL Rolling Review (2024), AAAI (2023,24,25), ICASSP (2024), ECML/PKDD (2022), JMLR/MLOSS (2022), WACV (2022,23), NeurIPS Creativity & GenAI Workshop (2024)
HCI	CHI (2022,24,25), UIST (2023,24), CSCW (2022,24), ICWSM (2022,23,24), DIS (2022,23,24), C&C (2022), TIST (2024), MobileHCI (2022), IMX (2022)
Other	Nature Scientific Reports (2024), NIME (2023,24)

OTHER

2023–2024	MIT Media Lab Student Survey Team
	Mixed-methods data analysis and visualization of student feedback for students, faculty, and lab leadership.
2021–2023	MIT Media Lab Students Offering Support
	Application review for 5 applicants through this program. Informally reviewed applications for many more.

Selected Press

A Rose Out of Concrete, *The Bay State Banner*
New algorithm aces university math course questions, *MIT News*
A Machine Can Now Do College-Level Math, *Inside Higher Ed*

More than 800 MIT graduates will sing one song together, virtually, *The Boston Globe*
Hacking Commencement, *MIT News*
Blanchard Explores Electro-Jazz Frontier at Berklee Showcase, *Downbeat Magazine*
Far Travel Music release debut EP, *NH7 Indiecision*
Bhayanak Maut Vocalist Sunneith Revankar's Solo Debut 'Pills', *Rolling Stone India*
Personifying Art's Power, Class of 2017 Takes Reins, *Berklee News*
How to Spot Political Deepfakes, *Kellogg Insight*
At Moogfest, Untamed Sounds and Futuristic Protests, *The New York Times*
MIT HUMANS project breaks down borders, *MIT News*
Can Parrots Converse? Polly Says That's the Wrong Question, *The New York Times*
The Data That Powers A.I. Is Disappearing Fast, *The New York Times*