

Nikhil Singh

PhD Student at MIT Media Lab

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Education

Massachusetts Institute of Technology

2020– PHD in *Media Arts and Sciences*

2018–2020 SM in *Media Arts and Sciences*

Berklee College of Music (*grad. summa cum laude*)

2013–2017 BM in *Composition*

2013–2017 BM in *Electronic Production & Design*

Selected Papers

- 2022 N Singh, C Wu, I Orife, M Kalayeh
Looking Similar, Sounding Different: Language-Invariant Training for Audiovisual Representation Learning (*Under Review*)
- 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*
- 2022 N Singh*, G Bernal*, D Savchenko*, E Glassman
Where to Hide a Stolen Elephant: Leaps in Creative Writing with Multimodal Machine Intelligence
TOCHI 2022: *ACM Transactions on Computer-Human Interaction*
- 2021 N Singh
The Sound Sketchpad: Expressively Combining Large and Diverse Audio Collections.
IUI 2021: *ACM Intelligent User Interfaces*

Fellowships, Honors, & Awards

- 2020–2022 LEGO® Papert Graduate Fellowship
- 2017 Earle Browne Award and Scholarship for Music Composition
- 2016 Max Mathews Award and Scholarship for Music Technology
- 2016–2017 Achievement Grant
- 2013–2017 Dean’s Award Scholarship

All Publications

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* (pres. CHI 2023)
ACM DL: [doi:10.1145/3511599](https://doi.org/10.1145/3511599)
- 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, Explains, and Generates University Math Problems by Program Synthesis and Few-Shot Learning at Human Level
PNAS: *Proceedings of the National Academy of Sciences*
PNAS OA: [doi:10.1073/pnas.2123433119](https://doi.org/10.1073/pnas.2123433119)

PEER REVIEWED CONFERENCE PAPERS

- 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](#)
- 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](#)
- 2022 I Drori, S Zhang, Z Chin, R Shuttleworth, A Lu, L Chen, B Birbo, M He, P Lantigua, S Tran, G Hunter, B Feng, N Cheng, R Wang, Y Hicke, S Surbehera, A Raghavan, A Siemenn, **N Singh**, A Shporer, J Lynch, N Verma, T Buonassisi, A Solar-Lezama
A dataset for learning university STEM courses at scale and generating questions at a human level
EAAI 2023: *Educational Advances in Artificial Intelligence*
Dataset: [github.com/idrori/stemQ](#)

WORKSHOP PAPERS AND PRESENTATIONS

- 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](#)

PREPRINTS AND WORKING PAPERS

- 2022 **N Singh**, C Wu, I Orife, M Kalayeh
Looking Similar, Sounding Different: Language-Invariant Training for Audiovisual Representation Learning (*Under Review*)
- 2021 K Lennon, K Fransen, A O'Brien, Y Cao, M Beveridge, Y Arefeen, **N Singh**, I Drori
Image2Lego: Customized LEGO® Set Generation from Images (*Under Review*)
Preprint: [arXiv:2108.08477](#)

- 2021 N Singh, B Kates, J Mentch, A Kharkar, M Udell, I Drori
Language Aware Zero-Shot AutoML (*Under Revision*)
Preprint: [arXiv:2106.13743](https://arxiv.org/abs/2106.13743)
- 2021 N Deutsch*, E Luzzi*, N Singh*, E Glassman
Deep-Reality Check: How Well Does Corrective Information Really Protect Us From Deepfakes?
(*Under Revision*)

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.

Professional Experience

- 2022 **Netflix, Inc.** *Machine Learning Research Intern*
Audiovisual machine learning research on the Product Machine Learning Research team in Los Gatos, CA. Focused on improving self-supervised audiovisual representation learning to power a wide range of applications.
- 2017–2018 **Freelance Software Developer and Technology Consultant**
Audiovisual software applications for a variety of arts industry clients, incl. tech to support installations, performance, and iOS apps. Samples available upon request.
- 2010–2020 **Audio Producer and Engineer**
Producer, recording/mix/mastering engineer on international records and productions: rock, electronic music, opera, and more. Music and sound design for film. Samples available upon request.

Presentations & Invited Talks

- Nov 2022 *Looking Similar, Sounding Different: Language-Invariant Training for Audiovisual Representation Learning*
Invited talk at Netflix research seminar
- May 2022 *Audio Production as Research and Development*
Panelist and co-host at Audio Engineering Society (AES) Europe.
- Apr 2022 *Image2Reverb: Cross-Modal Reverb Impulse Response Synthesis*
Invited talk at Columbia University’s graduate *Deep Learning* course
- Oct 2021 *Auditory Computation*
Lecture at MIT Media Lab’s *Reimagining Hyperinstruments* course
- Oct 2021 *Adventures in Audio, Art, and Computation*
Invited talk at Berklee College of Music’s *Machine Learning for Musicians* course
- Aug 2021 *Image2Reverb: Cross-Modal Reverb Impulse Response Synthesis*
Invited talk at Columbia University’s graduate *Deep Learning* course
- May 2021 *Aural Experience for Future Mobility Contexts*
Presentation to automotive company representatives at MIT Media Lab; with Karsten Schuhl
- Feb 2021 *Image2Reverb: Cross-Modal Reverb Impulse Response Synthesis*
Invited talk at MIT’s graduate *Applied Machine Learning* course; with Jeff Mentch and Jerry Ng
- Dec 2018 *Making Music from Large Audio Datasets*
Invited talk at MIT Senseable City research group

Teaching

- 2020–2021 **Teaching Assistant @ MIT Media Lab**
Reimagining Hyperinstruments instr. Tod Machover
ARTS@ML: Why Here? What's Next? instr. Tod Machover
- 2018 **Instructor @ Berklee College of Music**
Audio Programming in C
Audio Programming for iPad
Producing Music with Ableton Live ×3
- 2016–2017 **Teaching Assistant @ Berklee College of Music**
Audio Programming in C instr. Ben Houge
Audio Programming for iPad instr. Dr. Richard Boulanger (helped to develop and launch course)
- 2016–2017 **Tutor @ Berklee College of Music**
Audio Programming in C
Audio Programming for iPad (helped to develop and launch course)
- 2016–2018 **Guest and Additional Lectures**
Electroacoustic Composition instr. Dr. Richard Boulanger; lec. on Spectralism and Spectral Analysis
Programming in Max instr. Neil Leonard; substitution and project review
Video Programming in Jitter instr. Neil Leonard; substitution and project review

Industry Collaborations

As part of the *Opera of the Future* resarch group.

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

Service

REVIEWING

- 2023 **AAAI** (×3): *Association for the Advancement of Artificial Intelligence Conference*
- 2022 **CHI** (×6): *ACM Conference on Human Factors in Computing Systems*
- 2022 **CHI LBW** (×3): *ACM Conference on Human Factors in Computing Systems (Late-Breaking Work)*
- 2022 **CSCW**: *ACM Conference on Computer Supported Cooperative Work*
- 2022 **ICWSM**: *International AAAI Conference on Web and Social Media*
- 2022,23 **WACV** (×4): *IEEE/CVF Winter Conference on Applications of Computer Vision*
- 2022 **ECML/PKDD** (×4): *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases*
- 2022 **JMLR (MLOSS)**: *Journal of Machine Learning Research (Open Source Software Track)*
- 2022 **DIS** (×3; **Special Recognition** ×1): *ACM SIGCHI Conference on Designing Interactive Systems*
- 2022 **C&C** (×3): *ACM conference on Creativity & Cognition*
- 2022 **MobileHCI** (×2): *ACM International Conference on Mobile Human-Computer Interaction.*

ADVISING

- 2022 **Maximilian Mueller**
Committee Member, *Master in Design Engineering*, Harvard University
- 2018–2022 6+ MIT undergraduates through UROP program.