Chris Donahue

chrisdonahue.com
chrisdonahue@cmu.edu
+1 512 825 8619

Office Address
Gates & Hillman Centers (GHC) 7127
Computer Science Department
Carnegie Mellon University
5000 Forbes Ave
Pittsburgh, PA 15213

Currently

Assistant Professor, Computer Science Department, Carnegie Mellon University
Research Scientist (part-time), Google DeepMind and Magenta

Research interests

Generative AI for music and audio, human-AI interaction for creativity and productivity, machine learning, foundation models

Education

2022 Postdoc in Computer Science, Stanford University
Advised by Percy Liang
Research in foundation models for music and natural language processing

2019 PhD in Music, University of California San Diego
Co-advised by Miller Puckette (music) and Julian McAuley (computer science)
Thesis: "Enabling new musical interactions with machine learning"

2016 MA in Music, University of California San Diego
Advised by Miller Puckette
Thesis: "Extensions to convolution for generalized cross-synthesis"

2014 BS in Computer Science (with high honors), The University of Texas at Austin
Co-advised by Peter Stone (computer science) and Russell Pinkston (music)
Thesis: "Applications of genetic programming to digital audio synthesis"

Fundraising, honors & awards

2025 Adobe Research unrestricted gift in support of generative AI ($18,000)
2025 **Best paper award at the NAACL 2025 Student Research Workshop** (top 1 overall)
2025 **Best paper award at CHI 2025** (top 1% of submissions)
2025 PhD student Wayne Chi selected for NDSEG fellowship
2025 (Co-PI) AIxArts incubator fund with CFA colleague ($20,000)
2024 **Sony AI sponsored research grant ($160,000)**
2024 **(Co-PI) Sony Research Award Program ($100,000)**
2024 Gift from Hooktheory ($15,000)
2023 Gift from KLab ($10,000)
2023 **Adobe Research unrestricted gift in support of generative AI ($65,000)**

At CMU ↑ Before ↓

2021 **Best paper runner-up at ISMIR 2021** (top 3 papers of 200+ submissions)
2019 Named one of the Best Reviewers for NeurIPS 2019
2018 **Unity Global Graduate Fellowship recipient ($30,000)**
2018 UCSD Chancellor's Research Excellence Scholarship recipient ($25,000)
2018 NVIDIA hardware grant recipient ($3,000 value)
2018 Support award for the 19th ISMIR Conference ($500)
2018 Support award for the 7th ICLR Conference ($500)
2018 HPC @ UC Allocation for machine learning research (20,000 GPU hours)
2017 Sponsored Scholar award at the 34th International Conference on Machine Learning ($1,800)
2017 NVIDIA hardware grant recipient ($1,500 value)
2016 XSEDE Startup Allocation for machine learning research (6250 GPU hours)
2015 UCSD Academic Senate COR Grant for graduate research ($12,000)

Invited talks, guest lectures & seminars

2024 Oct Invited keynote, Speech and Audio in the Northeast. "The expanding horizons of music AI research" (host: Jonathan Le Roux).

2024 Apr* Invited talk, UC San Diego CSE/HDSI. "Unlocking musical creativity with generative AI" (host: Sanjoy Dasgupta / Arya Mazumdar).

2024 Apr* Invited talk, University of Michigan Ann Arbor CS. "Unlocking musical creativity with generative AI" (host: Joyce Chai).

2024 Mar* Invited talk, Boston University CDS. "Unlocking musical creativity with generative AI" (host: Brian Kulis).

2024 Feb* Invited talk, Northeastern CAMD. "Unlocking musical creativity with generative AI" (host: Matthew McDonald).

2024 Feb* Guest lecture, Northeastern CAMD MUST 2431. "Intro to music language modeling" (host: Matthew McDonald).

2023 Oct Invited talk, Stanford HAI: New Horizons in Generative AI. "Music generation with precise control and composable outputs" (host: Percy Liang).

2023 Oct

Guest lecture, CMU 11-667: Large Language Models. "LLMs beyond text: Music" (host: Daphne Ippolito).

2023 Sep Guest lecture, CMU 07-300: Research Overview. "Unlocking musical expression with generative models" (host: Ruben Martins).

2023 Apr Guest lecture, CMU Music Technology Course. "Demystifying music generative modeling: from Markov chains to AI Drake" (host: Annie Hui-Hsin Hsieh).

2023 Apr Invited talk, CMU Music & Technology Seminar. "Frontiers in controllable music generation" (host: Riccardo Schulz).

2023 Feb Invited talk, AAAI Workshop on Creative AI Generation. "Frontiers in controllable music generation" (host: Haw-Shiuan Chang).

2022 Jul Invited talk, ICML Workshop on Machine Learning for Audio Synthesis. "Frontiers and challenges in music audio generation" (host: Sander Dieleman).

2022 Feb Invited talk, ACMI Lab. "Unlocking musical expression with machine learning" (host: Zachary C. Lipton).

2019 Dec Invited talk, ASA San Diego. "Unlocking musical expression with machine learning" (host: Scott Hawley).

2019 Aug Invited talk, Bish Bash (Dolby). "Neural Loops: A factorized generative model for musical loops " (host: Jordi Pons).

2019 Feb Invited talk, P-lambda Seminar. "Machine learning methods for enriching musical interaction" (host: Percy Liang).

2019 Feb Guest lecture, Stanford DESINST 240—Designing Machine Learning. "Pairing human control with generative models for creative content synthesis" (host: Abhay Agarwal).

2019 Jan Guest lecture, Georgia Tech music tech seminar. "Music generation with language models" (host: Jason Freeman).

2018 Oct Invited talk, Unity Unite Conference. "Low- to high-level learning problems in game audio" (host: Diana Ford).

Teaching

2025 Fall (Instructor) CMU 15-798: Generative AI for Music and Audio
2025 Spr. (Instructor) CMU 15-322/622: Intro to Computer Music
2024 Spr. (Instructor) CMU 15-322/622: Intro to Computer Music
2017 Spr. (TA) UCSD MUS 172: Computer Music II
2017 Win. (TA) UCSD MUS 171: Computer Music I
2016 Fall (TA) UCSD MUS 170: Musical Acoustics
2015 Spr. (TA) UCSD MUS 174C: Audio and MIDI Studio Techniques III
2015 Win. (TA) UCSD MUS 174B: Audio and MIDI Studio Techniques II

2014 Fall (TA) UCSD MUS 174A: Audio and MIDI Studio Techniques I

Mentorship

Bold are doctoral advisees.

Current research mentees

2025- **Nathan Pruyne**, Incoming PhD student, Computer Science Department, CMU
Research area: Music AI

2024- Satvik Dixit, Masters student, Electrical and Computer Engineering, CMU
Research area: Generative AI for audio

2024- **Yewon Kim**, Visitor → Incoming PhD student, Computer Science Department, CMU
Research area: Human AI interaction

2023- Alexander Wang, MS Music Technology → Incoming PhD Student, HCII, CMU
Research area: Adaptive audio

2023- **Irmak Bukey**, PhD student, Computer Science Department, CMU
Research area: Multimodal AI in music

2023- **Wayne Chi**, PhD student, Computer Science Department, CMU
Research area: AI for productivity in programming and gaming

Past research mentees

2024-2025 Yichen Huang, Visiting researcher, Computer Science Department, CMU
2024 Xun Rick Zhou, Masters student, Computer Science Department, CMU
2023-2024 Shih-Lun Wu, Masters student, Language Technologies Institute, CMU
2020 Alexander Iyabor, Undergraduate, Computer Science Department, Stanford
2020 Rodrigo Castellon, Undergraduate, Computer Science Department, Stanford

Other junior collaborators

2025- Ben Stoler, PhD student, Computer Science Department, CMU
2025- Zachary Novack, PhD student, Computer Science and Enginering, UC San Diego
2025- Phillip Long, Undergraduate, Computer Science and Enginering, UC San Diego
2025- Yonghyun Kim, Masters student, Music Technology, Georgia Tech
2025- Junwei Deng, PhD student, Computer Science, UIUC
2024- Michael Freeman, Incoming PhD student, Computer Science, Cornell
2024-2025 Valerie Chen, PhD student, Machine Learning Department, CMU
2022-2024 Michael Feffer, PhD student, Societal Computing, CMU

Thesis committees

2024-	Jiatong Shi, PhD candidate, Language Technologies Institute, CMU
2024-	Shuqi Dai, PhD candidate, Computer Science Department, CMU
2024-	Alon Ziv, PhD student, Computer Science, Hebrew University of Jerusalem
2023-	Megan Wei, PhD student, Computer Science, Brown University
2023-	Sadie Allen, PhD candidate, Computer Engineering, Boston University
2023-	Yinghao Ma, PhD candidate, Center for Digital Music, Queen Mary University of London
2023-2024	Alexander Wang, Masters student, Music Technology, CMU
2024-2025	Ziyun Liu, Masters student, Music Technology, CMU Thesis title: *A Guide to Using Osu! Data for Beat and Downbeat Tracking*
2023-2024	Alexander Wang, Masters student, Music Technology, CMU Thesis title: *Music-Adaptive Audio Notifications*

Service

Departmental

- (Spring 2025) Faculty candidate host (Mengzhou Xia)
- (Spring 2025) CSD PhD admissions committee
- (Spring 2024) CSD PhD admissions committee

Committee member

- Co-organizer, ICML: AI Heard That! Workshop 2025
- Senior program committee, ISMIR: International Society for Music Information Retrieval Conference 2024
- Area chair, NAACL: Annual Conference of the North American Chapter of the Association for Computational Linguistics
- Metareviewer, ISMIR: International Society for Music Information Retrieval Conference

Conference reviews

- (ISMIR) International Society for Music Information Retrieval Conference
- (ICLR) International Conference on Learning Representations
- (ICML) International Conference on Machine Learning
- (NeurIPS) Conference on Neural Information Processing Systems
- (CHI) ACM Conference on Human Factors in Computing Systems
- (ICASSP) IEEE International Conference on Acoustics, Speech, & Signal Processing

Journal reviews

- Transactions of the International Society for Music Information Retrieval
- ACM Computing Survey
- IEEE Transactions on Signal Processing
- Journal of Selected Topics in Signal Processing
- IET Computer Vision

Other

- Mentor, CMU HCII BHCI Senior Capstone Project 2024, "Assistive tool for rapidly aligning music recordings and sheet music"
- Co-organizer, ISMIR 2020 Tutorial, "Designing generative models for interactive co-creation"
- Mentor, Women in Music Information Retrieval Mentorship Program, 5 years
- PhD Thesis Committee, Yinghao Ma, Queen Mary University of London, PhD Center for Digital Music
- MS Thesis Committee, Alexander Wang, Carnegie Mellon University, MS Music & Technology

Peer-reviewed publications

* Indicates equal first author contribution, † is equal senior author contribution.

For a complete list including pre-prints, see my Google Scholar profile.

2025 Wayne Chi*, Valerie Chen*, Anastasios Nikolas Angelopoulos, Wei-Lin Chaing, Aditya Mittal, Naman Jain, Tianjun Zhang, Ion Stoica, **Chris Donahue**†, and Ameet Talwalkar†. "Copilot Arena: A Platform for Code LLM Evaluation in the Wild", in **ICML 2025**.

2025 Satvik Dixit, Sungjoon Park, **Chris Donahue**†, and Laurie Heller†. "Learning Perceptually Relevant Temporal Envelope Morphing", in **WASPAA 2025**.

2025 Alexander Wang, **Chris Donahue**, and Dhruv Jain. "RISE: Music rearrangement for realtime intensity synchronization with exercise", in **ISMIR 2025**.

2025 Yichen Huang, Zachary Novack, Koichi Saito, Jiatong Shi, Shinji Watanabe, Yuki Mitsufuji, John Thickstun, and **Chris Donahue**. "Aligning Text-to-Music Evaluation with Human Preferences", in **ISMIR 2025**.

2025 Shih-Lun Wu, Aakash Lahoti, Arjun Desai, Karan Goel, **Chris Donahue**†, and Albert Gu†. "Towards Codec-LM Co-design for Neural Codec Language Models", in **NAACL Student Research Workshop 2025** (**Best Paper, top 1 overall**).

2025 Yewon Kim, Sung-Ju Lee, and **Chris Donahue**. "AMUSE: Human-AI Collaborative Songwriting with Multimodal Inspirations", in **CHI 2025** (**Best Paper, top 1% of submissions**).

2024 Alexander Wang, David Lindlbauer, and **Chris Donahue**. "Towards Music-Aware Virtual Assistants", in **UIST 2024**.

2024 Irmak Bukey, Michael Feffer, and **Chris Donahue**. "Just Label the Repeats for In-The-Wild Audio-to-Score Alignment", in **ISMIR 2024**.

2024 Megan Wei, Michael Freeman, **Chris Donahue**, and Chen Sun. "Do Music Generation Models Encode Music Theory?", in **ISMIR 2024**.

2024 Yusong Wu, Tim Cooijmans, Kyle Kastner, Adam Roberts, Ian Simon, Alexander Scarlatos, **Chris Donahue**, Cassie Tarakajian, Shayegan Omidshafiei, Aaron Courville, Pablo Samuel Castro, Natasha Jaques, and Cheng-Zhi Anna Huang. "Adaptive Accompaniment with ReaLchords", in **ICML 2024**.

2024 John Thickstun, David Hall, **Chris Donahue**, and Percy Liang. "Anticipatory music transformer", in **TMLR 2024**.

2024 Shih-Lun Wu, **Chris Donahue**, Shinji Watanabe, and Nicholas J. Bryan. "Music ControlNet: Multiple Time-varying Controls for Music Generation", in **TASLP 2024**.

2024 Kun Su, Judith Yue Li, Qingqing Huang, Dima Kuzmin, Joonseok Lee, **Chris Donahue**, Fei Sha, Aren Jansen, Yu Wang, Mauro Verzetti, Timo I Denk, and Timo Denk. "V2Meow: Meowing to the visual beat via music generation", in **AAAI 2024**.

2022 **Chris Donahue**, John Thickstun, and Percy Liang. "Melody transcription via generative pre-training", in **ISMIR 2022**.

2022 Karan Goel, Albert Gu, **Chris Donahue**, and Christopher Ré. "It's raw! Audio generation with state-space models", in **ICML 2022** (**Oral**).

2021 Rodrigo Castellon*, **Chris Donahue***, and Percy Liang. "Codified audio language modeling learns useful representations for music information retrieval", in **ISMIR 2021** (**Best Paper Runner-up, top 3 of 200+ submissions**).

2021 Hao-Wen Dong, **Chris Donahue**, Taylor Berg-Kirkpatrick, and Julian McAuley. "Towards automatic instrumentation by learning to separate parts in symbolic multitrack music", in **ISMIR 2021**.

2021 Mina Lee*, **Chris Donahue***, Robin Jia, Alexander Iyabor, and Percy Liang. "Swords: A benchmark for lexical substitution with improved data coverage and quality", in **NAACL 2021**.

2020 **Chris Donahue**, Mina Lee, and Percy Liang. "Enabling language models to fill in the blanks", in **ACL 2020**.

2019 **Chris Donahue**, Huanru Henry Mao, Yiting Ethan Li, Garrison W. Cottrell, and Julian McAuley. "LakhNES: Improving multi-instrumental music generation with cross-domain pre-training", in **ISMIR 2019**.

2019 Paarth Neekhara*, **Chris Donahue***, Miller Puckette, Shlomo Dubnov, and Julian McAuley. "Expediting TTS synthesis with adversarial vocoding", in **INTERSPEECH 2019**.

2019 **Chris Donahue**, Ian Simon, and Sander Dieleman. "Piano Genie", in **IUI 2019**.

2019 **Chris Donahue**, Julian McAuley, and Miller Puckette. "Adversarial audio synthesis", in **ICLR 2019**.

2019 Jesse Engel, Kumar Krishna Agrawal, Shuo Chen, Ishaan Gulrajani, **Chris Donahue**, and Adam Roberts. "GANSynth: Adversarial neural audio synthesis", in **ICLR 2019**.

2018 **Chris Donahue**, Huanru Henry Mao, and Julian McAuley. "The NES Music Database: A multi-instrumental dataset with expressive performance attributes", in **ISMIR 2018**.

2018 **Chris Donahue**, Zachary C. Lipton, Akshay Balsubramani, and Julian McAuley. "Semantically decomposing the latent spaces of generative adversarial networks", in **ICLR 2018**.

2018 **Chris Donahue**, Bo Li, and Rohit Prabhavalkar. "Exploring speech enhancement with generative adversarial networks for robust speech recognition", in **ICASSP 2018** (**Oral presentation**).

2017 **Chris Donahue**, Zachary C. Lipton, and Julian McAuley. "Dance Dance Convolution", in **ICML 2017**.

Professional experience

2023- Assistant Professor, Computer Science Department, Carnegie Mellon University

2023- Research Scientist (part-time), Google DeepMind and Magenta

2022-2023 Research Scientist, Google DeepMind and Magenta
Built SingSong, a generative AI system which creates music to accompany user singing. Used by major recording artists as part of Google DeepMind's Music AI Tools.

2020- Co-founder and inventor, Beat Sage
Created Beat Sage, a free service which converts music audio into rich interactive game

content. Used millions of times by thousands of daily active users.

2018 INTERN, Google
Built Piano Genie (IUI 2019), an intelligent instrument which allows non-musicians to improvise. Work on the Magenta team with Ian Simon and Sander Dieleman.

2017 INTERN, Google
Explored speech enhancement as a pre-processing procedure for speech recognition (ICASSP 2018). Work with Bo Li and Rohit Prabhavalkar on the acoustic modeling research team.

2016 INTERN, Google
Developed techniques for semantic clustering of URLs on Google's web crawling team.

2015 INTERN, Google
Trained music autotagging models and used them to make predictions on a large music catalogue. Work with Nicolas Boulanger-Lewandowski on the Google Play Music team.

2011-2014 MENTOR, UT Freshman Research Initiative
Mentored for UT's Freshman Research Initiative program in the Computational Intelligence in Game Design lab under Joel Lehman and Risto Mikkulainen.

2011-2014 INTERNSHIPS at UT Applied Research Laboratories, Qualcomm, and two startups
Various software engineering internships mostly involving full stack web development.

Media coverage

Coverage of Google DeepMind work on SingSong, MusicLM, and Music AI Tools.

THE VERGE Watch this screaming, rainbow-clad musician demo Google's AI DJ

PITCHFORK Live From the Uncanny Valley: How AI Tools Are Turning Words Into Music

TECHRADAR I've played with Google's Music FX DJ tool – and it's changed how I think about AI music tools

TECHCRUNCH Google makes its text-to-music AI public

Coverage of Piano Genie, an intelligent instrument which enables amateur improvisation, and **Fruit Genie**, a live performance involving Piano Genie and The Flaming Lips.

BUSINESS INSIDER A Google intern helped build an AI tool inspired by 'Guitar Hero' to let rookies play piano

THE VERGE Google's AI-powered Piano Genie lets anyone improvise perfectly by bashing buttons

ENGADGET Google's Piano Genie lets anyone improvise classical music

EVENING STANDARD Piano Genie: Google's AI programme is like Guitar Hero for the piano world

Stereogum Watch The Flaming Lips Play A Bowl Of Fruit At Google I/O

Coverage of Dance Dance Convolution, a system for converting audio into interactive game content, and **Beat Sage**, a free service based on this work.

MIT Tech Review Machine-Learning Algorithm Watches Dance Dance Revolution, Then Creates Dances of Its Own

The Verge Scientists have taught a neural network to choreograph Dance Dance Revolution levels

Vice This Machine Learned to Choreograph by Watching Dance Dance Revolution

The Register Yet another job menaced by AI! Uh, wait, it says here ... Dance Dance Revolution designers

UploadVR New AI Tool Turns Any Song Into A Custom Beat Saber Map, And It Really Works

Road to VR This 'Beat Saber' Project Uses AI to Generate Custom Beat Maps for Any Song