

Shih-Lun Wu

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EDUCATION

Doctor of Philosophy (Ph.D.) | Massachusetts Institute of Technology 08.2024 ~
in **Electrical Engineering and Computer Science (EECS)**

- Advisor: Dr. Cheng-Zhi Anna Huang
- Research areas: **Music & Audio Generation, Large Model Adaptation, Preference Tuning** [[overview slides](#)]

Master of Science (M.Sc.) | Carnegie Mellon University 08.2022 ~ 05.2024
in **Language Technologies**

- Cumulative QPA – **4.10/4.00**
- Research areas: **Music & Audio Processing, Generative Models, Multimodal Learning**
- Advisors: Dr. Chris Donahue, Dr. Shinji Watanabe

Bachelor of Science (B.Sc.) | National Taiwan University 09.2017 ~ 06.2021
in **Computer Science** (with minor in **Economics**)

- Cumulative GPA – Overall: **4.28/4.30**, Major: **4.28/4.30**, Rank: **1/176**
- Research areas: **Symbolic Music Generation, Formal Verification** [[thesis](#)] [[defense slides](#)]
- Advisors: Dr. Yi-Hsuan Yang, Dr. Chung-Wei Lin

HONORS & RECOGNITION

- **Citations** (Google Scholar, as of 11/20/2025): **850+** total, **550+** first-author | **GitHub stars: 550+**

MIT T.S. Lin Graduate Fellow | MIT Office of Grad Education 09.2025

- Selected through MIT institute-wide competition for full-year (AY25-26) graduate fellowship (**\$110K** award)

Siebel Scholar, Class of 2024 | The Siebel Foundation 09.2023

- Selected as one of 83 graduate students worldwide for outstanding research & leadership (**\$35K** award)

Winner (Research Org), Intern Project Showcase | Adobe Inc. 08.2023

- Secured top prize among **200+** research interns for developing Music ControlNet and related projects

1st Prize, Automated Audio Captioning Challenge | DCASE 2023 06.2023

- Won with advanced encoder architecture & LLM supervision, outperforming runner-up by **4%** (publication [6])

1st Prize (Ssu-Nien Fu's Award), Best Bachelor's Thesis | National Taiwan University 06.2021

- Awarded to **6** out of **3500+** graduating students for exceptional undergrad research

SELECTED PUBLICATIONS

- [12] **Shih-Lun Wu**, Ge Zhu, Juan-Pablo Caceres, Anna Huang, and Nicholas J. Bryan. "Stemphonic: All-at-once Flexible Multi-Stem Music Generation." *Under Review*, 2025. [[pdf](#)] [[demo](#)]
- [11] **Shih-Lun Wu**, Yoon Kim, and Anna Huang. "MIDI-LLM: Adapting Large Language Models for Text-to-MIDI Music Generation." *AI4Music Workshop at Annual Conf. NeurIPS*, 2025. [[pdf](#)] [[code](#)] [[model](#)] [[live demo](#)]
- [10] **Shih-Lun Wu**, Aakash Lahoti, Arjun Desai, Karan Goel, Chris Donahue, and Albert Gu. "Towards Codec-LM Co-design for Neural Codec Language Models." *Student Research Workshop at Conf. Nations of the Americas Chapter of the Assoc. for Computational Linguistics (NAACL-SRW)* 2025. (**Best Paper**) [[pdf](#)] [[code](#)]
- [9] Fang-Duo Tsai, **Shih-Lun Wu**, Weijaw Lee, Sheng-Ping Yang, Bo-Rui Chen, Hao-Chung Cheng, and Yi-Hsuan Yang. "MuseControlLite: Multifunctional Music Generation with Lightweight Conditioners." *International Conference on Machine Learning (ICML)* 2025. [[pdf](#)] [[code](#)] [[colab](#)] [[demo](#)]
- [8] **Shih-Lun Wu**, Chris Donahue, Shinji Watanabe, and Nicholas J. Bryan. "Music ControlNet: Multiple Time-varying Controls for Music Generation." *IEEE/ACM Transactions on Audio, Speech, & Language Processing (TASLP)* 2024. [[pdf](#)] [[tl;dr](#)] [[demo](#)] [[code \(3rd-party\)](#)]
- [7] Fang-Duo Tsai, **Shih-Lun Wu**, Haven Kim, Bo-Yu Chen, Hao-Chung Cheng, and Yi-Hsuan Yang. "Audio Prompt Adapter: Unleashing Music Editing Abilities for Text-to-Music with Lightweight Finetuning." *Int. Society for Music Information Retrieval Conference (ISMIR)* 2024. [[pdf](#)] [[code](#)] [[demo](#)]

- [6] **Shih-Lun Wu**, Xuankai Chang, Gordon Wichern, Jee-weon Jung, François Germain, Jonathan Le Roux, and Shinji Watanabe. "Improving Audio Captioning Models with Fine-grained Audio Features, Text Embedding Supervision, and LLM Mix-up Augmentation." *Int. Conf. on Acoustics, Speech, & Signal Processing (ICASSP)* 2024. (Oral paper) [[pdf](#)] [[code](#)] [[DCASE challenge results](#)]
- [5] **Shih-Lun Wu**, Yi-Hui Chou, and Liangze Li. "Listener Model for the PhotoBook Referential Game with CLIPScores as Implicit Reference Chain." *Annual Meeting of the Assoc. for Computational Linguistics (ACL)* 2023. [[pdf](#)] [[code](#)]
- [4] **Shih-Lun Wu** and Yi-Hsuan Yang. "Compose & Embellish: Well-structured Piano Performance Generation via A Two-Stage Approach." *Int. Conf. on Acoustics, Speech, & Signal Processing (ICASSP)* 2023. (Oral paper) [[pdf](#)] [[code](#)]
- [3] **Shih-Lun Wu** and Yi-Hsuan Yang. "MuseMorphose: Full-song and Fine-grained Music Style Transfer with One Transformer VAE." *IEEE/ACM Transactions on Audio, Speech, & Language Processing (TASLP)* 2023. [[pdf](#)] [[code](#)] [[demo](#)]
- [2] Antoine Liutkus, Ondřej Cífka, **Shih-Lun Wu**, Umut Simsekli, Yi-Hsuan Yang, and Gaël Richard. "Relative Positional Encoding for Transformers with Linear Complexity." *International Conference on Machine Learning (ICML)* 2021. (Long talk, acceptance rate: 3.0%) [[pdf](#)] [[code](#)] [[presentation video](#)] [[demo](#)]
- [1] **Shih-Lun Wu** and Yi-Hsuan Yang. "The Jazz Transformer on the Front Line: Exploring the Shortcomings of AI-Composed Music through Quantitative Measures." *Int. Society for Music Information Retrieval Conference (ISMIR)* 2020. [[pdf](#)] [[code](#)] [[poster](#)] [[presentation video](#)]

RESEARCH WORK EXPERIENCE

Research Scientist/Engineer Intern | Adobe Research 06.2025 ~ 09.2025

Music AI Group. Supervisor: Dr. Nick Bryan

- Invented *Stemphonic*, a diffusion-/flow-based model for 1-pass variable multi-stem music generation (publ. [12])
- Enabled composer-like workflows with accompaniment generation and stem-wise temporal activity controls
- Accelerated multi-stem workflow by ~50% while improving generation quality compared to existing methods

Research Intern | Cartesia AI Inc.

05.2024 ~ 08.2024

Technical Staff. Supervisors: Dr. Albert Gu, Dr. Arjun Desai

- Developed real-time neural audio codecs for state-space model (SSM)-based text-to-speech (TTS) (publ. [10])
- Reduced time-to-first-audio (TTFA) latency by 40% (95ms → 57ms) and improved intelligibility (WER) by 10%

Research Scientist/Engineer Intern | Adobe Research

05.2023 ~ 12.2023

Audio AI Lab. Supervisors: Dr. Nick Bryan, Dr. Gautham Mysore

- Invented *Music ControlNet*, enabling precise melody, dynamics, rhythm controls for diffusion text-to-music models
- Beat Meta's MusicGen by 49% on melody control, using 35x fewer params & 11x less training data (publ. [8])

Research Engineer | Taiwan AI Labs

07.2020 ~ 03.2022

AI Music Team. Supervisor: Dr. Yi-Hsuan Yang

- Bridged Transformers and VAEs for fine-grained style transfer (rhythm & harmony) of long music pieces (publ. [3])
- Collaborated with researchers @ INRIA / Télécom Paris on positional encodings for O(n) Transformers (publ. [2])
- Developed a widely used suite of quantitative metrics to assess the quality of machine-generated music (publ. [1])

EXTRACURRICULARS & SERVICE

Pianist, Violist, & Director of General Affairs

09.2018 ~ 06.2021

Symphony Orchestra, National Taiwan University

- Participated actively in concerts [[playlist](#)] and handled procurement, musical scores, and transportation affairs

Peer Reviewer

- ISMIR ('21~'25, *Outstanding Reviewer* '25), TISMIR ('21, '25), ACM CSUR ('23), ICASSP ('24), TASLP ('24)

Research Mentor

- Yi-Jen Shih ('21~'22, now PhD @ UT Austin), Fang-Duo Tsai ('24~, MS/PhD @ NTU), Matthew Quispe ('25~, MIT UROP)

Teaching Assistant

- Algorithms Design and Analysis (NTU, Fall '19)

SKILLS & QUALIFICATIONS

- Programming Languages & Infrastructure: Python · C/C++ · JavaScript · LaTeX · Linux · Slurm · Anaconda
- Machine Learning Frameworks: PyTorch · Keras · Tensorflow · HuggingFace · PyTorch Lightning
- CS fundamentals courses: DS & Algo, Algo Design & Analysis, Formal Language & Automata, Linear Algebra
- ML/DL-related courses: ML Techniques, Advanced NLP, Speech Recog & Understdg, Tiny & Efficient ML