

Chieh-Hsin (Jesse) Lai

Technical Lead / Staff Research Scientist @ Sony AI |
Visiting Assistant Professor @ National Yang Ming Chiao Tung University, Taiwan

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[Google Scholar \(KDnKGu8AAAAJ\)](#) | [Website](#)

Research Interests

Deep learning, generative modeling, and representation learning for computer vision, audio, and language; AI for sciences and physics-informed machine learning.

Experience

Sony AI, Japan <i>Senior Research Scientist</i> Focus: Deep Generative Modeling	<i>May 2022 – Present</i>
National Yang Ming Chiao Tung University, Taiwan <i>Visiting Assistant Professor</i> Supervising AI for Science research	<i>Aug 2024 – Present</i>
Sony, USA <i>Senior Research Engineer</i> Focus: Deep generative modeling and robustness	<i>Oct 2021 – May 2022</i>
Institute of Mathematics, Academia Sinica, Taiwan <i>Research Assistant</i> Focus: Harmonic Analysis, Differential Equations	<i>Aug 2015 – July 2016</i>
University of Minnesota, USA <i>Teaching Assistant</i> Courses: Linear Algebra, Calculus, Differential Equations	<i>Sep 2016 – May 2021</i>

Education

University of Minnesota – Twin Cities, USA Advisor: Gilad Lerman Focus: ML Theory, Anomaly Detection, Generative Models	<i>Ph.D. in Mathematics, 2016 - 2021</i>
National Tsinghua University, Taiwan Undergraduate Research: Harmonic Analysis and Boltzmann Equation	<i>B.Sc. in Mathematics, 2012 - 2015</i>

Selected Publications

(* denotes equal contribution. Full list available on my [Google Scholar](#).)

Book / Monograph

1. **Lai, Chieh-Hsin**, Yang Song, Dongjun Kim, Yuki Mitsufuji, and Stefano Ermon. The principles of diffusion models. *arXiv preprint arXiv:2510.21890*, 2025

Selected Papers

1. Kevin Rojas, Ye He, **Chieh-Hsin Lai**, Yuta Takida, Yuki Mitsufuji, and Molei Tao. Theory-informed improvements to classifier-free guidance for discrete diffusion models. *arXiv preprint arXiv:2507.08965*, 2025
2. Zheyuan Hu*, **Chieh-Hsin, Lai***, Yuki Mitsufuji, and Stefano Ermon. Cmt: Mid-training for efficient learning of consistency, mean flow, and flow map models. *arXiv preprint arXiv:2509.24526*, 2025
3. Gianluigi Silvestri, Luca Ambrogioni, **Chieh-Hsin Lai**, Yuhta Takida, and Yuki Mitsufuji. VCT: Training consistency models with variational noise coupling. In *Forty-second International Conference on Machine Learning*, 2025

4. Ayano Hiranaka*, Shang-Fu Chen*, **Chieh-Hsin, Lai***, Dongjun Kim, Naoki Murata, Takashi Shibuya, Wei-Hsiang Liao, Shao-Hua Sun, and Yuki Mitsufuji. Hero: Human-feedback efficient reinforcement learning for online diffusion model finetuning. In *ICLR*, 2025
5. Yong-Hyun Park, **Chieh-Hsin, Lai**, Satoshi Hayakawa, Yuhta Takida, and Yuki Mitsufuji. Jump your steps: Optimizing sampling schedule of discrete diffusion models. In *ICLR*, 2024
6. Koichi Saito, Dongjun Kim, Takashi Shibuya, **Chieh-Hsin, Lai**, Zhi Zhong, Yuhta Takida, and Yuki Mitsufuji. Soundctm: Uniting score-based and consistency models for text-to-sound generation. 2025
7. Junyoung Seo, Kazumi Fukuda, Takashi Shibuya, Takuya Narihira, Naoki Murata, Shoukang Hu, **Chieh-Hsin, Lai**, Seungryong Kim, and Yuki Mitsufuji. Genwarp: Single image to novel views with semantic-preserving generative warping. In *NeurIPS*, 2024
8. Dongjun Kim*, **Chieh-Hsin, Lai***, Wei-Hsiang Liao, Yuhta Takida, Naoki Murata, Toshimitsu Uesaka, Yuki Mitsufuji, and Stefano Ermon. Pagoda: Progressive growing of a one-step generator from a low-resolution diffusion teacher. In *NeurIPS*, 2024
9. Dongjun Kim*, **Chieh-Hsin, Lai***, Wei-Hsiang Liao, Naoki Murata, Yuhta Takida, Toshimitsu Uesaka, Yutong He, Yuki Mitsufuji, and Stefano Ermon. Consistency trajectory models: Learning probability flow ode trajectory of diffusion. In *ICLR*, 2024
10. Yutong He, Naoki Murata, **Chieh-Hsin, Lai**, Yuhta Takida, Toshimitsu Uesaka, Dongjun Kim, Wei-Hsiang Liao, Yuki Mitsufuji, J Zico Kolter, Ruslan Salakhutdinov, et al. Manifold preserving guided diffusion. In *ICLR*, 2024
11. **Chieh-Hsin, Lai**, Yuhta Takida, Toshimitsu Uesaka, Naoki Murata, Yuki Mitsufuji, and Stefano Ermon. On the equivalence of consistency-type models: Consistency models, consistent diffusion models, and fokker-planck regularization. In *ICML Workshop*, 2023
12. **Chieh-Hsin, Lai**, Yuhta Takida, Naoki Murata, Toshimitsu Uesaka, Yuki Mitsufuji, and Stefano Ermon. Fp-diffusion: Improving score-based diffusion models by enforcing the underlying score fokker-planck equation. In *ICML*, 2023
13. Naoki Murata, Koichi Saito, **Chieh-Hsin, Lai**, Yuhta Takida, Toshimitsu Uesaka, Yuki Mitsufuji, and Stefano Ermon. Gibbsddrm: A partially collapsed gibbs sampler for solving blind inverse problems with denoising diffusion restoration. In *ICML*, 2023
14. **Chieh-Hsin, Lai***, Dongmian Zou*, and Gilad Lerman. Robust variational autoencoding with wasserstein penalty for novelty detection. In *AISTATS*, 2023
15. Yuhta Takida, Takashi Shibuya, Weihsiang Liao, **Chieh-Hsin, Lai**, Junki Ohmura, Toshimitsu Uesaka, Naoki Murata, Shusuke Takahashi, Toshiyuki Kumakura, and Yuki Mitsufuji. Sq-vae: Variational bayes on discrete representation with self-annealed stochastic quantization. In *ICML*, 2022
16. **Chieh-Hsin, Lai***, Dongmian Zou*, and Gilad Lerman. Robust subspace recovery layer for unsupervised anomaly detection. In *ICLR*, 2020

Patents

- Yuta Takida, Masaaki Imaizumi, Takashi Shibuya, **Chieh-Hsin Lai**, Toshimitsu Uesaka, Naoki Murata, and Yuhki Mitsufuji. Information processing device, information processing method, and non-transitory computer readable storage medium

My (Main) Mentee / Students

- Zheyuan Hu (May 2025 - Present): PhD at National University of Singapore
- Che-Chia Chang (August 2024 - Present): PhD at National Yang Ming Chiao Tung University
- Chen-Yang Dai (August 2024 - Present): PhD at National Yang Ming Chiao Tung University

- Yonghyun Kim (July 2024 - Present): PhD student at University of Pennsylvania
- Gianluigi Silvestri (July 2024 - May 2025): PhD at OnePlanet Research Center
- Yangming Li (June 2024 - Nov. 2024): PhD at University of Cambridge
- Ayano Hiranaka (Dec. 2023 - June 2024): PhD student at University of Southern California
- Shang-Fu Chen (Dec. 2023 - June 2024): PhD student at National Taiwan University
- Dongjun Kim (May 2023 - March 2024): Post-doc at Stanford University

Invited Talks / Events / Academic Services

- Area Chair of *NeurIPS 2025*, *ICLR 2026*, *ICML 2026*
- Reviewer for *NeurIPS*, *ICML*, *ICLR* (since 2022), *IEEE TPAMI*, and *ACM MM 2025*.
- Organizing and Delivering Tutorial on Diffusion Models, *IJCNN 2025*, *ICASSP 2025*, *ISMIR 2024*
- NeurIPS 2025, 2024 Expo Workshop on Generative Models
- Invited talks at *NVIDIA Taiwan*, *National Taiwan University*, *National Yang Ming Chiao Tung University*, *National Tsinghua University*, *Appier Taiwan*, *Duke University*, *University of Minnesota*, *Tokyo University*, *Tohoku University*, *Korea Institute for Advanced Study*, *Sungkyunkwan University*, *Hanyang University* etc.