Charlie (Chao) Li

PhD Candidate, MIT CSAIL · Generative Models · Multimodal Learning · Real-World Sensing

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I build large-scale generative models of images and real-world sensor signals. At Meta (FAIR & MRS) I worked on pixel-space text-to-image generation and unified contrastive–generative pretraining (NeurIPS 2026); at MIT I develop cross-modal generative models that translate between physiological signals (ICML 2026) and contactless sensing models published in *Sleep* and *Nature BME*; before that, I worked on robotic manipulation and camera–radar fusion for 3D perception (IROS, Humanoids). I am interested in generative and multimodal foundation models that model the real world, from visual scenes and physical dynamics to human physiology.

EDUCATION

Massachusetts Institute of Technology · PhD, EECS (AI & ML concentration) · GPA 5.0/5.0 · Expected 2028
Advisor: Prof. Dina Katabi · Doctoral candidate (ABD) since Jun 2026

Massachusetts Institute of Technology · MS, EECS · GPA 5.0/5.0 · Jun 2024
Thesis: *Automatic Sleep Assessment from Nocturnal Breathing and Its Applications for Contactless Monitoring*

Carnegie Mellon University · BS, Electrical & Computer Engineering · GPA 4.0/4.0 · May 2022
College Honors & University Honors · E.M. Williams Award

RESEARCH EXPERIENCE

FAIR, Meta Superintelligence Labs · Menlo Park, CA — Jun 2026 – Present
Research Scientist Intern
- Improving the **aesthetic quality of pixel-space text-to-image generative models** through interventions during pretraining (manuscript under review).

Meta Recommendation Systems (MRS), Meta · Menlo Park, CA — May 2025 – Dec 2025
Research Scientist Intern · Host: Dr. Shlok Kumar Mishra
- Led **DREAM**, a unified autoregressive model that jointly learns visual representations and **text-to-image generation**, integrating diffusion-based generative objectives into contrastive pretraining.
- Outperformed prior contrastive models on both representation learning and text-to-image generation benchmarks; first-author paper at **NeurIPS 2026**.
- Contributed to *Xray-Visual*, scaling vision models on industry-scale data (arXiv 2026).

MIT CSAIL · Cambridge, MA — Aug 2022 – Present
PhD Candidate · Advisor: Prof. Dina Katabi
- Co-led **Physiology as Language** (ICML 2026): a cross-modal generative model that **translates respiration signals into EEG** during sleep.
- Co-first author on contactless sleep assessment from radio waves (*Sleep* 2024; selected for an editorial); contributed to a transformer that detects antidepressant use from one night of sleep (*Nature Biomedical Engineering* 2026).
- Developed methods for fair and accurate prediction across diverse patient demographics and conditions; designed gait- and sleep-based digital biomarkers for Rett syndrome and Parkinson's disease.
- Building a real-time closed-loop ML system that enhances sleep via predictive modeling and auditory stimulation.

Electrical & Computer Engineering, CMU · Pittsburgh, PA — Aug 2021 – May 2022
Research Assistant · Advisor: Prof. Swarun Kumar
- Developed **Metamoran**, a camera–mmWave radar fusion system for high-resolution, long-range **depth imaging**; classified objects in high-clutter scenes more accurately than Detectron segmentation (IROS 2022).
- Open-sourced a multimodal dataset of depth ground truth, lidar, camera, and raw I/Q radar data.

Robotics Institute, CMU · Pittsburgh, PA — Oct 2019 – Jul 2022
Research Assistant · Advisor: Prof. Nancy Pollard
- Developed **SoftTouch**, a sensor-placement framework for dexterous manipulation with non-anthropomorphic soft hands (first author, Humanoids 2022).
- Created the first quantitative–qualitative benchmark for in-hand translation and rotation dexterity of robot hands (Humanoids 2020, Best Interactive Paper finalist).
- Built the CMU Foam Hand III, a low-DOF, fully soft dexterous hand, with a multisensory contact system to classify manipulation failures.

Institute for Infocomm Research (I2R), A*STAR · Singapore Jun 2020 – Jul 2021

Deep Learning Research Intern · Advisor: Dr. Foo Chuan Sheng

- Developed **NoTeacher**, a semi-supervised method reaching **90–95% of fully supervised AUROC with 5–15% of labels** on class-imbalanced NIH Chest X-Ray and RSNA Brain data (*Medical Image Analysis* 2021).

Earlier: Embedded Systems Intern, NUS (2020); Magnetic Storage Research Intern, IMRE A*STAR (2019).

SELECTED PUBLICATIONS

* equal contribution. Full list on Google Scholar.

- **NeurIPS 2026** · **Chao Li**, T. Li, S. V. Nuthalapati, H.-Y. Chen, S. N. Shukla, J. Cheng, Y. Yang, J. Xiao, X. Fan, A. Singh, D. Katabi, S. K. Mishra. **Unifying Contrastive and Generative Objectives for Visual Understanding and Text-to-Image Generation (DREAM).**
- **ICML 2026** · K. Zha*, **Chao Li***, H. He*, P. Cao, T. Li, A. Mirzazadeh, E. Zhang, J. W. Lee, Y. Kim, D. Katabi. **Physiology as Language: Translating Respiration to EEG during Sleep.**
- **arXiv 2026** · S. Mishra, T.-Y. Lin, L. Wang, …, **Chao Li**, …, X. Fan, A. Singh. **Xray-Visual Models: Scaling Vision Models on Industry Scale Data.** arXiv:2602.16918.
- **Nature BME 2026** · A. Mirzazadeh, S. Cadavid, K. Zha, **Chao Li**, …, D. Katabi. **Transformer Model Detects Antidepressant Use From a Single Night of Sleep.** *Nature Biomedical Engineering*, accepted.
- **Sleep 2024** · H. He*, **Chao Li***, W. Ganglberger, K. Gallagher, R. Hristov, M. Ouroutzoglou, H. Sun, J. Sun, M. B. Westover, D. Katabi. **What Radio Waves Tell Us about Sleep!** *Sleep* zsae187. Selected for an editorial.
- **IROS 2022** · A. Prabhakara, D. Zhang, **Chao Li**, S. Munir, A. C. Sankaranarayanan, A. Rowe, S. Kumar. **Exploring mmWave Radar and Camera Fusion for High-Resolution and Long-Range Depth Imaging.**
- **Humanoids 2022** · **Chao Li**, N. Pollard. **SoftTouch: A Sensor-Placement Framework for Soft Robotic Hands.**
- **MedIA 2021** · B. Unnikrishnan, C. Nguyen, S. Balaram, **Chao Li**, C. S. Foo, P. Krishnaswamy. **Semi-supervised Classification of Radiology Images with NoTeacher.** *Medical Image Analysis* 73.
- **Humanoids 2020** · R. Coulson, **Chao Li**, C. Majidi, N. S. Pollard. **The Elliott and Connolly Benchmark: Evaluating the In-Hand Dexterity of Robot Hands.** Best Interactive Paper finalist.

Also: WiOpt 2024 (AoI fairness in wireless networks); *Advanced Functional Materials* 2025 (zero-field skyrmions); Rett syndrome biomarkers (in submission; Rett Syndrome Scientific Meeting 2025 abstract).

RESEARCH AREAS

Generative modeling: Text-to-image diffusion (pixel space), autoregressive generation, unified understanding + generation, cross-modal sequence translation

Representation learning: Contrastive pretraining, vision transformers, semi-supervised learning, large-scale vision pretraining

Real-world signals: Multimodal sensor fusion (camera, mmWave radar, lidar, RF), physiological time-series modeling, dexterous robotic manipulation

HONORS, TALKS & SERVICE

MIT HEALS Graduate Fellow (2026 – 2027)
Wellcome Trust Fellow, MIT Jameel Clinic (2023)
E.M. Williams Award & **Honors in Research**, CMU ECE / College of Engineering (2022)
SURF & **SURG** research grants; **Highest Scorer** (Engineering), Sigma Xi Poster Competition, CMU (2021)
Guest Lecture, UCF CAP 6938 (AI Knowledge Systems), on DREAM (Oct 2026)
Poster, ICML 2026, Seoul: “Physiology as Language” (Jul 2026)
President, Eta Kappa Nu (HKN) Sigma Chapter, CMU ECE Honor Society (2021 – 2022)