Jiahe Chen

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PROFILE

Ph.D. graduate in Robotics and Artificial Intelligence (AI) with a strong foundation in machine learning, multi-robot systems, and data-driven algorithm design. My research focused on developing scalable, fault-tolerant algorithms that enable robotic swarms to perform complex construction tasks in unpredictable environments. I bring hands-on experience in Classical ML (regression, trees, SVM, KNN, PCA), Deep Learning (CNN, RNN, LSTM, Transformers), Computer Vision (image segmentation, object detection and recognition, neural style transfer), Reinforcement Learning, and Generative AI (LLMs, prompt engineering, fine-tuning, RLHF, agentic AI). With multiple first-author publications in top robotics venues and a strong background in simulation, system design, and communication through teaching and collaboration, I am well-prepared for ML engineer or applied research roles in industry. **U.S. work authorized—no H-1B sponsorship required.**

TECHNICAL SKILLS

Programming Languages: Python, Bash, PowerShell
Libraries/Frameworks: Keras, TensorFlow, PyTorch, HuggingFace Transformers, Scikit-learn, OpenAI Gymnasium, Stable Baselines3, Pandas, NumPy, SciPy
Tools: AWS, Google Cloud, Jupyter Notebook, Git, ROS, Linux, MATLAB
Other: SQL, Data Visualization (Seaborn, Matplotlib, Pillow), Optimization (Optuna, CVXOPT)

EDUCATION

Cornell University   *Sep 2019 - Dec 2024*
- **Degree:** Ph.D. in Electrical Engineering, GPA 3.82/4.0
- **Thesis:** Error-Tolerant Decentralized Robotic Construction
- **Qualifying Exam:** Random Processes and Probability, Linear Algebra, Signals, and Systems
- **Committee:** Kirstin Petersen (Advisor), Nils Napp, Francesca Parise

University of Pennsylvania   *Sep 2017 - May 2019*
- **Degree:** M.S. in Electrical Engineering, GPA 3.97/4.0

Queen's University at Kingston   *Sep 2013 - May 2017*
- **Degree:** B.S. in Engineering Physics, Minor in Electrical Engineering, First Class Honours

RELEVANT COURSEWORK

CS 5780 ML for Intelligent Systems, ORIE 5741 Learning with Big Messy Data, CS 6780 Advanced ML, CS 5789 Introduction to RL, CS 6784 ML in Feedback Systems, ECE 4770 Foundations of Robotics

CERTIFICATES

Generative AI with Large Language Models – AWS
The Complete Agentic AI Engineering Course – Udemy
Deep Learning Specialization – DeepLearning.AI
Databases and SQL for Data Science with Python – IBM

SELECTED PUBLICATIONS

See Google Scholar for complete publications [Link]

1. **Jiahe Chen** and Kirstin Petersen, *Distributed Coordination of Simple Earthmover Robots for Terrain Modification*, under review in Autonomous Robots (AURO), 2025.
2. **Jiahe Chen** and Kirstin Petersen, *2D Construction Planning for Swarms of Simple Earthmover Robots*, International Symposium on Distributed Autonomous Robotic Systems (DARS), 2024.
3. **Jiahe Chen** and Kirstin Petersen, *Decay-Based Error Correction in Collective Robotic Construction*, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2022.

4. **Jiahe Chen**, Yifang Liu, Adam Pacheck, Hadas Kress-Gazit, Nils Napp, and Kirstin Petersen, *Errors in Collective Robotic Construction*, International Symposium on Distributed Autonomous Robotic Systems (DARS), 2021.

PROFESSIONAL SERVICES

Reviewer for RA-L and ICRA. **Teaching Assistant** for ECE 4160 Fast Robots (Cornell), ECE 2300 Digital Logic & Computer Organization (Cornell), ESE 568 Mixed Signal Design and Modeling (UPenn), ESE 570 Digital Integrated Circuits and VLSI- Fundamentals (UPenn)

AWARDS

Jacobs Fellowship (Cornell)	*Aug 2020 & Aug 2021*
Merit-Based Fellowship (Cornell)	*Aug 2019*
Outstanding Academic Award Honorable Mention (UPenn)	*May 2019*

PROJECTS

Collective Robotic Terrain Transformation   *Apr 2020 - Present*
Advised by Prof. Kirstin Petersen, Cornell University

- Designed a scalable, fault-tolerant algorithm for coordinating robotic swarms to construct complex terrains under motion noise and physical constraints; currently benchmarking against RL-based policies. [Link]
- Designed and validated a decentralized error correction algorithm that significantly boosts the system's reliability using time complexity analysis and statistical hypothesis testing. [Link]

Learning to Construct with Granules [Link]   *Mar 2023 - Dec 2023*
Advised by Prof. Kirstin Petersen, Cornell University

- Built a custom, highly efficient Python simulator to model robotic construction with granular materials.
- Developed reinforcement learning environments in **OpenAI Gymnasium**; trained agents using **PPO**, **A2C**, and **TRPO** algorithms. Deployed training on **Google Cloud** using multiprocessing; tuned hyperparameters with Optuna and applied reward shaping to accelerate training.

Predictive Modeling for Used Car Prices [GitHub]   *Sep 2021 - Dec 2021*
ORIE 5741 Learning with Big Messy Data, Cornell University

- Performed data curation and feature engineering on a massive real-world trading dataset (420k+ records, 25 features). Built and evaluated supervised ML models to accurately predict used car prices.

Malware Detection   *Apr 2025 - May 2025*
CS 6035 Introduction to Information Security, Georgia Institute of Technology

- Built supervised ML models for malware detection using real-world network traffic datasets (ClaMP, UNSW-NB15); performed data preprocessing, feature engineering, and hyperparameter tuning, achieving a **ROC AUC** score of 0.9982 for high-accuracy intrusion classification.

Computer Vision and Natural Language Processing   *May 2025 - Present*
Deep Learning Specialization, Dr. Andrew Ng

- Built and trained deep **CNNs**, including **ResNets** and **MobileNet**, for image classification. Implemented object detection with **YOLO**, and image segmentation using **U-Net**. Developed a face recognition and verification system and a neural style transfer system using **CNN**.
- Built **LSTM**-based models for music generation and sentiment analysis. Built a machine translator with **BiLSTM** and attention. Built a real-time trigger word detection system with **CNN** and **GRU**. Constructed an encoder-decoder Transformer from scratch in **TensorFlow** and applied pretrained Transformers for named-entity recognition and extractive question answering.

Generative AI with LLM   *May 2025 - Present*
GenAI with LLM, AWS + The Complete Agentic AI Engineering, Udemy

- Applied prompt engineering techniques and fine-tuned **FLAN-T5** models for dialogue summarization using **Hugging Face Transformer**; implemented full and parameter-efficient fine-tuning (**PEFT**), evaluated results with **ROUGE** metrics, and demonstrated improved generative performance. Additionally, used Reinforcement Learning from Human Feedback (**RLHF**) with **PPO** to detoxify **FLAN-T5** outputs.