Jiahe Huang

✉ chloehjh@umich.edu | 🌐 jhhuang.tech | G Jiahe Huang | ○ jhhuangchloe | in jhhuangchloe

---

Interests

My current research interests lie in computer vision and artificial intelligence for science, particularly in the relationship between the physical world and robotic computing. My focus areas include solving scientific problems, such as partial differential equations (PDEs), using neural methods for real-world applications, and augmenting data with 3D-aware techniques. I am eager to continue exploring new areas and advancing these fields.

Education

University of Michigan, Ann Arbor   Aug. 2023 – Apr. 2025 (Expected)
B.S.E. in Data Science, Dual Degree Program   Michigan, USA

- GPA 4.0/4.0
- A+ Courses: Computer Vision, Data Mining, Intro Computer Org, Comp Sci Pragmatics

Shanghai Jiao Tong University   Sept. 2021 – Aug. 2025 (Expected)
B.Eng in Electrical and Computer Engineering   Shanghai, China

- GPA 3.9/4.0 (Top 3%)
- Admitted to the UM-SJTU JI Honors Research Program
- A+ Courses: Probability Methods in Eng., Linear Algebra, Discrete Mathematics, and 10+ others

---

Publications

[1] "DiffusionPDE: Generative PDE-Solving Under Partial Observation"   *In Submission*
Jiahe Huang, Guandao Yang, Zichen Wang, Jeong Joon Park   *AI for Science Workshop @ ICML 2024* **(Oral)**

[2] "SpaceMeta: Global-Scale Massive Multi-User Virtual Interaction over LEO Satellite Constellations"   🔗
Jiahe Huang, Yifei Zhu   *IEEE Satellite 2023*

Research Experience

Neural Solver for Partial Differential Equations under Partial Observation   Nov. 2023 – May. 2024
Advisor: Jeong Joon Park   University of Michigan

- **Objectives:** Develop a neural network to simulate partial differential equations (PDEs) using potentially explainable partial data observations. The model should handle multiple instances and be capable of solving both forward and inverse problems simultaneously.
- **Contributions:** Learned AI for Science works like Physics Informed Deep Learning (PINN), Fourier Neural Operator (FNO) and applied the models on Stochastic PDEs to find their limitations; Trained diffusion models on the joint distribution of coefficient (or initial state) and solution (or final state); Applied diffusion sampling to solve the problem guided by both observation and PDE function.

Multi-User Virtual Interaction over LEO Constellations   Dec. 2022 – Aug. 2023
Advisor: Yifei Zhu   Shanghai Jiao Tong University

- **Objectives:** Select servers based on LEO satellite constellations to lower the end-to-end latency and achieve high synchronization among global-scale users in real-time interactions.
- **Contributions:** Simulated trajectories of LEO satellites; Reproduced SOTA architecture; Designed LEO-satellite-based relay-selection algorithms for multiuser virtual interaction situations; Applied Reinforcement Learning models like Q-Learning to optimize the selection algorithm.

Real-Time Object Detection in Traffic   Apr. 2023 – May. 2023
Advisor: Shuiguang Deng   Zhejiang University

- **Objectives:** Classify humans and vehicles in traffic.
- **Contributions:** Learned the usage of computer vision models like YOLOv2 and trained the dataset.

Selected Projects

VisionRefine: High-Resolution Image Recovery   Mar. 2024 – Apr. 2024
Final project of Computer Vision (EECS 442)   🔗 ○

- **Objectives:** Recover and enhance image resolution using deep convolutional networks, diffusion models, and transformers; Compare their outputs to understand each method's limitations.
- **Contributions:** Trained the diffusion model using EDM architecture; Guided the diffusion modal with alternative form of diffusion posterior sampling to recover the resolution.

Neural Field Reconstruction Nov. 2023 – Nov. 2023

Application of the NeRF Architecture to 2D Images

- **Objectives:** Reconstruct a given image using neural network; Enforce symmetric image output.
- **Contributions:** Trained a neural network model using positional encoding with Fourier features based on NeRF architecture; Applied other methods like CNN and Transformer for comparison.

Student Performance Prediction Nov. 2023 – Dec. 2023

Kaggle competition of Data Mining and Statistical Learning (STATS 415)

- **Objectives:** Understand how the input variables (self-evaluation, teacher-evaluation, etc.) relate to the response (student performance); Train a model to predict performance to a secret held-out test-set.
- **Contributions:** Used one-hot encoding and regularization to preprocess data; Designed deep learning architecture and trained an MLP neural network model to achieve high accuracy for the testing set.

Diabetes Prediction Nov. 2023 – Dec. 2023

Open-ended final project of Data Mining and Statistical Learning (STATS 415)

- **Objectives:** Evaluate the probability of a person having diabetes based on his living habits; Predict the probability of a person having diabetes based on his medical examination results.
- **Contributions:** Prepocessed data; Designed different machine learning models including decision trees, LDA, and QDA to predict the probability; Compared the models and obtained the most suitable one.

Selected Honors & Awards

WN. 2024	Dean's Honor List	University of Michigan
FA. 2023	Dean's Honor List	University of Michigan
Jul. 2023	Dual Degree Program (The Cheng Family) Scholarship	Shanghai Jiao Tong University
Apr. 2023	UM-SJTU JI Student Development Scholarship	Shanghai Jiao Tong University
Nov. 2022	SJTU Undergraduate Excellent Scholarship (Class B)	Shanghai Jiao Tong University
Oct. 2022	SJTU Merit Student Award	Shanghai Jiao Tong University

Skills

Programming Languages: C++, C, Python, R, MATLAB, JavaScript, HTML, LaTeX, etc.

Frameworks: PyTorch, TensorFlow, Networkx, OpenCV, OpenGL, etc.

Deep Learning: Diffusion Model, GAN, Transformer, CNN, RNN, MLP, etc.

Teaching Experience

Shanghai Jiao Tong University Shanghai, China

SU. 2024	**Data Structures and Algorithms (ECE2810J)**, Teaching Assistant
SU. 2023	**Physics I (PHYS1500J)**, Teaching Assistant
FA. 2022	**Honors Calculus II (MATH1560J)**, Teaching Assistant

Seminar Talks

DiffusionPDE: Generative PDE-Solving Under Partial Observation Jun. 2024

Computer Vision Seminar, University of Michigan Host: Sangwoo Mo

Selected Community Services

Student Advisor Mar. 2023 – Present

UM-SJTU Joint Institute Advising Center Shanghai, China

- Administrator of UM-SJTU JI Dual Degree program wiki.
- Host of 2023 Dual Degree Program Workshop, 2024 Research Workshop.
- On duty and managed Piazza to help students schedule their career plans.

Class Advisor Sept. 2022 – Aug. 2023

UM-SJTU Joint Institute Shanghai, China

- Helped students organize class activities and provided academic advice.