

GUOZHENG HUANG

School of Biomedical Engineering
Tsinghua Laboratory of Brain and Intelligence
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EDUCATION

- PhD candidate in Biomedical Engineering, Tsinghua University** September 2020 – Present
- Supervised by professor Xiaoqin Wang and professor Sen Song
 - Major class: brain and cognitive sciences (4.0/4.0), artificial intelligence(4.0/4.0), machine learning(4.0/4.0)
- Bachelor of Science in Pure and Applied Mathematics, Tsinghua University** September 2016 – June 2020
- Major class: mathematical analysis(4.0/4.0), computational complexity(4.0/4.0), network optimization(4.0/4.0)
 - Finished all courses in statistics, also completed computer science minor lessons with 4.0 in 10+ courses

RESEARCH EXPERIENCE

PhD thesis: Comparison of Meta-Learning Process of Humans and Marmosets in Parallel Dynamic Mazes

Developed a new paradigm to compare the meta-learning behaviors of humans and marmosets directly. Utilized reinforcement learning models to simulate subjects' learning process, achieving mean similarity of 0.965.

Experiment 1: Marmoset dynamic maze

- Established a dynamic maze with logical structures to measure the meta-learning behaviors of marmosets.

Experiment 2: Human virtual maze

- Scaled the physical maze of marmosets to human-appropriate size in Unity project compatible with PC, VR device and online experiment platform to take screen experiments on humans.

Experiment 3: MRI recording in subjects (in progress)

- Recording structural MRI of the marmoset brain under anesthesia after the physical maze experiments.
Recording functional MRI of the human brain during virtual maze experiments.

- Marmoset Music Preference** Tsinghua Non-human Primate Research Center
Team Leader May 2024 – Present
- Shifted the maze paradigm to test marmosets' sound preference without training or food/water constraints. Tested preference of marmosets in control and music development group for quiet/loud, consonant/dissonant and other sound materials in different conditions. Team members consist of PhD and undergraduate students from mathematical, biology and psychology department of Tsinghua and Central Conservatory of Music.

- Algonauts 2025 Challenge** Tsinghua University
Team Leader January 2025 – July 2025
- Predicted fMRI data while subjects were watching real movies using multimodal methods combining SVM, CNN, LLM and other machine learning methods. Reached average accuracy of 0.20581 in model building phase and average accuracy of 0.09208 in model selection phase. Got top 20 in 265 teams.

- Music Emotion Perception Model** Tsinghua Laboratory of Brain and Intelligence
Cooperation with Yifan Xu September 2021 – January 2022
- Used GRU model to categorize the EEG data while subjects were hearing music of positive or negative emotion. Got mean accuracy of 0.65132 to predict the emotion when subjects came across a new song.

- Undergraduate thesis: Generative network in hyperbolic space and inverse problems** Tsinghua University
Supervised by Professor Carlo Vittorio Cannistraci September 2019 – August 2020
- Summarized the methods to establish generative network models in hyperbolic space according to the real network. Optimized current nPSO model, modified new method: minimum curvilinear embedding and compared the complexity of them with former models.

- Handling Large-scale Environmental Health Data Sets** Harvard University
Remote Research with Professor Junwei Lu January 2019 – June 2019
- Discussed the existing methods to handle environmental health data sets and did some simulations. Used MCMC and Bayesian analysis to model the multi-layer data.

PROJECT EXPERIENCE

Neural Data Science Summer School

Cold Spring Harbor

Student

July 7th 2025 – July 21st 2025

- Admitted to Neural Data Science summer school of Cold Spring Harbor organized by professor Mark Reimers, Pascal Wallisch, Jennifer Sun and Hadas Benisty. Learned methods to model neural data from PCA, CCA to CNN, RNN and other machine learning methods. Analyzed real neural data from open datasets utilizing them.

Computational and Theoretical Neuroscience Summer School

Tsinghua Laboratory of Brain and Intelligence

Teaching assistant

August 14th 2022 – August 21st 2022

- Helped professor Xiaoqin Wang to organize the summer school with professor Quan Wen, Sen Song, Louis Tao, Stella Christie, Rava Azeredo da Silveira, et al. Guided homework and discussion for around 30 students.

The 2018 Yau math camp

Yau Mathematical Sciences Center

Teaching assistant

August 12th 2018 – August 24th 2018

- Helped professors from the American National Team (Po-Shen Loh, Carnegie Mellon University et al) accomplish the teaching tasks in Yau math camp about Algebra, Geometry, Combinatorics and Number Theory.

PUBLICATION LIST

[1] **Guozheng Huang**, Weijin Luan, Xiaoqin Wang, *A Cross-Species Paradigm for Meta-Learning: Comparative Insights from Humans and Marmoset Monkeys*, The Society for Neuroscience, 2025. (To be submitted)

[2] **Guozheng Huang**, Weijin Luan, Shengjie Yang, Donghang Gao, Kejuan Xu, Juan Huang, Xiaoqin Wang, *Marmoset Shows Preference for Consonance in a Maze Experiment*, Simian Collective, Pittsburgh, September 5-7, 2024. (In preparation)

[3] Chaoqun Cheng, Zijian Huang, Ruiming Zhang, **Guozheng Huang**, Han Wang, Likai Tang, Xiaoqin Wang(2025). *A real-time, multi-subject three-dimensional pose tracking system for the behavioral analysis of non-human primates*, Cell Reports Methods, 100986.

ADDITIONAL INFORMATION

Awards

- Future Researchers Scholars of Tsinghua University (2020-2025)
- Gold medal of Chinese Mathematical Olympiad (2015)
- Comprehensive Excellence Award of Tsinghua University (2025)
- Teaching Assistant Excellence Award of Tsinghua University (2023)
- Social Work Excellence Scholarship of Tsinghua University (2019)

Language

- Tofel: 104, GRE: V156 + Q170 + AW3.5

Coding

- Python, Matlab, R, C++, Java
- Unity, VR

Interests

- Triathlon, frisbee, hiking, writing