Jiazhen Hong

Piscataway, NJ 08854
Tel: 201-985-4402
Website: https://jiazhen-hong.github.io/jiazhenhong/
LinkedIn: http://www.linkedin.com/in/jiazhen-hong66
E-mail: jh1590@rutgers.edu

PROFILE

Expert in **machine learning**, **electroencephalography (EEG)**, **neural time-series modeling**, and **large language models (LLMs)**

- Lead, develop, implement, and publish research projects in **brain & time-series signals**, **imaging**, and **machine learning**
- Build real-time brain-computer interfaces (**BCI**) system (e.g. Mind speller) with **hardware-software synchronization**
- Execute large-scale data processing and model training on **CUDA-based GPU servers (e.g. Google Cloud Platform, Axon)**
- Advanced skills in **Signal Processing** (Image, Bio-signal), **Self-supervised Learning**, **Coding** and **GitHub collaboration**

EDUCATION

Rutgers University, New Brunswick, NJ, USA *Ph.D. candidate* *01/2020 – Present*
Computer Engineering, G.P.A.: 3.9/4.0
Thesis Topic: Artificial Intelligence for Time-Series Signal Processing in Brain-Computer Interfaces (BCIs)

Stevens Institute of Technology, Hoboken, NJ, USA *M.Sc.* *09/2017 – 01/2019*
Electrical Engineering, G.P.A.: 3.9/4.0

Jimei & Chung Yuan Christian University, China *B.Sc. (Double Degree)* *09/2012 – 06/2016*
Communication Engineering & Business, G.P.A.: 3.5/4.0 & 4.0/4.0

TECHNICAL SKILLS

- Python (**PyTorch Lightning**, TensorFlow, scikit-learn, Qt5, NumPy, Pandas)
- MATLAB® (**EEGLAB**, Digital Signal Processing toolbox, object-oriented programming)
- Hardware (Brain Products, actiCAP, Raspberry Pi, Arduino, VEX-brain)
- Deep learning models (Mamba, Swim Transformer, TimSformer, ResNet, Encoder-Decoder, CNN, LSTM)
- Tools (Git version control, GitHub, **Google Cloud Platform**, Latex, **Hugging Face**, VSCode, Anaconda, SSH)

WORKING EXPERIENCE

EMOTIV, San Francisco, CA, USA *Research Scientist Intern* (*Full-time*) *06/2025 – 09/2025*
- Published three first-author papers accepted at **NeurIPS** 2025, **IEEE ICDM** 2025, and **KDD** 2025.
- Developed and trained large-scale EEG foundation models using distributed pipelines on **Google Cloud Platform (GCP)**.
- Designed and patented a self-supervised, **Mamba-based EEG foundation model** for EMOTIV.

EMOTIV, San Francisco, CA, USA *Research Scientist Intern (Part-time)* *10/2024 – 02/2025*
- Conducted research on Mamba-based self-supervised learning.
- Developed scalable, multi-subject EEG data processing pipelines to support self-supervised model training.

Integrated Systems & Neuroimaging Lab, Rutgers University *Teaching/Research Assistant* *01/2020 – Present*

Research
- Developed ChatBCI, a complete real-time mind-controlled **brain-computer interface (BCI)** speller system enhanced with **LLMs**
- Led the integration of a **LoRA-Llama** model into the BCI project, incorporating **generative AI**
- Led and designed an **NSF-funded** temporal perception project involving **neural signal processing** and **ML**
- Developed topographic **image representation** for video-like electroencephalography (EEG) signals using **TimeSformer**
- Created a channel-selection method to improve the efficiency of **time-series** BCI processing for motor-imagery tasks

Teaching
- Digital Signal Processing.
- Linear Systems and Signals.

Department of Electrical and Computer Engineering, Rutgers University *Faculty Lecturer* *05/2022 – 07/2022*
- As a faculty lecturer, responsible for teaching a class of 30-40 students in Linear Systems and Signals.

PROFESSIONAL SERVICES & ACTIVITIES

Reviewer

- Conference Neural Information Processing Systems (NeurIPS) *2025*
- Journal IEEE Transactions on Biomedical Engineering (TBME) *2025*
- International Conference on Artificial Intelligence and Statistics (AISTATS) *2023 – 2024*
- IEEE International Symposium on Biomedical Imaging (ISBI) *2025*
- IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) *2024*

Technical Program Committee

- IEEE International Symposium on Biomedical Imaging (ISBI) *2026*

University Services

- Teaching Printer Circuit Board Assembly and soldering for Rutgers ECE department *2024*
- Faculty Lecturer for class Linear Systems and Signals *2022*

PUBLICATIONS

Journal (Accepted/Published)

- **J. Hong**, W. Qian, Y. Chen, and Y. Zhang, "A geometric approach to *k*-means," IEEE Transactions on Knowledge and Data Engineering (**TKDE**), accepted, 2025
- **J. Hong**, W. Wang, and L. Najafizadeh, "ChatBCI, a P300 speller BCI with context-driven word prediction leveraging large language models, from concept to evaluation," **Scientific Reports** (**Nature Portfolio**), accepted, 2025.

Conference (Accepted/Published)

- A. Subramanian, S. Mai, **J. Hong**, and L. Najafizadeh, "Neural Dynamics of Time Perception Under Acute Pain: An Auditory Temporal Bisection Study," 23rd IEEE International Symposium on Biomedical Imaging (**ISBI** 2026)
- **J. Hong,** G. Mackellar, S. Ghane, "SpellerSSL: **Self-Supervised Learning** with P300 Aggregation for Speller BCIs" is accepted by the 39 Annual Conference on Data on the Brain & Mind Workshop @ Neural Information Processing Systems (**NeurIPS** 2025)
- **J. Hong,** G. Mackellar, S. Ghane, "An Efficient Self-Supervised Framework for Long-Sequence EEG Modeling" is accpeted by IEEE International Conference on AI for Time Series Workshop @ Data Mining (**ICDM** 2025)
- **J. Hong**, and L. Najafizadeh, "Enhancing Typing Speed in **LLM-based** P300 Speller BCIs Using A New Data-Driven Dynamic Stopping Strategy," is accpeted by IEEE EMBS 12th Annual International Conference on Neural Engineering (**NER** 2025)
- S. Mai, **J. Hong**, T. Shors, and L. Najafizadeh, "Longest Sustained Cortical Activity Duration in Temporal Bisection Task Aligns with Geometric Mean for Log-Spaced Probes," is accpeted by IEEE EMBS 12th Annual International Conference on Neural Engineering (**NER** 2025)
- **J. Hong**, P. Rao, W. Wang, S. Chen, and L. Najafizadeh, "ChatBCI4ALS: A High-Performance, **LLM-Driven** Intent-Based BCI Communication System for Individuals with ALS," 47th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (**EMBC** 2025)
- **J. Hong** and L. Najafizadeh, "TopoEEG: a **TimeSformer**-Based Topographic **Image Representation** Method for Early Single-Trial Detection of P300," 22nd IEEE International Symposium on Biomedical Imaging (**ISBI** 2025)
- **J. Hong**, L. Najafizadeh, "P3T: A **Transformer** Model for Enhancing Character Recognition Rates in P300 Speller Systems," 58th Annual Asilomar Conference on Signals, Systems, and Computers (**Asilomar** 2024)
- **J. Hong**, F. Shamsi, and L. Najafizadeh, "A **Deep Learning** Framework Based on Dynamic Channel Selection for Early Classification of Left and Right Hand Motor Imagery Tasks," Proc. of 44th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (**EMBC** 2022)

(Under review)

- **J. Hong,** G. Mackellar, S. Ghane, "SAMBA: Toward a Long-Context EEG Foundation Model via Spatial Embedding and Differential Mamba"
- **J. Hong**, P. Rao, W. Wang, and L. Najafizadeh, "Spelling the Unsaid: A Semantic P300 Speller with LoRA-Tuned LLM for Intent-Based Communication}," IEEE IEEE Transactions on Biomedical Engineering (**TBME** 2026), invited submission, 2025
- Ashwini Subramanian, Siwei Mai, **J. Hong** and L. Najafizadeh, "Neural Dynamics of Time Perception Under Acute Pain: An Auditory Temporal Bisection Study," 23nd IEEE International Symposium on Biomedical Imaging (**ISBI** 2026)

(In Preparation)

- **J. Hong**, W. Wang, S. Haghani, and L. Najafizadeh, "Subject-specific Channel Selection Based on Davies- Bouldin Index for EEG **Motor Imagery Classification**," in preparation (Journal)
- **J. Hong**, and L. Najafizadeh, "A Geometric Spatio-Learnable EEG **Foundation Model** Across Visual and Auditory Modalities in the Temporal Bisection Task" in preparation (Journal)

AWARDS

- ECE Development and Research Excellence Award (2025-2026 cycle), Rutgers University *01/2026*
- Research & Conference Travel Award, funded by the School of Graduate Studies (SGS), Rutgers University *03/2025*
- Trainee Travel Award of 2024-2025 Rutgers Brain Health Institute, Cognitive and Sensory Neuroscience Focus Area *02/2025*
- Travel Award of 2024 IEEE Brain Discovery & Neurotechnology Workshop *09/2024*
- ECE Best Teaching Assistant Award for Fall 2023, Rutgers University *05/2024*