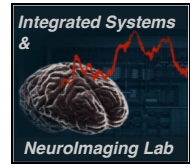


# Jiazhen Hong

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## PROFILE

- 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, distributed data processing and model training/testing on **CUDA-based GPU servers**.
- Advanced skills in **Signal Processing** (Image, Bio-signal), **Self-supervised Learning**, **Coding** and **GitHub collaboration**.

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## 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, G.P.A.: 3.5/4.0

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## TECHNICAL SKILLS

- Python (PyTorch, 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, Latex, Overleaf, VSCode, Anaconda, SSH, Django)

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## WORKING EXPERIENCE

- EMOTIV, San Francisco, CA, USA** *Research Intern* 10/2024 – Present
  - Built an encoder-decoder **Self-supervised Learning** framework for electroencephalography (**EEG**) signal reconstruction.
  - Developed a **Mamba-based foundation model** for long sequence time-series signals modeling.
- Integrated Systems & Neuroimaging Lab, Rutgers University** *Teaching/Research Assistant* 01/2020 – Present  
*Research*
  - As principal investigator to lead ChatBCI project, an **LLM**-Driven mind-controlled speller system for BCI.
  - Designed a fast P300 speller BCI incorporating **Generative AI**-based word prediction.
  - Built a **Transformer**-based model to enhance character recognition rates in the P300 speller system.
  - Developed topographic image representation for video-like EEG signals using **TimeSformer**.
  - Responsible for Integrated Systems & Neuroimaging EEG data collection and for exploring the Time Bisection Task project.
  - Created a channel selection method to improve the speed and efficiency of BCI systems for motor imagery tasks.
  - Explored a geometric approach to optimize the k-means algorithm, addressing issues with local minima.*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.

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## PROFESSIONAL SERVICES & ACTIVITIES

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### Conference Reviewer

- International Conference on Artificial Intelligence and Statistics (AISTATS)
- IEEE International Symposium on Biomedical Imaging (ISBI)
- IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)

2023 – 2024  
2024  
2024

### University Services

- Teaching Printer Circuit Board Assembly and soldering for Rutgers ECE department

2023

### Membershp

- IEEE Young Professionals
- IEEE Singal Processing Society Membership
- IEEE Membership
- IEEE Brain Community

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## PUBLICATIONS

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### (Accepted/Published)

- **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’22), Glasgow, Scotland, July 2022, pp. 3550-3553
- **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
- **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)

### (Under review)

- **J. Hong**, G. Mackellar, S. Ghane, “EEGM2: An Efficient **Mamba-2**-Based **Self-Supervised** Framework for Long-Sequence EEG Modeling” (Conference)
- **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” (Conference)
- **J. Hong**, W. Qian, Y. Chen, and Y. Zhang, “A geometric approach to  $k$ -means,” submitted (Journal)
- **J. Hong**, W. Wang, and L. Najafizadeh, “ChatBCI: A P300 Speller BCI Leveraging **Large Language Models** for Improved Sentence Composition in Realistic Scenarios,” in preparation (Journal)

### (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)

### (Posters)

- **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 (2024).
- **J. Hong**, W. Wang and L. Najafizadeh, “ChatBCI: A Fast P300 Speller BCI Incorporating Generative AI- Based Word Prediction”:
  - IEEE Brain Discovery and Neurotechnology Workshop (2024).
  - The 10th Annual Rutgers Brain Health Institute Symposium (2024).
  - Rutgers ECE Research Day (2024).
- **J. Hong**, F. Shamsi, and L. Najafizadeh, “A Deep Learning Framework Based on Dynamic Channel Selection”
  - The 8th Annual Rutgers Brain Health Institute Symposium (2022).
  - Rutgers ECE Research Day (2022, 2023).

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## AWARDS

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- Travel Award of 2024 IEEE Brain Discovery & Neurotechnology Workshop
- Best Teaching Assistant Award for Fall 2023, Rutgers ECE

09/2024  
05/2024