

# ZOU CHENGQI

(+852) · 6203-3017 ◇ cqzou@link.cuhk.edu.hk

The Chinese University of Hong Kong  
Ma Liu Shui, Shatin, New Territories, Hong Kong

## EDUCATION

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### The Chinese University of Hong Kong (CUHK)

BEng in Biomedical Engineering September 2022 - Present

- **cGPA : 3.643/4.000 - mGPA : 3.745/4.000**

- Coursework: Python and C Programming, Machine Learning, Deep Learning, Image Signal Analysis, EEG Signal Processing, fMRI Signal Processing, Brain Anatomy and Physiology

### Swiss Federal Technology Institute of Lausanne (EPFL)

Undergraduate Exchange Student February 2025 - July 2025

- Coursework: Immunoengineering, Machine Learning, System Neuroscience, Brain-like computation and intelligence, etc.

## RESEARCH EXPERIENCE

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### Machine Learning and Interpretable Deep Learning for Predictive Neural Decoding: A Multimodal fMRI-EEG Approach

January 2024 -

Supervisor: Dr.Wutao LOU The Chinese University of Hong Kong, Hong Kong

- **Project 3:** Decoding Neural Activity from fMRI BOLD, Informed by Simultaneous EEG, Using an Interpretable Transformer-based Model October 2025 - Present

- Leveraged a publicly available, open-source simultaneous EEG-fMRI dataset
- Performed comprehensive data preprocessing
- Implemented a transformer-structured model (comprising an encoder and a decoder) to learn underlying neural activity and kernels from the processed data, subsequently reconstructing fMRI BOLD signals for evaluating reconstruction fidelity
- Interpreted the learned latent representations (codes) and kernels to decode the underlying neural activity from fMRI BOLD signals

- **Project 2:** Interpretable Graph Neural Network (GNN) to Predict Trait Alexithymia September 2024 - June 2025

- Constructed brain graphs from functional connectivity matrices, where nodes represent brain regions and edges denote their functional correlations
- Trained an Interpretable BrainGNN model to predict Toronto Alexithymia Scale (TAS) using brain graphs
- Evaluated the performance of the GNN models, and conducted feature importance analysis leveraging BrainGNN's inherent interpretability to localize the most significant graph links ("edges") associated with TAS

- **Project 1:** Identify Neuroimaging Biomarkers for Sustained Pain using EEG January 2024 - May 2024

- Preprocessed EEG datasets, associating them with subjective pain ratings as labels
- Extracted a comprehensive set of features using different feature extraction techniques
- Trained machine learning models to predict subjective pain ratings
- Evaluated model performance and identified key EEG biomarkers associated with sustained pain through feature importance analysis

## **Design and Fabrication of a Chip for Automated FLISA Systems**

*September 2025 -*

Supervisor: Prof.Li ZHANG

The Chinese University of Hong Kong, Hong Kong

- Final Year Project
- Explore SiO<sub>2</sub> reinforcement techniques and PDMS substitution methods to enhance the mechanical strength of silicone chips
- Redesign the chip mold using SolidWorks and integrate a duckbill valve on the mold for unidirectional fluid ingress
- Design a mechanical hole puncher using SolidWorks and explore thermal silicone melting for standardized hole creation on the reaction chamber of the chip
- Address various chip challenges to improve its compatibility with Automated FLISA Systems

## **Develop an EEG-Based Brain-Computer Interface (BCI) for Robotic Control Using Deep Learning**

*June 2025 - August 2025*

Supervisor: Dr.Wutao LOU

The Chinese University of Hong Kong, Hong Kong

- Awarded a research grant totaling HKD 13,000 for this Summer Research Internship Project within the Engineering Faculty of CUHK.
- Developed a Motor Imagery (MI)-based Brain-Computer Interface (BCI) system, enabling real-time control of an Arduino robot car
- Designed and assembled the hardware components, including a 4-channel EEG acquisition cap and an Arduino-based robot car for real-time command execution
- Implemented a comprehensive software pipeline encompassing data preprocessing, effective feature extraction, and training deep learning models to translate EEG signals into control commands for real-time operation
- Designed an experimental paradigm for efficient training data acquisition, incorporating simultaneous stimuli presentation to evoke distinct MI states
- Participated in a poster presentation session hosted by the CUHK Faculty of Engineering, showcasing research findings

## **Develop Low-dimensional Materials for Electronics and Biosensors**

*July 2024 - August 2024*

Supervisor: Prof. Mengqiang (Mark) ZHAO

New Jersey Institute of Technology, USA

- Overseas Research Internship in the USA
- Investigated MXenes (a kind of 2-dimensional materials), exploring both wet (HF extraction) and dry (CVD) synthesis methods
- Tested various parameters to extract purer materials
- Fabricated device and chip using these materials

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## **RESEARCH INTEREST**

**Brain Computer Interface (BCI)**

**AI Implementation in Neuroengineering (specifically transformer-based models for BCIs)**

**Machine Learning and Deep Learning in EEG and fMRI Signal Analysis**

**AI-based Image Processing and Analysis**

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## **AWARD AND HONOUR**

<b>Honours at Entrance, CUHK</b>	2022
<b>Admission Scholarship, CUHK (300,000\$)</b>	2022 - 2026
<b>Research Grant Award of Summer Research Internship, CUHK (13,000\$)</b>	<i>October 2025</i>
<b>Outstanding exchange scholarship, Shaw College, CUHK (10,000\$)</b>	March 2025
<b>Yasumoto International Exchange Scholarship, CUHK (3,500\$)</b>	March 2025

<b>Overseas Summer Research Internship Funding, CUHK BME (16,000\$)</b>	May 2024
<b>Global Exposure Award Scheme, Shaw College, CUHK (3,198\$)</b>	July 2024
<b>Yasumoto International Research Scholarship, CUHK (5,000\$)</b>	July 2024
<b>Talent Development Scholarship, CUHK (10,000\$)</b>	2022 - 2023
<b>College Certificate of Academic Merit, Shaw College, CUHK</b>	January 2022
<b>Shanxi Province of Chinese Physics Olympiad</b>	2019

## SKILLS

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<b>Program Language:</b>	Python, Matlab, C, Arduino
<b>Design:</b>	Photoshop, 3D Max, SolidWorks, Adobe Premiere, Adobe Audition
<b>Languages:</b>	Mandarin Chinese (native), English, Cantonese (listen), French and Spanish
<b>Experiment and Research:</b>	Machine Learning and Deep Learning Implementation, PsychoPy for Experimental Paradigm Design, EEG and fMRI Signal Processing, Image Processing and Analysis, Wet Lab Skills, Silicone Chip Production, 3D Printing Model Design, Circuit Board Soldering and Assembly

## LEADERSHIP

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<b>Musical Society</b>	<i>CUHK</i>
President	October 2023 - October 2024
<ul style="list-style-type: none"> <li>• Led a team of 7 executive committee members and operate a musical community with more than 100 members, overseeing the planning and execution of various musical-related activities.</li> <li>• Successfully organized a GALA night in 2024 October in the Fook Wo and Laura Jee Li Theatre, CC College, CUHK, attracting over 50 participants and more than 200 attendees.</li> <li>• Managed the society's budget of approximately 15,000\$ and successfully seek financial funding of more than 12,000\$</li> </ul>	
<b>Mainland Undergraduate Student Orientation Gala Director (M'Night)</b>	<i>CUHK</i>
Director	Summer 2024
<ul style="list-style-type: none"> <li>• Directed and orchestrated the Mainland Undergraduate Student Orientation Gala (M'Night), a pivotal event within the orientation camp for new mainland students at CUHK.</li> <li>• Collaborated effectively with a co-director and two vice-directors to successfully execute the gala at Sir Run Run Shaw Hall, engaging over 100 performers and 700 students.</li> </ul>	
<b>Student Helper for BME Info Day</b>	<i>CUHK</i>
Student Helper	October 2024
<ul style="list-style-type: none"> <li>• Volunteered to actively engage prospective freshmen, promoting the Biomedical Engineering (BME) program and providing comprehensive academic information.</li> </ul>	