YUJI HAN

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Education Background

University of Pennsylvania (UPenn), Philadelphia, PA, the United States 08/2022-Present

- **College**: School of Engineering and Applied Science
- **Major (Main Program)**: Master of Science in Bioengineering **GPA**: 3.83/4.0
- **Certificate Program**: Social, Cognitive & Affective Neuroscience (SCAN)
- **Relative Course**: Brain-Computer Interfaces, Theoretical and Computational Neuroscience, Statistical Reasoning For Behavioral Science, Machine Learning

Huazhong University of Science and Technology (HUST), Wuhan, China 09/2018-06/2022

- **College**: College of Life Science and Technology
- **Major**: Bachelor of Engineering in Biomedical Engineering **GPA**: 3.86/4.0 (88.2/100)
- **Relative Course**: Biomedical Digital Signal Processing, Digital Circuit and Logic Design, Medical Image Processing

University of California, Irvine (UCI), CA, the United States **(Exchange Program)** 08/2021-06/2022

- **College**: Samueli School of Engineering
- **Major**: Biomedical Engineering **GPA**: 3.94/4.0
- **Relative Course**: Neural Time Series, Data Science

Academic Research

Modulatory Effects of tACS on Power Change and Network Functional Connectivity **05/2023-Present**

Research Project Supervised by Dr. Roy Hamilton and Dr. Denise Harvey, UPenn *Philadelphia, PA*

➢ Helped design and executed experiments involving tACS stimulation sessions, along with a sham session, with the stimulation condition order counterbalanced across 20 participants.
➢ Collected EEG signals before and after stimulation while participants are engaged in working memory and language tasks created using PsychoPy and synchronized with recording software using Lab Streaming Layer.
➢ Conduct comprehensive analysis to compare alterations in power, as well as changes in functional connectivity, before and after tACS in both real and sham sessions based on Python and MATLAB (in progress).

Paired Pulse TMS-EEG for Measuring Cortical Excitability **10/2023-Present**

Research Project Supervised by Dr. Roy Hamilton and Dr. Sudha Kessler, UPenn *Philadelphia, PA*

➢ Extracted rTMS-evoked EEG potentials (TEP), and replicated the N100 and P180 wave for single pulse.
➢ Examined how paired pulse affect the TEP, comparing the result between adults and pediatrics.
➢ Conduct time-frequency analysis and explore network connectivity (in progress).

Finger Flexion Prediction Algorithm based on ECoG Signal **03/2023-04/2023**

Course Project Supervised by Dr. Brian Litt, UPenn *Philadelphia, PA*

➢ Extracted six distinct features from both time and frequency domains using ECoG data obtained from three participants and constructed them into a response matrix for subsequent analysis.
➢ Employed machine learning techniques, specifically random forest, to train a predictive model using the feature matrix and glove data based on Python.
➢ Achieved an 53% accuracy rate, securing second place in the competition, and received an A+ grade.

A Rehabilitation Robot for Elder Male Living with Stroke **11/2022-12/2022**

Course Project Supervised by Dr. Michelle Johnson, UPenn *Philadelphia, PA*

➢ Designed and developed a rehabilitation robot with a monkey-like appearance.
➢ Leveraged Arduino as the central control unit and integrated various sensors to create multifaceted training modules.
➢ Collaborated seamlessly within a team to realize the project from concept design to 3D printing, code development, and circuit assembly and debugging.
➢ Achieved the highest evaluation scores in both the prototype and presentation.

Automatic Detection of Anatomical Variants on the Brain's Surface **09/2021-07/2022**

Research Project Supervised by Dr. Frithjof Kruggel, UCI *Irvine, CA*

➢ Optimized the automatic detection algorithm of plis de passage (small protrusions in the brain sulcus) using C++
➢ Detected the distribution of plis in over 1000 subjects, comparing results by both human visual assessment and machine-based analysis.
➢ Studied plis' number and distribution pattern, and their potential relationship with other physiological characteristics.
➢ Participated in the Undergraduate Research Symposium and gave post speech in behave of the lab.

Frequency Characteristics and Correlation Analysis of Neonatal Seizures based on EEG **04/2022-06/2022**

Course Project Supervised by Dr. Beth Lopour, UCI *Irvine, CA*

➢ Identified distinctive frequency characteristics and conducted the analysis of frequency variations before and during seizures, employing wavelet convolution techniques.
➢ Explored intricate patterns of connectivity within different brain regions through application of mutual information and power-based correlation coefficient methods.

A Portable Device for Automatic Measurement of Quasi-Continuous Capillary Refill **08/2020-07/2021**

Research Project Supervised by Dr. Pengcheng Li, HUST *Wuhan, China*

- Designed and prototyped the automatic Capillary Refill Time (CRT) measurement device which aims to get reliable real time CRT data and reduce the factitious error through the accurate pressure and measurement of apparatus.
- Recruited volunteers for experiments and improved algorithm to optimize the precise of CRT data.
- Gave an academic poster speech at the innovation and entrepreneurship project for college students in behave of team.

The RNA-Seq Analysis of Purkinje Neurons in SN6-KO Mice **07/2019-06/2020**

Research Project Supervised by Dr. Jingyu Liu, HUST *Wuhan, China*

- Screened wild-type mice and SN6-KO mice via genotype identification, and PC (EGFP carrying) conditional through EGFP fluorescence observation to knockout mice.
- Mastered skills of paraffin embedding, competent cells preparing, vector building, and PCR.

Neurobiology Laboratory Experience, HUST **12/2018**

- Acquired foundational knowledge in fruit fly breeding and physiological activity detection under the mentorship of senior researchers.
- Cultivated a keen interest in neuroscience through extensive reading on sleep and cognition (like decision-making, emotion, depression.

Working Experience

Hangzhou CodeDog Technology Co., Ltd. **07/2023-09/2023**

Working as Software Engineer and Product Manager (internship) *Hangzhou, China*

- Helped with designing an AI-powered all-in-one board game robot.
- Conducted market research, competitor and trend analysis as a product manager.
- Authored control algorithms for the robotic arm using Python as a software engineer.

Penn Biotechnology Consulting Group (PBG) **09/2022-12/2022**

Working as a volunteer in a consulting project *Philadelphia, PA*

- Conducted market research on virtual care and telemedicine companies to identify potential customers for a clinical care orchestration company.
- Drafted messages and marketing materials to reach out to potential customers and collaborated with the marketing and sales department to implement the outreach.

Wuhan United Imaging Medical Science and Technology Co., Ltd **07/2021-08/2021**

Working as a Systems Engineer (internship) *Wuhan, China*

- Investigated the product parameter of insulin pump in the market, such as power dissipation.
- Conducted surveys and assessments of communication modes and fundamental functionalities of Bluetooth Low Energy technology, comparing them to other prevalent communication technologies.
- Achieved successful two-way communication by leveraging low-power dissipation Bluetooth and mobile phones within the ESP32 platform.

Honors & Awards

- CITI Certification of Human Research & Good Clinical Practice 06/2023
- Certified SOLIDWORKS Professional in Mechanical Design 06/2022
- UCI Division of Continuing Education Scholarship 05/2022
- People's Scholarship-The Excellent Academic Scholarship, HUST 09/2021
- Interdisciplinary Contest in Modeling Certificate of Achievement, Meritorious Winner 04/2021
- People's Scholarship-Science and Technology Innovation Scholarship, HUST (twice) 10/2019; 10/2020
- The Outstanding Student of Summer English Training Camp of Life Science &Technology College 08/2019
- The 2018 Freshmen Excellent Scholarship 04/2019
- The 2018 Freshmen Social Welfare Scholarship 04/2019

Additional Information

- **The Volunteer Activity of Fighting COVID-19**, *Community Volunteer* 03-04/2020
- **The Volunteer Activity of Freshmen Reception,** *HUST, Volunteer* 09/2019
- **Class Management, HUST,** *Commissary in Charge of Student Practice* 09/2018-09/2019
- **The Charity Public Welfare Association, HUST,** *Member* 07/2019
- **The Etiquette Team, HUST,** *Vice President* 07/2019

Skills

Programming: MATLAB (EEGLAB), Python (MNE, PyTorch, NumPy), C++, R, Linux, ESP32, Arduino
Software: LaTeX, SolidWorks, Autodesk Inventor, SPSS, Jupyter, Microsoft Office (Word, Excel, PPT)
Prototyping: 3D Printing, Mill, Lathe, Laser Cutting