Maxine He

University of Illinois Urbana-Champaign
PhD Candidate in Neuroscience

Address: 2204 Mechanical Engineering
Building, 1204 W Green St, Urbana,
Illinois 61801
Phone: 412-539-5147
Email: maoyuan2@illinois.edu

EDUCATION

Ph.D. Neuroscience, University of Illinois Urbana-Champaign   *August 2019 - Present*
Expected: 05/2025
- **GPA**: 3.97/4.00
- **Concentration**: Computational Neuroscience, Signal processing, Neurophysiology of stress and anxiety

B.S. Neuroscience, Minor in Bioengineering & Chemistry,   *August 2015 – August 2019*
University of Pittsburgh

RESEARCH EXPERIENCE

Framework for detecting mental health changes in multimodal wearable data   *August 2022–Present*
University of Illinois Urbana-Champaign
- Combined both lab-controlled and in the wild observation condition using research grade and off-the-shelf wearable sensors
- Conduct stress-inducing test to elicit stress and state anxiety in participants and collect their physiological responses
- Remotely monitor stress and anxiety in participants during their routine daily activities using wearable devices
- Compare the performance of research grade and off-the-shelf wearable sensors in the lab-controlled condition
- Aim to create a robust ML model that handles well under both lab environment and real-life scenario

Remote state anxiety detection and monitoring using multimodal wearable sensors   *August 2020–Present*
University of Illinois Urbana-Champaign
- Remotely collect physiological signals, including heart rate, breathing rate, skin conductance, skin temperature, and acceleration, using wearable devices
- Monitor data collection process and collect daily check-in survey responses as ground truth
- Apply noise reduction techniques to process noisy data collected in the free living condition
- Create ML models to classify the state anxiety condition during clinical rotation

Development and validation of an upper arm training simulator for rigidity assessment   *August 2020–December 2021*
University of Illinois Urbana-Champaign
- Helped develop a robotic arm simulator that replicates the abnormal muscle tones often observed in patients with Parkinson's disease
- Recruited clinicians with expertise in neuromuscular diseases to evaluate the realism of the simulator in mimicking rigidity

Evaluation of how long-term Tai-chi Practice impacts resting state and functional connectivity   *December 2021—Present*
University of Illinois Urbana-Champaign
- Used a 64-channel electroencephalogram (EEG) cap system to collect brain activity signal under resting state
- Analysed the temporal coupling of difference brain regions by calculating the phase lag index of EEG signal in alpha and beta wave bands

Targeted ballet dance intervention for individuals with cerebral palsy *August 2019—May 2020*
University of Illinois Urbana-Champaign
- Analysed force and acceleration data collected from a 6-week long ballet dance intervention to evaluate change in the stretch reflex response
- Prepared a manuscript that explained how stretch reflex response changed after intervention in individuals with mixed type of cerebral palsy

Evaluation of Virtual reality game for motor rehabilitation in individuals with *August 2019—May 2020*
cerebral palsy
University of Illinois Urbana-Champaign
- Modified a virtual reality game with haptic feedback to help for the rehabilitation of dystonic cerebral palsy in children
- Used low magnitude isometric force task intervention that requires participants to match force and torque at a low dimension in the virtual reality game to facilitate the recovery of motor control

Relationship between Adiponectin and Alzheimer's disease in mice model *September 2018 – April 2019*

Department of Neurology, University of Pittsburgh
- Co-authored a review article about microglia, macrophages and aging.
- Analysed diffusion tensor imaging data to evaluate volume changes in mice hippocampus
- Contributed to assays on neuroprotective effects of Interleukin-13 on microglia

Evaluation of protein expression effects in regulation of *May 2017—December 2017*
cancer cells
Department of Bioengineering, University of Pittsburgh
- Assisted in testing the effects of profilin expression in breast cancer cells
- Learned laboratory techniques and helped preparing experiments and analysing data
- Maintained cell lines for experiments and cleanness of lab equipment

TEACHING EXPERIENCE

Human Anatomy and Physiology I & II (MCB 245/247) *August 2021—Present*
School of Molecular and Cellular Biology, University of Illinois Urbana-Champaign
- Provide overview of course contents to students and lead group lab activities
- Guide students to learn and apply basic principles of human anatomy and physiology

Experimental Techniques in Cellular Biology (MCB 253) *January 2021—May 2021*
School of Molecular and Cellular Biology, University of Illinois Urbana-Champaign
- Present the course materials to students and lead the discussion
- Demonstrate the operational procedures and principles of experimental techniques that are common in the biology laboratory

Undergraduate Teaching Assistant (CHEM 0120 Recitation) *January 2017 – April 2017*
Department of Chemistry, University of Pittsburgh
- Held weekly recitation sessions and go through course materials with students
- Attended weekly meeting with professor to report feedback and update students' progress

Undergraduate Teaching Assistant (CHEM 0120 Lab Session) *August 2016—December 2016*
Department of Chemistry, University of Pittsburgh
- Reviewed lab experiment procedures for students before each lab session
- Set up experimental equipment with graduate teaching assistant

SERVICES

Clare Boothe Luce Scholarship Mentor *August 2023 - Present*
University of Illinois Urbana-Champaign
- Regularly meet with the mentee to discuss research progress
- Provide feedback for their proposed research questions

International Students and Scholar Services Student Worker   *August 2023 - Present*
University of Illinois Urbana-Champaign
- Work with Shuttle Service Team to greet and direct new international students arriving to campus
- Assist with federally mandated immigration document check using Sunapsis database

Neuroscience Program First Year Student Mentoring   *August 2022 - Present*
University of Illinois Urbana-Champaign
- Regularly meet with the first-year student mentee to check with their progress
- Provide information and advice to help mentee settle into their first year

Development of a Computational Neuroscience Course   *March 2021—August 2021*
University of Illinois Urbana-Champaign
- Identify important topics in Computational Neuroscience that interests students with relevant background
- Find related resources for the course topic and help creating syllabus and objectives

Emergency Department Assistant   *May 2017—January 2019*
University of Pittsburgh Medical Centre Shadyside Emergency Department
- Assist triage nurses to transfer patient to treatment rooms
- Make treatment room visits and provided non-medical needs of patients

Arrival Survival Supervisor   *August 2017*
University of Pittsburgh
- Facilitate new students check-in and move-in process and supervise other student volunteers
- Answer questions from parents and students and provide resources for campus life

Arrival Survival Volunteer   *August 2016*
University of Pittsburgh
- Facilitate new students check-in and move-in process
- Answer questions from parents and students and provide resources for campus life

AWARDS

- Beckman Thomas and Margaret Huang Award for Graduate Research, University of Illinois Urbana-Champaign, 2023
- The LAS College Excellence in Undergraduate Teaching for Graduate Teaching Assistant – University of Illinois Urbana-Champaign, 2023
- The LAS College Excellence in Undergraduate Teaching for Graduate Teaching Assistant – University of Illinois Urbana-Champaign, 2021
- College Dean's List of Academic Excellence – University of Pittsburgh, Spring 2018, Fall 2018, and Spring 2019

ADDITIONAL SKILLS

- Programming languages: Python, MATLAB
- Statistical Analysis: R studio

Summary: strong background in Neuroscience; knowledge of basic principles of machine learning algorithms with relevant coursework; experience with simple machine learning models and signal processing; strong project management experience with good communication skills

PUBLICATION

- Xie, D., **He, M**., & Hu, X. (2019). Microglia/macrophage diversities in central nervous system physiology and pathology. *CNS Neuroscience & Therapeutics*, *25*(12), 1287.
- Miao, W., Jiang, L., Xu, F., Lyu, J., Jiang, X., **He, M**., ... & Hu, X. (2021). Adiponectin ameliorates hypoperfusive cognitive deficits by boosting a neuroprotective microglial response. *Progress in neurobiology*, *205*, 102125.

CONFERENCE PRESENTATIONS

- **He, M**., and López-Ortiz, C. (2020). "Target ballet class alters stretch reflex response while improving motor scores: a single case study", 74th American Academy for Cerebral Palsy and Developmental Medicine Annual Meeting, Live virtual meeting.
- Gim, K., **He, M**., Mansouri, M., Pei, Y., Ripperger, E., Zallek, C., Hsiao-Wecksler E.T. (2021). "Development of a Series Elastic Elbow Neurological Exam Training Simulator for the Lead-pipe Rigidity", Paper accepted at IEEE ICRA 2021 Conference.
- **He, M**., Mansouri, M., Pei, Y., Pedroza, I., Zallek, C.M., and Hsiao-Wecksler, E.T. "Clinical Validation Testing of an Upper Limb Robotic Medical Education Training Simulator for Rigidity Assessment", 21st Annual Design of Medical Devices Conference, Minneapolis, MN, USA. April 11-14, 2022.
- Hu, Y., **He, M**., Zhao, J., Hsiao-Wecksler, E.T., Hernandez, M.E. (2022). "Effect of Tai Chi on resting state alpha power and functional connectivity in older women", The American College of Sports Medicine 2022 Annual Meeting and World Congresses, San Diego, CA, USA. May 31 - June 4, 2022.
- **He, M**., Hu, Y., Zhao, J., Hsiao-Wecksler, E.T., Hernandez, M.E. (2022). "Effect of Tai Chi and Age on Beta-Band Power and Resting State Functional Connectivity", Society for Neuroscience 2022, San Diego, CA, USA. November 12-16, 2022.

MANUSCRIPTS IN PREPARATION

- He, M., Cerna, J., Alkurdi, A., Zhao, J., Gupta, P., Hsiao-Wecksler, E.T, Hernandez, M.E. Social, Physical, and Cognitive Stressor Identification using Electrocardiography-derived Features and Machine Learning from a Wearable Device.
- Hu, Y., **He, M**., Zhao, J., Hsiao-Wecksler, E.T, Hernandez, M.E. Effects of Tai-chi and age on spectrum power and resting state functional connectivity.
- Alkurdi, A., He, M., Hsiao-Wecksler, E.T, Hernandez, M.E. Review of machine learning methods for anxiety and stress detection and estimation.
- **He, M**., Gaebler-Spira, D., Leven, M. F. and López-Ortiz, C. Changes in stretch reflex response after participation in targeted ballet classes for individuals with mixed spastic and dyskinetic cerebral palsy.