
Haibo Wu

☎ (966) 0561250738 | ✉ haibo.wu@kaust.edu.sa

EDUCATION

King Abdullah University of Science and Technology (KAUST), Saudi Arabia 08/2021-present
Master's Degree in Biostatistics
GPA: 3.62/4.0

Harbin Institute of Technology (HIT), China 08/2017-06/2021
Bachelor's Degree in Electronics Information Engineering
GPA: 3.5/4.0 (85.2/100)
Graduation Project: Multi-Sensory Integration in Older and Young Subjects

Research Interests

- Modeling synaptic plasticity at individual neuron level with mathematical and computational tools; Spike neural networks and information processing in biological neural networks; Neural dynamics and other fields in computational neuroscience

Projects and Manuscripts

Estimating the time-evolving scale-specific coherence of multivariate locally stationary wavelet processes

03/2022-present
Independent Researcher Advisor: Prof. Hernando C. Ombao

- Proposed a new model to estimate time-localized cross-dependence of nonstationary signals based on the multi-resolution analysis of wavelet processes.
- Performed the approach on EEG ADHD data, determining the different connectivities between ADHD and controls group by permutation test, and captured the components that lead to changes of connection.
- Writing a Matlab toolbox for the whole model

Time-varying mutual information based Copula with rats LFP data

03/2022-present
Independent Researcher Advisor: Prof. Hernando C. Ombao

- Computed the mutual information between the channels in rats' hippocampus by modeling with Copula models.
- Revealed that the changing trend of mutual information is different in terms of the correct and incorrect response of rats during the memory tasks.

RESEARCH EXPERIENCES

Multi-Sensory Integration in Older and Young Subjects Based on EEG (City University of Hong Kong) 09/2020-04/2021

Independent Researcher Advisor: Professor Rosa H.M Chan

- Identified regions where information from different senses converges and/or is integrated by utilizing decoding and encoding models to determine those brain areas that are closely related to audiovisual integration tasks.
- Researched the mechanism for how information from multiple sensory regions is integrated via interactions among brain regions by using Granger Causality and Dynamic causal modeling with EEGLAB in Matlab and MNE in Python.
- Revealed that signals in certain brain areas have strong causal and statistical correlations with the execution

of audiovisual integration tasks.

Research on the Effect of Different Sleep Stages on Memory Consolidation Based on SEEG

09/2019-09/2020

Independent Researcher

Advisor: Associate Professor Xia Liang

- Applied the E-Prime system to design experiments based on SEEG data from about 100 patients with epilepsy, employed Brainstorm, Fieldtrip and other toolboxes to perform time-frequency analysis, causal analysis on the data, and comprehensively analyzed the consolidation effect of different sleep stages on memory according to the results of behavioral testing and signal processing.
- Concluded that the non-rapid eye movement period closely following the rapid eye movement period has a better effect on memory consolidation.

Whole Brain Reconstruction of Neurons and Development of Depression Model (Chinese Institute for Brain Research, Beijing)

07/2019-

08/2019

Independent Researcher

Advisor: Professor Minmin Luo

- Adopted a dual-adenovirus expression system that enables strong and sparse labeling of individual neurons with cell-type and projection specificity to conduct brain-wide reconstruction of single neurons, as well as the organization of long-range connectivity in the mouse brain.
- Constructed mouse depression model with Chronic Restraint Stress, and carried out certain behavior tests including sucrose preference test and forced swimming test for the reason that depressed mice tend to have anhedonia and hopelessness.
- Proposed that this labeling system may facilitate the process of generating mesoscale single-neuron projectomes of mammalian brains, and found those brain areas that have greater relevance to certain areas associated with depression such as anterior cingulate cortex (ACC).

ACADEMIC SKILLS

- Programming: Matlab, R, Python
- Related Skills: LaTeX, Adobe (Photoshop, Illustrator), Unix