Qiuyang Wang

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Education

B.S. in Chemistry (Honors Degree) **Wuhan University**, China (GPA 3.80/4.0) 2017.9-2021.6

· **Math**: Theory of ODEs, Complex Analysis, Statistics, Probability, Stochastic Processes, Discrete Math
· **Computer Science**: Data Structure, Machine Learning, C Programming
· **Chemistry and Biology**: Neurobiology, Physical Chemistry, Organic Chemistry, Analytical Chemistry, Molecular Modeling

Visiting Student in Columbia College **Columbia University in the city of New York**, U.S. 2020.1-2020.5

· **Math**: Theoretical Neuroscience, Numerical Math, Theory of PDEs, Analysis and Optimization

Research Experience

Partitioned Ensemble Average method and its implementation in spatially ordered SNN 2019.9 - 2020.3, 2020.9-now

Advisor: Jiwei Zhang (School of Math and Statistics, Wuhan University) Research Assistant

Duties included:

· Mechanically studied a new coarse-graining framework partitioned ensemble average (PEA) to integrate-and-fire network with multiple-firing events to avoid *the curse of dimensionality*.

· Rebuilt and improved a spatially ordered spiking neural network (SNN) model that matches the experimental result about neural correlation and attention.

· Combined the PEA with spatially ordered SNN above to further simulate place cells in hippocampus and implement large scale simulation about V1 (ongoing project).

Place cells generation via auto-encoder model with a strong history effect 2020.5- 2020.9

Advisor: Stefano Fusi (Centre of Theoretical Neuroscience, Columbia University) Research Assistant

Duties included:

· Simulated the memory performance of a Hopfield network with complex synapses model to solve the *catastrophic forgetting* problem.

· Built an auto-encoder model which can naturally generate place cells in hippocampus, and implemented the complex synapses model above to strengthen the history effect.

· Mechanically studied the concept cells and its generation through auto-encoder model, which regarded concept cells as place cells in feature space.

A novel antimicrobial treatment and a non-systematic drug delivery method 2018.6 - 2019.6

Advisor: Xianzheng Zhang (College of Chemistry and Molecular Science, Wuhan University) Research Assistant

Duties included:

· Developed a novel anti-bacterial method combining photodynamic therapy and chimeric peptides.

· Tested the idea about non-systematic drug delivery strategy to central neural system through axoplasmic transport.

Publications

1. Ai-Nv Zhang[1], Wei Wu[1], Chi Zhang, **Qiu-yang Wang**, Ze-Nan Zhuang, Han Cheng, and Xian-Zheng Zhang* *A Versatile Bacterial Membrane-Binding Chimeric Peptide with Enhanced Photodynamic Antimicrobial Activity* **2019** Journal of Materials Chemistry B, 7, 1087-1095.

Skills

Programming: python (most proficient), MATLAB, Julia, C++
Statistics: pandas(python), R
Math tools: Spiking Neural Network, pytorch, Machine Learning, Optimization
Experimental skills: Material Synthesis, Tumor Transplantation, Confocal Laser-Scanning Microscopy, Fluorescence Imaging

Honors

WHU Outstanding Scholarship for Visiting Student	2020
Honor Scholarship for Hongyi College	2019
Outstanding Student Scholarship (grade 2)	2019
2^{nd} Prize for Drama Competition in School of Sciences	2018