Qiuyang Wang

https://qiuyoungwang.github.io/ qw2319@columbia.edu +1 6465150054

Education

M.S. in Applied Mathematics **Columbia University in the city of New York**, U.S.(GPA 3.96/4.0) 2021.9-2022.12

·**Math**: Differentiable Manifolds, Topology, Dynamic Systems, Mathematics for Data Science, Partial Differential Equations, Applied Analysis, Modern Algebra, Modern Analysis, Numerical Optimization

·**Neuroscience**: Computing with Brain Circuits

B.S. in Chemistry (Honors Degree) **Wuhan University**, China (GPA 3.81/4.0) 2017.9-2021.6

· **Math**: Theory of ODEs, Functions of Complex Variables, Statistics, Probability Theory, Calculus, Linear Algebra

· **Computer Science**: Data Structure, Machine Learning, C Programming

· **Chemistry and Biology**: Neurobiology, Physical Chemistry, Molecular Modeling, Organic Chemistry, Analytical Chemistry

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

Reduced phototransduction model in the retina of *Drosophila* and the integration with other visual neuropils 2022.5-now

Advisor: Aurel A. Lazar (Department of Electronic Engineering, Columbia University) Research Assistant

(ongoing project):

· Developed a series of reduced models(RPMs) for the phototransduction process in the photoreceptor of retina

· Implemented the RPMs on the retina model of *Drosophila* on GPU via CUDA and accelerated its simulation speed (roughly 10 times faster now)

· Integrated the retina model with other visual neuropils (e.g. Lamina, Amacrine cells) based on Neurokernel

Coarse-grained method of PDEs for Integrate-and-Fire neural network 2020.9-2021.5

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

· Mechanically studied a new coarse-grained framework to solve the Integrate-and-Fire (IF) neural network based on PDEs to avoid *the curse of dimensionality*.

· Rebuilt and improved a spatially ordered IF network model that matches the experimental result about neural variability.

· Modelled the CaMKII pathway in neurons to show its on/off property in Long-Term Potentiation (LTP).

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

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

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

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

· 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), C, MATLAB, Julia

Tools: PyTorch, LaTeX, CUDA, networkx, PyCUDA, scikit-learn, pandas, scipy, numpy

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