JIZHENG DONG

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EDUCATION

Tandon School of Engineering, New York University Sep 2023 - Present
Ph.D. in Computer Science

Department of Mathematics, Nanjing University Sep 2016 - Jun 2020
B.S. in Information and Computational Science (Applied Mathematics) GPA 4.23/5.00

RESEARCH INTEREST

Connectome, Behavior Analysis, Neural Data Analysis, AI4neuroscience

PUBLICATION AND PRESENTATION

WormID-Benchmark: Extracting Whole-Brain Neural Dynamics of C. elegans At the Neuron Resolution Jan 2025
*Jason Adhinarta, **Jizheng Dong**, Tianxiao He, Junxiang Huang, Daniel Sprague, Jia Wan, Hyun Jee Lee, Zikai Yu, Hang Lu, Eviatar Yemini, Saul Kato, Erdem Varol, Donglai Wei*

bioRxiv

Poster: Genetic decoding of neuron wiring in visual system of Drosophila Oct 2024
***Jizheng Dong**, Alexander Ratzan, Himanshu Gupta, Sahil Faizal, Richard Mann, Erdem Varol*

Neuroscience 2024, Society for Neuroscience

Poster: Structured feature detection during social interactions Jul 2023
*J Ning, X Zhang, **J Dong**, Z Li, Y Shao, J Wang, D Chen, Q Liu, Y Sun*

The 16th Annual Meeting of Chinese Neuroscience Society

Poster: Quantification of natural social interactions Jul 2023
*J Ning, X Zhang, **J Dong**, Z Li, J Wang, D Chen, Q Liu, Y Shao, Y Sun*

The 16th Annual Meeting of Chinese Neuroscience Society

Poster: Gesture analysis during social interactions in Drosophila Oct 2021
*J Ning, **J Dong**, X Zhang, Z Li, J Wang, D Chen, Q Liu, Y Sun*

CSHL Neurobiology of Drosophila

RESEARCH EXPERIENCE

Neuroinformatics lab, New York University Sep 2023 - Present
Ph.D. student, supervised by Dr. Erdem Varol *New York City, NY, US*

Project: Genetic Decoding of the Brain Connectome

- Integrating single-cell resolution electron microscopy (EM) connectomics data with single-cell genomics to uncover the relationship between gene expression and neuronal circuit connectivity.
- Investigating genes and proteins influencing neuron morphology (e.g., dendritic pruning) and synapse formation using traditional machine learning techniques, such as bilinear models and Support Vector Machine (SVM), as well as advanced graph-based models, including Graph Attention Network (GAT) and Graph Auto-Encoder (GAE).

· Utilizing AlphaFold3 to predict and analyze interactions between Cell Adhesion Molecules (CAMs) identified through computational models, providing novel insights into their roles in synapse formation and neuronal connectivity.

Project: Neural Activity Simulation Based on Whole-Brain Connectome

· Building a synapse-level spiking neural network to predict large-scale neural activity, integrating connectome data and in vivo calcium imaging.

· Simplifying neuron morphologies using key structural points, constructing adjacency matrices for connections between simplified neurons, implementing time-sensitive Leaky Integrate-and-Fire models for enhanced accuracy.

Lab of Systems Neuroscience &Neuroengineering, Westlake University Oct 2020 - Jul 2023
Research Assistant, supervised by Dr. Yi Sun *Hangzhou, China*

Project: 3D Behavior Recording

· Real-time key points detection of fruit fly, computational reconstruction 3D posture based on prediction result of 2D key points from multi-view cameras.

· Training convolutional neural network to predict 3D posture based on monocular top-view image for multiple animals.

Project: Visual-motor transformation during courtship of Drosophila

· Key feature extraction and dimensional reduction for motion data of Drosophila.

· Behavior classification by k-means clustering method and data visualization by Uniform Manifold Approximation and Projection (UMAP).

· Statistical measurement for male-female relationship in different behaviors.

· Motion coordination analysis on how flies coordinate different body parts to produce movement, including forward walking, crab walking, wing extension.

Institute of Nanshu, Nanjing University Aug 2020 - Sep 2020
Research Intern, supervised by Dr. Ting Wu *Nanjing, China*

Project: Steel Defect Detection

· Defect detection of industrial steel products using segmentation model of convolutional neural network (CNN).

Department of Computer Science, Nanjing University Dec 2019 - May 2020
Research Intern, supervised by Dr. Yang Gao *Nanjing, China*

Project: Defense of Adversarial Attacks

· Modification of neural network structure to defend adversarial attacks based on the theory and method of filter and edge detection.

· Design of a Hebbian rule inspired recurrent module for the network and resulting discovery of the similarity between attacked images and the module modified images, which may be the attention of neural network during classification.

Institute of Brain and Cognitive Science, NYU Shanghai Jul 2019 - Aug 2019
Research Intern, supervised by Dr. Sukbin Lim *Shanghai, China*

Project: Inferring Synaptic Plasticity Rule

· Development of a computational method to infer synaptic plasticity rule under the assumption of random connection in recurrent neural network.

· Feasible explanations for the information storage mechanism in the neural network upon receiving several different stimuli.

Institutes of Brain Science, Fudan University Jul 2018 - Aug 2018
Research Intern, supervised by Dr. Jiayi Zhang *Shanghai, China*

Project: Imitation Behavior of Rodents

· Construction of experimental equipment using Raspberry Pi, cameras, and mechanical sensors for mice behavior recording.
· Correlation analysis between the chewing behavior and vision of mice under peer influence.
· Image processing algorithm for the dyed neurons counting.

HONORS AND AWARDS

NYU School of Engineering PhD Fellowship
The National Basic Subject Top-notch Talent Scholarship
The People's Scholarship in China

SKILLS AND HOBBIES

Programming	Python, MATLAB, R, C++
CS	Image Processing, SQL, LaTeX, Deep Learning (PyTorch, TensorFlow)
Leadership	Vice-Chairman of NJU Leadership Club, Originator of *Flint* Interdisciplinary Colloquium
Sports	Archery, Marathon