Penghao Qian

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EDUCATION

Fudan University (FDU), Shanghai, China **2024.09 - Now**
PhD students | Major in Artificial Intelligence at School of Computer Science

Southeast University (SEU), Nanjing, China **2021.09 - 2024.06**
Master in Computer Science | Average Score: 87.87/100 | Rank: 5% (7/151)

- Work on brain network analysis and neuron morphology under the lab of Prof. Hanchuan Peng.

China Agricultural University (CAU), Beijing, China **2016.09 - 2021.06**
Bachelor of Engineering | Major in Computer Science | GPA: 3.6/4.0 | Rank: 15%

RESEARCH EXPERIENCE

Analysis of structural and functional brain networks at the single-cell level Southeast University
Graduate Research *Supervisor:* Prof. Hanchuan Peng 2021.09 - 2023.08

- Develop an algorithm to generate single-cell network from 1891 full morphology reconstructions.
- Find that bouton locations are not homogeneous and have a significant impact on network wiring.
- Explore the link between anatomical details and network topology by perturbing morphology.

One paper was published in ***Cell Reports*** and got 2024 ***Brains for Brains Young Researcher Award***.

Tools for neuron classification based on manifold patterns Southeast University
Graduate Research *Supervisor:* A.P. Lijuan Liu 2022.5 - 2023.08

- Develop a toolkit to analyze the manifold patterns in the feature space of neuronal morphology.
- Detect the optimal subspace of features for classification of more than 9,400 mouse neurons.

One manuscript about manifold patterns was published in ***Bioinformatics***. Another one is under review.

Research of EEG signal correlation between students Tsinghua University
Undergraduate Research *Supervisor:* A.P. Dan Zhang 2018.10 - 2020.06

- Provide a process to reduce artifacts in Electro-encephalography (EEG) data collected by portable devices, including slicing, evaluating data quality, removing slow drifts and ocular artifacts.
- Analyze the relationship between EEG correlations among students and scores in different subjects.

One paper was published in ***npj Science of Learning***.

PUBLICATIONS

- **Qian P**, Manubens-Gil L, et al. Non-homogenous axonal bouton distribution in whole-brain single cell neuronal networks. ***Cell Reports***, 2024.
- Liu Y, Jiang S, Li Y, …, **Qian P**, …, Peng H. Neuronal diversity and stereotypy at multiple scales through whole brain morphometry. ***Nature Communications***, 2024.
- Zhao S, **Qian P**, et al. Cell Typing and Sub-typing Based on Detecting Characteristic Subspaces of Morphological Features Derived from Neuron Images. 2023. (***Preprint,*** under review)
- Chen J, **Qian P**, et al. Inter-brain coupling reflects disciplinary differences in real-world classroom learning. ***npj Science of Learning***, 2023.
- Liu L, **Qian P**. Manifold classification of neuron types from microscopic images. ***Bioinformatics***, 2022.

ACTIVITIES

Trainee **Shanghai Artificial Intelligence Laboratory, Shanghai**

Supervisor: Dr. Zixin Liu 2024.12 - 2025.06

- Utilization of fMRI and Biomarker multimodal data for Alzheimer diagnosis in PET-CT by LLM.

Research Assistant **Institute for Brain and Intelligence, Southeast University**

Supervisor: Prof. Hanchuan Peng 2024.06 - 2024.09

Research Assistant **Department of Psychology, Tsinghua University**

Supervisor: Prof. Dan Zhang 2017.09 - 2020.06

- Learned Brain-Computer Interface (BCI) and Electro-encephalography (EEG) related knowledge. Participated in the experiment design and execution.
- Managed, processed, and analyzed the EEG and Electrodermal activity (EDA) data. Completed the preprocessing process of physiological data such as EEG in natural scenes.

CONFERENCES AND TALKS

Computational and Cognitive Summer School Cold Spring Abor Asia, Suzhou

- Only 30 students pre year 2024.06

BioBit Program Summer School for Computational Biology Zhejiang Lab, Hangzhou

- Best Poster and Best Student Award 2023.08

BioImage Informatics 2021 virtual conference Institut Pasteur, Online

- Poster in *Bioimaging and microscopy applications* section 2021.11

The 3rd Annual Conference on Engineering Psychology of C.P.S. East China Normal University

- Analysis of EEG data collected by portable devices were presented by A.P. Dan Zhang 2019.10

IEEE 4th International Summer School for Neural Engineering Tsinghua University

- Comprehensive study of BCI techniques and participation in experiments 2018.08

COMPETITION

The 18th China Postgraduate Mathematical Contest in Modeling *Guangzhou, China*

Modeling of deep brain electrical stimulation (DBS) therapy for Parkinson's disease

Won the National 2nd Prize *Position: Team Leader* *2021.12*

Contemporary Undergraduate Mathematical Contest in Modeling *Beijing, China*

Design of Dynamic Scheduling Strategy of Smart Rail Guided Vehicle (RGV)

Won the National 2nd Prize *Position: Team Leader* *2018.09*

ADDITIONAL INFORMATION

Selected Honors

2024.06 Best Outstanding Young Students Award (10 pre year at the Southeast University)

2024.06 Honored Graduates Award (11 pre year at the college)

2024.05 Brains for Brains Young Researcher Award (by Bernstein Network)

2023.10 National Scholarship (11 per year at the college)

2023.10 Honor Students Award (15 per year at the college)

2021 - 2024 First level scholarship of graduate students

2017 - 2019 Scholarship for Academic Excellence

Homepage: https://mr-strlen.github.io

Google Scholar: https://scholar.google.com/citations?user=bMh8__oAAAAJ