Yixin Chen

Master's Student in Physics of Life

Education

2023–2026 (expected) **MSc in Physics of Life**, *University of Basel*, Basel, Switzerland

2023 **BSc in Physics**, *Jilin University (Project 985)*, Changchun, China

2023 **BSc in Physics**, *Tomsk Polytechnic University*, Tomsk, Russia

Skills

Programming MATLAB, Python, C

Tools LaTeX, Microsoft Office, SolidWorks

Research Experience

Oct 2024–May 2025 (expected) **Research Project: Exploring spatial memory formation through complex biological plausible neural network with novel online learning algorithm**, *Biozentrum, University of Basel*, Basel, Switzerland, *Computational Neuroscience Group*

- Modeled spiking neural networks(Feedfoward and recurrent neural networks) in a virtual agent navigating a 2D environment simulation task.
- Investigated emergence of grid-cell-like activity from place cells via online learning (synaptic plasticity rules).
- Applied principal component analysis (PCA) and Fourier analysis to analyze dynamics from place to grid cells in neural networks.
- Implemented agent-based simulation in C and Python, along with data visualization and analysis.

Feb 2025–Aug 2025 (expected) **Research Intern: Brain-Inspired Learning in RNNs**, *Automation Institute (Guoqi Li Group), CAS*, Beijing, China

- Developed local learning update rules integrated into linear attention mechanisms in RNNs.
- Implemented a linear attention module that updates focus based on immediate, context-dependent signals.
- Conducted experiments on synthetic time-series and real-world datasets to evaluate learning performance.
- Compared biologically plausible learning rules against global backpropagation baselines.

Dec 2023–Jul 2024 **Research Assistant: Large-Field-of-View Light-Field Microscopy**, *Biomedical Photonics Lab, Tsinghua University*, Beijing, China

- Developed computational imaging pipelines for light-field microscopy with extended field-of-view.
- Implemented 3D reconstruction algorithms and post-processing workflows for neural optical imaging data.
- Optimized MATLAB scripts for high performance processing of large volumetric datasets.
- Collaborated with experimentalists to validate imaging models against acquired microscopy data.

Biozentrum, University of Basel – Klingelbergstrasse 50 – 4056 Basel, Switzerland
+41 78 337 2345 • *yixin.chen@stud.unibas.ch*

Sep 2024–Jun 2025 (expected)

Remote Research Assistant: Bio-Inspired Algorithms, *Computer Science Dept., University of Birmingham*, Birmingham, UK

- Designed bio-inspired algorithms combining evolutionary computation and reinforcement learning.
- Developed and tested novel fitness evaluation functions and policy update mechanisms.
- Implemented prototypes in Python using standard ML libraries and custom evolutionary frameworks.
- Conducted performance benchmarking on synthetic and real-world datasets.

May 2021–May 2022

Research Intern: Second Harmonic Generation in Graphene, *CIOMP, Chinese Academy of Sciences*, Changchun, China

- Co-first author on publication "Study on the second harmonic generation mechanism in few-layer graphene".
- Performed first-principles calculations of electronic structure in bilayer and trilayer graphene.
- Analyzed band structures, first- and second-order conductivities, and polarization parameters.
- Developed MATLAB code to process and visualize nonlinear optical response data.

Awards

2019–2020 Jilin University Scholarship

2022 Award for Undergraduate Innovation and Practice Training Program, University of Chinese Academy of Sciences

References

Prof.Kong Lingjie – Supervisor, Biomedical Photonics Lab, Tsinghua University | KONGLJ@tsinghua.edu.cn

Prof. Cheng Jinluo – Supervisor, CIOMP, Chinese Academy of Sciences | jlcheng@ciomp.ac.cn

Dr. Everton Joao Agnes – Project Leader, Biozentrum Computational Neuroscience Group, University of Basel | everton.agnes@unibas.ch