

# YIXUAN LI

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[bruce-yixuan-li.github.io](https://github.com/bruce-yixuan-li)

## EDUCATION

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**University of Science and Technology of China (USTC)** September 2018 - June 2022

B.S. in Physics.

*Department of Applied Physics, School of Physical Sciences.*

GPA: 3.43/4.3

**University of Science and Technology of China (USTC)** September 2022 - present

Graduate Student in Biophysics and Neuroscience.

*USTC Life Sciences and Medicine*

GPA: 2.88/4.3

Advisor: Prof. Quan Wen

## RESEARCH INTERESTS

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- Utilizing Machine Learning and Deep Learning Tools in Neuroscience.
- Brain Machine Interfaces Empowering Paralyzed People to Walk and Talk Again.

## TEACHING

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**Teaching Fellow for the Computational Neuroscience Course at USTC** Fall 2022, 2023

- An advanced undergraduate course focusing on the big picture of computational neuroscience.
- Taught bi-weekly sessions that supplemented the main lectures with additional topics.
- For teaching materials, visit [this link](#). For my notes as a Teaching Fellow, visit [this link](#).

## RESEARCH PROJECTS

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**Graduate Research, Advised by Prof. Quan Wen, At USTC.**

**The Taxis Behaviors of *C. elegans*** June 2022 - present

- Investigating the integration of various types of sensory information in *C. elegans*.
- Aiming to clarify the strategies *C. elegans* use during taxis.
- Aiming to find the connections between neural activities and behaviors.
- Attempting to conduct whole-brain calcium imaging during *C. elegans* taxis.

**Extraction of Single-Neuron Calcium Trace from *C. elegans* ([Link](#))** November 2023 - January 2024

- Extracted single-neuron calcium traces from *C. elegans*, successfully segmenting the soma and axon/dendrite in images obtained from the experiments. This segmentation is essential for analyzing the activity of the axon/dendrite.
- The key idea is to first apply dilation and then erosion to separate the soma and axon/dendrite.

**Learning and Memory in Planarians** June 2023 - September 2023

- Investigated various types of learning and memory in planarians, including mechanical stimulation, electric shock, and spatial memory.

**Machine Label of the Behaviors of *C. elegans* ([Link](#))** May 2023 - September 2023

- Successfully conducted machine labeling of behaviors in *C. elegans*, including forward movement, reversal, turning, and roaming.

- Achieved an accuracy rate of over 94%.
- Utilized Principal Component Analysis (PCA), an unsupervised machine learning algorithm that eliminates the need for data labeling. The data labeling work has troubled the lab for several years.
- Achieved fast processing speeds.
- The algorithm has been adopted for continued use throughout the lab.

### Offline Tracking of Zebrafish

June 2023

- Employed DeepLabCut for offline tracking of zebrafish, specifically focusing on tail dynamics to discern bouts, which are crucial for interpretations of their behaviors.

### Undergraduate Research, Advised by Prof. Xiaochu Zhang, At USTC.

### Finite Element Method Simulations of tDCS, tACS, and TI ([Link](#))

July 2021 - June 2022

- Conducted finite element method simulations of tDCS, tACS, and TI.
- Discovered a novel method to enhance the focality of TI: replacing continuous stimulation of one electrode set with successive stimulation of multiple electrode sets.

### Circuit Implementations of tDCS, tACS, and TI

January 2021 - June 2021

- Assembled the circuits of tDCS, tACS, and TI according to the diagrams.

## HONORS AND AWARDS

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- 2018-2019, USTC, Outstanding Student Scholarship, Grade C (Top 40%).
- 2020-2021, USTC, Outstanding Student Scholarship, Grade B (Top 20%).
- 2022-present, USTC, First Level Scholarship of College of Future Technology.

## SKILLS

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- Programming Language: C/C++, MATLAB, Python, R, Julia, Mathematica.
- Simulation Software: COMSOL Multiphysics, SimNIBS.
- Other Computer Skills: Git, Linux, L<sup>A</sup>T<sub>E</sub>X.
- Experiment Skills: *C. elegans* Husbandry, Cross, and Behavior Experiments.
- TOEFL: 101 (28/30/22/21 for Reading/Listening/Speaking/Writing).

## OTHER ACADEMIC ACTIVITIES

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- Croucher Computational Neuroscience Summer School at HKUST. June 2023
- The 13th Computational Neuroscience Winter School at SJTU. January 2024

## SPORTS

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- USTC, Top 10 Among About 500 Students in the 10km Competition of Talent Class. Fall 2020, Spring 2021
- Participated in [Universities 100 Miles Relay](#) on Behalf of USTC. Fall 2022

## HOBBIES

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Exercising. [Data Mining](#). [Knowledge Sharing](#).