

# Yichen Wang

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## EDUCATION

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### University of California, Los Angeles

Bachelor of Science - Mathematics of Computation; GPA: 3.95 (Major: 4.00)

Scholarships: Dean's Honors List, 2021-2022

Los Angeles, United States

Sep 2021 - June 2025 Expected

### Beijing National Day School

Advanced Placement Diploma; GPA: 4.13/4.00; Rank: 15/150

Scholarships: Presidential Scholarship, Distinguished Student of the Year Recipient

Beijing, China

Sep 2018 - Jul 2021

## EXPERIENCE AND POSITIONS

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### Undergraduate Student Researcher

Arisaka Lab, Department of Physics and Astronomy, UCLA

Los Angeles, United States

Mar 2022 - Present

### Project Lead

CruX Neurotechnology, UCLA

Los Angeles, United States

Oct 2021 - Present

### Member

Nu Rho Psi Neuroscience Honors Society, UCLA

Los Angeles, United States

Oct 2021 - Present

## PROJECTS AND RESEARCH

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### EEG Alpha Wave Analysis on Eccentric Visual Stimuli

Undergraduate Student Researcher

Department of Physics and Astronomy, UCLA

Mar 2022 - Present

- Poster Title: *Correlation Between Alpha Wave Frequency and Eccentricity Dependent Reaction Time advised by Prof. Katsushi Arisaka*
- Performed behavioral experiment protocols and recording EEG data with PsycoPy and OpenBCI on human subjects
- Applied electric conducting gel on EEG electrodes for data recording
- Programmed MATLAB and Python protocol and data analysis codes
- Expected to present poster at UCLA 2022 Undergraduate Research Week

### Machine Learning Epileptic Seizure Detection from EEG Recordings

Project Lead

CruX Neurotechnology, UCLA

Jan 2022 - Present

- Project Title: *Machine Learning Epileptic Seizure Detection From Electroencephalography (EEG) Recordings*
- Pre-processed Brown University Elipsy Dataset from 400 labeled patient recordings
- Constructed Recurrent Neural Network with TensorFlow, consisting linear, LSTM, dropout, dense layers and sigmoid activation
- Generated individualized EEG streaming chart and real-time diagnosis report including our treatment suggestions
- Awarded winner at LA Hacks 2022
- Link to code repository and Devpost

### Multi-Input Game Control With Electromyography Complex

Project Lead

University of California, Berkeley

Mar 2021

- Project Title: *Multi-Input Game Control With Electromyography (EMG) Complex*
- Devised a sensor complex with electromyography (EMG) sensors to collect and pre-process upper limb muscle voltage information with C
- Mapped three muscle groups' voltage excitement to three respective in-game actions when reaching thresholds
- Used Arduino UNO with MPU6050 to sense the rotation of the helmet and send yaw, pitch, and roll data to the PC, enabling in-game first-person view
- Utilized matplotlib, serial, and win32api Python packages to process simultaneous data
- Awarded first prize "Hack To The Moon" in 2021 Cal Hacks hosted by University of California, Berkeley
- Link to code repository and Devpost

## Humpback Whales Identification

### Project Lead

Association of Computing Machinery, UCLA

Mar 2022 - Present

- Project Title: *Humpback Whale Identification with Residual Neural Network*
- Pre-processed 25000+ images dataset for training the model with Pandas and PIL
- Reproduced and adapted ResNet-18 with PyTorch to build the model
- Applied batch normalization and regularization techniques to improve model performance
- Achieved 80% accuracy at identifying 5005 unique whales (still improving)

## Kozai-Lidov Mechanism in Hierarchical Three Body Systems

### Student Researcher

Brown University

Mar 2020 - Jun 2020

- Paper Title: *Kozai-Lidov Mechanism in Hierarchical Three Body Systems* advised by Prof. Gregory Tucker
- Constructed a Python algorithm to simulate one single and two arbitrary hierarchical three-body systems
- Predicted orbital inclinations, eccentricities, and periodic change of K-L constant of six three-body systems
- Performed analytical Hamiltonian analysis of six modeled systems to validate application of Kozai-Lidov Mechanism
- Published research paper in *International Core Journal of Engineering* (ISSN: 2414-1895)

## Neuromatch Computational Neuroscience Summer School

Neuromatch Academy

### Student

July 2022

- Expected to complete guided computational neuroscience project

## SKILLS SUMMARY

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### Computational Skills

- **Languages:** C, C++, Python, MATLAB, JAVA, JavaScript, L<sup>A</sup>T<sub>E</sub>X, Bash
- **Frameworks:** PyTorch, TensorFlow, Keras, PsychoPy, NumPy, Matplotlib, Scikit, Pandas, TQDM, Flask, React
- **Tools:** OpenBCI, GIT, Gradle, Maven, CMake, Fusion 360 (Computer-aided Design)
- **Platforms:** Unix, Arduino, Google Colab, Kaggle

### Language Skills

- Chinese: Native; English: Fluent; Spanish: Intermediate
- SAT: 1540; TOEFL: 112

## COURSEWORK

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**Computer Science:** C++ Programming; Data Structures and Algorithms; Computer Organization

**Mathematics:** Calculus and Infinite Series; Multivariable Calculus; Linear Algebra; Differential Equations; Discrete Structures; Probability and Statistics

**Neuroscience and Biology:** Computational Neuroscience(UW); Intro to Anatomical, Developmental and Physiological Neuroscience and Research Methods(NEUROSC20); Cell, Genetics, and Molecular Biology; University Level Chemistry

**Physics:** Mechanics; Waves and Electricity; Magnetism and Electrodynamics; Optics; Special Relativity

## PUBLICATIONS

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1. **Y Wang \***, Q Gao, W Zhang, Y Sun, Z Guo, Kozai-Lidov Mechanism in the Simulations of Hierarchical Three-Body Systems, *International Core Journal of Engineering* 7 (2), 440-453

## HONORS AND AWARDS

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- Winner, LA Hacks Hackathon, University of California, Los Angeles - Apr, 2022
- Winner, Cal Hacks Hackathon, University of California, Berkeley - Mar, 2021
- Gold Medal (Global), Future Space Scholars Meet (FSSM) - Oct, 2020
- Gold Medal (Global), British Physics Olympiad (BPhO) Senior Physics Challenge - May, 2020
- Silver Medal (Global), British Physics Olympiad (BPhO) - Dec, 2019
- Gold Medal (Regional), FIRST Global China (FGC) - May, 2019
- Silver Medal (Regional), FIRST Robotics Competition (FRC) - Mar, 2019
- Best Display, China College “Internet Plus” Innovation and Entrepreneurship Competition - Mar, 2019