Hongbo Wei

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Education

University of California, Berkeley **August 2022 – Present**
Computer Science and Applied Mathematics, B.A. (GPA: 4.00*)* *Berkeley, CA*

Leland High School **August 2018 – June 2022**
Primary High School (Unweighted GPA: 4.00*; SAT II: 1570)* *San Jose, CA*

Stanford University Online High School **August 2018 – June 2022**
Part-Time High School Enrollment (Unweighted GPA: 4.00*)* *Palo Alto, CA*

Relevant Coursework

Data Structures and Programming Methodology, Discrete Mathematics and Probability Theory, Optimization Models, Numerical Analysis, Linear Algebra and Differential Equations, Real/Complex Analysis, Abstract Algebra, Multivariable Calculus, Structure and Interpretation of Programming Languages

Relevant Internships/Experiences

National Aeronautics and Space Administration (NASA) **June 2021 - August 2022**
Paid Year-Round Intern *Mountain View, CA*

- Assisted in the development of a deep learning model for classifying exoplanet candidates in Kepler and TESS satellite flux data.
- Utilized Keras/Tensorflow modules with multiprocessing to conduct preprocessing and normalization, create records of train/validation/test data.
- Leveraged NASA Advanced Supercomputing (NAS) clusters to develop and train ensemble models.
- Implemented machine learning techniques such as covariate shift correction, fine-tuning, and label propagation for investigating transfer learning from Kepler to TESS data.
- Created documentation and gave a presentation to the NASA Ames and Universities Space Research Association (USRA) community summarizing results and methodology from year-round internship.

University of Florida Astronomy Department **June 2020 - May 2021**
Intern *Gainesville, FL*

- Interned for a University of Florida Professor in Astronomy for developing preprocessing techinques for Kepler planet candidates.
- Implemented a GPU parallel processing "sigma-clipping" algorithm in CUDA/C++ to fold, normalize and identify subsets of data of statistical significance.
- Presented research at the 2021 Synopsys Silicon Valley Science Fair, received an Honorable Mention from the Search for Extraterrestrial Intelligence (SETI) Institute for methodology.

Ross Summer Mathematics Program **Summer 2021**

- Accepted to and participated in a highly intensive, problem-solving based pure mathematics summer program featuring challenging daily problem sets.
- Studied concepts and solved problems connecting concepts in number theory and abstract algebra (e.g. quadratic reciprocity, orders, finite fields, isomorphisms)
- Developed problem solving skills and improved composition of mathematical proofs.
- ≈ 150 attendees internationally, $< 20\%$ admit rate

Certificates

Deep Learning Specialization **December 2022**
Coursera/OpenAI

- Completed programming exercises in optimization algorithms, regularization, MLP networks, CNN architectures, and RNNs/Transformers.

Projects

Gitlet **Summer 2022**

- Developed a miniature version of the Git VCS in Java with complete branch and conflict resolution functionality.
- Utilized graph algorithms like topological sorting for conflict tracking, SHA256 hashing to store commit objects with amortized $O(1)$ retrieval.

Build Your Own Pacman **Summer 2022**

- Created a fully-navigable maze-like game in Java with pseudo-random graph-based world generation and adversarial non-player ghosts.
- Utilized breadth-first graph generation to spawn random worlds, shortest-path algorithms to simulate responsive movements of ghosts.
- Created a game menu for customizing properties of generated worlds (e.g. graph connectivity and dimensions of in-game corridors).

Almaden Valley Tutoring Database **Summer 2021**

- Implemented a Python program to automatically add tutors and students to an online database.
- Added support for compiling statistics regarding the number of hours tutored by individuals, matching respective reports generated by tutors and students.

Technical Skills

Languages: Python, Java, C/C++
APIs: Keras, Tensorflow, CUDA, Scikit-Learn
Frameworks: Linux, Git(Hub), LaTeX, OpenWRT

Awards

United States American Computing Olympiad (USACO) **April 2022**

Gold Division

- Contestant in the second-highest division of the USACO contest.
- Studied, analyzed, and implemented data structures (e.g. Hash-Tables, Union-Find, Fenwick Trees), algorithms (e.g. Strongly-Connected Components, Shortest Paths, Greedy) and programming methods (e.g. Dynamic Programming) as preparation for contest series.

Mathematical Association of America (MAA) **2018-2022**

4x AIME Qualifier (Top 2.5%), 1x AMC 10 Distinguished Honor Roll (Top 1%)

- Competed annually in the most prestigious math competition series in the United States.
- Studied concepts such as combinatorical proofs/identities, number theory, geometric constructions, algebraic manipulations in preparation for contests.

National Merit Scholarship **March 2022**

Recipient

- One of the 2,500 annual recipients of the $2500 National Merit Scholarship.

Synopsys Silicon Valley Science Fair **March 2021**

Honorable Mention from the Search for Extraterrestrial Intelligence (SETI) Institute

- Received in recognition of research methodology from University of Florida Internship.

President's Gold Volunteer Service Award **January 2022**

AP Scholar with Distinction **July 2021**

Teaching Experience

Berkeley CS61A **Spring 2023 - Present**

Academic Intern *UC Berkeley*

- Assisted students during lab sections with programming exercises and assignments for the largest lower-division CS class at UC Berkeley.

Almaden Valley Tutoring **Spring 2021 – Summer 2022**

Manager/Tutor *Leland High School*

- Served as a tutor and managed internal databases of a student-led organization providing tutoring to dozens of elementary and middle school students.

CITRUS Program **Fall 2020**

Volunteer *Leland High School*

- Provided individualized tutoring in mathematics for middle and high school students from under-resourced communities.