SUMER SAO

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EDUCATION

Stanford University, CA (September 2018 – Present)

- Bachelor of Science in Mathematical and Computational Science: Biology Track
  - GPA: 4.06/4
- Master of Science in Computer Science with a Specialization in Theory

Relevant Current and Completed Coursework

- Data Structures, Design and Analysis of Algorithms, Optimization and Algorithmic Paradigms, Operating Systems, Computer Systems, Compilers, Automata and Complexity Theory
- Matrix and Linear Algebra, Ordinary Differential Equations, Probability Theory, Multivariate Calculus, Intro to Optimization, Biochemistry and Molecular Biology, Intro to Microfluidics, Electricity and Magnetism

Honors and Awards

- Calvin Coolidge Presidential Foundation Scholarship Semifinalist—Top 100 Nationally
- USA Computing Olympiad (USACO): Platinum Competitor (Highest Division), North American Computational Linguistics Olympiad (NACLO): 18th place; Invitational Round Qualifier
- Eagle Scout with Silver, Gold, and Bronze palms
- National Merit Finalist and 2x National AP Scholar: 14 exams with a score of 5, 3 exams with a score of 4

WORK EXPERIENCE

Assistant Research Scientist, Wave Propagation Research Group, Towns Laser Institute, NASA-TISTEF (2017)

- Developed, implemented, and tested algorithms for the novel Radiometric Infrared Extinction Imager, over 1000 lines of python.
- Developed both frontend and backend software for our mathematical models to process video data and measure the Anisotropy Ellipse of Atmospheric Turbulence, sped up existing data processing code from taking 30 minutes to a few seconds.
- Set up experiments and collected data for the above two projects on the runway of the Shuttle Landing Facility (SLF)
- Project, available on my website: Development of Extinction Imagers for the Determination of Atmospheric Optical Extinction.

Breakout Mentors Tutor (2019 – Present)

- Mentor at Breakout Mentors, a company that gives a personalized approach for kids learning to code.
- Tutor 4-5 kids in Python, Java, and C++ working on projects from games, to algorithms, to machine learning.

RESEARCH AND PROJECTS

Intern at the Canary Center for Early Cancer Detection: Curtis Lab (2019 – Present)

- Working on genomic characterization of exceptional responders to capecitabine in metastatic breast cancer to reveal better treatment options and get a better understanding of tumors.
- Developing a 3-dimensional spatial model of breast tumors to inform how tumors grow before they are clinically observable. Implementing and optimizing the existing colon cancer model in C++.

Student Researcher in the Brunskill Lab (2019 – Present)

- Developing machine learning methods to optimize the design of primers and synthetic DNA sequences to predict which experiments would be most effective in detecting tens of thousands of possible mutations quickly and cheaply in a blood sample for cancer diagnosis.
- Proficiency in **Tensorflow**, **Keras**, Regression methods (Random Forest, SVR, Bayesian Regression, etc.), and **C**onvolutional **N**eural **N**etworks.

Independent Research (2017)

- Independently created a mathematical model to describe containers with fluid and solved them using computational techniques.
- Won awards at the Florida State and Engineering Fair, Orange County Regional Science Fair and Orlando Science Center Science Challenge. Project available on my website.

Competitor, Stanford TreeHacks (2019)

- ListenHere – Created a mobile-compatible web application using machine learning that listens for sounds and predicts what is being heard. Targeted towards audio impaired users, they can in real time identify important sounds for safety, quality of life, and engagement.
- The machine learning model constructed runs a concoction of Mel-Frequency Cepstrum Coefficients (MFCC) analysis, Principal Component Analysis (PCA) and a Support Vector Machine (SVM) model to classify the sound.

CLUBS AND ACTIVITIES

Stanford Certamen Founder (2019 – Present)

- Orchestrate Stanford's inaugural Certamen Invitation, an academic quiz bowl and lecture series weekend for middle and high schools across the nation, to provide an opportunity of exposure for local students to interact with Stanford students, faculty, and staff, and engage in Classical Studies with peers on a national level.

- Wrote questions for the tournament, worked with the Classics Department to organize room reservations, food orders, and guest speakers, designed flyers and worked on public outreach to schools around the country.

Stanford ProCo (Programming Contest) Coordinator, Stanford University Mathematical Organization (2019 – Present)

- In charge of organizing this event including running meetings, talking to corporate sponsors, and logistical planning with the university.
- Problem writer, tester, and judge for ProCo. This entails writing algorithmic problems, solutions, and judge data.
- ProCo is an annual computer science competition open to high school students in the Bay Area that has been held at Stanford for the past 10 years. Over 300 students participate in fun computer science challenges, including solving algorithmic type questions, programming games, and Capture the Flag (CTF).

Team Member, Stanford ACM ICPC (2018)

- Competed in the 2018 ACM ICPC PACNW Regional Competition placing 18th out of 134 teams
- Over 5 years of competitive programming experience, with extensive knowledge both in theoretical computer science and great technical skill in implementing tens of thousands of lines of code in C++, Java, and Python.
- USACO Platinum Competitor. Additionally, top 3 in several statewide high school Florida competitions.

SKILLS AND INTERESTS

- Technical: Java, C++, Python, C, Matlab, R
- Software: LaTeX, Excel, Gnumeric, Fits File Editor
- Languages: English, Hindi
- Professional interests: Intersection of computational techniques to cross-disciplinary problem-solving.