Alistair Keiller

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🎓 EDUCATION

Stanford Online High School: High School Student. 📍 Stanford, CA	2020-2024
Stanford University: Summer Session Student. 📍 Stanford, CA	Summer, 2023
University of California San Diego: Undergraduate Coursework. 📍 San Diego, CA	2023-2024
University of California Santa Cruz: Undergraduate Coursework. 📍 Santa Cruz, CA	Summer, 2022

👥 EXPERIENCE

Open Source Contributor (my 🖧 profile)   2020-Present

- Made 3,527 contributions to open-source projects like LLVM, Iced, and Typst. Fix bugs and add features. Changes propagate to the knowledge pool anyone can build upon.
- Rewrote Typst's build system; featured by Typst on their website as a top contributor.
- Contributed an RFC to Iced (a Rust GUI framework).

Inventor   2016-Present

- Created a browser-based collaborative editor with a client-side compiler (patent pending). Stanford Online High School's AP Computer Science A class now uses my editor with great success, reliability, and robustness (after nine rewrites and hundreds of hours of debugging).
- Developed a Tetris-like learning game to teach Quantum Computing. In "Quantris," players maneuver pieces representing quantum operations to complete objectives.
- Provide insights and tools for new ventures. Designed a math syntax tree explorer algorithm for a high-growth EdTech startup.
- Designed the architecture, frame, and electronics for a mass-scale go-kart manufacturing startup.

Emeritus Summer Intern   Summer, 2022

Emeritus collaborates with more than 80 top-tier universities to make high-quality education accessible and affordable worldwide. Time Magazine World's Top EdTech Company of 2024 (emeritus.org)

- Full Stack Engineer on a 25-person international software engineering team.
- Worked on back end and front end of the customer purchasing interface.
- Created full demo web interface showcasing new concepts; helped resolve issues with main interface.
- Learned from a world-class DevOps process, including a complex GitHub workflow and integration between GitHub, task management systems, and CI workflow runs.
- Proactively implemented Emeritus' first reproducible development environment, making sharing projects within the team easier.

AlwaysAI Summer Intern   Summer, 2020

An early leader in providing real-time insights through Vision AI (alwaysai.co)

- Created an application for retail and manufacturing that detects when people are unmasked or not socially distanced and runs on inexpensive edge hardware.
- Developed an application for ubiquitous consumer drones to detect trash type and quantity while flying overhead.

🏅 HONORS AND AWARDS

• Three First Robotics Competition Judges' Awards	2022-2024
• Google Foobar Level 5 (Highest Level): Google's Software Engineering Assessment	2022
• USACO Silver	2020
• Gold Medal, World Math Team Competition	2019

📖 PUBLICATIONS

- A. Keiller, "An Approach to Reduce Computational Load: Precalculating Gain Matrices for an LQR Controller of a Four-Axis Manipulator Using State Space Kinematics". 2023.
  - Published in arXiv and TechRxiv.

👉 *EXTRACURRICULARS & COMMUNITY SERVICE*

SOHS's FIRST Robotics Competition Team Founder, Captain, Lead Programmer   2021-Present

Under strict rules, limited time and resources, teams of students are challenged to raise funds, design a team "brand," hone teamwork skills, and build and program industrial-size robots to play a difficult field game against like-minded competitors. It's as close to real-world engineering as a student can get. (firstinspires.org)
- Founder of <u>first-ever</u> online, global FRC team (out of 3,300 teams competing).
- Grew team from being the only participant to the biggest club at Stanford OHS.
- Won three Judges' Awards for the complex problem solving required to drive our international workflow, unique design process, and innovative control systems research.
- First FRC team to successfully implement VSLAM and Object Detection; our robot knows the location of itself, other robots, and game pieces.
- Secured donations from NASA, Qualcomm, Northrop Grumman, Viasat, Megapro, and Stanford.
- Our temperamental robot, *Scrambled Eggs*, was a crowd favorite.

Stanford Online High School TA and Peer Tutor   2021-Present
- First research TA for Light & Heat (Thermodynamics and Optics) and Modern Physics (Special Relativity and Quantum Mechanics).
  - ‣ Developed new representation of PR-box states for 228x memory reduction compared to standard.
  - ‣ Created a number of interactive visualizations and real-time simulations to illuminate difficult concepts such as single-slit diffraction and 2D time-dependent Schrödinger equation. This has led to students all over the school asking for my help in courses I haven't even taken.
- TA for AP Computer Science A: Rewrote the assignment's build system in Gradle to improve build support with more editors and operating systems.
- Selected as peer-tutor for Modes of Writing and Analysis.

Hackathons and Kaggle Competitions   2020-Present
- Kaggle competition first place: The final project for my Stanford University graduate-level (majority master/PhD students) STATS 202 class was to predict patients' schizophrenia. I focused on iteration speed rather than algorithms. Rather than applying RNNs, LSTMs, and massive ensemble models, I used a cross-validation-hyperparameter-tuned XGBoost, which trained in under a minute and let me carefully control overfitting. I found which 10% of studies, doctors, and hospitals had the most optimal data, normalizing for any biases in each. My model ranked #1 on the Kaggle leaderboard.
- UC Berkeley's Calico programming competition (9/300): Each team member brought a uniquely qualified perspective to problems and challenged their own viewpoints to understand each other's.
- Stanford Online High School Hackathon first place: Created a custom Jeopardy interface that pulls information about Stanford Online High School to create questions.
- The High School Mathematics Contest in Modeling (HiMCM): I recreated and combined 7,000 lines of code across five research papers and four programming languages.

Cambiar Education (nonprofit venture studio), Volunteer   2019-Present
- Support IT and technology: Develop recommendations for software and hardware purchases.
- Provide user feedback to startup entrepreneurs on their education technology products.
- Contributed to operations and logistics for team design sprints and jam sessions.

Clean Water, Volunteer   2019-Present
- Fundraised for fresh-water wells that enable village economic development.
- Traveled to Zambia to connect with community and set up infrastructure.
- Selected as keynote speaker for major fundraising event, which raised over $300,000.

Math and Computer Science Tutor, Volunteer   2016-Present
- Taught math in Tijuana elementary school.
- Hosted Scratch workshops at the San Diego Maker Faire.
- Tutored students in Lattice Point Geometry, Discrete Math, Electrical Engineering, Multivariable Calculus, and Data Science.

Interests
- Enjoy nature breaks, away from my binary better half (computer) – long ultralight backpacking treks, sailing Hobie Cats, mountain biking, windsurfing.
- Train for Ultimate Frisbee by playing with Curry, my Border Collie.
- Love to debate anything philosophy.