# Allen Li

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## Education

**Massachusetts Institute of Technology**, Physics & Electrical Engineering and Computer Science — Aug 2025 – May 2029

- **Current Coursework:** Quantum Mechanics II, Dynamical System Modeling and Control Design, Nanotechnology: From Atoms to Systems, Introduction to Linguistics

## Experience

**Undergraduate Researcher**, **Ferroelectric Materials and Devices Group @ Research Laboratory of Electronics**, **MIT** — Sep 2025 – Present

- Assisted in fabricating high power and energy density electrostatic capacitors on the nanometer scale for usage in on-chip systems; investigated unexpected negative capacitance effects associated with hafnium zirconium oxide's interaction with other dielectrics.
- Used Python and Klayout to iterate on capacitors.
- Learned and experimented with improvements to the atomic layer deposition and lithography process used to manufacture the capacitors.

**Research Assistant**, **NASA Ames Research Center**, **CA** — June 2024 – Aug 2024

- Installed and tested software for drone cases used for studying and fighting wildfires.
- Analyzed data on incidents related to drones/wildfires.

## Publications

**Impact of Carbon Number and Atom Number on cc-pVTZ Hartree-Fock Energy and Program Runtime of Alkanes** — Mar 2024

Michelle Pan, Vaibhav Vaiyakarnam, Allen Li, Larry McMahan

DOI: 10.59720/23-130

## Leadership

**Monta Vista Science Olympiad President** — May 2024 – Jun 2025

Ensured the structure and success of our team of 15 in ∼10 competitions, held meetings to connect with and support members. Started the virtual Monta Vista Invitational, organizing test writers and logistics with the 60 teams competing. Worked within the team with partners to learn about event theory and build sensors and machines to compete with.

**Monta Vista Physics and Engineering Club President** — Jun 2024 – Jun 2025

Encouraged interest in physics and engineering from 30+ high school students through explaining everyday phenomena and running build challenges.

**STEMBoost Physics Curriculum Lead** — Aug 2023 – Jun 2025

Helped prepare tests and proctor for the STEMBoost and Kennedy Science Olympiad competitions, each with 70+ teams of 15 competing.

**A Major Problem Acapella President / Rehearsal Leader** — Sep 2024 – Mar 2025

Led acapella rehearsals of 16 people, communicated with our choir and helped plan performances to community members during Christmas, to a senior home, and to members of our choir.

**Aspiring Scholars Directed Research Program Research Group Leader** — Sep 2023 – Mar 2024

Led a group of 5 in researching the trend of ground state energies of alkanes and their isomers.

## Achievements

**International Physics Olympiad Gold Medal** — July 2025

**European Physics Olympiad Gold Medal** — July 2024

One of five team members selected to compete for the US in the International & European Physics Olympiads, which consist of three theoretical and two experimental problems in ten hours. Overall rank: 6th Place, 2nd Place (respectively). [ipho2025.fr, eupho.ee]

**Science Olympiad Div. C Nationals First Place Team Member** — June 2024

Competed in: Detector Building (Chemistry), Experimental Design (General Science), Optics (Physics), Robot Tour (Robotics). [soinc.org/2024-national-tournament]

**USA Computing Olympiad Gold Division** Jan 2023
Learned how to apply various algorithms—DP, segment trees, maximum flow, greedy, etc.—to solve difficult computing problems.

## Projects

**Robot Tour**
Designed and built a small robot car controlled by an Arduino capable of precisely navigating a maze of walls.

**AM Radio**
Constructed an AM radio using basic electronic components (resistors, capacitors, op-amps, etc.).

**Tutor Pairing**
Created a website to help match tutors and students from form responses for my high school's tutoring program.

**Physics Simulations**
Coded simulations of various mechanical systems using Runge-Kutta 4 approximation from vanilla JavaScript.

**Graph Algorithms**
Created a website to visualize the operations of graph algorithms on fully customizable graphs with React.js.

## Technologies

**Languages:** C++, C, C#, Python, Java, JavaScript, SQL, HTML

**Tools:** CAD (Fusion360/Onshape), Klayout, LTspice