Stanford University, CA
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https://haleyso.github.io

Haley M. So

Interests

Photonics, Optics, Solid State Devices, Quantum Computing, Machine Learning

Education

Stanford University — Stanford, CA
PhD in Electrical Engineering, NSF Graduate Research Fellow — expected June 2025

Columbia University — New York, NY
B.S. in Electrical Engineering, Cum Laude — May 2020

Relevant courses: Solid State Devices and Materials, Photonics, Quantum Mechanics, Lightwave Devices, Data Structures in Java, Quantum Computing, Machine Learning, Digital VLSI

Research

Fan Lab — Stanford, CA
Stanford University — September 2020—present

- Learning inverse design for metamaterials, using machine learning for photonic devices.

Nanophotonics and Quantum Optics Lab — Waterloo, ON
Institute for Quantum Computing — May 2019—August 2019

- Built a UV interference lithography optical setup and worked to create new techniques to fabricate fiber integrated distributed Bragg mirrors to increase light-matter interactions for cavity QED.
- Performed Lumerical simulations to test theory of my project. Advised by Prof. Michal Bajcsy.

Lightwave Research Lab — New York, NY
Columbia University — September 2018—present

- Designed and computer modeled broadband couplers and low loss multimode interference (MMI) splitters for wavelengths 1450nm to 1640nm in RSoft with splitting ratios of 90/10 and 50/50 for a new optical data routing system. Advised by Prof. Keren Bergman and Anthony Rizzo.

III-V Optoelectronics Lab — Albuquerque, NM
Sandia National Laboratories — May 2017—August 2017

- Built setup and microscope to measure optical reflection and transmission spectra of semiconductor micro-cavities to determine modal frequencies and optical losses of cold cavity resonators.
- Analyzed data, derived analytical equations to model optical devices, and observed microfabrication processes. Co-authored two publications. Mentored by Dr. Darwin Serkland.
- Worked with lasers in infrared region, aligning, mode matching, and measuring beat frequencies.

Skills

Computer Science: Python, Java, SQL, Matlab, HTML & CSS, RSoft, Lumerical, LaTeX
Electronics: Cadence Virtuoso, Schematic and PCB layout, breadboarding
Optics: Laser alignment, fiber coupling, mode matching

Publications

D. K. Serkland, **H. M. So**, G. M. Peake, M. G. Wood, A. J. Grine, C. P. Hains, K. M. Geib, G. A. Keeler, *"Mode selection and tuning of single-frequency short-cavity VECSELs."* International Society for Optics and Photonics, 2018.

D. K. Serkland, T. J. Morin, A. J. Grine, G. M. Peake, W. Y. Kendall, M. G. Wood, C. P. Hains, **H. M. So**, A. L. Soudachanh, K. M. Geib, *"All-Semiconductor Coupled-Cavity VCSELs for Narrow Linewidth."* International Semiconductor Laser Conference (ISLC). IEEE, 2018.

Experience

Infrastructure Software Engineering Intern — San Francisco (remote), CA
Splunk — June 2020—August 2020

- Automated unit testing for ASan builds to catch memory errors, shifting testing left.
- Created service for internationalization of Splunk product using Docker and Jenkins.

Signals and Systems Course Assistant — New York, NY
Columbia University — September 2019—May 2020

- Guided students in understanding class material and homework.
- Graded homeworks and tests.

Undergraduate School on Experimental Quantum Information Processing, Selected Student — Waterloo, ON
Institute for Quantum Computing — May 2019

- A two-week program consisting of lectures introducing quantum information theory and experimental approaches to quantum devices, followed by 30+ hours of hands-on exploration of Quantum Information Processing (QIP) using the experimental facilities at the institute.

Hardware Product Sprint, Selected Student — Mountain View, CA
Google — May 2019—August 2019

- 1 of 28 students selected for Googles 12-week developmental program in consumer electronics.
- Designed my own clock featuring 60 LEDs and frequency analyzer using microcontrollers, breadboard prototyping, PCB design, assembly, and testing.

Private Wealth Management Intern — New York, NY
Morgan Stanley — January 2019—May 2019

- Created strategies for clients to support their future financial ambitions with The Vinder Group.

Data Science Intern — Menlo Park, CA
Facebook — June 2018—August 2018

- Queried with SQL and visualized data in Excel and internal tools to create a dashboard to track engagement with product outreach efforts for the Social Goods Crisis Response Team.
- Presented data-driven optimizations to increase audience interaction with Crisis Response product by over 10%, a potential 4.5 million more people in the past three months.

National Science Fair Judge — New York, NY
Broadcom MASTERS — 2017, 2018, 2019

- Served as a judge for the Electrical Engineering and Computer Science projects, evaluating 60 middle school students throughout the country.

The Glimpse Group AR/VR — New York, NY
Intern — January 2018 - May 2018

- Used Unity to build augmented reality projects for clients, including a collaboration with Mt. Sinai, augmenting one of their neuroscience posters for a conference.

Columbia Emerging Scholars Program Teacher Assistant — New York, NY
Columbia University Computer Science Department. — September 2017—December 2017

- Led students in group problem-solving and weekly discussions in computer science fields, from machine learning to graphics, to inspire students to create for community impact.

Columbia University Alma Mater Ambassador — New York, NY
Columbia University Admissions — September 2017—January 2018

- Represented Columbia Admissions in New Mexico, coordinating with high schools to plan visits and info sessions. Presented to groups over 50 people.

Leadership Experience

Women in Computer Science — New York, NY
President — April 2017—May 2020

- Directly managed 25 board members in planning events, building community, promoting academia, hosting networking events and trips to tech companies for women in the Columbia community to promote women in tech. Previous roles: VP, Diversity Chair.
- Founder of the WiCS Coordinator program to keep a group of 20 underclassmen in computer science by encouraging bonding through group work in weekly meetings on initiatives like professor lunches and middle school outreach.
- Co-led DivHacks 2018, a hackathon for underrepresented students in tech to explore computer science, organizing meetings with the team, reaching out for sponsorships, budgeting, website design, and logistics.

Columbia Undergraduate Science Journal — New York, NY
Senior Advisor, Associate Editor — September 2016—May 2020

- Reviewed and selected undergraduate scientific papers for the Columbia Undergraduate Science Journal (CUSJ).
- Planned and held the Spring Research Symposium and other events to share student research and guide students in finding research.

Urban New York — New York, NY
Columbia Undergraduate Student Life Trip Leader — September 2018—May 2020

- Led students in trips into the city to help them immerse themselves in the art and culture of New York. Planned logistics and liaised between the Student Life Office, faculty, and students.

Hong Kong Students and Scholars Society — New York, NY
Senior Advisor, Treasurer — September 2016—May 2020

- Advised e-board in planning events for the community and in managing the budget.

Service

Green New Student Orientation — New York, NY
Orientation Leader — August 2017—present

- Taught first-years the green initiatives and how to live sustainably on campus and in the community.
- Organized Green Sale, promoting recycling and reusing by selling back donated appliances/books/dorm essentials at lower prices. This year we made $36,000 for environmental initiatives on campus.

Achievements

Academic and Engineering awards

- National Science Foundation Graduate Research Fellow (2020)
- Institute for Quantum Computing Undergraduate Research Award (2019)
- Columbia Named Scholar (2018, 2019)
- Columbia Computer Science Emerging Scholar (2017)
- Lockheed Martin National Merit Scholar (2016)
- Woodcock Family Education Scholarship (Four Year Science Award 2016)

Art awards

- Columbia CSArtist (2017)
- Scholastic Arts and Writing Awards: Gold Key Portfolio (2016)

Other Passions

- Painting, Figure Drawing, Animating, Cartooning (11 years)
- Classical Ballet (16 years total, 7 pre-professional)
  - Columbia NuDance Contemporary Dance Group (2020)
  - "Grand Duo" choreographed by Mark Morris (2017)
  - The Performers Ballet and Jazz Company, Soloist (2009-2016)
- Piano (12 years Classical, 1 year Jazz)