Alec Lau

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Education

Stanford University

B.S. Engineering Physics (Quantum Science Concentration) | *Advisor: Ben Lev*

Concentration coursework including Advanced Topics in Quantum Mechanics, Information Theory, Many Body Quantum Dynamics

B.S. Mathematics (Pure) | *Advisor: Ravi Vakil*

Year-long graduate sequence in topology/geometry, as well as symplectic and 4-dimensional topology/geometry. Additional graduate courses in mathematical physics: quantum field theory, quantum groups, quantum algorithms

Work Experience

Tesla Jan. 2021 - *Present* | Fremont, CA

Glass Multiphysics Engineer

- Computational physics for the glass team

Meranti Research Laboratories Aug. 2020 - Jan. 2021 | Remote

Plasma Physics Simulation Analyst Intern

- Wrote Python code for plasma simulations for use of data analysis for fusion reactor designs

Advanced Technology Center, Lockheed Martin Space Jun. 2019 - Sep. 2019 | Palo Alto, CA

Research Science Engineering Intern

- Wrote and simulated VHDL code for FPGAs for use in space flight

Research Experience

Mathematics/Theoretical Condensed Matter Physics Remote | Jul. 2020 - Present

Advisor: Kevin Walker, Microsoft Station Q

- Applying algebraic and geometric topology to theoretical condensed matter physics. Namely, analysis of particle types in Dijkgraaf-Witten topological quantum field theory with non-abelian gauge groups.

Feldman Group, Dept. of Physics, Stanford University

Undergraduate Researcher, Full-Time | P.I.: Ben Feldman, Stanford University | Jun. 2018 - Sep. 2018

- Designed and created devices to fabricate custom single electron transistor tips for studying the quantum Hall regime

Dionne Group, Dept. of Applied Physics/Materials Science & Engineering, Stanford University

Undergraduate Researcher, Full-time | P.I.: Jennifer Dionne, Stanford University | Jun. 2017 - Sep. 2017

- Synthesized gold plasmonic nanoparticles with optimal Raman enhancement, tested different synthesis conditions to alter nanoparticle geometry, & characterized them on the Tecnai TEM electron microscope
- Wrote numerical method simulations of nanophotonics on different nanoparticles

Projects (see https://hirako22.github.io/making.html for details and additional projects)

Feature-Focused Photograph Generation May 2019

- Nominated for project prize in a graduate course of almost 600 students

Voice-controlled Dorm Lighting System Aug. 2016

Mechatronic Iron Man Arm Replica	Jun. 2015
Bare-bones Raspberry Pi LED sound display	Mar. 2018
Retro style Wooden Coffee Table	Aug. 2014
Rubber Band Machine Gun	Mar. 2012

Skills

VHDL | FPGA Design | C | C++ | Java | Javascript | Chemical Safety | Electron Microscopy | Scientific Python | Soldering | Mechatronic Design | Woodworking | Welding | Metalworking | Arduino | Raspberry Pi | Bare Metal Programming | Customer Service | Numerical Methods | Autodesk Inventor | Numpy | Vacuum System Design | Prototyping | Deep Learning for Image Recognition | LaTeX

Languages

German (6 years), Mandarin (1 year)

Miscellaneous

- Leland Stanford Junior University Marching Band (LSJUMB) (Section Leader Sep. 2018 - Dec. 2019)
- Stanford Quantum Computing
- Stanford Taekwondo (Competed in Pac-West and Collegiate Nationals tournaments in black belt sparring)
    - Quarter Finalist at 2019 Collegiate Nationals, featherweight division black belt sparring