

Alec Lau

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Education/Coursework (underline indicates a graduate course)

Stanford University Stanford, CA

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

Classical Mechanics, Variational Mechanics, Relativity, Organic Chemistry, Electrodynamics, Quantum Mechanics, Computer Systems, Programming Abstractions, Quantum Algorithms & Quantum Cognition, Topological Quantum Computation, Quantum Information, Complexity, Gravity, & Black Holes, Information Theory, Convolutional Neural Networks

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

Analysis, Theoretical PDEs, Group Theory, Ring Theory, Differential Topology, Mathematic & Statistics of Gambling, Quantum Field Theory for Mathematicians, Algebraic Topology, Galois Theory, Quantum Groups, Differential Geometry

Work Experience

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

Research Science Engineer Intern

- Wrote and simulated VHDL code for FPGAs for use in space flight
- Big data processing for LIDAR 3D modeling

AMC Theatres Jul. 2015 - Sep. 2016 | Wauwatosa, WI

Theatre Crew

- Worked the Box Office, concession stand, usher, trainer
- Employee of the Month, February 2016

Wauwatosa School District Aug. 2015 - Jun. 2016 | Wauwatosa, WI

Student Helpdesk Operator

- Set up & distributed school chromebooks, helped to troubleshoot various computer problems
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Engineering/Research Experience

Mathematics Research Stanford, CA | Oct. 2018 - Present

Advisor: Daniel Bump, Stanford University

- Research in topological quantum computation; topology, theoretical physics, theoretical computer science, representation theory, quantum groups, category theory

Feldman Group, Dept. of Physics, Stanford University Stanford, CA

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

The Dionne Group, Dept. of Materials Science & Engineering, Stanford University Stanford, CA

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
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Projects

Voice-controlled Dorm Lighting System Aug. 2016

Coded & soldered an Arduino-based analog LED control system with a voice recognition platform

Mechatronic Iron Man Arm Replica Jun. 2015

Designed, built, coded, & soldered an arduino-based mechatronic Iron Man arm with custom-wired lights, a custom sound trigger, & a moving rocket chamber

Bare-bones Raspberry Pi LED sound display Mar. 2018

Retro style Wooden Coffee Table Aug. 2014

Built a pine & birch coffee table, made custom jigs for attaching parts & safely cutting double bevels

Rubber Band Machine Gun Mar. 2012

Built a motorized mechanism that releases 150 rubber bands in ~3 seconds, based on Ogg Craft's design

Feature-Focused Photograph Generation May 2019

Designed novel architecture for a semantic image GAN designed to produce photorealistic images

Nominated for project prize in a class of almost 600 students

Mathematics Directed Reading Program at Stanford University

Riemannian Manifolds Talk: "Riemannian Manifolds & Differential Geometry" | Spring 2018

Algebraic Topology No talk given | Summer 2018

Skills

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

Languages

German (6 years), Mandarin (1 year)

Miscellaneous

Leland Stanford Junior University Marching Band (LSJUMB) (Section Leader since Sep. 2018), Stanford
Taekwondo (Competed in Pac-West and Collegiate Nationals tournaments, 2019), Stanford Robotics