HARSHVARDHAN BABLA

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SKILLS

Programming

Python (with TensorFlow & SciKit-Learn), Java, C#, C, HTML5 & CSS, SQL, Prolog, Q#, Verilog, and Arduino.

Technical Software

MATLAB, COMSOL, Cadence, and SPICE.

Graphic Design

Adobe Photoshop and Illustrator.

Languages

Fluent in English, French, Hindi, Swahili, and Gujarati.

EXTRACURRICULARS

Contemporary Logic Design

Teaching Assistant *Fall '18 & 19*

- Thoroughly explain concepts and debug Verilog code related to digital logic and RTL design.

IgniteSTEM *Sept '18 - Present*

Team Lead for Sponsorships

- Coordinate with leaders from education-based firms and non-profits to talk at and sponsor our conferences, which are aimed at bringing an interactive, creative and project-based STEM curriculum to K-12 students

Princeton Tarana *Oct '19 - Present*

South Asian Acapella Group
Co-President and Base Soloist

EDUCATION

Princeton University *Class of '21*

B.S.E. in Electrical Engineering (focus in Quantum Information).
Certificates in Applied and Computational Mathematics, Robotics and Intelligent Systems, Applications of Computing, and Statistics and Machine Learning

Honors: Princeton Electrical Engineering Slingshot Fund Winner – Summer 2019

Relevant Coursework: Quantum Computing, Advanced Quantum Mechanics with Applications, M.L. and Pattern Recognition, Advanced Algorithm Design, E.M. Wave Theory and Photonics, Devices and ICs, Electronic and Photonic Devices, Contemporary Logic Design, Intro. to Programming Systems, Applied Algebra.

EXPERIENCE

Houck Lab, Princeton Electrical Engineering *Jun '19 - Present*

Undergraduate Researcher

- Improving the lifetime (T1 coherence time) of superconducting Transmon quantum-bits by attempting to reduce two-level-system losses at material interfaces and improving electrical connectivity between superconductors.
- Characterized fabrication techniques such as isotropic tapered etching of metals, deposition of new materials, and surface cleaning schemes through imaging techniques such as Scanning Electron Microscopy (SEM), Atomic Force Microscopy (AFM), and X-ray Photoelectron Spectroscopy (XPS).
- Learning to perform measurements such as transmission scans, two-tone spectroscopy, pulsed spectroscopy, Rabi Measurements, T1, T2 and T2* on superconducting qubits cooled to millikelvin temperatures.

Houck Lab, Princeton Electrical Engineering *Jun '18 – Aug '18*

Software Engineer, Research Assistant

- Designed an interactive Python GUI to help the other lab members design coplanar waveguide resonator circuits to simulate photonic lattices.

PROJECTS

Investigating the Effect of a Sawtooth Refractive Index Profile of Semiconductor Waveguides in Quantum Cascade Lasers *May '19*

- Investigated the eigenmodes of a sawtooth refractive index using a COMSOL simulation, by varying the wavelength or the number of teeth.

Retroreflectors for a Moving Airplane Wing *Mar '19*

- Proposed a system to investigate chemical plumes from forest fires using lasers.
- Designed a thin tape-like reflector to perfectly back-reflect a laser pointed from the top and to the tip of an airplane wing, while the wing flexes during flight.

Error Mitigation for Near-Term Quantum Computing *Feb '19*

IBM Qiskit Camp and Hackathon.

- Coded an error-mitigation technique that would intentionally introduce more errors into a quantum computer, and then extrapolate to a case of no errors.

Autonomous Obstacle-Avoiding Drone *Sept '18 - Present*

Princeton Robotics Club, Team Lead for Drone Hardware Team

- Programmed a RaspberryPi to interpret data gathered from an array of sensors, including time-of-flight sensors, cameras, and motor-encoders.