Kunj Shah

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EDUCATION

MS in Electrical Engineering | Rensselaer Polytechnic Institute, Troy NY   Aug 2020 - May 2021
- GPA: 4.00

BS in Mechanical Engineering | Rensselaer Polytechnic Institute, Troy NY   Aug 2017 - May 2020
- GPA: 3.58

ELECTRIC VEHICLE AND SUSTAINABILITY EXPERIENCE

Aurora Flight Sciences *(A Boeing Company)* | Sustainable Aircraft Electrical Engineer II - Power System Lead   Oct 2022 - Present
- Leading the architectural design of the 28VDC and 115VAC Low Voltage Power System (LVPS) and detailed design of 43 aircraft electrical harnesses in Capital Logic and Harness XC for NASA funded Electrified Powertrain Flight Demonstrator (EPFD)
  - Delegating tasking to 5 other engineers
  - Creating Failure Mode, Effects, and Criticality Analysis (FMECA) to inform design decisions and ensure safety
  - Conducting voltage drop analysis to ensure adequate power delivery to devices
  - Writing requirements to ensure power quality compliance as per MIL-STD-704 and DO-160
  - Producing and maintaining Functional System Diagrams (FSDs) and Harness Block Diagrams (HBDs)
  - Selecting appropriate MIL-DTL-D38999 and MIL-DTL-5015 connectors, multicore wires, shields, backshells, plugs, caps, and overbraid to meet aircraft requirements
  - Interfacing with the mechanical design team to inform harness layout decisions
  - Saved Aurora $15K in materials and labor by identifying and rectifying CAN standard noncompliance in 3 harnesses
  - Generating and documenting drawing revisions through Engineering Change Requests (ECRs)
- Created and maintained an Electrical Load Analysis (ELA) Excel spreadsheet for next generation Virgin Galactic Mothership to ensure adequate power delivery during normal and emergency flight phases in addition to suitable redundancy to achieve a failure rate of less than 10E-6
  - Reduced vehicle weight by 197 lbs by writing a Python script that interfaced with the ELA to optimize wire gauge while respecting derated wire ampacity as per AS50881 and appropriate worst-case voltage drop in normal and emergency cases as per DO-160

Alaka'i Technologies *(Sustainable Air Mobility Vehicles)* | Electric Powertrain R&D Engineer   Jun 2021 - Aug 2022
- Overhauled the existing hydrogen powertrain by pioneering an airworthy 500V hydrogen-battery hybrid system from conception to testing
- Developed ground support equipment for 296V lithium polymer battery charging, cooling, and communication (CAN)
- Designed harnesses to provide 18 kW of auxiliary power from DC/DC converter to support controllers, pumps, and fans
- Conducted power booking to appropriately allocate devices on 5V, 14V, 28V, and 56V buses from DC/DC converter
- Identified and rectified shock and fire safety hazards pertaining to the high voltage vehicle powertrain
- Designed a thermal test bench (electrical, mechanical, software, and plumbing) to validate powertrain components

Electric Vehicle Autonomous Charger Robot *(Personal Project)* | Inventor   Oct 2019 - Jun 2024
- Transforming EV ownership by developing a robot to autonomously plug in vehicles with a target >99% success rate
- Utilizing SolidWorks, Python, C and MatLab/Simulink to create the mechanical, electrical, and control systems
- Supporting potential future commercialization by optimizing the design for mass manufacturability

Enhanced Electric Delivery Vehicle Regenerative Braking Research at RPI | Graduate Researcher   Jun 2020 - May 2021
- Extended EV range by 5% by redesigning the drivetrain to improve regenerative braking performance
- Forecasted the theoretical range improvement by simulating the propulsion system in Dymola
- Validated the drivetrain's ideal application by performing a parametric study for vehicle ranging from 2000 to 10000 kg

Electric Vehicle Conversions 101 Pop-Up Course *(Privately Hosted Event)* | Instructor   Jan 2020
- Trained a class of 12 students on fundamental electronics, charging and motor technologies
- Illustrated the process of revitalizing an ICE vehicle by substituting in an electric drivetrain
- Exemplified safe troubleshooting methods for high voltage systems using multimeters and oscilloscopes

Luminescent Solar Concentrator (LSC) Research at RPI | Undergraduate Research Assistant   May 2019 - Aug 2019
- Instituted an experiment to assess the LSC's (an accessory for solar panels) performance
- Engineered a circuit to measure and log the panel's output at its maximum power point
- Quantified the LSC's effectiveness by processing the captured data in Excel and Matlab

Automatically Shifting Bicycle *(Personal Project)* | Inventor   Sept 2017 - Aug 2019
- Prototyped a bicycle accessory that could autonomously shift through 18 gear ratios based on sensor data
- Developed an Android app using Blynk to allow the user to set up the accessory with any bicycle
- Designed and manufactured a PCB, 3D printed enclosure, and sheet metal support structure

INTERNSHIP EXPERIENCE

Lawrence Berkeley National Lab *(Funded by US Dept of Energy)* | Science Undergraduate Laboratory Intern   Jun 2020 - Aug 2020
- Overhauled the ALS-U support structures to decrease the first natural frequency below 16.6 Hz
- Conducted and evaluated ANSYS modal analysis to pinpoint and rectify suboptimal geometric features
- Defeatured assemblies in PTC Creo to decrease element count for finite element analysis

Lutron Electronics *(Global Lighting Controls Manufacturer)* | Mechanical Engineering Co-Op   Aug 2019 - Dec 2019
- Developed 3 functional screw retention prototypes for an injection molded part to comply with UL standards
- Identified non-corrosive alternative lubricants for polycarbonate by conducting tensile testing
- Validated dimmer switch design changes by designing equipment to concurrently cycle 15 units

Precision Valves and Automation *(Conformal Coating Dispense Systems)* | Mechanical and Fluids Intern   May 2018 - Aug 2018
- Bridged the gap between design and manufacturing by producing nearly 50 detailed SolidWorks drawings
- Constituted pneumatic schematics for conformal coating fluid systems
- Improved CAD maintainability by restructuring over 30 parts and assemblies to be parametric

LEADERSHIP & EXTRACURRICULAR ACTIVITIES

ASME Robotics at RPI | President   Sep 2018 - Apr 2020
- Orchestrated a group of 15 students through the design process of building a robot for ASME SDC
- Developed and manufactured a robot with 6 independent motion systems with closed loop feedback
- Designed a circuit and PCB in Altium to control 12 motors (steppers, servos, and DC) via Bluetooth
- Instructed 4 classes of 15 students on the basics of mechanics, electronics, programming, and controls

SKILLS

Mechanical Software: PTC Creo & Windchill, SolidWorks & SolidWorks PDM, ANSYS, KeyShot, AutoCAD
Mechanical Skills: Prototyping, 3D printing, Machining, Laser Cutting, Power Tools, Injection Molding
Electrical Software: Eagle, Altium, Capital
Electrical Skills: Soldering, Breadboard Prototyping, Circuit Design/Analysis, PCB design, Multimeters/Oscilloscopes
Programming & Controls: C/C++, Arduino, Python, MatLab/Simulink, Dymola/Modelica, Git