JUSTIN SAPUN

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EDUCATION

Dartmouth College, Hanover, NH   **June 2025**
Bachelor of Engineering, Major in Computer Engineering: **GPA 3.93/4.0**
Relevant Coursework: Embedded Systems, Digital Electronics, Software Development
Honors/Awards: Tau Beta Pi, Academic Distinction Citation in Modern Statistic Computing

Bard College, Annandale-On-Hudson, NY   **June 2024**
Bachelor of Arts, Major in Computer Science: **GPA 3.85/4.0**
Relevant Coursework: Theory of Computation, Algorithms and Data Structures, Machine Learning
Honors/Awards: Dean's List 6/6 Semesters, Johns Hopkins Center for Talented Youth Annual Scholarship Recipient

PROFESSIONAL EXPIERENCE

DALI Lab, Hanover, NH   **December 2024-June 2025**
Embedded Engineer
- Developed a wearable sensor system to detect femoral nerve palsy in infants with developmental dysplasia of the hip, aiming to improve early diagnosis for patients using Pavlik harnesses using accelerometers and gyroscopes
- Partnered with Benchmark Space Systems to design and build a custom arcade cabinet running a Godot 4 game on a Raspberry Pi, featuring integrated joystick controls, CRT video output, and custom hardware wiring

Electrified Garage, Amesbury, MA   **June 2023-August 2024**
Technician
- Conducted comprehensive diagnostics, repairs, and software updates for electric vehicles, showcasing proficiency in EV systems and technology.
- Demonstrated strong customer service skills and prioritized safety compliance while assisting with electric vehicle conversions, contributing to a seamless and efficient service experience.

PROJECTS

Automatic Window Shades   **May 2024-Present**
- Created drivers for various hardware components for use with AVR microcontrollers including the L293D H-bridge, and DS3231 Real Time Clock, successfully integrating multiple systems.
- Engineered power consumption strategies, reducing idle consumption to 17uA for the transmitter, theorizing a battery life of up to 347 days, significantly enhancing device usability and sustainability.
- Currently constructing a prototype PCB to integrate all hardware components for enhanced efficiency and reduced size

High Power Deicing for Heat Pumps   **September 2024-March 2025**
- The objective is to integrate Pulse Electrothermal De-icing technology into Air Source Heat Pumps to enhance cold climate efficiency, targeting a 75% reduction in defrosting energy and a seasonal Coefficient of Performance increase to over 3.0
- Prototyped modular evaporator coils with 2.4 mΩ resistance; calculated PETD deicing energy use of 272 kJ per cycle compared to 1140 kJ in traditional systems; validated a potential 18% reduction in annual heating costs for residential users

Electric Motorcycle Conversion   **August 2023-August 2024**
- Designed and built a 30-series LiFePo4 battery pack managed internally by a BMS. Implemented three speed functions and variable regenerative braking displayed on an LED screen. Tested HV and LV systems to ensure basic operation.
- Independently designed and constructed the low voltage electrical system ensuring seamless integration of new components and compliance with safety standards.

FPGA Morse Code Decoder   **March 2023-June 2023**
- Designed and implemented a digital Morse code decoding game using FPGA technology, achieving 100% real time decoding accuracy and processing user inputs within a response time of 40 milliseconds.
- Developed a robust state machine and data path that successfully interprets Morse code signals transmitted from 2 button inputs, allowing for seamless mapping to ASCII characters displayed on a VGA monitor.

Analog Inverted Pendulum Control System   **March 2023-June 2023**
- Developed a dynamic model of an inverted pendulum system on a battery powered car by successfully deriving a final transfer function through analysis of motor dynamics, sensor behavior, and force to angle relationships.
- Implemented a PID controller achieving a closed loop system with less than 50% peak overshoot and a settling time of 0.65 seconds, meeting design specifications for fast response to disturbances.

LEADERSHIP, SKILLS & INTERESTS

Leadership: Volunteer Ski Patroller, Dartmouth Men's Volleyball, Vice-President of Economics and Finance Club
Programming Languages: Python, C, C++, Java, VHDL, MATLAB, HTML, SHELL
Software Skills: Algorithm Development, Data Analysis, Linux, GitHub, CLI, SSH, Databases, PCB Design, SolidWorks, CAD