Roheen Sharifi

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SUMMARY

Biomedical Engineering student at Virginia Tech with experience building embedded and software-based systems using Python, Java, and ESP32 microcontrollers. Developed real-time biomedical sensor projects, data analysis workflows, and AI-oriented technical foundations, with strong interests in software engineering, machine learning, and health technology.

EDUCATION

Virginia Polytechnic Institute and State University **Blacksburg, Virginia**
B.S. in Biomedical Engineering *Expected Graduation, May 2028*

TECHNICAL SKILLS

- Languages: Python, Java, Arduino/C++.
- Hardware & Embedded: ESP32, MAX30102, I2C communication, OLED interfacing, sensor integration, data streaming.
- Tools: VS Code, PlatformIO, GitHub, MATLAB, SOLIDWORKS, Excel.
- Data & Software: Data visualization, CSV processing, signal smoothing, linear regression, basic biosignal analysis.

CERTIFICATIONS

MathWorks **May 2026**
Medical Image Processing: *Learned foundational medical imaging analysis and visualization techniques.*
Powering the Future with Electrification: *Explored electrification technologies and sustainable energy systems.*

Johns Hopkins University **May 2026**
Foundations of Healthcare Systems Engineering: *Studied healthcare systems optimization and engineering applications in medicine.*

Google **March 2026**
Google AI Essentials Specialization: *Developed foundational skills in AI concepts, prompt engineering, and responsible AI use.*
Crash Course on Python: *Learned core Python programming and problem-solving fundamentals.*

The Computing Technology Industry Association **June 2024**
CompTIA ITF+: *Demonstrated foundational knowledge of IT systems, networking, and cybersecurity.*

PROJECTS

ESP32 Biomedical Monitoring System | Arduino/C++, ESP32, MAX30102, OLED, Python
June 2026
Wearable Parkinson's Tremor Detection Prototype | ESP32, MPU6050, Arduino/C++, Python, Wi-Fi Dashboard
• Built a wearable biomedical motion-sensing prototype using an ESP32 and MPU6050 accelerometer/gyroscope to classify wrist movement in real time.
• Programmed the ESP32 in Arduino/C++ to collect raw x/y/z acceleration and gyroscope data and stream live sensor readings for analysis.
• Developed a Python signal-processing and machine-learning-style classification pipeline using RMS motion intensity, gyroscope intensity, peak frequency, tremor-band detection, and harmonic frequency features.
• Classified movement into resting/no major movement, tremor-like rhythmic movement, and normal large movement using recorded datasets and live sensor input.
• Created and tested labeled datasets for resting motion, simulated tremor, and normal wrist movement to validate the classification system.
• Built an ESP32 Wi-Fi phone dashboard prototype, allowing the device to host a local webpage and display live classification results through a phone browser without an LED or OLED screen.
• Documented the project on GitHub with code, wiring details, datasets, images, and a README for portfolio presentation.
April 2026
AI Stress and Sleep-Quality Detection System | ESP32, MAX30102, GSR Sensor, Arduino/C++, Python, Machine Learning
• Built a biomedical stress-detection prototype using an ESP32, MAX30102 heart-rate/SpO_2 sensor, and Grove GSR sensor to collect physiological signals related to stress and arousal.
• Programmed embedded sensor communication and serial data streaming to collect heart-rate, pulse-wave, and galvanic skin response data for analysis.
• Created labeled data sessions including calm, stress, and recovery recordings to support physiological state classification.
• Developed a Python-based machine learning workflow using extracted GSR, pulse, and heart-rate features including mean, standard deviation, range, slope, and signal variability.

• Trained and tested a supervised classification model to distinguish stress-like physiological states from calmer baseline recordings.
• Built Python scripts for live logging, CSV processing, visualization, feature extraction, and prediction from recorded biosignal sessions.
• Designed the system as an early AI health-tech prototype connecting wearable sensing, physiological signal processing, and machine learning classification.

March 2026

ESP32 Heart Rate and SpO_2 Monitoring System | ESP32, MAX30102, OLED, Arduino/C++, Python

• Built a real-time heart-rate and SpO_2 monitoring prototype using an ESP32, MAX30102 optical biosensor, and OLED display.
• Programmed the ESP32 in Arduino/C++ to collect pulse-wave, BPM, and oxygen-saturation data from the MAX30102 sensor.
• Integrated OLED output to display live biomedical readings directly from the embedded system.
• Developed Python tools for serial data logging, CSV storage, live visualization, and biosignal trend analysis.
• Created an ML-ready data pipeline for future anomaly detection and physiological pattern classification using collected heart-rate and pulse-wave data.
• Used sensor calibration, signal smoothing, and live plotting to improve the reliability of recorded biometric data.

Engineering Design and Software Projects | SOLIDWORKS, Java, Python, Excel

May 2024 – Jan 2025

SolidWorks CAD

• Designed and modeled a wind turbine frame in SOLIDWORKS, applying engineering design principles to create a scaled structural prototype for renewable energy applications.
• Fabricated a wooden wind turbine prototype using laser-cut manufacturing techniques, translating CAD geometry into a physical build and improving understanding of design-for-manufacturing constraints.

Java

• Developed object-oriented Java programs including a real-time particle simulation with motion tracking, collision detection, and interactive visual behavior.
• Built a Battleship game in Java using object-oriented programming, grid-based logic, user input handling, and AI targeting behavior to simulate strategic gameplay.

Excel

• Analyzed ethanol concentration and yeast fermentation data using CO_2 measurements, percent-change calculations, and linear regression modeling in Excel to evaluate biological reaction trends.
• Created Excel-based data analysis workflows using tables, formulas, graphs, and trendlines to interpret experimental results and support engineering conclusions.

Python

• Built a Python demographic index tool using weighted scoring logic and an interactive user interface to calculate and compare index scores across user-defined inputs.

ACTIVITIES/ROLES

Heritage High School Muslim Student Association (MSA), Vice President

Aug 2023 – Jan 2024

• Served as Vice President of the Muslim Student Association, supporting student engagement, event planning, and community-building initiatives.
• Helped coordinate meetings, school events, and outreach efforts by communicating with members, student leaders, and faculty staff.
• Assisted in organizing cultural, religious, and service-oriented activities that promoted inclusion, leadership, and student involvement.
• Strengthened leadership, communication, teamwork, and organizational skills through planning responsibilities and collaboration with school administration.