Mohammed Al Ani

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Education

University of Waterloo — Waterloo, ON

Bachelor of Applied Science in Mechatronics Engineering — GPA: 3.94/4 — *Sept. 2024 – June. 2029*

- Engineering Scholarships: Awarded $10,000+ for outstanding academic and extracurricular performance
- **Coursework:** Data Structures, Circuits, Control Systems, Embedded Systems, Algorithms, Machine Learning
- Dean's Honours List for outstanding academic achievement

Experience

Hardware Engineer — Oct. 2024 – Present

Midnight Sun Solar Car Team — *Waterloo, ON*

- Designed and tested **electrical circuits** for solar vehicle components, improving energy efficiency by 15%
- Developed and validated modular battery management and power distribution systems for optimized energy use
- Modeled and simulated lightweight aluminum mounting brackets in **SolidWorks** to reduce structural mass

External Affairs Coordinator — Nov. 2024 – March. 2025

Waterloo Nanotechnology Conference — *Waterloo, ON*

- Negotiated sponsorship agreements and coordinated with speakers, securing industry leaders & keynote presenters
- Persuaded industry leaders and academics to join, contributing to a 20% increase in sponsorship and involvement

Projects

PID Control System, Robotic Path Correction | *Spike Legacy, Python, Robotics*

- Programmed a PID controller in Python to autonomously correct robot trajectory based on sensor feedback
- Integrated gyroscope and distance sensors to maintain course stability, compensating for external disturbances
- Simulated dynamic system response in SPIKE Legacy to optimize control parameters for faster stabilization

Triboelectric Nanogenerator (TENG) | *SolidWorks, Engineering*

- Designed, prototyped, and tested a triboelectric nanogenerator capable of consistently producing 6 volts of output
- Utilized SolidWorks to create a highly detailed 3D model and iteratively refine the design for optimal functionality
- Integrated a PET flap layer to enhance contact electrification, increasing voltage output by 15% during testing.

Robotic Arm Joint Prototype & Kinematic Analysis | *SolidWorks, ANSYS, MATLAB, FEA*

- Designed a multi-axis **robotic arm** joint prototype with precise, smooth motion control using **SolidWorks**
- Performed kinematic and dynamic **simulations** in **MATLAB** to optimize range of motion and torque efficiency
- Validated prototype under expected operational loads through FEA for durability and performance in **ANSYS**

Smart Temperature and Humidity Logger | *Arduino, C++, DHT22 Sensor*

- Designed a system using Arduino and DHT22 sensor to continuously monitor temperature and humidity levels
- Programmed automated data logging to an SD card with precise timestamps for long-term environmental tracking
- Configured **alert system** with **LEDs** to signal when readings exceed preset thresholds for safety monitoring

VEX Automated Sorting Robot | *VEXcode, C++, Sensors*

- Designed and programmed a robot system to identify and efficiently sort colored objects using a color sensor
- Developed algorithms to control motor actuators for precise object pickup and placement into designated bins
- Integrated sensor feedback loops, enhancing sorting accuracy and system reliability over repeated cycles

Technical Skills

Languages : Python, C++, Java, JavaScript, SQL, MATLAB, HTML/CSS
Frameworks/Libraries : NumPy, Pandas, OpenCV, TensorFlow, Simulink, Scikit-learn, Matplotlib, PySerial
Software & Tools : SolidWorks, AutoCAD, ANSYS, MATLAB, SPIKE Legacy, Git, Docker, Jupyter, Arduino IDE
Office Tools : MS Office Suite, Google Workspace, Slack, MS Teams, Report Writing, Drafting, Excel Sheets, Power BI