

# Sivan Syed



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## EDUCATION

The University of Texas at Austin (GPA: 3.8/4.0)

Bachelor of Science, **Electrical and Computer Engineering**

Certificate, **German**

May 2027

Bachelor of Science, **Physics**

Minor, **Materials Science and Engineering**

**Relevant Coursework:** Circuit Theory, Electromagnetic Engineering, Computational Physics, Fluid Dynamics, Solid-State Electronic Devices, Thermodynamics and Statistical Mechanics, Mechanics of Solids, Embedded Systems, Fundamental Electronic Circuits, Dynamics

## EXPERIENCE

Adom Industries Inc. / R&D Design Engineer / Electrical and Robotics Engineering

May 2025 – August 2025

- Designed the **mechanical** and **electrical systems** for robotic shuttle drivetrain to pick up and deliver circuit boards autonomously
- Applied **FEA** methods to analyze stress, strain, and deformation, **reducing material usage** by 88%

Sandia National Laboratories / R&D Computational Engineer / Pulsed Power Physics

May 2024 – August 2024

- Analyzed fluid **RTIs** and **RMI**s to diagnose inaccuracies in **ALEGRA simulations**
- Built a fast **current-pulse generator** to synthesize **10k+ waveforms** for ML-aided **surrogate modeling** and **UQ pipelines**
- Wrote **ODE/trajectory solvers** to track radial liner implosions and compare ALEGRA predictions and observed instability spectra

FSAE Longhorn Racing / Dynamics + Vehicle Modeling Engineer / Steering Lead, Member

September 2022 – August 2025

- Designed an anti-Ackermann geometry with **compliance modeling** to tune **slip-angle behavior**; verified through Python simulation and track feedback loops
- Re-engineered** steering column using **carbon-fiber** layups, cutting system weight  $\approx 68\%$  while **maintaining torsional rigidity**
- Created a **modular** gearbox CAD stack (GD&T, CNC and composite fab) with fast-swap adjustability for testing days

Large Enriched Germanium for Neutrinoless Double-beta Decay – Karol Lang / High Energy Particle Detectors November 2022 – Present

- Analyzing **scintillating** and **wavelength shifting fibers** to detect the neutrinoless double-beta decay
- Visualized** and analyzed **positional and intensity variation** from Fermilab's Hadron Monitor for preparation to be repaired
- Simulating** through a **Docker supported codebase**, MaGe, photon emissions from scintillating fibers

## Projects

Surrogate ML Model for Magneto-Hydrodynamics Radial Trajectory Prediction

**Relevant Skills:** Neural Network, MATLAB

- Implemented an **FNN Machine Learning model** to replicate **Magneto-Hydrodynamics simulations** with  $>98\%$  fidelity
- Utilized for rapid High Energy Density simulations and iterative design of future tests

Vehicle Dynamics and Modeling

**Relevant Skills:** Vehicle Modeling, Computational Dynamics, Simulation, Python, C++

- Created a **kinematic model of the vehicle** to **optimize car performance** and stability
- Designing **compliance model** to **simulate** stress of vehicle parts and implement **collision detection** through FEM

Weather-Damage Forecasting **Relevant Skills:** Python, XGBoost, PyTorch, Predictive Analysis, Data Visualization, Data Analysis, LSTM

- Predicted** damage with an **LSTM model** with  $>98\%$  accuracy to set optimal insurance prices and maximize profits
- Explored numerous **time analysis approaches** such as **ARIMA**, **LSTMs**, and a **Transformer model**, comparing and optimizing each

Plasma Physics Fusion Reactor Anomaly Detector

**Relevant Skills:** Python, XGBoost, sklearn, PCA, Kaggle, Anomaly Detection, RNN

- Developed and compared **PCA + Random Forest anomaly detection** models for when MIT's tokamak fusion reactor was unstable
- Simulated with **time series analysis** models such as **RNNs** for fusion reactor conditions during runtime

Transformer Model for Pulse Shape Discrimination

**Relevant Skills:** Transformer Theory, Neural Network

- Developing **Pulse Shape Discrimination Methods** of radioactive sources and incorporating a Transformer model for optimization
- Cleaning data for input use into the Transformer and achieving  $>98\%$  accuracy as reported

Steering Gearbox

**Relevant Skills:** CAD, SOLIDWORKS, ANSYS, Manufacturing, CNC, Manual Mill, Lathe

- Performed **stress analyses** of various parts with **finite element analysis** from **Ansys** and **SOLIDWORKS**
- Calculated by hand steering efforts and ratios with high level **vehicle modeling** and **computational verification**

Ping Pong Ball Equilibrium Robot

**Relevant Skills:** Mechatronics, Robotics, Controls, C, C++

- Developing **inverse kinematics** and **PID control** of a **robotic platform** for precise movement correction within  $\pm 0.5$  mm accuracy.
- Programming **firmware** for **motor control**, and **microcontrollers** in **C/C++** to interface with IMUs, encoders, and servo motors.

## SKILLS

**Software Language Proficiencies:** Rust, C, C++, ARM, Python, MATLAB, Bash, JS, HTML, CSS, LaTeX

**Simulation/Modeling Software:** Fusion360, KiCAD, LTSpice, FLASH, MaGe, SOLIDWORKS, VCarve, Inventor, Ansys