SHRUTAM OSWAL

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PROFESSIONAL SUMMARY

A results-driven Mechanical Engineer who bridges the gap between digital design and physical reality. Combines deep expertise in **CAD, FEA, and CFD** with hands-on fabrication skills (**TIG Welding, 3D Printing**) to lead projects from concept to completion. As a **Lean Six Sigma Green Belt** and former **Robotics Team Captain**, I bring a unique, data-driven methodology to optimize system performance and deliver tangible business results.

AREAS OF EXPERTISE

- **Design & Analysis: :** SolidWorks, PTC Creo, DFM, FEA (ANSYS), CATIA
- **Fabrication & Prototyping:** MEMS Cleanroom Fabrication, 3D Printing, Rapid Prototyping, TIG Welding
- **Quality & Process Optimization: :** Lean Six Sigma, Statistical Process Control (SPC), DMAIC, DOE, Minitab
- **Mechatronics & Controls::** System Integration, Motor Sizing & Selection, Pneumatics, Arduino, C/C++, MATLAB, Raspberry Pi
- **Data Analysis & Programming::** MATLAB, Minitab, Python, C++, C#

PROFESSIONAL EXPERIENCE

University of Illinois - Chicago **Chicago, IL, USA**
Research Assistant UGV Navigation & Control | UIC Robotics and Motion Lab *September 2025 - Present*
- Developing an autonomous navigation stack in ROS for an Unmanned Ground Vehicle (UGV).
- Integrating and fusing data from LiDAR, IMU, and GPS to enable robust localization and path planning.
- Applying control theory to optimize navigation stability and authoring Python scripts for autonomous obstacle avoidance.

Hyster-Yale Group **Pune, MH, India**
Research and Development Controls Engineer *November 2021 - July 2023*
- Accelerated system performance validation by 30% by modeling and simulating complex electromechanical systems, including hydraulic actuators and electrical powertrains.
- Ensured 100% compliance to EN 1175 safety standards, leading HIL/SIL/MIL testing and conducting robust root cause analysis on integrated systems.

Tech Mahindra- Makers Space **Pune, MH, India**
Mechanical Design Engineer Intern *November 2019 - July 2020*
- Optimized a rocker-bogie suspension system for stability and cost, achieving a 20% reduction in material usage through iterative FEA simulation in CATIA V6 and SolidWorks.

PROJECTS & OUTSIDE EXPERIENCE

ABU Asia-Pacific Robot Contest
Robotics Team Captain *2017 - 2021*
- Led a multidisciplinary team to design, fabricate, and deliver a 23 kg competition robot from concept to reality, leading all mechanical design and system integration efforts.
- Engineered a lightweight 11 kg TIG-welded aluminum chassis and a multi-axis pneumatic manipulator in SolidWorks, performing all motor sizing and torque calculations to integrate a high-performance Mecanum wheel powertrain.
- Programmed and integrated the full powertrain using Arduino, selection of size all motor drivers and the 24V Li-Ion battery system.

Automated Bottle Capping Station (Hardware Hackathon Winner)
Undergraduate Student *2019 - 2019*
- Owned the design, fabrication and prototyping of an automated capping station, SolidWorks design to sensor selection (LiDAR, proximity) and actuator integration (pneumatics, motors, motor drivers).
- Programmed the Arduino control system (C++) to manage all I/O and execute the complete operational sequence.
- Commissioned and validated the system, tuning actuator timings to achieve a reliable throughput of 23 bottles/minute.

Enclosure Design for Electronic Systems (DFM & FEA) **Chicago, IL, USA**
Research Assistant *2023 - 2024*
- Engineered a multi-part sensor enclosure in SolidWorks, focusing on Design for Manufacturability (DFM) for injection molding and rapid prototyping via 3D printing.
- Applied cantilever beam theory to design robust snap-fit joints, calculating permissible deflection and strain limits to ensure durability over multiple assembly/disassembly cycles.
- Conducted a DFMEA to proactively identify and mitigate potential failure modes (e.g., hook fracture, fatigue), leading to material selection of ABS for its optimal balance of elasticity and strength.
- Validated the design's structural integrity against drop-test scenarios using FEA simulations in ANSYS.

Six Sigma DMAIC Project: Robotic Wafer-Handling Optimization **Chicago, IL, USA**
Graduate Student
- Slashed a critical robotic wafer-handling defect rate from 12% to <5%, leading a Six Sigma project that directly restored production efficiency and reduced rework costs.
- Pinpointed root causes of wafer damage by applying Fishbone Diagrams and regression analysis to isolate inconsistent torque application and mechanical drift as the primary failures.
- Authored the control plan, developing and piloting an automated torque calibration algorithm and an optimized predictive maintenance schedule to ensure long-term process stability.

EDUCATION

University of Illinois - Chicago **May 2025**
Master's, Mechanical Engineering *GPA: 3.7*