

Sana F. Hafeez

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EDUCATION

- Carnegie Mellon University, Pittsburgh, PA** May 2026
- Mechanical Engineering, Master of Science - Research Track
 - Computational Engineering and Robotics Lab (CERLAB)
 - 3.8/4.0
- Georgia Institute of Technology, Atlanta, GA** May 2024
- Mechanical Engineering, Bachelor of Science
 - Concentration in Automation and Robotic Systems
 - High Honors

PROFESSIONAL EXPERIENCE

- Intuitive Surgical, Manufacturing Process Engineering Intern, Systems** May 2024- August 2024
- Drafted detailed multiview drawings of equipment, fixture, and tooling part designs and assemblies using GD&T annotations
 - Conducted root analysis of manufacturing failures for a PCA integration tool and created a tool redesign, saving an estimated \$60,000
 - Performed data analysis determining primary structural failure mode for vendor supplied component
- Amazon Robotics, Hardware Development Engineer Co-op** January 2022 – June 2022
- Won innovation contest, competing against full-time engineers, to improve delivery van packing capabilities with robotic solution
 - Designed and prototyped mechanical systems and support infrastructure for autonomous units intended for micro fulfillment centers
 - Executed testing procedures to establish efficacy of developing pick and place programs
- Invention Studio at Georgia Tech, Prototype Instructor, 3D-Print Tool Group Lead** December 2021- May 2024
- Spearheaded introduction of metal-composite 3D printing including equipment scoping and implementation of operating procedures
 - Technical lead responsible for repair, maintenance, supplying of 50 FDM, SLA, and specialty 3D-printers valuing \$200,000 total
 - Established protocols and trained ~500 students, researchers, faculty to assist in design process from ideation to manufacturing
- Georgia Tech Research Institute, Undergraduate Research Intern, Dr. Mick West** May 2021 - July 2021
- Designed enclosure for underwater robot's communication system (Lagrangian Float)
 - Identified and repaired point of failures including malfunctioning variable buoyancy pressure vessel

RESEARCH AND PROJECTS

- Robotic Crokinole Opponent, Electromechanical System Design Capstone** August 2024 - December 2024
- Created computer vision system using OpenCV and Raspberry Pi 4B to determine accurate positional data of all game discs
 - Designed game strategy state machine and path planning algorithm, programmed on Arduino
 - Won "Best Prototype" at Carnegie Mellon's Tech Spark Engineering Expo
- Total Shoulder Arthroplasty Retractor Set, restor3d** January 2024 – May 2024
- Won "Best Mechanical Engineering Project" at Georgia Tech's Capstone Expo, exhibition with over 200 projects by senior students
 - Developed five retractors to outperform existing options by optimizing glenoid access and minimizing tissue damage, surgeon tested
 - Designed in Solidworks and manufactured in-house using sheet metal fabrication methods over 4 rounds of iterations
- Multi-Material 3D Printing & Sintering, Dr. Ellen Mazumdar, Atlanta, GA** August 2022 – August 2023
- Characterization of 3D-printed metal-PLA composites investigating applicability in mechanical and electrical systems
 - Designed and implemented testing procedures for mechanical properties of sintered components following ASTM standards
 - Won President Undergraduate Research Award for project proposal
- Aqua-Bots, Dr. Mick West, Atlanta, GA** August 2019 – December 2021
- Designed chambers of a modular autonomous underwater vehicle capable of exploring the Antarctic ice shelf using SolidWorks
 - Conducted thermo-fluid analysis to verify thermal limits of electronics bay would not be exceeded
 - Coordinator for project development timeline, team deliverables, and lab presentations

SKILLS

Software: MATLAB, Simulink, Python, C++, CMake, OpenCV, Java, LabVIEW, Microsoft Office Suite, SAP, Agile, Windchill

CAD: Siemens NX, Fusion 360, Solidworks, Inventor, AutoCAD, Blender, OnShape

Fabrication: 3D Printing Repair and Maintenance (Bambu, Creality Belt, Formlabs, Prusa, Markforged, Ultimaker), Manual Milling, CNC Milling, Metal Machining, Wood Machining, Water Jet, Laser Cutter, Arduino, Raspberry Pi, Soldering, Sewing

Concepts: Advanced Part Modeling, Design for Manufacturing, Machine Design, Electromechanical System Design, Material Selection, Rapid Prototyping, Robotics, Control Design Systems, Computer Vision, Additive Manufacturing, Engineering Computation