Joel Jacob

joelj@andrew.cmu.edu | 914-350-0775 | linkedin.com/in/joeljacob2006 | joel-jacob.com

Education

Carnegie Mellon University – BS in Mechanical Engineering — Expected May 2027

Skills

Software:	Onshape, SolidWorks, Ansys Discovery, UltiMaker Cura, Git
Embedded Systems:	Python, MATLAB, Java, C++, Arduino, Raspberry Pi
Manufacturing:	3D Printing, Machining, Fabrication, Laser Cutting, Soldering, Mechanical Assembly

Projects

NASA Lunabotics Challenge — Nov 2025 – Present

- Designed excavation subsystem components for the NASA Lunabotics Challenge as a member of CMU Moon Miners, focusing on efficient lunar regolith collection, while ensuring compatibility with chassis and sensor mast
- Devised a dual-channel bucket excavator design capable of a mass flow rate of $3.8\,\mathrm{kg\,s^{-1}}$ using SolidWorks
- Performed structural FEA in Ansys Discovery to optimize weight while maintaining required safety factors

Combat Robot — Sept 2024 – Present

- Founded a new robot project under CMU Combat Robotics, coordinating a team to design, develop, and manufacture a 3-lb undercutter combat robot to compete in the National Havoc Robot League.
- Designed 10+ custom structural parts on Onshape, notably a bespoke TPU chassis and AR500 steel spinner weapon, to reliably troubleshoot part interactions before machining and 3D printing
- Calculated ideal motor Kv with MATLAB and evaluated the weapon's 3-dimensional mass moments of inertia (using formulated ideal hook and relief angles) to balance tangential force output and angular frequency

FIRST Robotics Team 5123 — Oct 2021 – June 2024

- Oversaw the 12-member control department as the director to architect, network, and program a complete CAN bus-based wiring and controller system to win the FRC NYC Regional Championship in 2023
- Implemented Java command-based robot code with 5 specific subsystems, notably coding a custom driver input scheme that was more efficient and intuitive than the standard options to increase driving precision
- Reduced steady-state error by 65% by integrating Raspberry Pi with PhotonVision for visual odometry and pose estimation and by calibrating delays and PID gains to achieve autonomous driving

Experience

Research Assistant, Carnegie Mellon University – Pittsburgh, PA — Sept 2025 – Present

- Developing a wearable assistive device as a member of the MetaMobility Lab at CMU using sensors and deep learning, contributing to augmented human mobility and improved user assistance capabilities
- Redesigning hip exoskeleton hardware for improved user fit by applying human biomechanics principles, leveraging SolidWorks and 3D printing to achieve precise motor-joint alignment and a 30% weight reduction.

Retail Sales Associate, S & A Stores Inc – Bronx, NY — June 2025 – Aug 2025

- Maintained organization of products across high-traffic areas, integrating loss prevention protocols, to improve overall customer experience, comply with presentation standards, and reduce product stock-outs by 20%

Green Team Associate, Groundwork Hudson Valley – Yonkers, NY — June 2022 – June 2024

- Reduced harmful sources against native biota by taking part in environmental engineering at over 20 job sites