

Jack Weigand

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Education

University of California, Merced | Merced, CA

Bachelor of Science, Mechanical Engineering

May 2028

Relevant Coursework: Fluid Mechanics, Materials Science, Numerical Methods, Statics and Dynamics

Relevant Experience

Formula SAE EV - Bobcat Racing | UC Merced

Aerodynamics Team Lead

2026 – Present

- Lead a **15-member aerodynamics subteam**, the largest in team history, across front wing, rear wing, cooling, and body panel groups, setting season milestones, running weekly work sessions, and mentoring new members in CFD and composites manufacturing.
- Secured **\$13,000+ in donations** (19 times the subteam's season budget), including prepreg carbon fiber from TCR Composites, vacuum bagging supplies from Airtech, and simulation licenses from Ansys, through cold outreach to 35+ suppliers.
- Developed **\$100 3D-printed prepreg molds** as an alternative to machined aluminum tooling, heat testing glass-filled high-temp PLA to 340°F to confirm it could survive a 310°F cure, then annealing the printed molds and curing the team's first prepreg carbon fiber part.
- Designed a **swan neck rear wing mount** with bonded carbon fiber ribs, using SolidWorks FEA across six load cases to size the 6061-T6 aluminum strut to a minimum factor of safety of 2.3.
- Leading design of the **dual-radiator cooling system** for the car's Emrax motor, modeling heat load, pump operating point, loop pressure, and fan airflow to size components within the motor's flow and pressure limits.
- Implementing **2D-to-3D correction algorithms** in the rear wing CFD optimization pipeline to predict 3D wing behavior from 2D CFD results at a fraction of the computing cost.

Rear Wing Lead

2024 – 2026

- Designed and manufactured the team's **first carbon fiber rear wing**, producing over **50 lbf of downforce at 39 mph**, working with the chassis team on mounting hardpoints and FSAE rule compliance.
- Built an **automated CFD optimization pipeline** using DAKOTA and SU2 on UC Merced's Pinnacles HPC cluster, running evolutionary algorithms across wing configurations to reach **50% more downforce** than the initial design while maintaining drag efficiency.

Project Experience

Robotic Arms | Personal Projects

Summer 2026

- Designed, 3D printed, assembled, and wired a **3-axis robot arm** powered by NEMA 17 steppers with **19:1 planetary gearboxes** for torque, controlled by custom ESP32 firmware with magnetic encoder feedback.
- Trained the custom arm to dribble a ball in NVIDIA Isaac Sim using **reinforcement learning**, designing the arm's observations and refining the reward function.
- Trained an **imitation learning** pick-and-place policy for an open-source SO-101 arm in LeLab, recording demonstrations by teleoperating it with a leader arm.
- Trained a ball pick-and-place policy for the SO-101 in NVIDIA Isaac Sim with randomized textures, gravity, and ball size and shape, achieving **sim-to-real transfer** to the physical arm.

Skills

CAD & Simulation: SolidWorks (FEA), Onshape, ANSYS Fluent, SU2, OpenFOAM, Gmsh, DAKOTA (optimization), ParaView, NVIDIA Isaac Sim

Fabrication: Carbon fiber and fiberglass composites, prepreg layup and oven cure, wet layup, vacuum bagging, mold design, hot wire foam cutting, 3D printing

Software & Tools: Arduino, ESP32, Git, SLURM (HPC job scheduling), Claude Code