Maximilian **Kowalski**

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Education

University of Colorado, Boulder: BS in Mechanical Engineering — *Boulder, Colorado*

Grad Courses: Design for Manufacturability, and Mechatronics and Robotics — *Aug 2019 – May 2023*

Technical Skills

Design/Analysis: SolidWorks CSWA, SolidWorks Analysis, NX, CREO, Fusion360, 6SigmaET, Mesh Editors, Various PDM Systems

Programming: C++, Python, Matlab, Simulink, Arduino, ROS2 Humble, MoveIt2

Engineering: GD&T, DFM, DFA, Manufacturing and Assembly Instructions, Systems Engineering, Team Management

Manufacturing: 3-axis and 5-axis CNC milling, CNC router, lathe, TIG/MIG Welding, FDM/SLS/SLA 3D printing, Bandsaw, Drill Press, Hand Tools

Professional Experience

Kazvu Labs — *Anahiem, California*

Electro-Mechanical Engineer — *May 2024 – Present*

- Co-designed, built, and integrated a novel 1.8 m 7-axis collaborative robotic arm for human-centric tasks for commercial environments.
- Owned end-to-end development of three custom actuator sizes utilizing strain-wave gearboxes and 3-phase BLDC motors (∼63–298 Nm), including architecture, detailed design, part selection, verification testing, manufacturing, and assembly.
- Integrated a custom friction-pin brake, dual high-resolution absolute encoders, and precision bearing preload, and commissioned/tuned COTS motion controllers, including electrical interface design, wire harnessing, and full system-level integration.
- Analyzed joint torque data from recorded robot trajectories to ensure proper actuator sizing and reliability of brake system. Contributed to a multi-modal structural optimization, analyzing robot permutations through Forward Kinematics-based workspace exploration and Jacobian analysis.
- Delivered alpha unit in 13 months at ∼50% of UR10e BOM cost with +/- .5mm accuracy and 100% workspace coverage.
- Owned setup of SolidWorks 3DEXPERIENCE PDM and a standardized, unique part numbering system and the transition to NX with an on-prem server deployment
- Architected and prototyped modular mobile robotic tooling systems to support a wide range of surface-interaction and material-handling processes.

SV Automotive Engineering — *Ontario, California*

Engineering Intern, Mechanical Design Engineer — *June 2021 - August 2021, November 2023 – May 2024*

- Supported custom vehicle builds through part design, collaboration with third-party manufacturers, independent assembly projects, parts list generation, and hands-on engineering support across multiple programs.
- Designed 3D-printed electronic enclosures and engineered bespoke components for key projects, such as, a crashed Porsche 959, fully reassembling a vintage ’67 911S, and performing meticulous disassembly and diagnostics on a totaled BMW X5.
- Completed reconstruction of a scrapped car from a train crash to a SEMA design show finalist with the CSF SEMA 911 project car.
- Designed and fabricated a twin turbo, Chromoly, Pagani styled exhaust system, and installed an engine for a Martini Racing-inspired ’78 911.

Eberspächer VAIREX — *Lafayette, Colorado*

Manufacturing Engineering Intern — *June 2023 – August 2023*

- Engaged in identifying and implementing process enhancements, playing a pivotal role in the reorganization and optimization of facility setups.
- Conducted work studies to identify and address operational inefficiencies within the process.

Mercury Systems - Mission Systems Division — *Torrance, California*

Mechanical Engineering Intern — *June 2022 – August 2022*

- Developed a comprehensive thermodynamic model of an avionic mission control system and a head-mounted display.
- Conducted thermal characterizations utilizing 6SigmaET, leveraging material qualities and thermodynamic equations to ensure optimal performance.
- Implemented design enhancements in Creo and SOLIDWORKS managed changes with OnePDM to optimize heat sink thermal efficiency.

Engineering Projects

Industry Capstone Project: Autonomous Rover for Landfill Methane Monitoring — *Design Center Colorado*

CAD/Manufacturing Engineer — *August 2022 - May 2023*

- Designed and built a proof-of-concept autonomous rover for the Hannigan Air Quality Lab and Waste Management to collect SEM data in landfill environments and evaluate low-cost automation feasibility, owning all SOLIDWORKS CAD (design, revisions, drawings), FEA of critical components, fabrication/manufacturing reviews, and integration with electronics.

Mobile Vision-Guided Projectile-Launching Robot Platform — *MCEN 5115 - Mechatronics and Robotics I*

Engineering Team Leader — *August 2022 - May 2023*

- Utilized a state-space model to navigate a predefined field, using sensing and OpenCV color detection to locate an opponent’s balloon, and accurately launch projectiles via a mecanum-drive platform with a high-speed flywheel launcher.

Manufacturability Reports — *MCEN 5045 - Design for Manufacturability*

Engineering Team Leader — *January 2023 - May 2023*

- Led team-based manufacturability analyses on existing and new products, including reverse-engineering a Fujifilm Quicksnap Flash 400 disposable camera and designing a compact spice dispenser, using DFM/DFA, process selection, assembly and cost breakdowns, and ethical/safety considerations to improve cost and assembly efficiency.