Maximilian **Kowalski**

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Education

Bachelor of Science in Mechanical Engineering — *Boulder, Colorado*

University of Colorado, Boulder — *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, First and VEX Competitions

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

Professional Experience

Kazvu Labs — *Anaheim, 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
- Delivered alpha unit in 13 months at ∼50% of UR10e BOM cost with +/- .5mm accuracy and 100% workspace coverage
- Owned end-to-end development of three custom actuator sizes utilizing strain-wave gearboxes and 3-phase BLDC motors (∼63-298 Nm), including detailed design, part selection and vendor relations, verification testing, manufacturing jigs, drawings with GD&T, and assembly instructions
- Integrated a custom friction-pin brake, dual high-resolution absolute encoders, and precision bearing preload, and owned electrical interface design, wire harnessing, and system-level integration of COTS motion controllers and embedded compute
- Analyzed joint-torque data from recorded robot trajectories to confirm actuator sizing and brake-system reliability, and tested early prototypes with a custom dyanometer to verify design decisions and validate hardware performance
- Contributed to a multimodal structural optimization, analyzing permutations through workspace exploration to confrim dexterity and reachability
- Architected prototype modular end-of-arm tooling with swappable soft-goods heads and 2-DOF translation/rotation featuring a prototyped sealed IPX-7 motor enclosure, isolated power system, and custom wireless/motor-control boards to shorten robotic process time
- Established SolidWorks 3DEXPERIENCE PDM and a unique part numbering system and the transition to NX with an on-prem deployment

SV Automotive Engineering — *Ontario, California*

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

- Supported two custom vehicle builds through part design, collaboration with third-party manufacturers of interior and wire harnessing, independent assembly projects, and parts list generation for the restoration and diagnostics of classic vehicles
- Replicated unatatainable components for a crashed Porsche 959 including an electronic enclosure and brake airflow duct, full restoration of a vintage ’67 911S, and diagnosed a heavily crashed BMW X5, documenting structural frame damage, coolant leaks, and the full replacement parts list
- Helped rebuild the CSF 911 assembling the engine, repairing sheet-metal frame with TIG/hammer work, and MIG-welding a custom powertrain stand
- Executed the design and fabrication of a bespoke twin turbo, Chromoly, Pagani styled exhaust system, and installed a improved 3.4L engine for a Martini Racing-inspired ’78 911 to improve performance over 35% to 578 wheel HP

Eberspächer VAIREX — *Lafayette, Colorado*

Manufacturing Engineering Intern — *June 2023 - August 2023*

- Alongside the assembly operators performed standard work and time studies a to capture cycle times, highlight bottlenecks, and trace defect root causes (impeller height variation, stray chips, motor-stator winding defects), feeding the data into continuous-improvement initiatives
- Deployed low-cost Lean fixes: standardized pre-loctited fasteners, reorganized the warehouse with 5S and product-family slotting, and refreshed the MRB area with clearer tagging and segregation

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

Mechanical Engineering Intern — *June 2022 - August 2022*

- Developed a steady-state lumped thermal resistance model of an avionic mission-control enclosure in 6SigmaET and wrote training materials
- Managed changes from Creo and SOLIDWORKS with OnePDM to optimize heat sink thermal efficiency in accordance to thermal model

Engineering Projects

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

CAD/Manufacturing Engineer, Mechanical Team Lead — *August 2022 - May 2023*

- Designed and built an autonomous rocker-bogie rover for landfill surface emission monitoring with a BOM of $3.1k and exceeded all mobility requirements while collecting SEM data proving automation of testing for the Hannigan Air Quality Lab and Waste Management
- Owned rocker-bogie suspension, skid-steer drivetrain, and managed revision-controlled CAD and GD&T drawings
- Directed DFM/DFA fabrication reviews with industry partners, helped perform FEA on critical structures, and coordinated design with electrical team

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

Engineering Team Leader — *August 2022 - May 2023*

- Led a 5-person team building a sub-$200 autonomous mecanum-drive robot with a modular single-flywheel launcher; sized a projectile shooter using launch-velocity, flywheel geometry and current-draw calculations and packaged electronics in a laser-cut MDF and 3D-printed chassis
- Implemented control architecture of a finite-state machine for match phases, PD wall-alignment from dual ultrasonics and IMU, OpenCV color tracking on Raspberry Pi 4 and Arduino motor control

Manufacturability Reports — *MCEN 5045 - Design for Manufacturability*

Engineering Team Member — *January 2023 - May 2023*

- Reverse-engineered the Fujifilm Quicksnap Flash 400 Disposable Camera, producing a fully detailed model. Found modifications to combine 4 parts to increase theoretical part efficiency by 13% and reduced unit cost by $1.40
- Devised a unique, compact refillable spice dispenser and applied industry-standard DFM/DFA metrics to iterate the design, reducing assembly error-proofing, insertion, and secondary-operation scores by ∼20% while limiting unit cost increase to ∼3%.