Jesse Koeppel

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github.com/Dharklol | linkedin.com/in/jesse-koeppel | U.S. Citizen | German Dual Citizen

EDUCATION

Washington University in St. Louis — **St. Louis, MO**
B.S. Mechanical Engineering | Junior — *Expected May 2028*

EXPERIENCE

WashU Racing – Formula SAE — **St. Louis, MO**
Suspension Subsystem — *Sep. 2024 – Present*

Suspension Lead — May 2025 – Present

- Lead a **~9-member subsystem team** responsible for **19 major assemblies** and **120+ part-numbered components** across suspension, steering, and wheels/tires; manage up to **~$11K** in annual subsystem budget and teach vehicle dynamics to **~10–15 new members**.
- Owned design and delivery of the complete **WUFR-26 steering subsystem**, spanning **5 major assemblies** and **47 BOM part numbers**; carried hardware from CAD and drawing release through manufacturing coordination, assembly, fitment, and vehicle integration.
- Coordinate in-house and outsourced manufacturing through GD&T, technical drawings, tolerance reviews, and DFM; manage sponsor/manufacturer interfaces including **Boeing-sponsored additive manufacturing of uprights** and technical design reviews with **Divergent**.
- Developed a chassis–suspension torsional-stiffness and load-transfer sensitivity analysis following competition feedback, defining stiffness limits to keep chassis-induced lateral load-transfer shift below approximately **1 percentage point** and preserve anti-roll-bar tuning authority.

Suspension Member — Sep. 2024 – May 2025

- Completed MEMS Signature Lab training and designed fixtures for **Instron load-frame testing**; validated anti-roll-bar behavior across **five adjustment settings** to loads of **2,000 N**.
- Measured ARB stiffness from approximately **902–2,634 N/mm** and compared physical load-deflection data with analytical and FEA predictions to validate component contribution to suspension roll stiffness.
- Supported suspension fabrication and validation through SolidWorks CAD/FEA, technical drawings, composite linkages, ARB hardware, and vehicle assembly.

PROJECTS

Formula SAE Steering System & Vehicle-Dynamics Software — SolidWorks / MATLAB / Simulink / Python / Git

- Designed the WUFR-26 steering system through SolidWorks motion studies and MATLAB/Simulink trade studies, developing rack placement, steering-arm geometry, and tie-rod pickup locations while resolving chassis/suspension interference and manufacturability constraints.
- Built and maintain a version-controlled **Python vehicle-dynamics framework** implementing rigid steering and double-wishbone kinematics, suspension actuation/anti-roll-bar models, tire/vehicle-state interfaces, and automated unit/benchmark testing against reviewed SolidWorks, OptimumK, and physical test data.
- Evaluated geometry against a **20% steering-effort reduction target** and **±115° steering-wheel input limit**; the final packaged design reduced modeled effort by **14% (20.0 to 17.2 N·m)** at **±102° input** while retaining approximately **67.7% Ackermann**.

Automated Real-Time Data Acquisition & Analysis Platform — Python / Linux / Raspberry Pi / AWS

- Designed and deployed an automated Linux-based platform for acquiring and analyzing **real-time financial/event-market order-book data**, with scheduled services, external storage, integrity auditing, and reproducible pipelines; validated more than **1.19 million records** across **1,000+ data chunks** during burn-in testing.
- Deployed and benchmarked AWS EC2 infrastructure for low-latency collection across up to **40 simultaneous market streams**, achieving approximately **6 ms median source-to-server latency** with **zero observed sequence gaps** during benchmark runs.
- Developed Python analytics for event-level time-series behavior, controlled comparisons, and out-of-sample validation, emphasizing repeatable evidence over exploratory results.

TECHNICAL SKILLS

Engineering: SolidWorks, CAD, FEA, GD&T, technical drawings, design for manufacturability, prototyping, test fixture design, mechanical testing, experimental validation, design reviews
Programming & Simulation: Python, MATLAB, Simulink, R, C++, C#, Microsoft Excel
Systems & Data: Linux, Git, Raspberry Pi, AWS EC2, real-time data acquisition, automated testing, data analysis