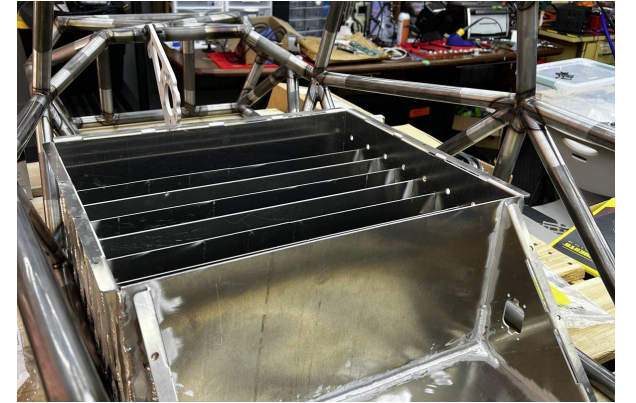
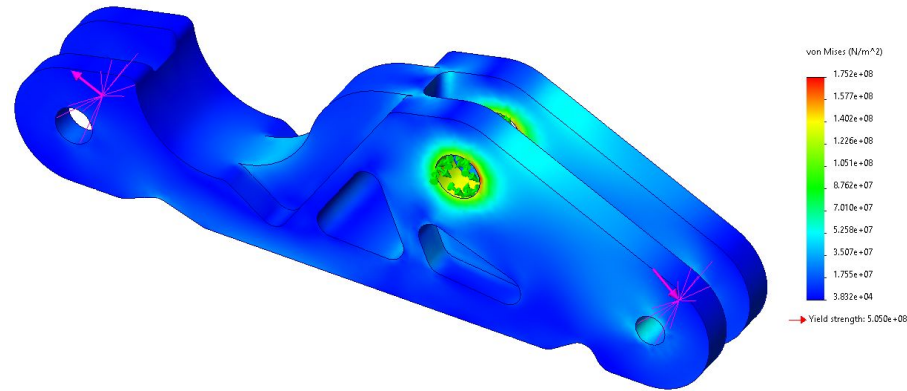
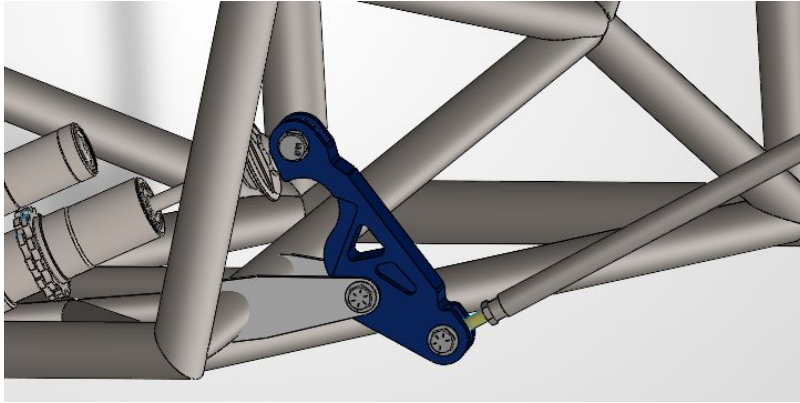


Joshua Law Portfolio

Mechanical Engineering @ UC Berkeley



About Me

I'm a junior in Mechanical Engineering at UC Berkeley (B.S. expected May 2028). I enjoy designing parts that are easy to build and working with the machinists and technicians who make them. At Glenair, I designed fixtures and test tooling that went into production, and at Jacobs Hall I run laser cutters and 3D printers. I'm currently seeking Winter/Spring/Summer 2027 internships in mechanical design or manufacturing engineering.

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Accumulator Enclosure | Caltech Racing

Skills: SolidWorks Sheet Metal, DFM, Waterjet Cutting, Weld Prep

Apr 2025 – Jan 2026

Goal

- Build a **nonflammable battery container** inside the car's frame, quickly and cheaply in-house

My Contribution

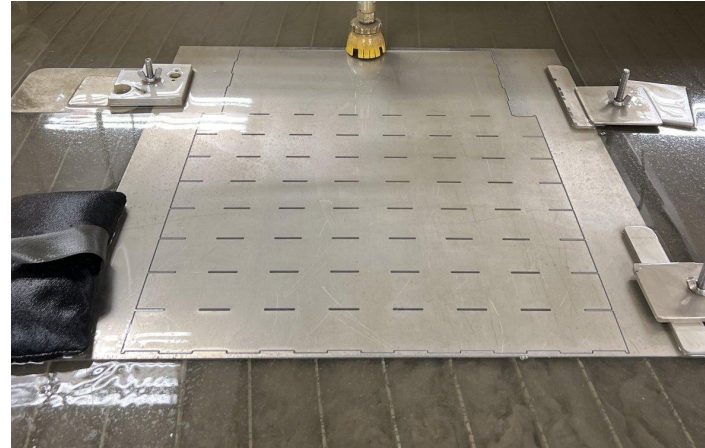
- Designed the **sheet-metal enclosure** as one of three engineers; teammates did the welding
- Modeled **3D-printed separators** that keep high-voltage plugs from being swapped
- Checked fastener access and clearances with lead engineers to prevent assembly interference

Key Decisions

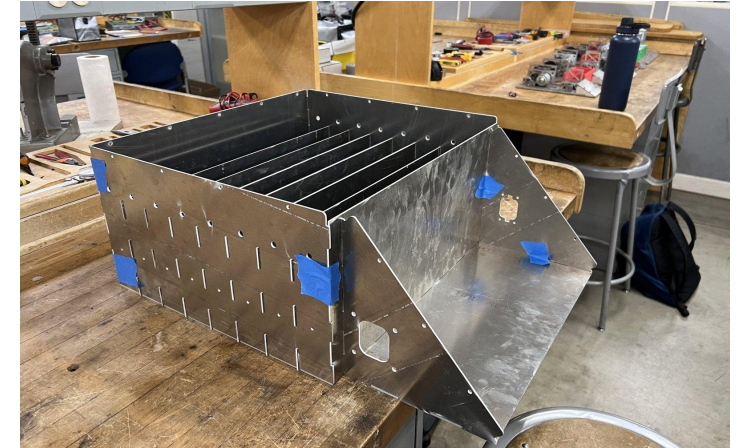
- Picked **welded sheet metal** over a machined block: more welding, but **\$1,000+** cheaper
- Added **100+ interlocking tabs** so panels align themselves, replacing a welding jig

Outcome

- Delivered an enclosure that was welded and **fit into the car** with the battery installed
- Would improve: **material choice**, after some panels cracked during bending; bracket strength and cooling still need checks



1 · Panels cut on the waterjet



2 · Panels dry-fit with interlocking tabs



3 · Welded enclosure in the car's frame



4 · Printed separators on the battery plugs

Front Rocker | Berkeley Formula Racing

Sept 2026 – Present

Skills: SolidWorks Simulation (FEA, Topology Optimization), Hand Calculations, DFM, Engineering Drawings

Goal

- Design a front rocker that carries **pullrod** load to the **shock** within the car's fixed mounting points

My Contribution

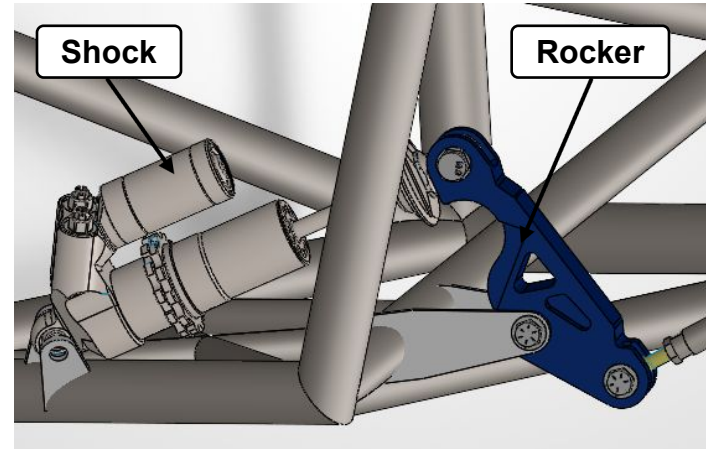
- Did the full design alone: **hand calcs**, CAD, **simulation**, drawing, and cost estimate
- Derived a **3g bump** load case by hand (**6,264 N** pullrod force), then checked it in simulation

Key Decisions

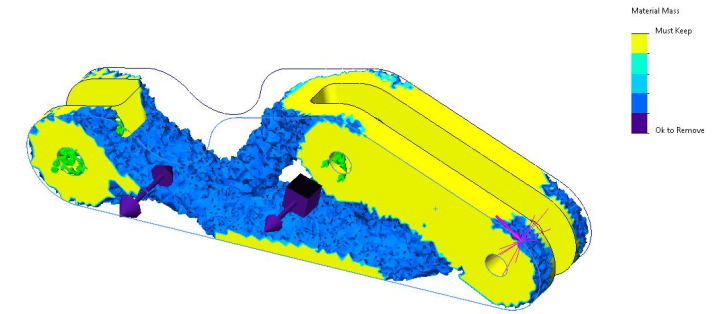
- Chose **one-piece CNC** over waterjet or 3D printing: more machining, but accurate hole alignment
- Applied **topology optimization** to cut weight **25%** while keeping the part 3-axis machinable
- Picked **bronze bushings** at the pivot, which only rocks through a small angle under high load

Outcome

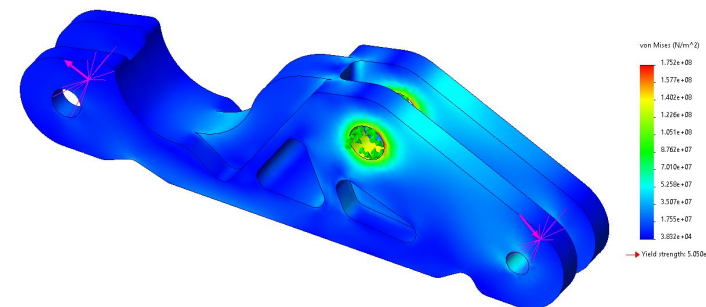
- Simulation shows **FOS 2.9** vs. a 1.5 target; ready to machine at about **\$66** per part
- Next: add **braking and cornering** loads, then build and measure the part



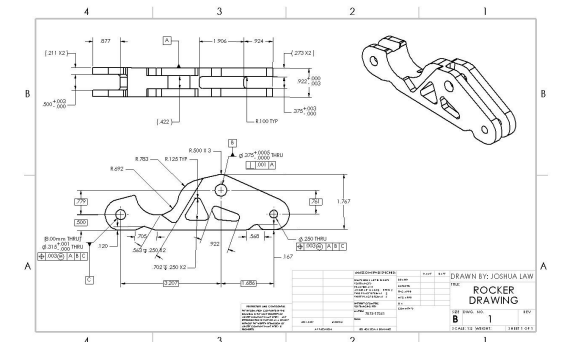
1 · Rocker in the car's suspension (CAD)



2 · Simulation showing removable material



3 · Stress simulation of the final design



4 · Drawing used to machine the part

Fixture & Test Tooling Design | Glenair

Jul 2026 – Aug 2026

Skills: SolidWorks Design Tables, Fixture Design, SLA 3D Printing, Tolerance Stack-Up, GD&T, Micro-Vu CMM

Goals

- Bond seals on a **new connector** that had never been assembled, without loading its pins
- Check that bonded sub-assemblies would not arc under **high-voltage (DWV) testing**
- Replace a **\$1,000 tool-steel leak test fixture** that had no drawings and was heavy to handle
- Give a connector series with **no standard test contacts** a reusable pin set

My Contribution

- Designed **SLA-printed bonding fixtures** that press only on the seals through a **350°F** cure
- Designed **3D-printed DWV fixtures** with contact pins potted in epoxy for **3,000 VAC** testing
- Measured the leak fixture on a **Micro-Vu CMM** and redesigned it as **one aluminum part**
- Designed **6 brass test pins** sharing one length that reaches every connector's contact clips

Key Decisions

- Printed fixtures in high-temp, non-conductive resin: **2 days** vs. over a month from the shop
- Ran **tolerance stack-ups** across stacked parts so fixtures cleared them in the worst case
- Set up **Design Tables** so one model generated fixtures in several configurations
- Put **GD&T** only on the leak fixture's functional holes and loosened slot tolerances to cut cost

Outcome

- Enabled the **first production build of 50+ units**; every printed fixture was used
- Confirmed in production testing that the bonded sub-assemblies **did not arc**
- Prototyped the leak fixture in print and got the pin set approved; neither was built



1 · PowerPlay receptacle (Glenair photo)



2 · PowerPlay plug (Glenair photo)