LUIS RAMIREZ

Mechanical Engineering | New Jersey Institute of Technology | B.S. expected May 2027

luisramirez092905@gmail.com | 732-215-3710 | linkedin.com/in/luis-ramirez-njit | luis-ramirez-nu.vercel.app

Mechanical engineering student with hands-on experience in field engineering and automotive parts, and a growing portfolio of CAD design, FEA/CFD simulation, and mechanism analysis projects from coursework at NJIT. Seven projects are shown below, spanning SolidWorks and Creo Parametric.

Experience: Automotive Parts Specialist, AutoZone (2025 - present) | Field Engineering Technician, Pittenger Paving & Excavating (2021 - 2023) | EOP STEM Tutor, NJIT (2024 - 2025) | Alpha Phi Omega, active brother

COVER LETTER

To Recruiters

Dear Recruiter,

Thank you for taking the time to look at my work. I'm a Mechanical Engineering student at the New Jersey Institute of Technology, pursuing a Psychology minor and the BS/MS program, and I'm looking for a Summer 2027 internship, co-op, or entry-level role where I can do real mechanical design and hands-on engineering work.

My experience combines design and the field. The projects in this portfolio include a 20+ component Creo drive assembly with fits sized through tolerance analysis, an ASME Y14.5 multiview detail drawing, static and thermal FEA studies, and a 3D-printed prototype we revised after testing. Outside the classroom, I spent about two years as a Field Engineering Technician at Pittenger Paving & Excavating, verifying layouts and tolerances on 20+ sites, and I currently troubleshoot and install components at AutoZone. As an EOP STEM Tutor at NJIT, I logged 200+ hours breaking down technical material for first-year students, and I'm fluent in Spanish.

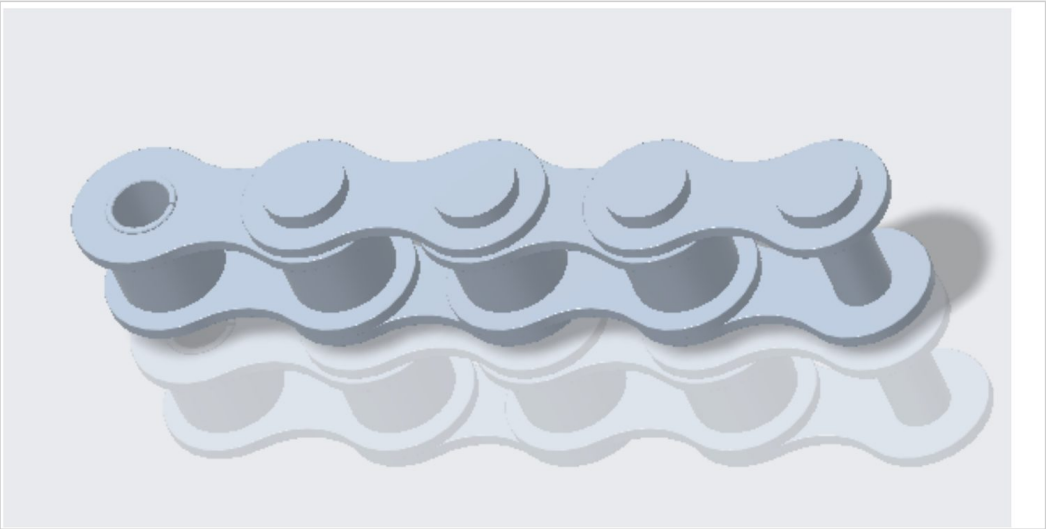
I'd welcome the chance to bring that work ethic to your team. My resume and website (luis-ramirez-nu.vercel.app) have more detail. Thank you for your time, and I look forward to connecting.

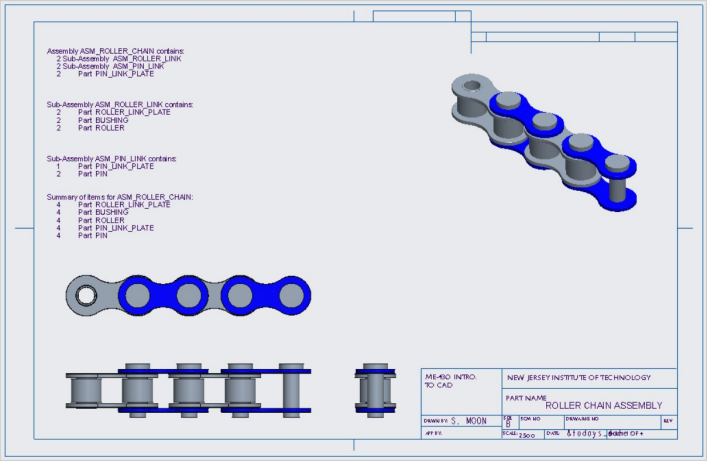
Sincerely,
Luis Ramirez

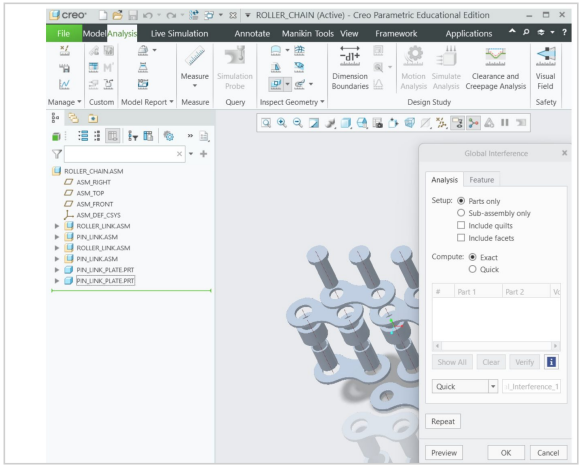
PROJECT 01

Roller Chain & Sprocket Drive Assembly

PTC Creo Parametric | Bottom-up assembly, drawings, interference check | ME-430







Top-level assembly drawing (left) and Creo global-interference check confirming zero interfering parts across the full chain (right).

OVERVIEW

Modeled every roller-chain component (roller link plate, pin link plate, bushing, roller, pin) as an independent parametric part in Creo, then built a bottom-up assembly: two reusable sub-assemblies (roller link, pin link) combine into a 20-part, five-component chain segment. A single controlling dimension propagates through every repeated instance.

Skills shown: parametric part modeling, bottom-up assembly, clearance/interference verification, exploded-view drawings, BOM generation.

KEY RESULTS

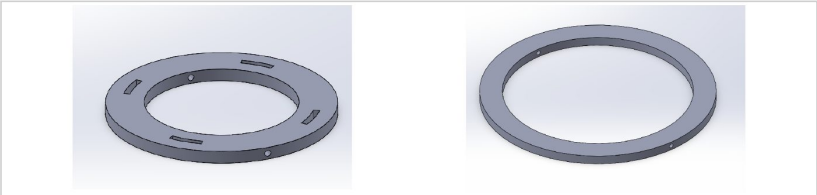
- 20 part instances from 5 unique components, 2 reusable sub-assemblies
- Global interference analysis: zero interfering parts at nominal fit
- Pin/bushing sized for running clearance; pin/plate for a rigid press fit
- Full drawing package: 4 sheets, exploded views, balloons, BOMs

PROJECT 02

Gyroscopic Cup Holder

SolidWorks | Team project with Ghazi Mustafa | Concept-to-prototype





Inner and outer gimbal rings, modeled in SolidWorks.





Left: assembled PLA prototype, printed for about $10. Right: prototype holding a standard water bottle during hand-tilt testing.

OVERVIEW

A self-leveling beverage mount for cyclists and wheelchair users, built around a two-ring gimbal: an inner ring cradles the cup and an outer ring lets it pivot about a second axis, so gravity keeps the cup upright as the mounting platform tilts. Three market products were benchmarked before finalizing the concept, and the design was carried from sketch through SolidWorks CAD to a printed and tested prototype.

Skills shown: concept sketching, market benchmarking, multi-part CAD assembly, 3D-print prototyping, design-for-tolerance iteration.

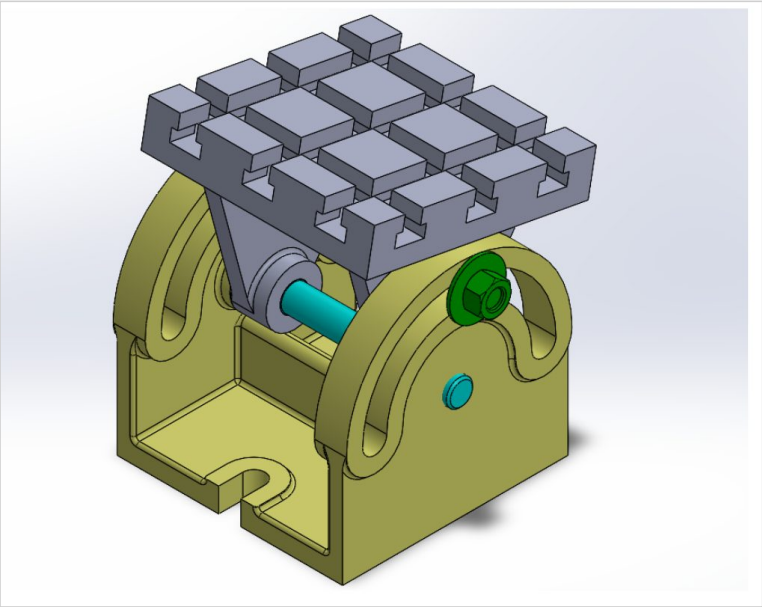
KEY RESULTS

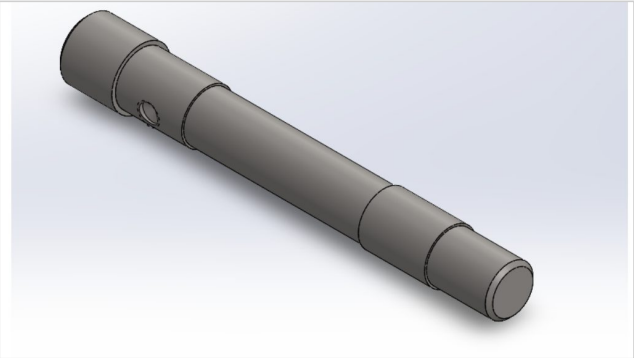
- Fits standard cups 64-100 mm dia.; total weight under 1 kg
- Passive, no electronics; prototype cost approx. $10 in PLA
- Prototype testing found zero-clearance fits too tight
- Revised pin-hole dia. 0.175 in to 0.2 in and eased rib fit by 5 deg

PROJECT 03

Swing Table Assembly

SolidWorks | ME-430 Machine Design | Pivoting trunnion mechanism





Precision steel trunnion stud - locates in the base bores and table arms, retained by a hex bolt/nut on one side and a slotted set screw on the other.

OVERVIEW

Designed a trunnion-pivot swing table from a reference engineering drawing: a steel stud passes through bearing bores in a cast-iron base and matching arms on a cast-iron table, letting the table rotate freely about a fixed horizontal axis while staying rigidly supported. The base's T-slot channel allows it to clamp directly to a fixture, and all fasteners are standard, toolbox-sourced hardware.

Skills shown: reverse-engineering from a reference drawing, multi-part assembly, toolbox hardware integration, material and BOM specification.

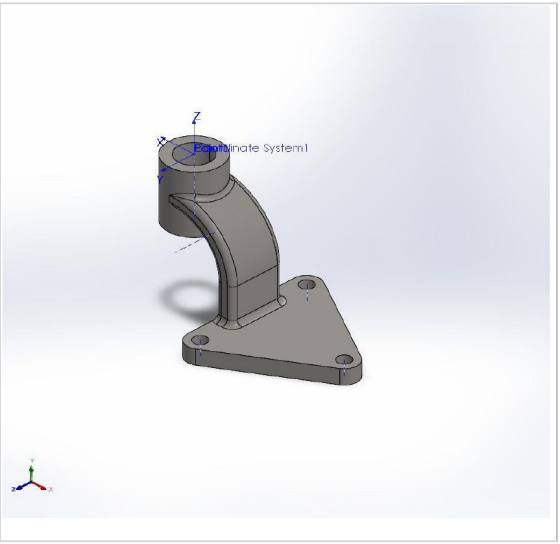
KEY SPECS

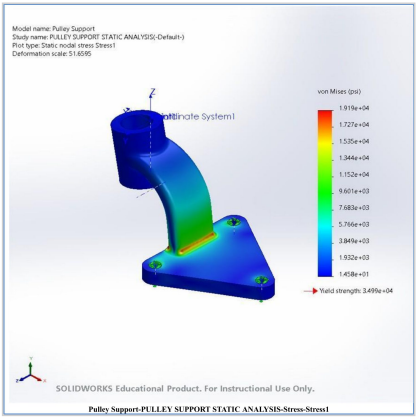
- Base footprint 7 in; table plate 7-1/4 x 4-1/2 in
- Assembly height 5-5/8 in; pivot bore 3/4 in core dia.
- Base & table: ductile / gray cast iron; stud: carbon steel
- Fasteners: AISI 304 stainless hex bolt, nut, washer, set screw

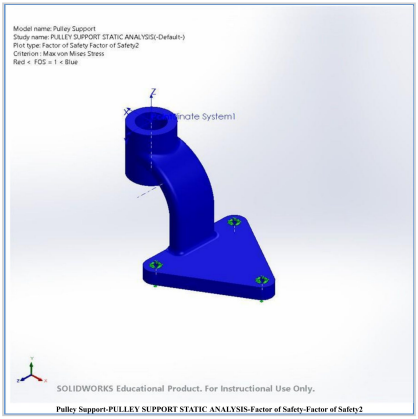
PROJECT 04

Mechanical Drive Pulley Support

SolidWorks Simulation | Static FEA | Cast alloy steel bracket







Von Mises stress (left) peaks at the base fillet; Factor-of-Safety plot (right) shows the entire bracket above FOS = 1.0.

OVERVIEW

Ran a static structural FEA on a cast-alloy-steel pulley support bracket under a 100 lbf horizontal bearing load and a 20 lbf vertical load, with the three base bolt holes fixed. A refined mesh (0.033 in elements) was applied at the base fillets to resolve stress concentrations, and a Design Insight study identified low-stress material that could be removed in a future light-weighted revision.

Skills shown: static FEA setup, mesh refinement, stress/FOS/displacement interpretation, topology-informed light-weighting.

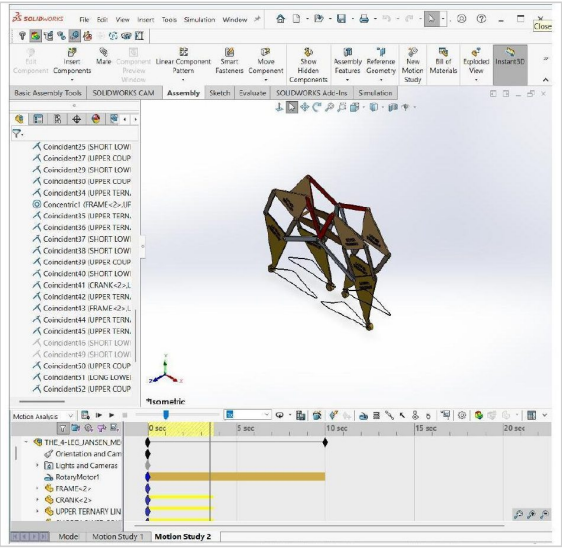
KEY RESULTS

- Max von Mises stress 19,190 psi vs. 34,994 psi yield (FOS 1.82)
- Max deflection 0.0093 in at the top of the bearing collar
- Mesh: 50,260 nodes / 32,645 elements, 0% distorted
- Design Insight: over 65% of material carries little to no load

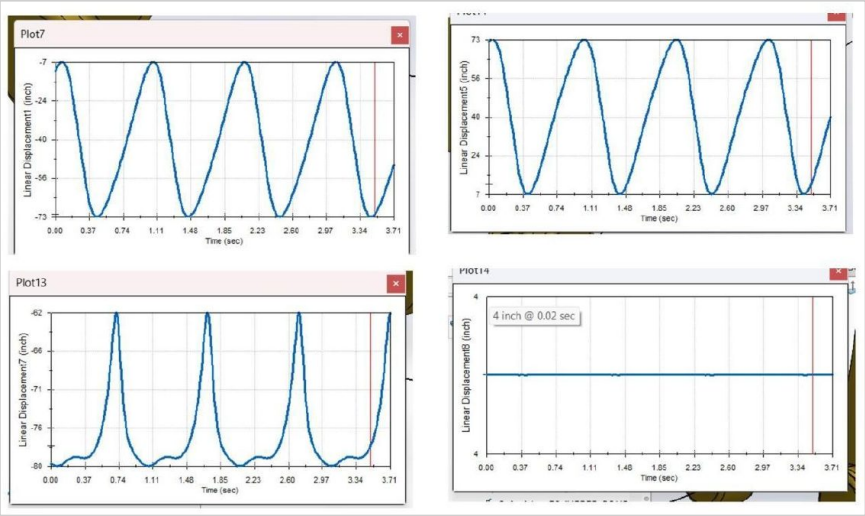
PROJECT 05

4-Leg Jansen Walking Mechanism

SolidWorks Motion | Planar eight-bar linkage | Kinematic simulation



Four-leg Jansen assembly mid-simulation in SolidWorks, with the mate list and RotaryMotor1 Motion Study timeline visible.



Linear displacement time histories: X-displacement for two legs shows an out-of-phase walking gait; Y-displacement (bottom-left) shows the flat stance / fast swing foot curve; Z stays flat, confirming planar motion.

OVERVIEW

Assembled a four-legged walking base built on the Jansen linkage, a planar eight-bar leg mechanism whose single rotating crank produces a foot-shaped path with no separate ankle or gait controller. Drove the assembly with a rotary motor in SolidWorks Motion at 60 RPM and extracted quantitative displacement/velocity time histories to back up the animation.

Skills shown: mechanism/linkage assembly, motor-driven motion studies, trace-curve and time-history data extraction, kinematic validation.

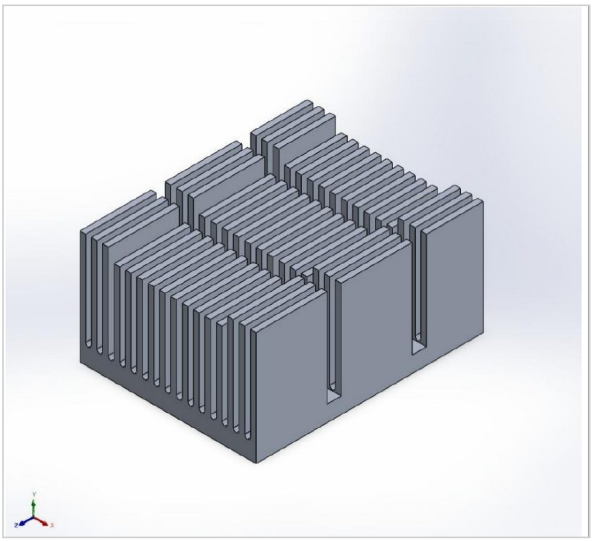
KEY RESULTS

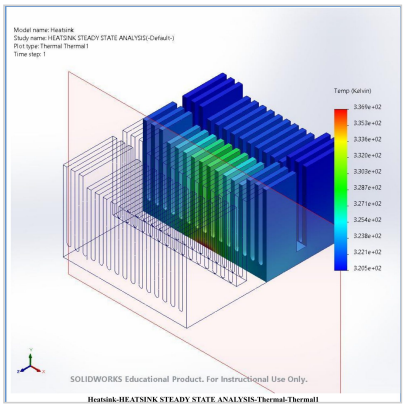
- ~20 leg-link instances plus shared frame/crank, all 1-DOF driven
- Y-displacement shows the signature flat-stance/fast-swing gait
- Two legs run exactly out of phase, confirming a stable 4-leg gait
- Z-displacement/velocity ~0, confirming fully planar motion

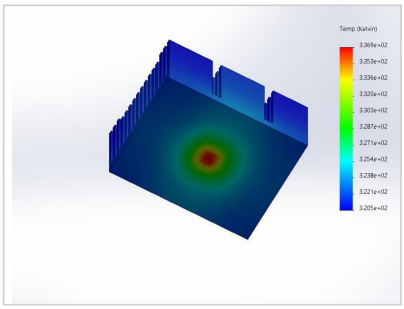
PROJECT 06

CPU Heatsink Thermal Analysis

SolidWorks Simulation | Steady-state thermal FEA | 1060 aluminum







Side section (left) and underside (right) temperature plots. Heat spreads from a central 50 W CPU contact patch, outward through the baseplate and up the fin array.

OVERVIEW

Modeled an extruded finned aluminum heatsink and ran a steady-state thermal FEA with a 50 W CPU heat load on the base and natural convection (h = 25 W/m^2-K) across all 239 exposed faces. The study characterized the temperature gradient from the CPU contact patch to the fin tips and identified which fin channels run warmest, informing where forced-air cooling would help most.

Skills shown: steady-state thermal FEA, convection boundary conditions, heat-flux interpretation, design guidance from simulation results.

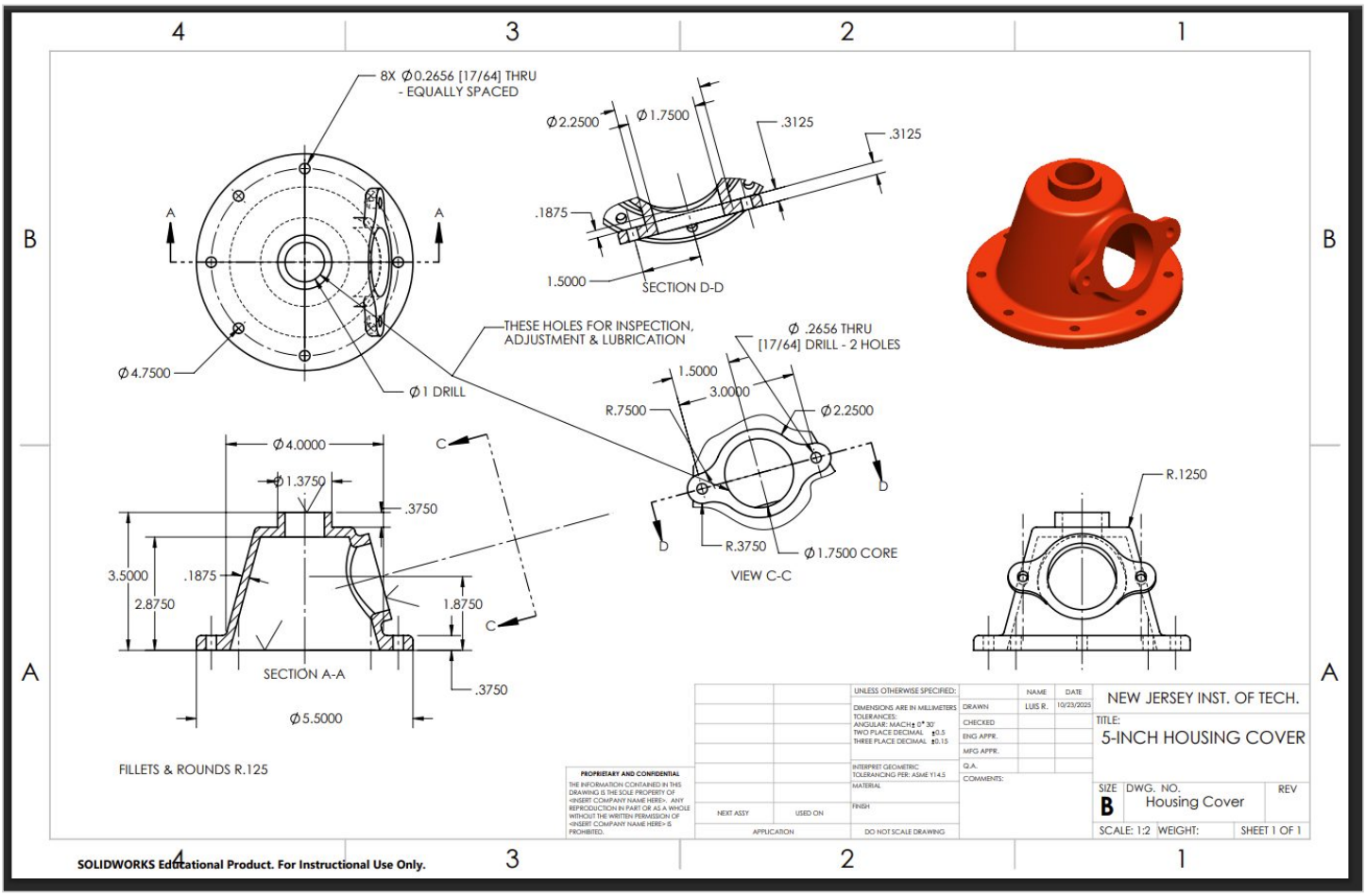
KEY RESULTS

- Max steady-state temp 336.9 K (63.9 C) at the CPU contact patch
- Min temp 320.5 K (47.5 C) at the outer fin tips; delta-T 16.4 K
- Stays well below the 85-100 C silicon-throttling range
- Center fin channels run hottest - best target for a cooling fan

PROJECT 07

5-Inch Housing Cover

SolidWorks | Multiview detail drawing | ASME Y14.5



Complete detailed drawing: top view, Section A-A, Section D-D, auxiliary View C-C, right side view, and shaded isometric.

OVERVIEW

Built a manufacturing-ready detailed drawing of a bell-shaped housing cover from a supplied SolidWorks part model. Six views on a single Size-B sheet at 1:2 scale - a top view, a full section, a projected side view, a full auxiliary section, a partial auxiliary view, and a shaded isometric - fully and unambiguously define the part's stepped bore, mounting-hole pattern, and side-lug geometry per ASME Y14.5 conventions.

Skills shown: multiview and section-view detailing, auxiliary views, GD&T per ASME Y14.5, drawing-package standardization.

KEY SPECS

- Base flange dia. 5.500 in on a 4.750 in bolt circle
- 8x 17/64 in mounting holes, equally spaced
- Stepped central bore: dia. 2.2500 / 1.7500 in
- General fillets & rounds R0.125 in