

Marcus Chen

Senior Mechanical Engineer | Product Development

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Professional Summary

Results-driven Senior Mechanical Engineer with 8+ years of experience in product development, CAD-based design, and manufacturing process optimization. Proven track record of delivering complex mechanical systems from concept through production at Vertex Dynamics, Apex Manufacturing, and Nimbus Robotics. Expert in SolidWorks, CATIA V5, and ANSYS with deep knowledge of DFM/DFA principles, FEA simulation, and GD&T (ASME Y14.5). Licensed Professional Engineer (PE) with a passion for elegant, manufacturable design solutions that reduce cost and improve performance.

Core Competencies

CAD & Simulation

SolidWorks	
CATIA V5	
ANSYS (FEA/CFD)	
AutoCAD	
Inventor	
Siemens NX	

Manufacturing & Processes

CNC Machining	
Injection Mold- ing	
Sheet Metal De- sign	
Welding & Fab.	
Additive Mfg.	
GD&T (Y14.5)	

Professional Experience

Vertex Dynamics

Auburn Hills, MI

Senior Mechanical Engineer | Jan 2021 – Present

- Lead a team of 5 engineers in designing next-generation automotive powertrain components, delivering 3 major product lines that generated \$12M in first-year revenue.
- Spearheaded the transition from 2D drafting to full 3D parametric modeling in SolidWorks, reducing design cycle time by 35% and eliminating 90% of interference errors.
- Developed a modular fixture system for CNC machining cells that cut changeover time from 45 minutes to 12 minutes, saving an estimated \$280K annually across 6 production lines.
- Conducted FEA structural and thermal analyses on high-stress engine mounts, optimizing topology to achieve 22% weight reduction while maintaining 2.5x safety factor.
- Authored the company's DFM/DFA design guidelines handbook, now adopted as the engineering standard across all product development teams.

Apex Manufacturing

Grand Rapids, MI

Mechanical Design Engineer | Jun 2018 – Dec 2020

- Designed and validated 14 injection-molded consumer product enclosures, managing projects from initial concept sketches through tooling approval and PPAP submission.

- Implemented tolerance stack-up analyses using CETOL 6 σ , resolving chronic assembly issues on a high-volume product line and reducing scrap rate from 4.2% to 0.8%.
- Collaborated with the sourcing team to re-engineer 8 legacy steel bracket assemblies into single-piece aluminum extrusions, cutting per-unit cost by \$3.40 (41% reduction).
- Created detailed manufacturing drawings with full GD&T callouts per ASME Y14.5-2009, supporting a seamless handoff to 3 contract manufacturers across 2 countries.

Nimbus Robotics

Ann Arbor, MI

Junior Mechanical Engineer | Aug 2016 – May 2018

- Contributed to the mechanical design of a 6-DOF collaborative robot arm, owning the wrist joint assembly and end-effector mounting interface from prototype to production.
- Performed dynamic simulation in MATLAB/Simulink to validate motor sizing and gearbox selection, ensuring the arm met 0.1 mm repeatability targets at full payload.
- Built and tested 20+ rapid prototypes using in-house 3D printers and a small CNC mill, accelerating design iterations from weekly to daily turnaround.

Project Portfolio

Modular Robotic End-Effector Platform

2023 – Present

Lead Mechanical Engineer

Designed a modular, quick-change end-effector system for industrial robots featuring a pneumatic locking mechanism with 0.02 mm repeatability. The platform supports 8 interchangeable tool heads (gripper, vacuum, welding, inspection) and reduced tool-change downtime by 78% compared to bolted solutions. Managed the full development cycle including concept CAD in SolidWorks, FEA validation in ANSYS, DFMEA analysis, and field testing at 3 customer sites. Patent pending (US 2024/0123456 A1).

High-Efficiency Shell-and-Tube Heat Exchanger

2021 – 2022

Design Lead

Re-engineered a shell-and-tube heat exchanger for an industrial HVAC system, achieving a 31% improvement in thermal efficiency through optimized baffle spacing and tube layout. Used ANSYS Fluent for CFD analysis of flow distribution, then validated results against ASME PTC 12.5 test data. The redesign eliminated a chronic hot-spot issue that had caused premature tube failure and reduced annual maintenance costs by \$145K for the client (a Meridian data center facility).

Automated Assembly Cell for EV Battery Trays

2022 – 2023

Mechanical Systems Architect

Architected the mechanical layout for a 12-station automated assembly cell producing EV battery trays at 45 units per hour. Integrated 4 six-axis robots, a 40-meter conveyor system, and 6 custom pneumatic clamping fixtures. Delivered detailed 3D layouts in CATIA V5, managed collision detection for all moving elements, and supported commissioning at the customer's Tennessee facility. The cell achieved OEE of 92% within 4 weeks of launch.

Education

Relevant Coursework

Finite Element Analysis
Advanced Thermodynamics
Robotics & Control Systems
Design for Manufacturability
Fluid Dynamics
Materials Science

Meridian University — Ann Arbor, MI

Master of Science in Mechanical Engineering

2016

Concentration: Design & Manufacturing | GPA: 3.82/4.00

Bachelor of Science in Mechanical Engineering

2014

Minor: Computer Science | GPA: 3.67/4.00 | *Summa Cum Laude*

Certifications & Licenses

Professional Engineer (PE)	Michigan — Mechanical Engineering, License #620-014-892	2020
CSWP — SolidWorks	Certified SolidWorks Professional (Dassault Systèmes)	2019
Six Sigma Green Belt	ASQ Certified — Process Improvement & Statistical Analysis	2018
GD&T Professional	ASME Y14.5 Senior Certification (Technologist Level)	2021
ANSYS Mechanical	Certified Simulation Specialist — Structural Analysis	2022

Professional Affiliations

American Society of Mechanical Engineers (ASME) — Member since 2016

Society of Automotive Engineers (SAE International) — Member since 2018

Society of Manufacturing Engineers (SME) — Member since 2020