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Design Experience

- Lightweight Airframes
- Aerodynamics/Airfoils
- Avionics Assemblies
- Actuators and Mechanisms
- Autonomous Vehicles
- Computer Vision
- Medical Devices
- LEDs and Lasers
- Optics
- Sensors
- Robotics
- Thermal Management
- Cables and Wiring
- Industrial Automation

Skills

- Mechanical Engineering
- Product Development
- Project Management
- Technical Leadership
- System Architecture
- Technology Innovation
- Hardware Design
- UX & UI Design
- Rapid Prototyping
- Transfer to Manufacturing
- Ramping and Scaling

Patents

- WO 2023/220447 A9
Mission-adaptable aerial vehicle and methods for in-field assembly and use
- US 11,192,100 B2
Multi-factor urine test system that adjusts for lighting and timing
- US 10,928,325 B1
Urine test system with nutritional recommendations

Summary

Innovative mechanical engineer with over 15 years of experience in mechanical design and analysis, prototyping, qualification, and manufacturing. Invented, validated, and commercialized new technologies in aerospace, defense, digital health, medical devices, lighting, power, agriculture, and automation. Proficient in CAD, FEA, GD&T. Hands-on expertise in rapid prototyping, additive manufacturing with metals, SLA resins, PA 12, carbon fiber ABS, CNC machining, composites, electro-mechanical integration and testing.

Core Competencies

Design	CAD (SolidWorks, NX, Creo), GD&T (ASME Y14.5), DFM, DFX, UXD
Analysis	FEA/CFD (SolidWorks Simulation, Ansys, Cadence), FMEA
Testing	Functional, structural, electrical, thermal, optical, aero, fluid, environmental, end user
Manufacturing	Additive (MJF, SLA, CF-ABS, metals), composites, CNC machining, sheet metal, injection molding, chemical, biological, automation

Experience



3D Systems

Consultant, Mechanical Engineering

Aug 2024 – May 2025

- Led design of print chamber and gas handling systems for the world’s largest direct metal printer
- Achieved technology milestones resulting in \$7.65M additional government funding to continue development of the large format metal printer
- Built and operated custom laminar flow test chamber with integrated sensors to validate new technology concepts
- Performed FEA analysis to validate print chamber designs under high heat loads, gas flow rates, and positive pressure conditions



Firestorm

Head of Mechanical Engineering

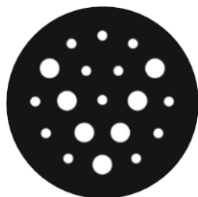
Nov 2022 – Jul 2024

- Developed multiple unmanned aircraft systems including the Tempest modular 3D printed UAS platform that secured over \$100M in government contracts
- Designed lightweight polymer and composite airframes with quick-change propulsion, payloads, avionics, wings, launch systems and tool-less assembly
- Applied DFM to reduce cost and build time and enable decentralized production
- Oversaw environmental qualification testing (thermal cycling, vibration, antenna configuration, EMP survivability) and led FMEA to improve product performance

Patents (continued)

- US 10,383,606 B1
Toilet based urine analysis system
- US 11,457,568 B2
Multiple colors, and color palettes, of narrowband photosynthetically active radiation (PAR) time-staged over hours, days, and growing seasons yields superior plant growth
- US 10,602,669 B2
Narrowband photosynthetically active radiation (PAR) substantially only at each of multiple emission wavelengths yields good photosynthesis at reduced energy cost

- Joined as employee #2 and helped grow the team to over 40 people
- Drove new products through prototyping, development, and manufacturing ramp
- Provided expert mechanical design solutions for a wide range of engineering and manufacturing challenges, ensuring all designs met requirements and deadlines
- Created alignment between leadership, engineering, and business teams by translating high level vision and long term goals into detailed product requirements, objectives, key results, and realistic timelines
- Implemented custom tailored processes for product development, quality control, company strategy, interviewing, and hiring
- Managed 5-10 engineers, selected and hired the best talent, provided technical guidance and mentorship to team members
- Deployed SolidWorks and PDM, 3D printers, test stands, and other tools that created a strong engineering foundation to support future growth



Vessel

Co-founder, Head of Hardware and Innovation

Aug 2017 – May 2022

- Created the world's first affordable and consumer friendly at-home instant test for a wide range of vitamins and minerals, hormones, and more
- Invented and developed consumer testing platform from concept to mass production, precision optical diagnostic devices, computer vision algorithms, chemistry calibration and quality control systems
- Ramped up production to 100,000 units per month
- Helped raise over \$20M in funding and grew team from zero to over 40 people
- Built and led engineering and science teams to support hardware and consumables
- Ran scrum meetings, weekly sprints, and department OKRs (Agile Black Belt)
- Helped design app user interface (4+ stars in app store) and grew user base to over 20,000 monthly active users



Symbiotic Systems

Co-founder, CTO

Oct 2011 – Apr 2018

- Created the world's first software controlled agricultural LEDs to deliver sun intensity light with controllable spectrum spanning from ultraviolet to infrared
- Invented and patented dynamic spectrum and frequency modulation systems
- Designed and manufactured commercial grade high-power 11-band spectrum adjustable intelligent LED systems for agriculture and biotech applications
- Conducted advanced analysis and testing (structural, thermal, optical)
- Set up production lines and supply chains with dozens of custom component manufacturers across Asia and United States
- Constructed test chambers and ran research trials with different types of plants
- Coordinated scientific studies with PhD plant researchers at Salk Institute and the Center for Applied Horticultural Research which produced amazing results, data, and third party white papers
- Demonstrated 300% increased fruit production (grams per watt) and up to 500% increase in various terpenes in third party trials against HPS lights



Merlin CSI

Electromechanical Systems Engineer

Mar 2012 – Dec 2014

- Developed industrial automation systems and custom robotics
- Built programmable logic controllers and cable harnesses
- Provided engineering services onsite for customers, integrating with different engineering teams
- Programed CNC machines to fabricate parts from aluminum, steel, titanium, invar
- Created fixtures and procedures for manufacturing inspection and quality control
- Programmed mobile and web applications in ASP.NET to present live sensor data and analyze historical data via satellite and cellular telemetry from proprietary computer systems in remote off-grid locations
- Designed user interfaces for multiple back end software platforms



CareFusion

Consultant, Mechanical Engineering & Industrial Design

Nov 2012 – Feb 2013

- Responsible for mechanical and industrial design of multiple touch screen products
- Designed injection molded plastic housing to be ergonomic, durable, and sanitary
- Created recognizable shapes across family of products with modern surfacing techniques such as continuous curvature
- Selected special materials to survive aggressive cleaning chemicals and drop testing
- Designed enclosures to eliminate fluid ingress and features that trap dirt
- Integrated capacitive flex circuits with enclosure to detect touch in multiple areas
- Designed shielding to protect display signal and electronics from EMI
- Developed specification for projected capacitance touch screen stack and mechanical button stack with metal dome switch and light guide illumination
- Designed to be field serviceable and easily replaceable



Nordson Asymtek

Consultant, Mechanical Engineering

Mar 2012 – Oct 2012

- Responsible for mechanical design of subsystems in precision dispensing machine for semiconductor fabrication
- Designed and constructed industrial grade enclosure for secure mounting and connecting of proprietary electronics, rack mount computers, and high voltage three phase power supplies allowing rapid access for service and maintenance
- Performed FMEA on mechanical parts and assemblies
- Designed, assembled, and tested complex pneumatics system for operation of precision fluid dispensing valve, conveyor system, cooling and heating
- Evaluated solenoid valves and electro-pneumatic regulators from all vendors comparing response time and hysteresis to qualify products

Environmental Lights

Product Engineer

Feb 2011 – Oct 2011

- Designed and tested LED lighting and power systems for custom applications including television shows and large scale installations in hotels and restaurants
- Developed high efficiency LED products to stimulate algae growth in bioreactors which consume exhaust gasses and produce renewable crude oil and feedstock
- Communicated directly with customers to determine unmet needs
- Introduced new products after extensive testing and created easy to read technical documentation covering installation and operation of electrical systems
- Constructed professional photo studio and created product images and videos
- Handled sales and technical support with 100% customer satisfaction and retention
- Performed market leading research on LED bulbs and magnetic driver compatibility with forward phase dimmers, reverse phase dimmers, and phase adaptive dimmers

Cognitive TPG



Mechanical Engineer

Jun 2008 – Oct 2010

- Successfully managed engineering projects from prototype to manufacturing
- Produced CAD models and drawings with geometric dimensions and tolerances
- Designed complex parts for manufacturability with different materials and processes including 5 axis machining, wire EDM, stamping, casting, injection molding, and rapid prototyping
- Purchased ASTM and ISO standards and published technical procedures to increase consistency among parts designed by different engineers
- Conducted thermal tests and stress tests to understand modes of failure and improve product reliability

Education



Washington University in St. Louis

Bachelor of Science, Mechanical & Aerospace Engineering

Aug 2004 – May 2008 · 4 years

- Activities and Societies: University Nanosatellite Program, Engineering Leadership Council (EnCouncil), Engineering School Dance Party (Vertigo 2008), Martial Arts
- Advanced Coursework: Biomedical Engineering, Mechanical Design and Machine Elements, Manufacturing Processes, Mechanical Behavior of Composites, Advanced Space Mission Design, Advanced CAD and Finite Element Analysis
- Additional Studies: Business Management, Micro and Macro Economics, Finance