Matthew Nolan

(480) 241-8301 | Email | LinkedIn

SUMMARY

Ambitious and motivated engineer with experience in robotics, mechanical design, modeling and simulation, electronics, 3D printing, and manufacturing. Proven leadership in R&D environments and community robotics organizations. Seeking full-time positions in robotics, mechanical, or mechatronics engineering.

WORK EXPERIENCE

ThermaSat Inc | Vice President of Robotics | Scottsdale, AZ
March 2023 – February 2025
- Spearheaded the mechanical, electrical, and software technology development of the "HotSwap" satellite servicing system under a USSF Phase II SBIR grant
- Developed the overall system architecture / project scope, and managed SBIR deliverables
- Ensured timely completion of project milestones, and conducted quarterly design reviews with USSF TPOC to unlock each level of funding
- Led a small team of engineers to design, manufacture, and test electromechanical prototypes for servicing small satellites
- Supervised in-house prototype manufacturing using a Haas UMC-500 5-axis CNC mill, Wazer desktop waterjet, laser cutters, 3D printers, etc
- Design PCBs in Fusion360 to adapt COTS satellite payloads to a custom, standardized electrical interface

Intel Corporation | Graduate Technical Intern / Process Engineer | Chandler, AZ
January 2022 – March 2023
- Supported fab operations and analytics on a process engineering team for a PVD / CVD tool fleet
- Applied statistical process controls to rapidly diagnose tool issues, plan repairs, and preserve quality
- Worked with technicians to conduct preventative and reactive maintenance and maximize throughput
- Designed custom interactive web report in Python to visualize live testfire data across the tool fleet

Howe Industries | Engineering Intern | Scottsdale, AZ
January 2021 – December 2021
- Researched / prototyped Advanced Thermoelectric Generators and tested at OSU's TRIGA research nuclear reactor
- Researched and wrote a NIAC Step A Proposal for a nuclear-powered multi-target orbital debris removal system concept
- Designed, fabricated, and programmed a 2D motion platform to automate data collection for localized radiation measurements of an experimental nuclear rocket fuel plate
- Performed iterative material coating simulation in MCNP for the development of a novel boron-based neutron detector

Fulton 3D Print and Laser Cutter Lab | Lab Assistant | Tempe, AZ
January 2019 – December 2022
- Co-led the lab's PPE manufacturing for local medical facilities during COVID-19 global pandemic
- Managed and fulfilled student 3D print submissions, and taught students how to use the laser cutters
- Led the team's maintenance, troubleshooting, and repair efforts for a variety of 3D printers and laser cutters

EDUCATION

M.S. Robotics And Autonomous Systems (Mech & Aero Concentration) | Arizona State University
Graduated with Distinction, 4.00 GPA
B.S.E. Mechanical Engineering | Arizona State University
Summa Cum Laude, 4.00 GPA, Moeur Award Recipient

TECHNICAL SKILLS

Computer-Assisted Design: SOLIDWORKS, Fusion 360 (CAD + CAM + Electronics), Autodesk Inventor, FreeCAD, ANSYS, COMSOL, MCNP
Programming: C++ (Arduino, PlatformIO), MATLAB, Python (scripting, data analysis, scikit-learn, OpenCV), ROS (MoveIt, Gazebo), SQL Pathfinder, JMP, Git
Manufacturing: 5-axis CNC mill, CNC router, manual mill / lathe, waterjet cutter, CO2 laser cutter, 3D printers (FDM, SLA), electronics prototyping

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NOTABLE TECHNICAL PROJECTS / ACTIVITIES

Vision-Based Control of a Holonomic Ground Robot using a Camera-Equipped UAV
M.S. Applied Project, August – December 2022
- Developed real-time ArUco marker detection and pose estimation of a ground robot using overhead UAV camera stream
- Enabled driver input in world-frame planar velocity (with independent rotation and translation) using PID and switched system controllers
- Derived and implemented general inverse kinematics solutions for a parametrically defined 4-wheel holonomic drive
- Applied a kinematic Kalman filter for pose estimation and world-frame velocity transformation
- Built a custom Arduino-based USB-to-SBUS adapter to allow PC-based Python control of a traditional RC transmitter systems

Intuitive Control of a Tool-Changing Robotic Arm
Mechanical Engineering Capstone, January – December 2021
- Designed and built a 6-DOF human-scale robotic arm prototype, modeled in Solidworks and stress-analyzed in ANSYS
- Integrated ROS MoveIt + Gazebo for real-time mirroring of user arm motions via Oculus Quest controller
- End effectors use a magnetic interface to swap attachments automatically. Demonstrated gripper and wire cutter tools

Combat Robotics
January 2020 – Present
- Design, simulate, and manufacture, and compete with fully custom 1lb, 3lb, and 12lb combat robots in national tournaments
- Several podium placements, including 1st place in 12lbs at Robot Combat League (RCL) Nationals 2025
- Current mentor for Combat Ready Robotics at ASU (CRR)
- Founding member of CRR (President)
  - Taught members mechanical design concepts, manufacturing techniques, material allocation, and RC electrical systems
  - Organized and conducted combat robot meetings and workshops
  - Planned and coordinated yearly ASU-hosted student tournaments
  - Lead student teams in designing 3lb and 30lb combat robots

Sun Devil Robotics Club (SDRC): Vice President & Mechanical Team Lead
January 2019 – May 2022
- Manage and collaborate with other members to compete in the University Rover Challenge
- Assist with meeting/event planning, budgeting, and purchase orders
- Lead the design and manufacture of the rover's chassis and differential suspension system
- Assist Electrical team with developing mounting solutions for our electrical hardware
- Teach new members mechanical design principles, designing for manufacturing, and various CAD tools

Select Personal Projects
2017 – Present
- Custom coreXY 3D printer design, manufacturing, and construction
  - Features direct-drive extrusion, sensorless homing, auto-bed-leveling, and mains-powered build plate
  - Prints up to 120mm/s, capable of printing PLA, ABS, Nylon, TPU, CF-PA
  - Fully modeled in Solidworks
- FPV racing/acrobatic drone
  - Custom carbon fiber chassis CAD and CAM, machined on CNC router
  - Hand-assembled electronics, configured with Betaflight
- Edge-lit acrylic display with LED animations
  - 3D-printed base housing Arduino Nano, programmed in C++, smartphone GUI control over Bluetooth
- Custom lightsaber model
  - Hilt is hand-fabricated out of aluminum, polycarbonate "blade" with high-powered LED and modified toy soundboard