Gabriel Dimonde

PhD Student

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Education

BS **University of Louisiana at Lafayette**, Mechanical Engineering — Lafayette, LA
- GPA: 3.79/4.00 — Aug 2019 – May 2023
- Senior capstone: Friction Stir Extrusion Machine (IMECE2025 publication)

Experience

University of Louisiana at Lafayette, PhD Student — Lafayette, LA
- Researching geodesic path planning on Riemannian manifolds — Aug 2025 – present
- Studying Gauss's Principle of Least Constraint — 9 months
- Low-power robotic sensing

L3Harris, Associate, Field Engineer — Broussard, LA
- Collaborated with team to identify electrical drawing vs. implementation differences — Jan 2024 – Aug 2025
- Increased responsibilities during coworkers' international travel — 1 year 8 months
- Generated BOM for sub-unit with incomplete data, completing key project task
- Fixed complex electrical issues through schematic review and troubleshooting
- Transitioned to new segment, adapted within a week, helping to meet tight deadlines
- Developed a PLC program for actuator control with relays
- Created relay control circuit for the actuator and PLC
- Identified and resolved a critical AC system electrical fault, increasing system reliability
- Analyzed and repaired engine bay lighting circuits by interpreting electrical drawings
- Documented E-STOP circuit, improving maintenance efficiency of an old ASV
- Field tested CW78 and CW76 autonomous surface vehicles at a local lake
- Fabricated an aluminum moon-pool cover for the C-Target, reducing water drag
- Gained CLI proficiency; developed recursive grep command to automate file search
- Configured networks via CLI, wrote bash script for VPN tunnel splitting
- Diagnosed radar issue via manufacturer collaboration

University of Louisiana at Lafayette, Undergraduate Student Researcher — Lafayette, LA
- Spearheaded material testing for Martian regolith self-healing concrete — Sept 2022 – Sept 2023
- Designed, 3D printed, and molded cube and cylinder sample molds — 1 year 1 month
- Designed 3D-printable Compressmeter/Extensometer, reducing costs by ~$500
- Conducted ASTM-standard cube compression tests
- Assisted chemical engineers with regolith mixing and brick baking

BlueCollar Engineering and Manufacturing, Intern — Lafayette, LA
- Created to-scale floor plan of an ~50,000 sq-ft manufacturing plant using AutoCAD — Dec 2020 – Aug 2022
- Modeled bollards with Autodesk Inventor — 1 year 9 months
- Determined bollard material with FEA simulation
- Generated and redlined drawings for each bollard and other designs
- Manufactured parts with a Bridgeport milling machine
- Established fast maintenance routines for shop equipment, ensuring maximum lifetime
- Developed Autodesk tutorials to streamline part library additions

Projects

Friction Stir Extrusion Machine Dec 2023 – May 2024

- Identified two sources of EMI noise in transducer data, improving data integrity to ±2 lbs
- Completed a 3×3 test matrix — 100% of sponsor's goal
- Assisted in various PLC code improvements in ladder logic form
- Directed a cross-functional team, ensuring all contributed to project success

Digital Twin — 8-DOF Robotic Arm May 2023 – Aug 2023

- Learned Wolfram Mathematica to model the robotic arm
- Applied homogeneous transformations between body frames
- Studied inverse kinematics and difficulty of closed-form solutions
- Applied basic control theory to individual DOF to achieve desired end-effector position

CNN vs Fully Connected Image Classifier Jan 2023 – May 2023

- Trained autoencoders using TensorFlow and Keras to reconstruct iron microstructures
- Developed classifiers using a neural network and autoencoder layers
- Evaluated classifier performance (~60% correct)
- Plotted error types with confusion matrices

ATV Constant-Mesh Transmission Jan 2022 – May 2022

- Measured and dynamically modeled ATV transmission parts in SolidWorks

Publications

Temperature and Force While Forming A1100 Round Solid Cylinders in a Friction Stir Extrusion Machine Oct 2025

William J. Emblom, Jhonatan Gil Romero, *Gabriel Dimonde*, Alaric Bloss, Grahm Casse, Paul Daugereau, Jacob Garcia, Javen Bolden, Scott W. Wagner, Vinh Nguyen, Paul Darby
10.1115/IMECE2025-164201 (Proc. ASME Int. Mech. Eng. Congr. Exp. (IMECE2025))

Funding

Louisiana Board of Regents GRASS Summer 2026

- $10,000 — Integrated trajectory planning and control for scalable multi-UAV crop monitoring in smart agriculture
- Graduate Researcher under PI Dr. Boyang Zhang

Skills

Programming: Python, Java, MATLAB, ROS2, PLC Ladder Logic, Structured Text, Mathematica

Hardware: 3D Printing, Electrical Troubleshooting

Tools: Linux CLI, Autodesk Inventor, SolidWorks, FreeCAD, Gazebo Harmonic

Teamwork: Documentation, Communication, Collaboration