Lance Phillips

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EDUCATION

Johns Hopkins University
GPA: 3.65

BSE & MSE - Mechanical Engineering
September 2019 - May 2023 (expected)

Available to work in August 2023

SKILLSET

SolidWorks, NX, FEMAP (NASTRAN), ANSYS Structural, ABAQUS, MATLAB, Arduino, Java, C/C++, Lotus SHARK
Mill, lathe, wire EDM, sheet metal fabrication, TIG/MIG welding, 3D printing, laser cutting, woodworking, soldering

ENGINEERING EXPERIENCE

Space Exploration Technologies Corp. (SpaceX)   **May 2022 - August 2022**
Falcon Structures Intern
- Developed enveloping qualification test for lower joint of aft buildup of Falcon 9, Heavy Interstages, saving ~20 hours per build
  - Proved damage tolerance at component end-of-life, removing the need for time-consuming phased-array ultrasonic scans
  - Created all manufacturing documents to streamline test article manufacture time and push forward test
- Designed new LOX/RP drain system of second-stage Merlin Vacuum Engine through Falcon 9, Heavy Interstages
  - Prototyped and tested custom retention geometry to simplify vehicle integration and reduce build time
  - Identified possible thermal issue with cryogenic LOX impacting stage grounding through bondline temperatures (EMI risk)

Blue Jay Racing (Baja SAE)   **September 2019 - Present**
Team Captain, Suspension Kinematics Design Lead (prev. Suspension Lead Engineer)
- Won 1st Place in Design out of more than 100 teams in Tennessee 2022, led team to top 10 finish in Arizona 2022.
- Orchestrated shift in handling philosophy from first principles of design for 2023 vehicle (prev. unconsidered for 8 years)
  - Adjusted track widths for optimal ride rates and oversteer characteristics, implemented Ackermann steering characteristics
  - Iterated through kinematic hardpoint design in SHARK for handling characteristics and weight-efficient component design
  - Started working on MATLAB bump response script to characterize needed ride rates for optimal handling
- Developed criterion for vehicle handling characteristics by modifying ride, roll, and spring rates for 2022 vehicle
  - Processed and filtered (Savitsky-Golay) wheel force transducer test data to determine vehicle loads and roll moments
  - Documented in an extensive, auto-updating design criteria document for future reference and comparing testing results
- Significantly improved analysis methods by using assembly-level finite element analysis and documented hand calculations
  - Finite element analysis in ANSYS, using nonlinear contacts and joints to model loading to that experienced during driving
  - Designed and analyzed frame tabs using aircraft lug analysis method (*Airframe Stress Analysis and Sizing, Michael Niu)*
- Designed, jigged, and manufactured control arms, knuckles, hubs for both front and rear suspension
  - Initiated a shift to correct filler wire (ER80S-D2) for AISI 4130 steel to maintain joint strength equivalent to base material
  - Decreased subsystem mass by 34% (28 lbm) *while* increasing durability (all design margins met)

Hopkins Extreme Materials Institute   **February 2021 - May 2021**
Undergraduate Research Assistant
- Developed MATLAB code to plot orientation dependence of Young's Modulus from anisotropic boron carbide, given experimental stress/compliance tensors, Miller and Miller-Bravais orientation systems

OTHER EXPERIENCE

Vista Fire Department   **July 2018 - Present**
Interior Firefighter (Volunteer)
- Awarded Firefighter of the Year in 2021 for "Exceeding expectations and showing dedication to the community and department through training, and call response"
- Responded to 400+ calls to service since 2018, while attending weekly drills, training, and monthly overnight shifts