Joshua David Eckels

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Education:

B.S. Mechanical Engineering **GPA 3.98/4.0** 2017-2021
Rose-Hulman Institute of Technology Terre Haute, IN 47803

- Minors: Aerospace engineering, Thermal fluids, Computer Science, Music
- Coursework: Propulsion, Thermodynamics, Internal Combustion Engines, Aerodynamics Computational Fluid Dynamics, Numerical Simulation, Data Structures
- Activities: Wind tunnel lab, Fabrication shop, Formula SAE aero, Turbojet analysis

Research experience:

Los Alamos Dynamics | Undergraduate Researcher 2020-ongoing
Los Alamos National Laboratory, Los Alamos, NM 87545

- Performed ultrasonic wavefield imaging on components for non-destructive evaluation
- Improved performance and processing time of acoustic wavenumber spectroscopy by training a convolutional neural network to recognize defects in plate-like structures
- Integrated ANSYS, MATLAB, and deep learning workflow with Python automation

Assistive Robotics Lab | Undergraduate Researcher June-Aug 2019
Virginia Tech, Blacksburg, VA 24061

- Investigated off-road navigation constraints for autonomous rovers and handicapped users
- Integrated simultaneous localization and mapping software with object detection algorithms to identify and localize barriers in a 3D point cloud map for off-road robotic navigation
- Tailored navigation routing algorithms to the special needs of handicapped users

CS Educational Research | Undergraduate Researcher 2018
Rose-Hulman, Terre Haute, IN 47803

- Identified misunderstandings of computer science students when reasoning about code
- Analyzed data patterns to develop an online reasoning tutor to aid in student code tracing
- Automated the collection of data from students' problem-solving approaches

Software skills:

- Siemens STAR-CCM+ | Experience in 2D and 3D flow visualization and CFD
- Ricardo WAVE | Experience in combustion engine analysis and simulation
- ANSYS Mech, Fluent | Proficient in ANSYS workbench tools and Python scripting
- MATLAB | Proficient in numerical analysis and system modeling
- BS SOLIDWORKS | Intermediate CAD and stress/motion analysis experience
- OpenCV, ROS, Fast.ai | Intermediate in machine learning and conv neural networks
- Cloud computing | Remote deep learning virtual machine with GPU acceleration
- Languages | Proficient in Java, Python, C, Linux and shell scripting

Honors:

- Barry Goldwater research scholarship nomination 2019
- Heminway Bronze medal for top of undergraduate class 2019
- Rose-Hulman Dean's List 9/9 quarters 2017-present
- Tau Beta Pi engineering honor society and community involvement 2018-present

Conferences:

J.D. Eckels, I.F. Fernandez, K. Ho, N. Dervillis, E.M. Jacobson, and A.J. Wachtor, "Application of a U-Net Convolutional Neural Network to Ultrasonic Wavefield Measurements for Defect Characterization," presented at the 39th Int. Modal Analysis Conf. (IMAC), Feb. 8-11, 2021 2021

Publications:

(In Review) **J.D. Eckels**, E.M. Jacobson, I.T. Cummings, I.F. Fernandez, K. Ho, N. Dervillis, E.B. Flynn, and A.J. Wachtor, "Predicting Local Material Thickness from Steady-State Ultrasonic Wavefield Measurements Using a Convolutional Neural Network", Ultrasonics, (2021)