

Geoffrey Andrews

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Education

Purdue University - West Lafayette, IN

- Ph.D. in Aeronautical and Astronautical Engineering – May, 2021 (*expected*)
Research Topic: Acoustic Influences on Boundary Layer Transition in Hypersonic Wind Tunnels
GPA: 3.44
- M.S. in Aeronautical and Astronautical Engineering – May, 2017
Research Topic: Computational Modeling of Rocket-Based Combined Cycle Propulsion Systems
GPA: 3.64

Lehigh University - Bethlehem, PA

- Bachelor of Science in Mechanical Engineering – May, 2015 (*expected: May, 2016*)
Minor: Aerospace Engineering
GPA: 3.27

Research Experience

- **Ph.D. Student**, Purdue School of Aeronautics and Astronautics (2015-present)
 - Currently researching unsolved problems in hypersonic boundary layer transition using massively parallel computations, focusing especially on acoustic and geometric receptivity effects.
- **Graduate Research Fellow (BAEF-VKI)**, von Karman Institute for Fluid Dynamics (2020-present)
 - Studying hypersonic boundary layer stability in the VKI Longshot hypersonic gun tunnel
- **Graduate Co-op Student**, NASA Glenn Research Center (2016-present)
 - Work encompasses computational hypersonic systems analysis.
 - Developed thermodynamic cycle model of a dual-mode scramjet for use in a turbine-based combined cycle engine analysis.
- **Research Assistant**, Lehigh University Aerospace Systems Laboratory (2013-2015)
 - Assisted, supervised, and performed tests using the lab's closed-loop subsonic wind tunnel.
 - Performed aerodynamics tests on a gun-launched surveillance drone for the U.S. Army.
 - Upgraded tunnel test setup by designing and installing new instrumentation.
- **Undergraduate Research Fellow**, Lehigh University Bionanomechanics Laboratory (2014-2015)
 - Created a computer program and novel apparatus to rapidly creating microfluidic devices in an out-of-cleanroom environment using Digital Light Processing technology and greyscale lithography.

Publications and Presentations

- G. Andrews, J. Poggie; "Effects of Freestream Acoustic Disturbances on Hypersonic Boundary Layer Stability," AIAA Aviation 2020.
- G. Andrews, J. Poggie; "Stability of Cylindrical and Conical Boundary Layers," AIAA SciTech 2019, San Diego, California.
- G. Andrews; "A Hybrid Length Scale Similarity Solution for Swirling Turbulent Jets," ICAS 2018, Belo Horizonte, Brazil.
- G. Andrews, A. Black, J. Graham, O. Rique; "Preliminary Design of a Rotating Detonation Engine for Launch Vehicle Applications," AIAA Paper 2018-1671, January 2018
- R. He, S. Wang, G. Andrews, W., and Y. Liu, "Generation of Customizable Micro-wavy Pattern through Greyscale Direct Image Lithography," *Scientific Reports*, 2016

Honors and Awards

- Belgian-American Educational Foundation–Von Karman Institute for Fluid Dynamics Graduate Fellowship – 2020
- Outstanding Service Scholarship (Purdue University College of Engineering) - 2020
- Abe M. Zarem Award for Distinguished Achievement in Aeronautics (American Institute of Aeronautics and Astronautics) - 2018
- Aviation Week & Space Technology's 20 Twenties 2017 Recipient
- Graduate Individual Aircraft Design Competition – Second Place (American Institute of Aeronautics and Astronautics)
- Ross Graduate Fellowship (Purdue University) - 2015
- Purdue Forever Fellowship (Purdue University) - 2017, 2019
- Y. B. Wei Prize in Mechanical Engineering and Mechanics (Lehigh University) – *“In Recognition of Outstanding Academic Achievements and Demonstrated Leadership Qualities”*
- Undergraduate Research Fellowship (Lehigh University College of Engineering and Applied Sciences)

Relevant Skills

- Computational modelling (thermodynamic and fluids analysis) at both low- and high-fidelity levels using a variety of commercial, open-source, and home-grown tools
 - Programming languages: Python, Fortran, C++, C, and MATLAB
 - CFD tools: SU2, ANSYS Fluent, plus several in-house codes; stability codes LASTRAC and STABL
 - CAD packages: SolidWorks, AutoCAD, Inventor
- Strong hands-on background in hardware fabrication and prototyping

Professional Memberships

- AIAA – *American Institute of Aeronautics and Astronautics*
- RAeS – *Royal Aeronautical Society*
- ASEE – *American Society for Engineering Education*
- Pi Tau Sigma, Sigma Gamma Tau - *Mechanical and Aerospace Engineering Honor Societies*

Outreach and Volunteer Experience

- Creator, organizer, and director of Purdue Space Day's outreach program, a STEM advocacy initiative which brings educational engineering activities to over 1,500 students in Northern Indiana each year.
- Creator and director of “Project HALO”, a NASA-funded collaboration between Purdue University and local high schools which introduces students to engineering by allowing them to design, build, and launch a scientific balloon payload to 100,000 feet.
- American Institute of Aeronautics and Astronautics (AIAA) – Current chair of a national-level working group for educational outreach; formerly founded first AIAA student branch at Lehigh University and served as Branch Chairman.
- Students for the Exploration and Development of Space (SEDS) – Led educational outreach efforts for a rotation at the Mars Desert Research Station by collecting “letters to Mars” from ~250 schoolchildren and responding both via letter and via a series of YouTube videos.

Past Projects

- NASA Convergent Aeronautics Solutions (CAS) Micro-Seedling – *A Wing-in-Ground-Effect (WIG) Aircraft for Coastal Transport* – Led the conceptual design of an air transportation concept to alleviate congestion in highly-trafficked airspaces.

- Lehigh University Mechanical Engineering Capstone Project - *Energy Harvesting from Diaphragm Pumps* - Worked as lead engineer with a team of students to develop and test a novel power-generation device and develop an associated business model.
- Lehigh University AIAA Club Project – *Autonomous Quadrocopter for AHS Student Challenge*
Worked as project manager; led the design of a robotic vehicle for autonomous search missions.

Other Skills

- Instrument-rated commercial pilot with tailwheel, complex, and high-performance endorsements; classical musician (French horn, piano, vuvuzela); talented baker & travel enthusiast. Relatively proficient in French.