Curriculum Vitae

Andrew H. R. Lamkin

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1 Contact Information

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2 Education

Ph.D Aerospace Engineering, University of Michigan, 2021 - Present
M.Sc Aerospace Engineering, University of Michgian, 2020 - 2022
Concentration: Gas Dynamics
B.Sc. Mechanical Engineering, Michigan State University, 2016 - 2019
Concentration: Aerospace Engineering
Minor: Computer Science Engineering
Prev. Mechanical Engineering, Oakland University, 2016
Prev. Aerospace Engineering, Illinois Institute of Technology, 2014-2015

3 Academic Awards and Distinctions

- Graduated with Honor, Michigan State University, 2019
- College of Engineering Dean's List, Michigan State University, 2016-2019
- Top Student in Class, Michigan State University, 2017
- Heald Scholar, Illinois Institute of Technology, 2015-2016

4 Experience

Ph.D Candidate, University of Michigan, January 2021 - Present
MDO Lab, Advised by Joaquim Martins

- Aeropropulsive optimization considering the coupling between thermodynamic cycles, CFD, and CAD based geometry.
- Optimization of thermodynamic cycle models considering hydrogen fuel and water recirculation.
- Interior penalty Newton solver development using pseduo-transient continuation and an unsteady line search for box-constrained nonlinear systems.
- Implementation of parallel multi-objective gradient-based approach for large scale design space optimization.
- Parallel high-performance computing on large scale clusters.
- ITAR restricted projects in collaboration with the Air Force Research Laboratory at the Wright-Patterson Air Force Base.

Graduate Student Research Assistant, University of Michigan, June 2020 - December 2021
MDO Lab, Advised by Joaquim Martins

- Modeling a N+3 technology (high bypass, geared) turbofan engine to accommodate electric hybridization and increased thermal management capability.
- Design optimization of a supersonic mixed-flow turbofan engine considering takeoff noise, efficiency, and emissions.
- Reduced order modeling of supersonic inlet drag with derivatives for gradient-based optimization.

Research Assistant, Michigan State University, May 2019 - December 2019
Combustion Laboratory, Advised by Patton Allison

- Designed and built a narrow channel combustion device to study turbulent flames through a predetermined narrow channel.
- Created a ignition control box with a custom single spark ignition circuit for reliable relight of the narrow channel combustion device.
- Worked with Particle Image Velocimetry (PIV) using a McKenna Burner and turbulent fuel sprays.
- Assisted with the repair of a Quanta-Ray high powered laser for use during PIV and PLIF flame studies.
- Constructed of a large acrylic box to study different pre-vaporized fuel sprays using PIV analysis.
- Operated a Phantom high-speed camera for PIV analysis.

5 Presentations

1. *Coupled Aeropropulsive Analysis and Optimization of a High-Bypass Turbofan Engine*, International Council of Aeronautical Sciences Conference, Stockholm, Sweden, Sep 2022
2. *Overview of Aeropropulsive Optimization Applied to Turbofan Engines* University of Michigan Industrial Advisory Board Event, Ann Arbor, MI, Sep 2022
3. *Progress in Aeropropulsive Design Optimization with MPhys*, OpenMDAO/MPhys Workshop, Cleveland, OH, Oct 2022
4. *Advancements in Coupled Aeropropulsive Design Optimization for High-Bypass Turbofan Engines*, AIAA Aviation 2023, San Diego, CA, Jun 2023

6 Publications

Papers in Conference Proceedings

[1] A. H. R. Lamkin, A. Yildirim, J. R. R. A. Martins, and N. A. Wukie. Advancements in Coupled Aeropropulsive Design Optimization for High-Bypass Turbofan Engines. In *AIAA Aviation Forum*, San Diego, CA, June 2023.

[2] P. N. Atma, A. H. R. Lamkin, and J. R. R. A. Martins. Comparing Hydrogen and Jet-A for an N+3 Turbofan with Water Recirculation using Gradient-Based Optimizaiton. In *AIAA Aviation Forum*, San Diego, CA, June 2023.

[3] A. H. Lamkin, A. Yildirim, and J. R. R. A. Martins. Coupled aeropropulsive analysis and optimization of a high bypass turbofan engine. In *33rd Congress of the International Council of the Aeronautical Sciences*, September 2022.

7 Memberships in Professional Societies

- AIAA Student Member
- ASME Graduate Student Member