630-779-3396
kjmath@mit.edu

Kelly Mathesius

kjmath.github.io/portfolio

A maker and engineer with demonstrated skills in fabrication, design for manufacturing, modeling and optimization of constrained physical systems, scientific software, and technical communication. Excited to apply multi-disciplinary aerospace project experience to new challenges in emerging manufacturing technologies and processes.

SKILLS

Programming: python, MATLAB, Mathematica, git
Design Optimization: CasADi, AeroSandbox
CAD: SolidWorks, Creo, 3D model revision control (GrabCAD, ThangsSync), GD&T
Manufacturing: mill, lathe, waterjet, laser cutter, sewing, soldering, additive manufacturing (polymers, metals, and ceramics), solid rocket propellant production, composites, silicone mold production, polymer casting

EDUCATION

Massachusetts Institute of Technology *Cambridge, MA*
Doctor of Philosophy in Aeronautics and Astronautics – Space Propulsion *Sept 2019 - May 2023 (Expected)*
- Key classes: additive manufacturing, design of high temperature materials, structure of materials, cellular solids, space propulsion, rocket propulsion, matrix methods in data analysis

Master of Science in Aeronautics and Astronautics *Sept 2017 - June 2019*
Bachelor of Science in Aerospace Engineering *Sept 2013 - June 2017*

WORK EXPERIENCE

MIT International Center for Air Transportation *Cambridge, MA*
Graduate Researcher *Sept 2017 - Present*
- Designed and conducted experiments to measure the effects of solid rocket motor design parameters on exhaust plume radiant emission
- Developed an end-to-end differentiable model in python for exhaust plume radiant emission of rocket motors; utilized model and AeroSandbox computational framework to optimize aircraft design and analyze performance tradeoffs
- Managed a team of undergraduate researchers

MIT AeroAstro 3D Printer Workshop *Cambridge, MA*
Instructor and Manager *Jan 2018 - March 2020*
- Implemented and managed a 3D printer workshop for the MIT AeroAstro department with FDM and SLA printers
- Led seminars and hands-on workshops on proper printer use, material selection, hazard awareness, trouble-shooting strategies, and designing for additive manufacturing

Blue Origin *Kent, WA*
Engines Materials and Processes Intern *June - August 2019*
- Identified, mixed, and characterized alternative extrude honing media for improving interior surface finish of cast or additively manufactured components
- Designed and built a test rig for evaluating extrude honing media; tested effectiveness of developed extrude honing media at improving surface finish of test coupons

Boeing *Huntsville, AL*
SLS Flight Termination System Intern, SLS Cryo Filters and Valves Intern *June - August 2016, 2017*
- Compiled and presented test procedure data packages for the Space Launch System's flight termination system pyrotechnics to NASA for Range Safety approval
- Designed and prototyped a voltage and current tester for life cycle testing of valve limit switches; developed a MATLAB tool to filter and analyze data for lot acceptance testing of switches

Northrop Grumman *Manhattan Beach, CA*
Aerospace Engineering Intern *June - August 2015*
- Developed MATLAB code to model the effects of contamination on the surface emissivity of the mirrors on the James Webb Space Telescope and implemented a GUI to simplify use of the code
- Characterized additively manufactured aluminum coupons and utilized results to select heat treatment parameters