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| 630-779-3396  kjmath@mit.edu | **Kelly Mathesius** | [kjmath.github.io/portfolio](https://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](https://web.casadi.org/), [AeroSandbox](https://github.com/peterdsharpe/AeroSandbox#readme)

**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 - June 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