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| 630-779-3396  kelly.mathesius@gmail.com | **Kelly Mathesius**, PhD | [kjmath.github.io/portfolio](https://kjmath.github.io/portfolio/) |

An engineer with demonstrated skills in data analysis, modeling and optimization of constrained systems, scientific software, manufacturing, and technical communication. Excited to apply multi-disciplinary project experience to new challenges in data science.

**SKILLS**

**Programming:** python, MATLAB, git, SQL (BigQuery)  
**Data Analysis**: numpy, pandas, seaborn, matplotlib, lmfit, pingouin  
**Computational Optimization:** [CasADi](https://web.casadi.org/), [AeroSandbox](https://github.com/peterdsharpe/AeroSandbox#readme)

**EDUCATION**

**Massachusetts Institute of Technology** *Cambridge, MA*

*Doctor of Philosophy in Aeronautics and Astronautics – Space Propulsion* *Sept 2019 - June 2023*

* Key classes: matrix methods in data analysis and machine learning, numerical methods, statistics, additive manufacturing, rocket propulsion

*Master of Science in Aeronautics and Astronautics Sept 2017 - June 2019*

*Bachelor of Science in Aerospace Engineering Sept 2013 - June 2017*

**WORK EXPERIENCE**

**Formlabs** *Somerville, MA  
Research and Development Engineer*  *June 2023 - Present*

* Develop and implement models to understand stereolithography printing process physics: fluid pressure on parts during print process, identification of time-optimal layer heights, flow artifacts on cupped volumes
* Propose experiments, collect data, and analyze results for improving print quality and print speeds of Form 4 printers
* Write SQL queries for print metrics; analyze data with statistical methods; visualize data with Grafana and Redash dashboards

**MIT International Center for Air Transportation** *Cambridge, MA  
Graduate Researcher Sept 2017 – June 2023*

* 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

**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