

# Geneva C. Isaacson

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[www.genevaisaacson.com](http://www.genevaisaacson.com)

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## **Experience:** **Triton Systems, Inc.** (Remote – Chelmsford, MA)

*Staff Engineer, September 2023 – current*

- Managing research and development for the modeling and design of 3D-printed optical lenses for telescopes.
- Developing an optical ray tracing model in COMSOL to determine the effects of thermal expansion on the focal point of a telescope.
- Acted as lead author on numerous SBIR and STTR Army, Navy, and Space Force proposals. Assisted multiple other SBIR proposals by identifying and supporting project modeling needs in COMSOL, FEMAP, and MATLAB.
- Modeled tensile loading and unloading conditions with fatigue of functionally graded composites.
- Developed a parametric thermal analysis coupled with CFD for a chemical glass cooling sample.
- Developed a structural feasibility study for conformable storage tanks in FEMAP.
- Created a structural model of an ice rescue vehicle for different rough terrain loading conditions.
- Designed a passive thermal management polymer for use on satellite propulsion lines.
- Developed a Computational Fluid Dynamics simulation incorporating structural and thermal changes for an oil quantity sensor.
- Modified a Peridynamic MATLAB code to analyze carbon/carbon hypersonic composite structures.
- Developed a CAD master model for handheld decontamination devices, SUBSAFE hull penetrators, and linear actuators with their gear chains.
- Conducted system analysis of a handheld plasma decontamination device to improve weight and ergonomics, leading iterative mechanical design efforts to implement enhancements.
- Utilized microcontrollers to code a system for user feedback on distance and time constraints.
- Crafted plumbing to integrate a hydrogen storage tank into a converted hydrogen fuel cell car.
- Provided project support for innovative research in structures, composite materials, metal additive manufacturing, robotics and anti-tamper systems, and acoustics.
- Collaborated with university partners on special design projects.

## **NASA Mass Space Grant Fellowship** (Worcester, MA)

*Graduate Researcher, May 2022 – August 2022*

- Designed a method for generating mock Polymer Bonded Explosives (PBXs) developed with Polydimethylsiloxane (PDMS) and sugar crystals.
- Defined how tension, compression, and vibration of mock PDMS PBX forms volatile spots on mock explosive crystals to determine safer ways for handling.

## **Belcan Engineering LLC.** (Remote – Windsor, CT)

*Structures Intern, August 2021 – August 2022*

- Performed mortality analysis for subsystem components within aerospace electrical applications.
- Identified appropriate load sets utilizing current and legacy engine component schematics.
- Calculated modal analysis based on Campbell diagrams.

**Worcester Polytechnic Institute (Worcester, MA)**

Laboratory Assistant, May 2023 – September 2023

- Led a project team of undergraduate students in a microfluidics laboratory to develop a new accessible, low-cost platform utilizing Taylor Dispersion.

Teaching Assistant (TA/PLA), October 2020 – May 2023

- Teaching classes and labs to groups of 20-60 students; grading assignments, quizzes, exams; proctoring exams; making rubrics; holding office hours and tutoring sessions.
  - *Mathematics*: Ordinary Differential Equations, Linear Algebra, Calculus, and Statistics.
  - *Physics*: Mechanics and Electromagnetism (including labs)
  - *Aerospace*: Finite Element Methods for Partial Differential Equations and Composite Materials.

**Education:**      **Worcester Polytechnic Institute (WPI)**, Worcester, MA, May 2023  
                         **Master of Science in Aerospace Engineering**, GPA: 3.69/4.0  
                         **Bachelor of Science in Physics**, GPA: 3.66/4.0  
                         **Bachelor of Science in Mechanical Engineering**, GPA: 3.66/4.0

**Projects:**      **Aerospace Engineering Graduate Research**, August 2022-May 2023  
*Influence of Interfacial Damage Accumulation on Heat Generation in Energetic Materials*

- Defining Hydroxyl-terminated polybutadiene (HTPB) characteristics through peel test delamination to determine Young's Modulus.
- Testing and documenting how tension, compression, and vibration of a mock HTPB PBX forms volatile spots on explosive crystals to provide manufacturers a stable product for industrial use.
- Conducted a comprehensive analysis of rocket fuel performance.

**Major Qualifying Project (Physics/Mechanical Engineering)**, August 2022-May 2023*Applications of an Accessible Microfluidics Platform for Taylor Dispersion Properties*

- Developing a platform utilizing Taylor Dispersion to validate a unique procedure for future use in other fields.
- Analyzing molecular dispersion using fluorescein dye in a microfluidics laboratory.

**Independent Research Project (Physics), August 2022-January 2023***Wave Characterization on Photonic Integrated Circuits (PICs)*

- Experimented with state of the art, Keysight equipment to develop a method using a network analyzer and a 1500 Laser to generate a standard set of data.
- Tested with WPI inhouse-made nano station to construct the PIC.

**Relevant Coursework:**

- Quantum Mechanics 1, Introduction to Astronomy, Introduction to Space Systems, Calculus 1-4, Linear Algebra, Differential Equations, Linear Programming, Boundary Value Problems, Engineering Mathematics

**Publications:**

- *Adapting Taylor Dispersion to Microfluidics Scale.*
- *Short Video Projects on Physics Education: The Physics of a Roller Coaster.*
- [Geneva Isaacson Google Scholar](#) – Contains all articles and technical contributions.

**Conferences:**

- COMSOL 2024 Boston Conference – Co-presented finding from a fatigue study on functional graded materials being used for aerospace applications.
- WPI GRIE 2023 – Presented my graduate research findings.

**Certifications and Trainings:**

- NASA Transform to Open Science Open Science Program
- UMass Lowell Corporate Education
  - Project Management: Planning & Scheduling, Risk Management, Agile & Scrum
- ATA Engineering: Introduction to FEMAP
- COMSOL: Introduction to COMSOL Multiphysics®
- AIAA “Technical Writing Essentials for Engineers”

**Awards:**

- NASA Transform to Open Science Open Science Program
- UMass Lowell Corporate Education
  - Project Management: Planning & Scheduling, Risk Management, Agile & Scrum
- ATA Engineering: Introduction to FEMAP
- COMSOL: Introduction to COMSOL Multiphysics®
- AIAA “Technical Writing Essentials for Engineers”

**Activities:**

**Amateur Telescope Makers of Boston**, March 2023 – Present  
**Sigma Pi Sigma** (Physics Honors Society), March 2022 – May 2023  
**Alpha Phi Omega** (Service Fraternity), September 2020- May 2023  
 ▪ President, Membership VP, Leadership VP, Treasurer  
**Alpha Phi** (Social Sorority), October 2020 – May 2023  
**WPI NCAA Track and Field**, August 2019 – May 2023

**Skills:**

**Computer Skills:** Microsoft Office, MATLAB, SolidWorks, Python, LabVIEW, Rapid Prototyping  
**Simulations:** COMSOL Multiphysics (Ray Optics, Computational Fluid Dynamics, Structural Mechanics, Electromagnetism, AC/DC), FEMAP NASTRAN, Simulink  
**Laboratory:** Soldering, Thermal FLIR Cameras, Instron, Microfabrication, Microscopy, DIC