

Tristan Heusser

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Aerospace Propulsion · Experimental Physics · Quantitative Modeling

EDUCATION

University of Toronto

Expected 2029

Bachelor of Applied Science, Engineering Science

- Rigorous, physics- and mathematics-intensive curriculum
- Coursework: Vector Calculus & Fluid Mechanics, Thermodynamics & Heat Transfer, Waves & Modern Physics
- Dean's Honour List, Winter 2026

Nelson Mandela School Berlin

2025

International Baccalaureate Diploma

- IB score 40/45, with 7 in HL Mathematics: Analysis & Approaches and 7 in HL Physics
- Valedictorian; class speaker for four consecutive years
- Awarded the DPG-Abiturpreis (German Physical Society) for outstanding achievement in physics

RESEARCH & TECHNICAL EXPERIENCE

Research Assistant

2026 – Present

Cooper Lab, York University

- Designed and executed a study of zincate-assisted copper and black nickel electroplating on aluminized Mylar toward solar absorber applications across 6 zincate conditions, confirming substrate continuity beforehand and localizing the resulting deposition failure to the substrate via a successful aluminum foil control
- Co-authored a technical report documenting the electroplating methodology, results, and failure analysis
- Determined the solubility limit of calcium nitrate tetrahydrate in HPLC water by incremental addition, establishing an experimental value of 195 g per 100 mL against a 121–129 g literature reference range and evaluating thermal and hygroscopic effects as partial explanations for the discrepancy
- Built an enclosure for an 80 lb off-axis parabolic mirror from 80/20 framing, laser-cut acrylic, and 3D-printed parts
- Assembled and aligned the LED illumination and lens stage of a schlieren optical system; currently designing a 3D-printed mount for the slit aperture

Junior Editor, Econometrics and Data Science

2026 – Present

International Student Economics Journal, peer-reviewed undergraduate research

- Selected to join the editorial team responsible for evaluating quantitative and econometric submissions
- Role includes reviewing data and replication packages for reproducibility and methodological soundness

Aerospace Propulsion Researcher

2024 – 2025

Research Student Team, BEARS, Technical University of Berlin

- Analyzed recorded footage from 10 thermite ignition trials, measured and compared burn times
- Built a relay-controlled Arduino ignition system for rocket engine testing
- Applied energy balance and heat transfer analysis to inform ignition system design choices
- Collaborated with multidisciplinary teams to refine experimental protocols and testing procedures

Independent Researcher

2025

Micromouse Maze Algorithms, Research Paper

- Modeled mazes as weighted graphs and adjacency matrices; implemented and compared A*, Dijkstra's, BFS, DFS
- Proved graph-theoretic equivalence between a pixelated maze representation and the original maze
- Evaluated algorithm performance across 10000 trials per algorithm using Big-O complexity analysis and statistical testing (ANOVA, Tukey HSD)

Workshop Designer & Mentor

2024

Pi-Top Robotics Workshop, Educational Outreach

- Designed and led a robotics workshop for 20 students, covering programming and coordinate-based navigation
- Mentored students through hands-on problem-solving using the Pi-Top robotics platform

SKILLS

Programming	Python, C++, C, MATLAB, Arduino
Computation	Graph search algorithms (A*, Dijkstra's, BFS, DFS), optimization, Big-O analysis
Mathematics	Linear algebra, numerical methods, probability & statistics, ANOVA, Tukey HSD
Laboratory	Electroplating and surface preparation, optical alignment, experimental design
Design & Fabrication	SolidWorks, 3D printing, laser cutting, soldering, sensor interfacing, relay control
Tools	Git, NumPy, Pandas, Matplotlib, Jupyter, LaTeX, Linux
Languages	English (fluent), German (fluent), French (intermediate)