

David McQuestion Johnson

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EDUCATION

Cornell Tech, New York, NY
Master of Engineering, Operations Research (ORIE)
Cornell University, Ithaca, NY
Bachelor of Science, Engineering Physics, Magna Cum Laude

Expected May 2027

May 2026

TECHNICAL SKILLS

Programming & Computing

- Python, NumPy, pandas, SciPy, scikit-learn, PyTorch, MATLAB, Fortran, SQL, Java
- CLI, Linux/Bash, Git/GitHub, HPC, SSH
- Data structures and algorithms; unit testing, debugging

Machine Learning

- Supervised and unsupervised learning; model validation and regularization
- CNNs, RNNs, and Transformers

Plasma Physics & Research

- MHD codes: Chimera, FLASH
- Magnetic reconnection, atomic models
- Magic2, sheared-flow-stabilized Z-pinch
- Pulsed-power generators, magnetic diagnostics

Simulation, Modeling & Optimization

- Numerical ODE/PDE solvers: finite differences, Runge–Kutta integration
- Linear, integer, and nonlinear optimization
- Markov chains, Poisson processes, Monte Carlo
- Statistical modeling, time-series analysis, uncertainty quantification, sensitivity analysis

Engineering & Diagnostics

- Synthetic diagnostics, experimental design
- ANSYS, ParaView, CAD

Laboratory & Fabrication

- Oscilloscopes, function generators, multimeters
- Soldering, CNC; mill and lathe machining, cleanroom

Credentials

- U.S. DoD Secret security clearance
- Wilderness First Responder

COURSEWORK

Current M.Eng.

- Optimization Methods
- Optimization of Neural Networks
- Deep Learning
- Modeling Under Uncertainty
- Product Studio

Computing & Engineering

- Object-Oriented Programming & Data Structures
- Foundations of Machine Learning
- Electronic Circuits
- Digital Logic
- Numerical Analysis & Differential Equations

Physics

- Classical Mechanics I & II
- Quantum Mechanics I & II
- Electricity & Magnetism I, II, & III
- Advanced Experimental Physics
- Fusion Energy
- Statistical Mechanics

Mathematics

- Mathematical Physics I & II
- Multivariable Calculus
- Linear Algebra
- Differential Equations
- Probability Models & Statistical Inference

HONORS & AWARDS

Follett Family Fellowship, Cornell Tech
Cornell Engineering International Summer Research Grant
Caltech Summer Undergraduate Research Fellowship (SURF)
Dean's List
Outstanding Article of 2024, Augustine Collective, for *The Weight of Story*

\$40,000 Merit Scholarship
2025
2025, declined
All semesters
One of five selected

PROFESSIONAL AND RESEARCH EXPERIENCE

Inertia Enterprises, Livermore, CA

Computational Physics Contractor, part-time

Sep 2026 – Present

Computational Physics and Experimental Design Intern

Jun 2026 – Aug 2026

- Developed 1D FLASH radiation-hydrodynamics simulations of prompt X-ray heating in xenon gas cells across pulsed-power facilities and operating conditions.
- Built frequency-dependent radiation-source and Mylar/SiN window-transmission models for X-ray transport and burn-through simulations.
- Evaluated optical, spectroscopic, and X-ray diagnostics to benchmark atomic-physics models and validate simulations.
- Proposed campaigns for COBRA, MAGPIE, and Sandia's Z Machine, defining diagnostic strategies, parameter scans, and validation metrics.
- Integrated experimental data, ran multidimensional parameter sweeps and sensitivity analyses, and translated results into engineering recommendations.
- Presented a simulation-driven experimental proposal to the approximately 50-person company and authored a phased implementation roadmap.

Cornell University Laboratory of Plasma Studies, Ithaca, NY

Oct 2023 – Dec 2025

Undergraduate Researcher

Full-time: Summer 2024

- Modeled magnetic reconnection with a full magnetohydrodynamics code on HPC resources.
- Built custom Python data-reading and post-processing tools for simulation analysis and publication-quality figures.
- Developed a nonlinear snowplow model and fabricated simulation-driven gas-puff hardware for pulsed-power experiments on COBRA.
- Designed, built, and calibrated magnetic diagnostics, including Rogowski coils and B-dot probes, for pulsed-power experiments.
- Compared simulations with experimental literature and contributed revisions to submitted research manuscripts.

Plasma Physics Group, Imperial College London, London, United Kingdom

June 2025 – Aug 2025

Undergraduate Researcher

- Investigated sheared-flow-stabilized Z-pinchs using radial wire arrays and axial targets in MHD simulations.
- Tuned initial and magnetic boundary conditions for cylindrical MHD simulations of pulsed-power plasmas.
- Developed a flexible inductance framework to control current division in Z-pinch electrodes and circuit models.
- Proposed three experimental geometries for subsequent testing by the group's doctoral researchers.

General Dynamics Electric Boat, New London, CT

Jun 2023 – Aug 2023

Design & Engineering Intern

- Saved over \$500,000 annually by identifying and resolving an engineering-management inefficiency in a production workflow.
- Identified a \$2M+ design-timeline issue and elevated it to a Vice President at a 20,000+ employee company.
- Authored a detailed letter describing the issue and received a return offer to help resolve it.

PUBLICATIONS & PRESENTATIONS

arXiv preprint (2026) — *Indirect-Drive Fusion Target Design for Commercial Fusion Energy*; co-author as a member of the Inertia Collaboration (listed as D. Johnson). [arXiv:2609.19752](https://arxiv.org/abs/2609.19752).

- Provided substantive technical and editorial review, identifying inconsistencies in target-gain reporting and recommending improvements to scaling explanations, equation notation, and technical definitions.

Physics of Plasmas **33**, 092103 (2026) — *Delayed current sheet formation due to an external field in pulsed-power-driven reconnection experiments*; co-author, contributed magnetic-reconnection modeling. [doi:10.1063/5.0343782](https://doi.org/10.1063/5.0343782).

APS Division of Plasma Physics (DPP) 2026 — First-author presentation accepted on a design for Z-pinch experiments based on previous experiments and new simulation results.

LEADERSHIP, TEACHING & EDITORIAL WORK

Cornell Outdoor Education, Ithaca, NY

Sep 2022 – May 2026

Instructor

- Completed 800+ hours of instruction and staff training; taught Redwoods Tree Climbing, Tree Climbing, Rock Climbing, Canoeing, Day Hiking, and Backpacking.
- Served as a Cornell Outdoor Odyssey guide and guide-training facilitator (2023–2024) and as a Land Staff Training facilitator (Fall 2024).

Physics Learning Strategies Center, Cornell University, Ithaca, NY

Aug 2024 – May 2025

Tutor

- Tutored students across 15+ physics courses and multiple departments.

Cornell Claritas

Aug 2024 – May 2025

Senior Editor

- Wrote essays and poems on culture, philosophy, theology, literature, and science.
- Led writing workshops, edited and proofread dozens of essays, and helped manage publication operations.

Society of Physics Students

Aug 2024 – May 2026

Peer Mentor

- Mentored two first-year physics students on research, physics coursework, and the transition to college.

Logos Seminar

Aug 2023 – May 2024

Fellow

- Participated in a closed seminar studying foundational works in philosophy and theology.

TECHNICAL & INDEPENDENT PROJECTS

HPC Job Status Monitor

Summer 2025

- Built a Python GUI tool to monitor HPC jobs through SSH, retain completed-job logs, and restore job state between sessions.
- Adapted authentication from Paramiko to keyboard-interactive SSH after an institutional authentication change.

Brownian Motion and Thermal Diffusion

- Used microscopy to measure sedimentation and Brownian trajectories of polystyrene beads; wrote an automated bead-counting script and performed uncertainty analysis to reproduce Boltzmann's constant.

Gamma-Ray Spectroscopy

- Calibrated a NaI(Tl) scintillation detector and analyzed Cs-137, Co-60, and Na-22 spectra using background subtraction, peak fitting, energy calibration, and a script to extract MCA live times.

Muon Decay Lifetime Measurements

Ongoing

- Measuring muon lifetimes from experimental decay data, detector instrumentation, and statistical lifetime extraction.

Solar-Panel Frequency-Response Study (PHYS 2210), Cornell University

Jan 2024 – May 2024

- Measured solar-panel wavelength response under different lighting conditions; accounted for lux-meter frequency response, wrote the final report, and presented results to five faculty members.

Cislunar Explorers, Space Systems Design Studio

Jan 2023 – May 2023

Electrical Subteam

- Researched and selected hardware components for telemetry, tracking, and communication; helped the team converge on a 12U CubeSat design with onboard demonstrative technologies.

Redwood Charcuterie Board

Summer 2025

- Designed and fabricated a giant-sequoia charcuterie board using a homemade planer, hand sanding, and a mineral-oil and beeswax finish.

Scientific Writing

- *Measuring the Boltzmann Constant Via Sedimentation and Brownian Diffusion*
- *Gamma-Ray Energy Deposition in NaI(Tl): Photoelectric Absorption, Compton Scattering, and Pair Production*
- *Experimental Measurement of the Muon Lifetime*

Additional Essay

- *An Economic, Philosophical, and Practical Analysis of Dilution in Trademark Policy*

Published Essays and Poems

- *Stuck in the Middle with Me*, Claritas, Fall 2024, “Margins”
- *Hey Zeus!*, Claritas, Spring 2024, “Home”
- *Cornell’s Secular Sabbath, Mere Orthodoxy*, January 2024
- *The Weight of Story*, Claritas, Fall 2023, “Stages”
- *Stages Poem*, Claritas, Fall 2023, “Stages”
- *Windows Imply Doors*, Claritas, Spring 2023, “Love”
- *Life, Death, and Dirty Dishes*, Claritas, Fall 2022, “Mystery”