Kazuki Tojo

Massachusetts Institute of Technology
Department of Aeronautics and Astronautics
Gas Turbine Laboratory

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Education

Massachusetts Institute of Technology — Cambridge, MA, USA
S.M.-Ph.D. in Aeronautics and Astronautics, GPA 4.9/5.0 — *Expected 2026 & 2029*

Princeton University — Princeton, NJ, USA
B.S.E. in Mechanical and Aerospace Engineering, GPA 3.93/4.00 — *2024*

University of Oxford — Oxford, UK
Princeton-Oxford Engineering Exchange (Non-Degree) — *2022-23*

Research Experience

MIT Gas Turbine Laboratory — *Summer 2026–*
Advisor: Masha Folk
Ph.D. Thesis

- Developing an agentic AI network to analyse turbomachinery data methodically from first principles, aiming to uncover novel information from CFD data that exceeds human capacity for rigorous analysis

MIT Gas Turbine Laboratory — *Sept 2024–Present*
Advisors: Edward Greitzer, Marshall Galbraith, Graham Pullan, Sam Grimshaw, Zoltán Spakovszky
S.M. Thesis

- Developing an integral parameter to quantify overall stability of compressor with radially varying characteristics
- Using a body force model with the Solution Adaptive Numerical Simulator (SANS) to perform steady, unsteady and eigenanalysis calculations
- Investigating explainability of spike stall inception via linearised theory

Princeton Electric Propulsion & Plasma Dynamics Laboratory — *Sept 2023–May 2024*
Advisor: Edgar Choueiri
B.S.E. Thesis

- Performed thermal analysis of 30 kW MPD thruster to optimise structural/material design under high thermal loads
- Experimentally validated thruster heat-up phase with broad temperature agreement from 1.3% to 19.5% in magnitude
- Operated vacuum chamber with roughing pump and roots blower for thruster testing
- Developed an Arduino PID controller to maintain constant positive argon gauge pressure in lithium handling glovebox
- Machined and implemented an aluminium motor-valve mechanism with copper tubing for robust physical PID control
- Project funded by NASA-JPL and nominated for Departmental Award for Excellence in Senior Independent Work

Oxford Thermofluids Institute *Oct 2022–June 2023*
Advisors: Kam Chana, John Coull
M.Eng. Thesis

- Developed a novel method of high frequency and high sensitivity gas analysis by pulsing the tungsten filament of a MEMS gas flow sensor as a thin-film and obtaining heat curves
- Derived and validated a finite-elements model using high pressure argon gas, compressed dry air and exhaled breath
- Performed water bath calibrations to obtain temperature coefficient of resistance of thin-film filaments
- Improved measurement frequency by 3 orders of magnitude compared to gas sensors on the current market

Princeton Complex Fluids Group *Sept 2023–May 2024*
Advisors: Howard Stone, Paul Kaneelil

- Studied 2D and 3D sessile drop coalescence of non-Newtonian fluids through microscopy and interferometry
- Used free surface synthetic Schlieren imaging to obtain 3D images of drops too tall to capture through interferometry
- Used PIV to perform noise detection & elimination and obtain drop displacement fields through pattern distortion
- CAD designed and 3D printed syringe fixtures to allow for simultaneous drop ejection
- Quantified elastic parameters of test fluids using rheometer

Research Interests

My research interests are broad and I believe in problem-oriented methodologies, enabled by my past theoretical, computational and experimental experiences:

- Problems rooted in fluid dynamics, thermodynamics and heat transfer
- Problems with applications in aerospace propulsion (air-breathing and rocket)
- Problems with applications in energy processing

Awards

Ezoe Memorial Recruit Foundation Academic Division: Graduate Scholarship
Supports exceptionally accomplished Japanese youth competing on the world stage. Other divisions include music, sports and art. Annual workshop in Tokyo to discuss matters in the context of making a difference on the global stage. This is the only Japanese scholarship that supports graduate students studying abroad. On average, 7 to 8 scholars are selected annually.

Magna Cum Laude, Princeton University

Sigma Xi, The Scientific Research Honor Society

Tau Beta Pi, The Engineering Honor Society

M.Eng. Thesis First-Class Honours, University of Oxford

Ezoe Memorial Recruit Foundation Academic Division: Undergraduate Scholarship

Teaching Experience

MIT 16.540: Internal Flows in Turbomachines *Spring 2026*

Instructor: Edward Greitzer

- Teaching assistant for a graduate class based around discussions and concept questions
- Bridged discussions between students and instructor
- Supported in adjusting exam questions based on class proficiency
- Topics included:
  - Pressure fields and upstream influence
  - Concepts of vorticity, circulation and vortex structures
  - Fluid motions in a non-inertial frame of reference
  - Loss sources and mechanisms in fluid flow processes

Industry Experience

Interstellar Technologies, Japan *June 2021–Aug 2021*

Propulsion Engineering Intern

- Compiled a benchmark survey of over 600 orbital/suborbital rocket engines launched globally
- Conducted visual post-flight analyses of engine combustion performance during two suborbital flights to space
- Shadowed test engineers during pre-flight procedures: captive firing test, LOx and ethanol flow tests, full dress rehearsal

Publications

Kaneelil P.R., **Tojo K.**, Farsoiya P.K., Deike L. and Stone H.A. (2026). Coalescence of viscoelastic sessile drops: the small and large contact angle limits. *Journal of Fluid Mechanics, 1026, A12*.

Tojo, K. (2024). Thermal Behaviour of a Lithium Self-Field Magnetoplasmadynamic Thruster. *B.S.E. Thesis*, Princeton University.

Tojo, K. (2023). Gas Sensing for Cooling and Combustion using Micro-Electro-Mechanical Systems: A Proof of Concept Study. *M.Eng. Thesis*, University of Oxford.

Presentations

Tojo, K., Galbraith, M., Greitzer, E., Pullan, G., Grimshaw, S., Spakovszky, Z.(April, 2026). Examination Of A Compressor Rotating Stall Criterion For Radially Non-Uniform Flow. *Mitsubishi Heavy Industries Workshop with MIT and University of Cambridge*, Takasago, Japan.

Tojo, K. (May, 2024). Thermal Behaviour of a Lithium Self-Field Magnetoplasmadynamic Thruster, *Mechanical and Aerospace Engineering Senior Awards Oral Presentation, Princeton University*.

Tojo, K. (April, 2024). Thermal Behaviour of a Lithium Self-Field Magnetoplasmadynamic Thruster, *Mechanical and Aerospace Engineering Senior Thesis Poster Session, Princeton University*.

Leadership & Service Activities

Massachusetts Institute of Technology *Sept 2024–Present*
Club Soccer, Club Rowing (treasurer)

Princeton University *Aug 2020–May 2024*
Outdoor Action Program Orientation Leader
- Trained every year on leadership, technical wilderness skills and first aid
- Led 4 day orientation camping trips for groups of 12 incoming freshmen as first introduction to Princeton
- Built students' social foundation going into freshman year and developed one-on-one relationships for personalised support beyond orientation period

Princeton Rocketry Club (General Officer), Sinfonia Orchestra (Principal French Horn), Club Baseball

Camp Adventure, Walsrode, Germany *July 2023–Aug 2023*
Camp Leader
- Trained on camp leadership, technical wilderness skills, first aid and lifeguarding certifications
- Led wilderness program for campers (ages 6-17) to foster nature awareness, teamwork and self-esteem
- Organised 10 camp activities per day, from wilderness survival and high ropes to arts & crafts and raft building
- Cared 24-hours continuously for campers, such as food preparation, night watch and mental & physical healthcare
- Picked up and dropped off campers from regional airports and train stations, ran weekend trips to attractions in nearby towns

University of Oxford *Oct 2022–June 2023*
Varsity Baseball, College Football (soccer), College Rowing, St. Hilda's College Middle Common Room Committee

Asian American Academy of Science and Engineering *June 2022*
Guest Speaker on Asian experience of college engineering for high school students

Skills

Software
MATLAB, Python, C++, Ansys, LabVIEW, CFD, CAD/CAM, FEA/FEM

Hardware
Machine shop, Arduino, 3D printing, Electronics, Optics, Vacuum chamber, Wind tunnel, Laser cutting, Raspberry Pi

Qualifications
NAR L1 High Power Rocketry, PADI Scuba Advanced Open Water, WMA Wilderness First Aid, GLA Lifeguard

Languages

Japanese (native), **English** (native), **Thai** (conversational), **Mandarin** (conversational)

References

Professor Edward Greitzer, S.M. Advisor
H.N. Slater Professor in Aeronautics and Astronautics, MIT
Head, Air Sector
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Professor Masha Folk, Ph.D. Advisor
Charles Stark Draper Career Development Professor of Aeronautics and Astronautics, MIT
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Dr Marshall Galbraith, S.M. Advisor
Principal Research Engineer, Department of Aeronautics and Astronautics, MIT
galbramc@mit.edu

Professor Graham Pullan, S.M. Advisor
Professor of Computational Aerothermal Design, University of Cambridge
Co-Director, Whittle Laboratory
+44 1223 339837
gp10006@eng.cam.ac.uk

Dr Sam Grimshaw, S.M. Advisor
Girton College Mitsubishi Heavy Industries Turbomachinery Senior Research Fellow
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Background

I was born in Malaysia and grew up in Thailand under Japanese expatriate parents. My mother, sister and I spent every summer in Japan. For several summers, we attended a public school in Tokyo since holidays were misaligned between Thai international schools and Japanese public schools. In Bangkok, I attended a British school, Shrewsbury International School, on a music scholarship, playing the french horn and the piano. I also enjoyed sports, captaining the football (soccer) and softball teams. In Sixth Form (final two years of high school), I served in leadership positions of House Captain, Prefect, Senior Executive and Head of School. I came to the USA for the first time for my undergraduate studies at Princeton University, where, beyond aerospace engineering, I continued my passions in sports, music and leadership. My father still lives in Thailand and my mother has returned to Japan. My older sister is pursuing a Ph.D. in neuroscience at Dartmouth College. My multicultural background is something I cherish heavily, as I have gotten to learn about contrastingly different values of life around the world. This has allowed me to be grateful about various things I had previously taken for granted. Finally, I have three life goals:

1. Experience, thoroughly (i.e. beyond holiday travel and ideally living and working), as many countries in the world as possible.
2. Make a positive impact that is quantitatively non-negligible on a global scale.
3. Go to space.