Kazuki Tojo

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EDUCATION

Massachusetts Institute of Technology, MA, USA September 2024-Present
Master of Science (S.M.) and Doctoral Degree (Ph.D.) in Aeronautics and Astronautics
Adviser: Prof. E. Greitzer (Gas Turbine Laboratory)
Honours: Ezoe Recruit Foundation Graduate Academic Fellowship

Princeton University, NJ, USA GPA: 3.933 (Departmental: 3.950), August 2020-May 2024
B.S.E. in Mechanical and Aerospace Engineering; Certificate in Robotics & Intelligent Systems
Relevant Coursework: Thermodynamics, Fluid Mechanics, Space Flight, Space System Design, Rocket & Air-Breathing Propulsion
Honours: Ezoe Recruit Foundation Undergraduate Academic Fellowship, Tau Beta Pi Honour Society, Sigma Xi Honour Society

University of Oxford, UK First-Class Honours on MEng Thesis, October 2022-June 2023
Exchange Program (non-degree program): Completed MEng thesis on "Gas Analysis by MEMS Heat Transfer" and BEng courses

Shrewsbury International School Bangkok, Thailand (Head of School) GPA: 4.00, July 2020
A Levels: 4 A*s; IGCSEs: 12 A*s and 1 A
Honours: Sir Martin Rees Scholar, Sir David Lees Scholar, BPhO AS Challenge Silver, C3L6 Cambridge Chemistry Challenge Gold

Other University Acceptances
Undergraduate: Stanford University, Imperial College London, University of Michigan, University of Toronto (with scholarship)
Graduate: Stanford University, Princeton University, Georgia Institute of Technology, University of Illinois Urbana-Champaign

ENGINEERING EXPERIENCE

Electric Propulsion & Plasma Dynamics Laboratory — Researcher, Prof E. Choueiri September 2023-May 2024
- Performed ANSYS 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
- Developed PID controller with Arduino to maintain constant positive argon gauge pressure in lithium handling glovebox
- Project funded by NASA-JPL and nominated for prestigious MAE Award for Excellence in Senior Independent Work

Cislunar Space Mission Design — Project Leader January 2023-May 2024
- Theoretical design of a space mission to establish communication, data relay and object tracking architectures in the cislunar domain within a $400 million budget to support NASA's Artemis program
- Led a 24-person team over 12 weeks to develop a 4-satellite mission satisfying the Request For Proposal
- Presented the mission design to space systems experts at NASA Goddard Space Flight Center

Princeton StudioLab — Makerspace Technical Assistant March 2022-May 2024
- Taught 3D printing, laser cutting, soldering and Raspberry Pi, and providing general technical makerspace support

Princeton Rocketry Club — General Officer August 2020-May 2024
- Built and successfully launched an L1 Apogee Zephyr rocket with data collecting payloads (GoPro and Arduino)
- Building the smallest (by mass) and cheapest two-stage sounding rocket to reach the Karman line, launch planned in 2025
- Finalised structures and motors on RASAero II, building full CAD model and developing stage separation mechanism

Search-and-Rescue-Robot (SaRR) Project — Project Leader September 2023-December 2023
- Designed, manufactured and programmed an autonomous 10 kg SaRR under $750 to manoeuvre through a winding chute, climb over a 12" wall, navigate towards a light source and deposit a medkit by a "trapped victim"

Oxford Thermofluids Institute — MEng Thesis, Prof K. Chana, Prof J. Coull October 2022-June 2023
- Developed a novel method of high frequency & high sensitivity gas analysis by pulsing, through a soldered 9-pin d-sub connection, 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

Aerofoil Modelling Project — University of Oxford (First-Class Honours on Report) October 2022-January 2023

- Developed an aerofoil free flight simulator on MATLAB through a progression of three finite-element models, from the panel method (inviscid, thick, steady conditions) to the boundary layer method (viscid, thick, unsteady conditions)
- Generated flight trajectory data using final model and matched to reference data for optimisation of aerodynamic parameters

Personal Drone Project August 2022-September 2022

- Designed, built and flew a 250mm quadcopter through CAD, 3D printing, soldering, electronics and software setup

Princeton Complex Fluids Group — Researcher, Prof H. Stone May 2022-August 2022

- 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 PIVLAB 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

Princeton Space Physics Group — Laboratory Student, Prof D. McComas September 2021-May 2022

- Dis/re-assembled ion source to model internal structure, recreated as GEM file for parameter-varying SIMION simulations
- Conducted beam projection at incremental angles for NASA's IMAP SWAPI calibration in UH vacuum chamber (cryopump)

Fluid Mechanics Laboratory — Princeton University, Prof L. El-Gabry January 2022-May 2022

- Verified the Blasius solution experimentally by measuring dynamic pressure at varying wind tunnel velocities and positions
- Designed and optimised a wind turbine for coefficient of power in QBlade and tested 3D printed model in wind tunnel

Interstellar Technologies, Japan — Propulsion Engineer Intern June 2021-August 2021

- 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 & Ethanol flow test, Full Dress Rehearsal

EXTRACURRICULAR ACTIVITIES

Princeton University August 2020-May 2024

- Princeton Rocketry Club (General Officer), Outdoor Action Program (Orientation Leader), Sinfonia Orchestra (Principal French Horn), Club Baseball

Camp Adventure (Walsrode, Germany) — Camp Leader July 2023-August 2023

- Led wilderness program for campers (ages 7-17) to foster nature awareness, teamwork and self-esteem
- Organised 10 activity sessions per day, from wilderness survival and high ropes to arts & crafts and raft building
- Continuous 24-hour care of campers, such as food preparation, night watch and mental & physical healthcare

University of Oxford October 2022-June 2023

- Varsity Baseball (4th at Nationals), College Football (League & Plate Champions), College Rowing (x2 Promotions at Summer VIIIs Regatta), St. Hilda's College MCR Committee

Asian American Academy of Science and Engineering — Guest Speaker June 2022

- Gave a guest lecture on the Asian experience of college engineering, giving advice to aspiring high schoolers

Shrewsbury International School Bangkok August 2011-July 2020

- Head of School, Senior Executive, Prefect, Deputy House Captain, Head of Year, Symphony Orchestra (Principal French Horn), Varsity Softball (Captain), Varsity Football

SKILLS

Language: English (Native), Japanese (Native), Mandarin (Conversational), Thai (Conversational)
Technology: MATLAB (Advanced), CAD/CAE/CAM/FEA/FEM (Advanced), Python/Java/C++ (Advanced), LabVIEW (Basic)
Practical: Soldering (Advanced), 3D printing (Advanced), Optics (Advanced), Vacuum chambers (Advanced), Arduino (Advanced), ANSYS (Intmd.), Wind tunnels (Intmd.), Electronics (Intmd.), Machine shop (Intmd.), Laser cutting (Intmd.), Raspberry Pi (Intmd.)
Others: PADI Scuba Advanced Open Water, NAR L1 High Power Rocketry, WMA Wilderness First Aid, GLA Lifeguard