

MARTIN LEUNG

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Education

Imperial College London

MEng Aeronautical Engineering - Predicted First Class Honours

London, United Kingdom

Oct. 2022 – June 2026

Professional Experience

Rocket Test Facility Intern @ Airborne Engineering

July 2024 - September 2024

- Supported test campaigns to ensure mechanical feasibility by designing and assembling LCH4/LOX high-pressure plumbing panels, delivering calibrated propellant flows for customer engine tests.
- Contributed to engine-to-test-stand connection and accommodation, managing cryogenic valve boxes, sensor cabling, and aerogel/mineral wool insulation for a 1000L cryogenic LCH4 tank and lines.
- Designed and tested an electronically activated spark-ignited torch to safely burn excess methane post-firing, solving spatial constraints within the dynamic test bay.

Engineering Teams (Imperial College London Rocketry)

Propulsion Technical Lead & Various Engineering Roles

October 2022 - Present

- Bipropellant Hopper (Engine-to-Vehicle Accommodation):** Led the mechanical arrangement of the propulsion system, iterating through tens of layouts. Designed and manufactured the tanks, TVC mounts, brackets, managing complex hose routing to resolve spatial constraints and ensure vehicle coherence.
- Regenerative Engines (Thermo-mechanical Models):** Rapidly developed the UK's first student-built regen engine (world's first printed in DMLS AlSi10Mg), followed by testing 4 subsequent iterations over two years. Used first-principles physics for rapid plausibility checks, built 1D Python models to define heat flux and structural load cases, and spent tens of hours post-machining injector geometries.
- Turbomachinery Group Lead (Hardware Realization):** Led a team of 7 to develop a 20,000 RPM electric pump in 2 months. Created 20+ manufacturing drawings with GD&T, and personally machined most hardware from concept to working prototype using manual/CNC machines to achieve H7 tolerances.
- TVC Integration & Testing:** Integrated the regenerative engine with TVC actuators to achieve the first student team TVC in Europe, ensuring structural survival and mechanical feasibility during a highly dynamic load environment across 16+ hot-fire tests.

Master's Thesis & Independent Projects

Liquid Rocket Engine Turbopump (Master's Thesis)

2025 - Present

- Designing, manufacturing, and testing a 20,000 RPM turbopump from first principles to deliver 0.4kg/s of propellant at 20 bar, making quick mechanical physics assessments to check the plausibility of a Barske-type impeller and supersonic turbine.
- Proactively mitigated risks through comprehensive safety cases (FMEA, SOPs). Designed and built high-pressure test rigs from the, plumbing, blast shields, including custom DAQ, power management, and safety relays (Raspberry Pi/ESP32) to independently run test campaigns.

6DOF Flight & Structural Simulator

Independent

- Developed a 6DOF simulator in Python to define mechanical load cases for propulsive system components based on hypersonic flight profiles and dynamic aerodynamic environments.
- Modeled rocket bending, fin flutter, buckling, and deflection to define structural requirements, sizing high-altitude liquid rockets to prevent overbuilding while mitigating coning behaviors.

Academic Structural Coursework

Orbital Structures & FEA Optimization (Abaqus, Fusion360)

Year 3

- Linkage Arm Optimization (1st Prize - Best Structure):** Mass-optimized a linkage arm via rapid iteration between CAD and Abaqus Python scripts. Won 1st prize in the cohort for achieving the highest failure load-to-weight ratio, successfully predicting physical failure modes.
- Neptune Orbiter:** Defined mechanical load cases and conducted FEA for a spacecraft structure, analyzing random vibration, sinusoidal, and shock loading to ensure survival in dynamic launch environments and satisfy Falcon 9 modal requirements.

Skills

Hands-On Manufacturing: 300+ hours machining (Manual/CNC Lathes & Mills), 50+ manufacturing drawings, GD&T, DFMA, DMLS

Propulsion Systems: Propulsion integration, turbomachinery, high-pressure systems, test campaigns, launch crew

Mechanical Analysis: Thermo-mechanical modelling, dynamic load environments, FEA (Abaqus, Ansys Mechanical), modal/shock analysis

Simulation & Software: CFD (Star-CCM+, Ansys Fluent), CEA, RPA, Fusion360, SolidWorks, CFTurbo, MATLAB, Python, C++