

Alexander Tong

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EDUCATION

Boston University

B.S. Mechanical Engineering, Aerospace Concentration

Expected May 2028

GPA: 3.71/4.00

PROFESSIONAL EXPERIENCE

Boston University Plummer Laboratory

Mechanical Engineering Assistant

June 2026 - Present

Boston, MA

- Designed and structurally analyzed a vibration-test fixture in SolidWorks for a 3 kg payload; dynamic FEA predicted 0.44 mm relative deflection at 20.1 Hz with 13 mm peak-to-peak base excitation
- Reduced shaker-fixture mass 40.4% (3.19 to 1.90 kg) through first-principles calculations and SolidWorks FEA
- Analyzed bored M10 bolts and mating adapter under preload from 21.7 ft-lbf tightening torque; calculated minimum FOS 2.46 across thread shear, bearing, and pull-through failure modes
- CNC-milled 6061-T6 shaker-fixture on Haas VF-2 Mill to 0.005 in tolerance; generated G-code and engineering drawing
- Fabricated hardware in-house for \$71.11 versus a \$1,170 outsourcing estimate, reducing direct lab cost by 93.9%
- Designed the test matrix, procedure, and three of four specimen concepts for 48 Instron 68SC-5 tests; processed 0–181 mN force data to investigate physical Ising models

Culturion

Mechanical Engineering Intern

February 2026 - June 2026

Sydney, Australia

- Designed 3 sheet-metal sampling rack variants in Onshape for adhesive-free reactor-port installation, applying bend-relief, flange, and clearance constraints to limit electrical and flow interference
- Planned and executed the company's first chamber-wide nanoparticle deposition study across 4 elevations and magnetic configurations using SEM, optical microscopy, and ImageJ; characterized magnetic polarity-dependent deposition
- Proposed magnetic and fluid-dynamic collection concepts to protect plasma-reactor vacuum pumps

PROJECTS

Aerodynamic Downcomer Fairing

Project Lead, Boston University Rocket Propulsion Group

August 2026 - Present

- Leading 4-person team in set-based design of supersonic downcomer fairing, combining empirically-sourced leading-edge, midsection, and boattail geometries across Mach 2-2.81; performed CoDR and trade via first-order drag calculations
- Completed Mach 2.81 ANSYS Fluent simulation of legacy fairing, creating drag baseline for reuse versus redesign trade

Argo Separation and Recovery Subsystem

Co-Lead Engineer, Boston University Rocket Propulsion Group

June 2025 - Present

- Designed and tested vacuum-compatible recovery system for 135 lb dry-mass liquid bipropellant rocket targeting 100k ft
- Proposed, designed, machined, and integrated a custom CO₂ deployment system after vinyl-charge test failures; optimized mass for Lamé hoop-stress (FOS 2.01) and thread-shear (FOS 6.31) failure; vacuum-tested the assembly
- Designed 352 L vacuum chamber for deployment tests at 1.1% atmospheric pressure; sized door using Roark plate theory for 1,663 lbf pressure load and yield FOS 2.12; tested vinyl-charge and CO₂ systems
- Dynamically tested Brummel eye splices in 1/2 in Kevlar shock cord to an estimated 1,800 lbf and 1.5 times max loading; selected splices over knots using published 2x strength comparisons
- Authored integrated subsystem vinyl black-powder test SOP and led test operations, including crew briefings and fire/abort decisions; supported post-test inspection and failure assessment
- Calculated 823 lbf parachute-opening and 1,230 lbf snatch loads via synthesis of 5 papers; traded hardware accordingly

AIAA Design-Build-Fly Aircraft

Wing Structural Lead, Boston University

June 2025 - December 2025

- Led structural, material, and manufacturing trades for two Fusion 360 wing designs; built an XPS/carbon-fiber wing 42.7% lighter than the prior complete wing and cut build time from three months to one

Hybrid Rocket Nozzle

Lead Engineer, Boston University Rocket Propulsion Group

September 2024 - November 2024

- Led 5-person team in FEA-driven structural design and optimization of hybrid rocket nozzle for 45k feet ASL, reduced mass 73% with calculated minimum yield FOS 7.8 under mechanical loads; resin-printed and hot-fired for 2 seconds

TECHNICAL SKILLS

SolidWorks, Structural & Dynamic FEA, Ansys Fluent, CNC & Manual Machining, DFMA, Sheet metal, Python, DAQ