

BOYUAN YU

Education

University of Southern California, Los Angeles

Aug. 2024 – now

PhD student in Combustion Physics, Mechanical Engineering

University of Oxford, Oxford

Oct. 2023 – July 2024

Master of Engineering

University of Oxford, Oxford

Oct. 2020 – July 2024

Bachelor of Engineering

Core Curriculums: Calculus, Linear Algebra, ODEs and PDEs, Statistics, Compressible Flow, Turbomachinery, Turbulence and Boundary Layers, Multiphase Flow and Heat Transfer, Applied Thermodynamics, Chemical Thermodynamics, image Processing, Linear Dynamic Systems, Optimal Control

Experience

Oxford Thermofluid Institute

July 2023 – Oct 2023

Research Assistant

University of Oxford, Oxford, UK

The project focuses on integrating hydrogen as potential fuel in future aviation. It aims to design a frost-free heat exchanger for heating the hydrogen stream and conducting thermal stress studies on heat exchangers.

- Review literature related to two phase boiling heat and mass transfer for cryogenic liquid and experimental level hydrogen liquefaction.
- Enhance my comprehension of Ansys Mechanical and Ansys Fluent by editing and implementing Journal files and APDL code to simulate temperature distribution and stress profiles in a heat exchanger.
- Perform simulations on a cross-flow heat exchanger to determine the flow rate of the cryogen.
- Utilise Journal files to run flow simulations.
- Perform conjugate analysis from flow simulation to mechanical analysis.

Oxford Thermofluid Institute

June 2022 – Sep. 2022

Research Assistant

University of Oxford, Oxford, UK

The project is sponsored by Rolls-Royce to investigate the heat and mass transfer characteristics of two-phase boiling on a horizontally placed solid boundary.

- Study the capillary effect and surface pattern's impact on critical heat flux.
- Provide an overview of the prior investigation into the impact of surface refurbishment on heat transfer coefficient and critical heat flux.
- Conduct experiments on surfaces with varying roughness and analyse the influence of surface roughness on the heat transfer coefficient and critical heat flux.
- Apply the Rohsenow correlation to experimental data to find the best fit empirical coefficient and check the consistency with previous literature.

ROVER System

12/2022

Intern

Online

The project's objective is to enhance my proficiency in SolidWorks.

- * Designing a safety system for the omnidirectional treadmill specifically to protect delicate users.
- * Utilise SOLIDWORKS to visualize the design and generate detailed mechanical drawings for components.

Oxford University Gliding Club

June 2022 – June 2024

Maintenance Officer

Oxford, UK

I assumed this role with the intention of deepening my comprehension of aircraft structures and seizing the opportunity to engage in glider flying experiences.

- Assist DI (Daily Inspection) of gliders at the beginning of fly days.
- Identify, document, and analyse abnormal conditions in gliders, seek guidance from experts, and determine maintenance priorities.
- Participate in the annual inspection process, thoroughly assess gliders, and determine their operational suitability.

Projects

Design of Electric Formula Student Race Car | Instructor: Martin Davy, Ryan Walker **Oct. 2022 – May 2023**

- Examine the previous aerodynamic design of the student racing car. After a few simulations, I opted to focus on creating an underfloor configuration to mitigate drag and generate downforce instead of designing a rare wing.
- Implement the source-vortex panel code to compute the lift and drag coefficients for 2D multi-airfoil configurations using grid search method.
- Employ Ansys Fluent to pseudo-validate the results obtained from the source-vortex panel method.
- Compose a report that documents the design procedure and the underlying design philosophy.

Develop Source-Vortex Panel Method in MATLAB | Instructor: Luca di Mare **Oct. 2022 – Feb. 2023**

- Explore the fundamental aspects of finite element analysis and numerical optimization.
- Study the panel-vortex and panel-source methods, and construct a discrete model of an airfoil.
- Develop a source-vortex panel code capable of calculating lift and drag coefficients for steady flow case.

Fluid Mechanics Coursework Module | Instructor: David Gillespie, Thomas Hermann **June 2022**

- Introduced to a number of different aspects of Fluid Mechanics, ranging from turbulent heat transfer to supersonic flow.
- Conduct a 2D Ansys Fluent simulation of a heat exchanger flow passage to obtain the velocity and temperature profiles at the outlet.
- Apply Schlieren photography to visualize and analyze pressure distribution in cross-sonic flows.
- Simulate an airfoil's cross-sonic performance in Ansys fluent and cross validate it with experimental results.

CFD Used in Shape Design for Aerodynamic Performance | Instructor: Luca di Mare **May 2022**

- Understand the meaning of NACA four digit airfoil designator.
- Program a MATLAB function to generate airfoil's coordinate based on four-digit-input.
- Perform 2D simulation on airfoils with different angle of incidence. Depicting lift and drag coefficient.

Technical Skills

IT & Program Language: MS Office, LATEX, MATLAB, Python, Java

Design & Simulation Tools: SOLIDWORKS CAD, Ansys Mechanical, Ansys Fluent

Languages: bilingual: Chinese, English

Hobbies and Interests

Gliding: I have been gliding at Oxford University Gliding Centre (OUGC) after COVID, and I found great enjoyment in it. Gliding transforms aerodynamics from equations on paper into melodies in the sky. It brings me one step closer to achieving my two goals: becoming an engineer and flying in the sky. In the future, I may also consider obtaining a private pilot's endorsement.

Running: I began running after high school graduation. It provides a welcome escape from daily routines, offering me a tranquil space for recovery.

Photography: My engagement in gliding sparked this hobby. Capturing extraordinary moments through photography is truly remarkable. I initially started with a GoPro and later incorporated a camera. Throughout this journey, I've also cultivated an appreciation for the simple beauty of daily life, and I derive immense joy from documenting these moments through photography. Furthermore, sharing these cherished moments with family members through pictures is a wonderful way to bridge distances and create connections.