The Incorporation of the Hammermen Edinburgh Scholarship Award Report 2025

Carlos Fitzpatrick

Introduction

Through the Incorporation of the Hammermen Scholarship, I have embarked on trips to three different cities over the summer, exploring them and visiting awe-inspiring modern and historical engineering buildings and feats.

A longer-term trip to a specific area was a greatly appealing idea to me, but unfortunately, I was not able to do this due to commitments related to my participation in the University Air Squadron (RAF).

Paris

- **Paris Airshow**

The Paris airshow provided an in-depth insight on the future of aerospace; and allowed me to network extensively with different industrial players such as Airbus, Boeing, Embraer and Lockheed. In addition, the varied flying display was remarkable, with fast jets, multi engine aircraft and rotary assets all flying demonstrations.

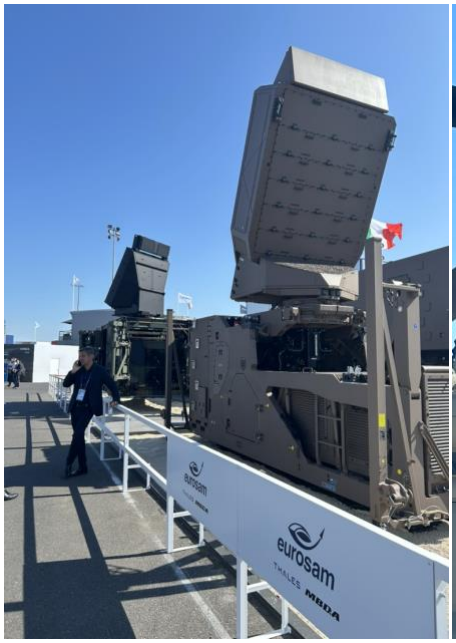

Figure 1: EUROSAM Air Defence System

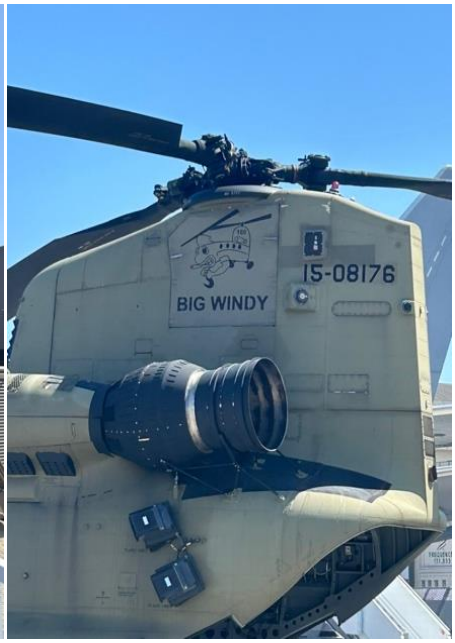

Figure 2: A US Army CH-47F Chinook on Static Display

I had previously interned at Airbus on a year-long placement, and thus I felt very much at ease during the trade days at the airshow. I was able to truly understand the direction of not only

structures and aerodynamics technology, but also recent advances in unmanned aerial systems; which are becoming more commonplace in the modern battlefield.

Overall, the airshow was an extremely relevant and valuable experience for me, especially in light of my internship with Airbus and my flight training with the University Air Squadron.

I took advantage of my time in Paris to visit other relevant places of interest – notably, the *musee de l'air de l'espace*. This museum allowed me to greatly deepen my understanding of the origins of certain aerospace technologies, in addition to noting how air and space engineering has evolved over time. Perhaps the most impressive exhibits were the Ariane 5 rocket and Concorde.

- **Notre Dame Cathedral**

In addition to the aerospace related visits, I also had the opportunity to visit Notre-Dame Cathedral, which has only recently been restored following the devastating fire. The emotional weight of this space was palpable, especially due to the cleanliness and brightness of it after being restored; which is not something you see often in other European gothic cathedrals.

One interesting aspect of the restoration was the reliance on professional stonemasons to craft the extremely intricate masonry that was damaged in the fire. It is truly impressive to see that these skills live on, and with irreproachable quality.

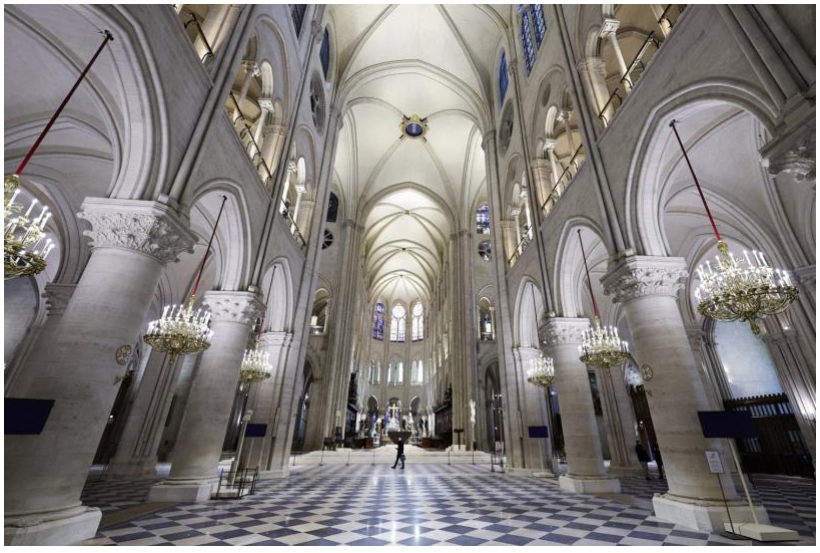

Figure 3: Notre Dame Cathedral Post-Restoration

UAE – Dubai & Abu Dhabi

- ## Yas Marina Circuit

As a former participant in Formula Student with HWRacing and a lifelong Formula 1 fan, discovering the Yas Marina circuit in person was an impressive experience; and allowed me to understand racing circuit design first-hand.

- ## Abrahamic Family House

The Abrahamic Family House in Abu Dhabi is truly a special architectural project – it consists of a church, a synagogue and a mosque all within a common courtyard. From an architectural engineering perspective, it blends art and structure so effortlessly and learning about the construction and design of it was enlightening.

To me, this project represented an ultimate goal for engineering; and more specifically civil engineering – the harmonious blend of form and function.

Figure 4: Abrahamic Family House

- ## Burj Khalifa

Visiting the Burj Khalifa is an inspiring experience for any engineering student, and it certainly was for me. Myriad aspects of this building necessitated novel engineering thinking to make them work – such as the absence of traditional tuned mass dampers, and consequently the extremely deep foundations.

Seeing first-hand the modern marvels that the study of engineering has allowed is incredibly motivating for an engineering student, and something I believe every young engineer should strive to do.

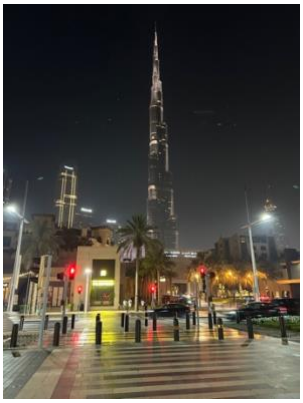

Figure 5: Street level view of the Burj Khalifa

Rome

• St Peter's Basilica and the 7 Pilgrim Churches

In addition to a general visit of the city and St Peter's Basilica, I also took the time to visit six other major churches, which are along with St Peter's, the *pilgrim churches* of Rome. The main objectives of this church tour were to discover the architectural and structural engineering techniques used that have allowed them to stay standing for centuries.

Perhaps the most impressive part of St Peter's Basilica, aside from the main dome, is St Peter's Square, designed by the famous Lorenzo Bernini. 284 columns form two semicircular colonnades based on a triple-centred oval geometry. The diameter of the columns increases from the inner to the outer rows, with the result being perfect alignment from two specific viewpoints in the square.

Overall, the value I gained from visiting these churches was mostly the awe and wonder of human achievement in architecture, masonry and engineering.

- **Basilica of St John Lateran**
  Originally built in the 4th century, this church is officially the cathedral of Rome. Baroque and Romanesque in style, colossal statues adorn the façade.

- **Church of St Mary Major**
  5th century church; known for its multiple intricate facades; and the tomb of the late Pope Francis.

- **Church of St Paul Outside the Walls**
  Originally a fourth century church but significantly modified after an 1823 fire, most imposing feature of this church were the spans between the columnar supports. These are much wider than most churches and demonstrates the ambition of the rebuilding engineers in exploiting all the engineering advances available to them.

- **Church of St Lawrence Outside the Walls**
  Decorated in the Cosmatesque style but still antique in its basic structure, this church perhaps shows the most interesting juxtaposition between two eras – roman and renaissance Italy.

- **Basilica of the Holy Cross in Jerusalem**
  Originally a building within Constantine's Imperial palace; the colossal granite columns are still visible in today's church.

- **Church of St Sebastian Outside the Walls**
  Known for its extensive network of catacombs; this church is dedicated to the Praetorian Guard Sebastian, executed for his faith.

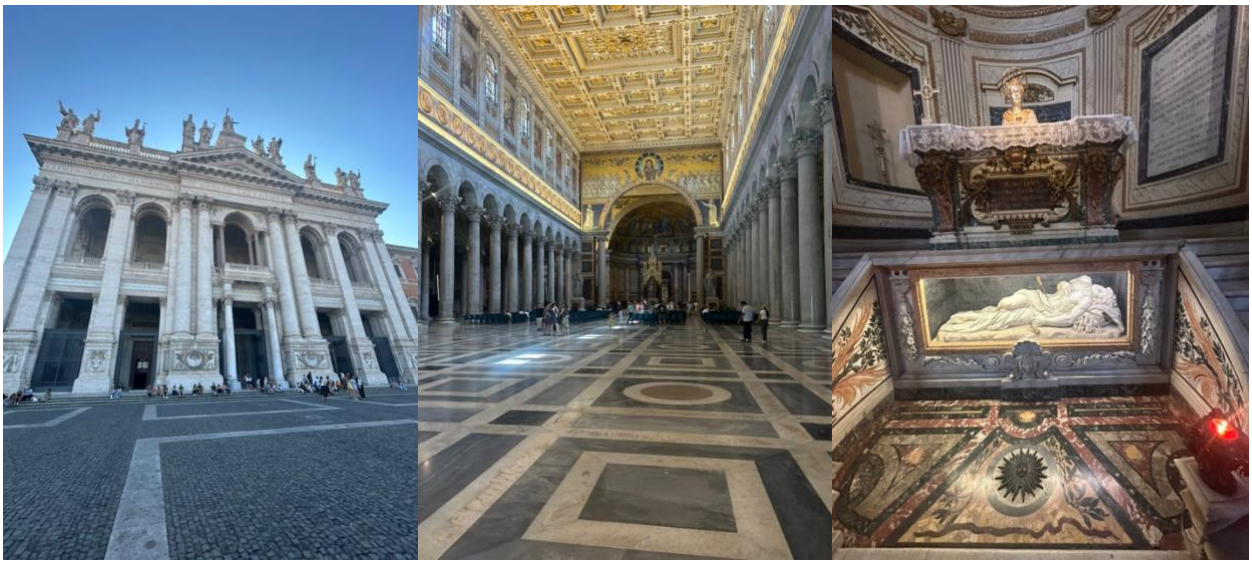

Figure 6: Basilica of St John Lateran, Church of St Paul Outside the Walls & the Tomb of St Sebastian

- **The Pantheon**

This building is truly a masterclass in materials science and structural engineering. The crux of its strength and longevity lies in the famous *roman concrete* used in its construction. The overwhelming feeling I felt whilst visiting was one of humility – modern humans often think they have unlocked the tools and methods to build more perfectly, yet this structure which is based on simple geometry has such an intrinsic beauty and cohesiveness that modern buildings, even the aforementioned Burj Khalifa, would struggle to beat. In that way, as a young engineer it pushed me to be more curious and inquisitive about the world; and understand that there are engineering lessons to be learnt everywhere.

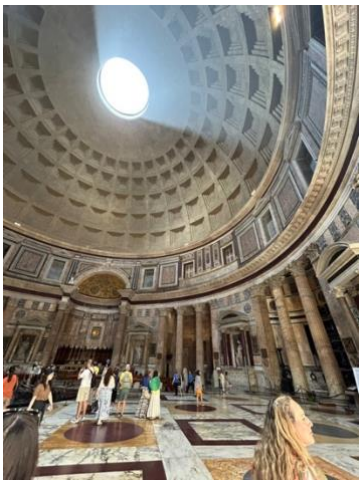

Figure 7: The Pantheon

Value to Student

Overall, the Hammermen Scholarship allowed me to broaden my engineering horizons by providing the means to visit events and places that I would otherwise not have had access to.

I feel I have developed my knowledge and understanding of both engineering and technical subjects, but also art and history. Effectively, many of the sites I visited were at the intersection of the technical and the artistic; which has given me an appreciation of interdisciplinary connections – something I believe is important in engineering.

As an engineer, the opportunity to see impressive engineering in practice has been so valuable, especially after studying engineering theory for so long. I am also glad that I was able to see this over different domains such as aerospace and civil engineering.

In addition, I greatly developed my engineering curiosity – being able to look at a structure and wondering *Why?* And *How?* The repetition of these questions throughout my different visits has truly

focused my curiosities in everyday life, and has me thinking more than ever about the engineering that surrounds me.

A major benefit to me was the ability to build networks at the Paris Airshow. The skills required to do this are primordial for an engineer, but one also requires an opportunity – this scholarship allowed me to pursue that opportunity.

Finally, a general awareness of the direction of engineering – in terms of technologies, attitudes towards sustainability, construction and design – was discerned through different aspects of my summer. This general awareness will surely be useful with regard to future employment.

Through these experiences, I have started my final year of studies with a more robust technical understanding of aerospace topics, and a refreshed curiosity for architecture and the built environment.