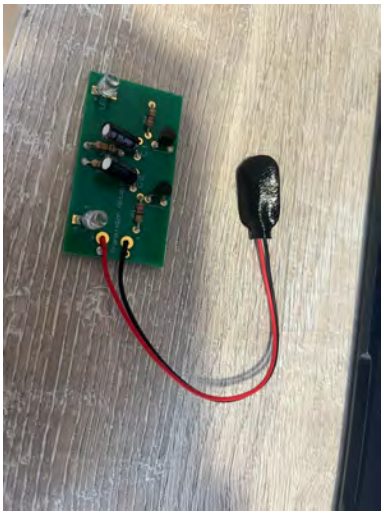
EIL Blog: Scott Yehle

The resources made available to us as engineers at The Diamond lab facility at the University of Sheffield was indispensable. We spent the last week of the program at the University of Sheffield. The first three weeks we were learning at the IES center in London. Our time here was dedicated purely to lecturing. But in Sheffield we were able to allocate the majority of our time here to spend in the labs in The Diamond building

The Diamond building is a space dedicated to teaching engineering. There are three floors worth of lab spaces. These are not just research labs either, they are purely teaching labs meant for the sole purpose of teaching upcoming engineers how to use the equipment related to their fields. The lab spaces here include a structures and dynamics lab, aerospace Lab, computing and robotics lab, electronics and control lab, materials lab, bioengineering lab, fluids lab, and a thermodynamics lab.



The lab spaces we were able to use while we were here were the electronics and control lab and the thermodynamics lab. On each lab day we were able to do two labs. On our first of three lab days, Monday, we were in the electronics and control lab. The two labs we did Monday were a Lab where we got to analyze, assemble, then solder a circuit into a real working example. And our second was to analyze voltage measurements on a passive high-pass filter and a passive low-pass filter. On Tuesday and Thursday we had thermodynamics labs. The first lab we had on Tuesday was identifying mystery gasses based on their measured molar masses. The second lab on Tuesday was one where we boiled a refrigerant in a pressure chamber and observed and recorded its behavior. We did two labs on Thursday as well. The first lab was based on heat exchangers and measuring entropy changes through simple heat exchangers. In our second lab on Thursday we made very simple heat engines that functioned, although quite inefficiently.

Hi I’m Sammy, and I absolutely loved my time in the Engineering in London Program.

Not only did the program further advance my studies as an aerospace engineering major, it also cultivated my knowledge of how things in our world came to be. However, there was one excursion that really impacted me, and that was our trip to the Royal Observatory.

Being an aerospace engineer, space has always fascinated me. My trip to the Royal Observatory intensified this curiosity. People from hundreds of years ago built the telescope to look at the sky for patterns to create maps, and time. These are things we use in our everyday lives without thinking twice about where it came from.

We have our phones, computers, and smartwatches to tell us where we are, or what time it is. It was amazing to see the first watches ever built, and how they mornited each one to see if it was actual to how the sky moved. It not only made me more thankful for things I have, but my respect from the engineers that came before me changed into a different perspective. It grew exponentially and made me want to learn more about our world than ever before.

EIL SCHOLARSHIP BLOG By: Krisha Patel

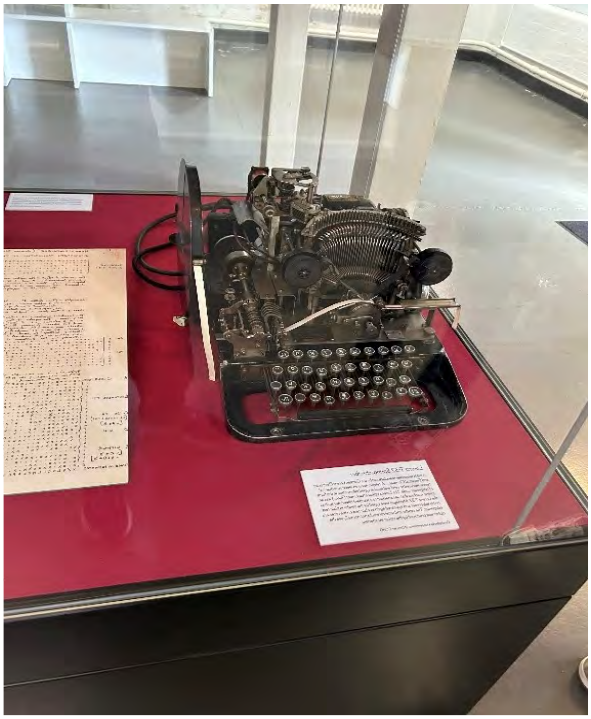
Engineering in London was one of the best experiences in my life. I am so grateful to have done this program. Not only was I able to complete two courses required for my major, but I also learned so much about the field of engineering. Through this experience, I visited the Kew Bridge Steam Museum, which was an amazing experience, and a place I was completely unaware existed. This museum had some of the oldest steam engines that are still operational, and as an engineer, this was so fascinating. Below are two engines that are not used anymore but are still operational, and I was fortunate enough to see them run.

It was very interesting to learn about the great engineering that took place during the 1800s-1900s, and the reliability and maintainability of these machines, because even now, they are still able to operate. From talking about engines in class, to seeing one in real life, and learning about how it works, was unbelievable; to be able to relate concepts to actual machines. Without this program, I would have never learned about this incredible place, and learned about how steam engines operate and the huge impact they have had on society.

Sara Boundy

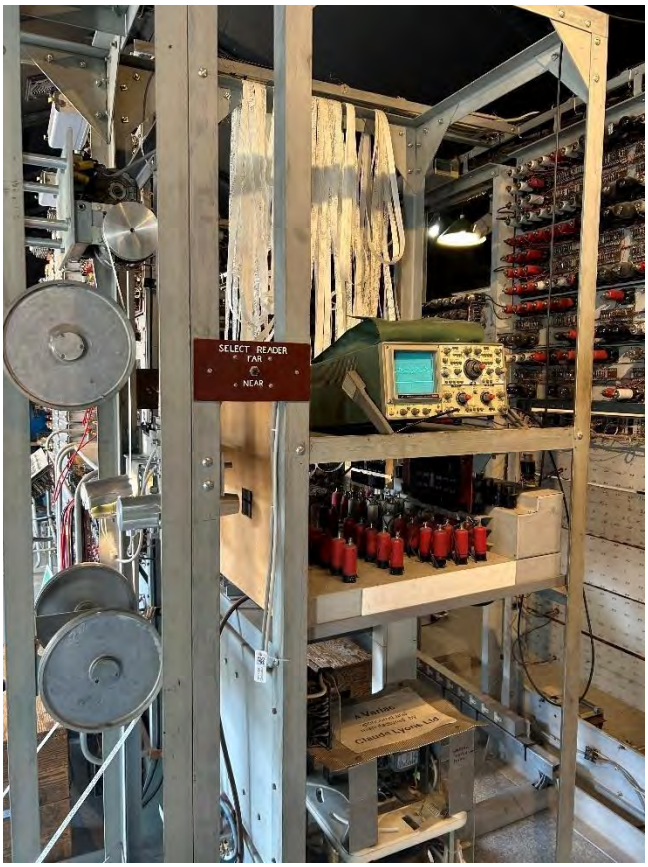
Bletchley Park and the Museum of Computing

The excursion to Bletchley Park and the Museum of Computing was invaluable to me as a Computer Engineering major. I saw the Enigma, Lorenz cipher, Bombe, and Colossus machines in person and received an excellent lecture about the Enigma and Bombe in the Museum of Computing. A person demonstrated both machines working and explained how three rotors, each with twenty-six contacts, would use a different for each key on the keyboard that was pressed, so each letter was mapped according to a different formula. The Bombe had thirty-six rotors, in twelve sets of three, modeled after the Enigma, to decode a twelve-letter message. The Enigma could be modeled as a Mealy Machine, because it depends on input from a user as well as its current state. I learned about Mealy machines in Introduction to Digital Logic and it was very interesting to make that connection to such an iconic machine.



The Lorenz cipher was at Bletchley Park, and it used a more secure code than the Enigma. However, it was not as portable as the Enigma, so it was only used by the German High Command. It outputted a tape with holes punched in each row, and each hole punch combination represented a different letter. In the Museum of Computing, I saw the Colossus, a machine built to decode the Lorenz attachment. It took fourteen years to build and was not finished until after the war ended. The input of the Colossus is the tape output of the Lorenz attachment, and a sensor is used to detect where the holes were punched in the tape. The Colossus is much more complex than the Bombe and it was

fascinating to watch both of them operate. The Colossus contained much digital technology that the Bombe did not, as it was one of the first digital computers; an ancestor of the technology I have been working with and will continue to work with as my career progresses.



Chapin Mohney: Brunel Museum

During the 19th century, London's docks were experiencing higher and higher demand as the city's population grew. With all of the large ships traveling up and down the Thames river came more and more goods which needed to be loaded and unloaded and moved from one side of the river to the other. The need to transport goods across the river started to become a bottleneck for London's ports. At this time, bridges were extremely hard to implement as they either had to be tall enough to let ships pass under, or be capable of moving out of the way. To solve this problem, French engineer Marc Brunell proposed his idea for a tunnel under the Thames.

Despite the fact that multiple attempts to build such a tunnel had previously failed, Brunel was determined to succeed. Construction for the Thames Tunnel began in 1825. As no under river tunnel had ever been built, Brunel was in completely uncharted territory requiring him to develop a variety of new technologies including the first ever mining shield. Construction was slow and dangerous, as river dredging above the tunnel caused multiple floods, the worst of which killed six miners and almost killed Marc's son Isambard. Despite the flooding, extremely tight budgets, and scepticism from fellow engineers, the Brunels continued work on the Thames Tunnel until its completion in 1843.

As an engineering student, seeing this monumental achievement in person was extremely rewarding. It is one thing to read about the insane odds faced by the Brunels, but it was another to actually stand on the bank of the Thames and imagine the genius, ambition, and creativity required to consider building a tunnel under it. They put their professional careers, money, time, and lives on the line to complete it and it changed the history of London forever. While walking through the Brunel museum, I learned about Marc and Isambard's other incredible projects and their never ending commitment to progress. It made me proud to call myself a future engineer. I can only hope to be responsible for a fraction of the positive impact they had on the world.

EIL 2025 Blog Post

Written by Noelle Whidden

One excursion we did this summer that I feel had a big impact on me was visiting the Royal Institution and Michael Faraday Museum. Getting to visit a place where 14 Nobel Prize winners have worked was a blessing in itself, but the museum also holds some of the most significant inventions in science and engineering including Faraday's electric motor and electric generator.

Along with the museum, we also got to listen to a lecture called "How to Grow a House" given by Martyn Dade-Robertson where he spoke about new materials that are being developed that could potentially grow buildings. It was really interesting to hear about this futuristic technology, especially since technology like this could be the next step in making cities more sustainable. It was especially intriguing to find out that Dade-Robertson is actually an architect, rather than a biologist, proving that it is never a bad idea to expand your knowledge in all sorts of areas, rather than just focusing on our majors.