TUHH CamPUS Placement 2019

Non-technical Report

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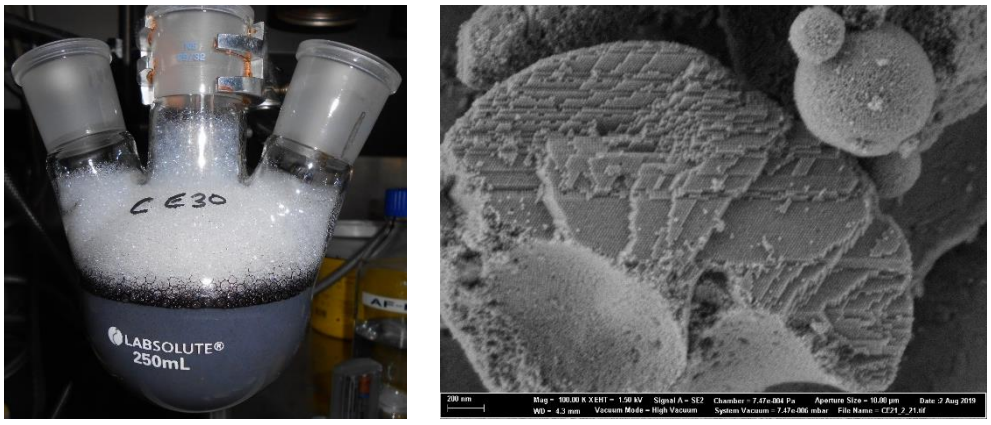
After three years studying Materials Science, I knew I wanted to complete a Master's degree in the subject, but I wasn't sure what I wanted to do next. Did I want to work in industry, or continue studying to a PhD, and perhaps beyond that, academic research? Having spent my previous summers working in the UK in R&D consulting, I wanted to experience academic research, and I wanted to work and travel outside the UK. The CamPUS scheme was therefore a brilliant opportunity for me.

I was a little apprehensive about working outside the UK for the first time, but the fact that I would be there with another Cambridge student was reassuring. I chose Germany because I know a little German, and I hoped to improve my language skills during the placement.

The research group had a very welcoming atmosphere; English was the common language due to the range of nationalities within the group. I was able to sit in on a larger group meeting and get a sense of the range of research being done, as well as being given freedom to manage my own time. All my colleagues were happy to help if I had a problem, or to discuss their projects with me. The lab also hard strict opening hours, which made maintaining a good balance of work and other activities very straightforward.

The research group was one part of a larger, multi-university effort to produce a biomimetic material based on nacre. The part of the project I was working on was producing stable, self-assembling supercrystals of magnetite nanoparticles via an emulsion-evaporation process. This involved producing a range of test samples, to identify the optimal process for producing magnetite nanoparticle supercrystals. The over-arching aim of the whole project was to find a synthetic, mass-producible material that was as hard and crack resistant as nacre, utilizing the toughness inherent in a nano-scale structure.



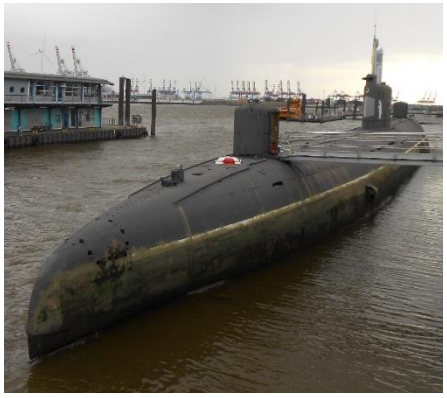
Left: a sample being prepared. Right: an SEM image of a successful sample, showing an ordered, nano-scale structure.

The first few stages of the project revolved around perfecting the synthesis and testing process. The main challenges in the project were experimental; time and equipment limitations meant we could only make two samples a day. Although this was at times frustrating, it left enough time to perfect the process for preparing SEM samples. For the most part, I worked independently in the lab to manufacture the samples. My supervisor set the general goals each day, but within that I had freedom to manage my own time.

My accommodation was on campus, in a block of student flats. It was cheap, comfortable and conveniently close to the lab, and the students already living there had a strong sense of community. There were several social events over the course of my stay, ranging from 4th of July celebrations to wine tasting classes, and everyone was made welcome.

Hamburg is a large city with a wide range of things to do. On different weekends, I joined an Erasmus bar crawl, took the train to visit Copenhagen and even saw my first opera. I particularly enjoyed exploring U-434, a decommissioned Soviet submarine that is now a museum. The most surprising part of my placement when Bea won tickets to a nearby festival- we definitely hadn't packed for that.

The main skill I have learnt over these two months has been proper planning- whether organizing my lab work over a week to fit with other people's schedules and equipment availability, or organizing my own weekends, my ability to plan into the longer term has improved greatly. I am grateful to my hosts at TUHH, particularly my supervisor Alex Plunkett, and to the Armourers & Brasiers' Company for giving me this opportunity.



Clockwise from top left: the U-434 Museum, a former Soviet submarine; the Little Mermaid Statue in Copenhagen; and the Airbeat One Festival main stage.