Physics and Maths research internship

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As part of the new International Research Internship module for physics and mathematics students, I visited the Deutsches Elektronen-Synchrotron, or DESY, for one month to study and complete a project in using machine learning and AI to aid the search for new areas of physics.

DESY, Hamburg campus

Lying on the outskirts of Hamburg, DESY is one of the World's leading research centres for accelerator physics research and development. Boasting the world's best storage ring for producing X-ray radiation, PETRA III, as well as XFEL, the European Free Electron Laser, DESY is the world's leading research centre for x-ray experiments. A lot of the research carried out there uses data from the Large Hadron Collider at CERN. I myself worked within the CMS group, who's work is to analyse the data from the CMS detector at LHC. The group consisted of both PhD students and full-time employees of DESY from all over the world. I had discussions with people from as far away as Egypt and India who had chosen DESY as their favoured institute. Not only did this mean I got to meet many interesting people, it also gave me an insight into the process of applying and being accepted for PhD or professional positions at institutes like this. Everyone was so welcoming and friendly that it made the whole experience an absolute pleasure and reaffirmed that this was the career path I wanted to follow.

The old ARGUS detector on display at the entrance to DESY

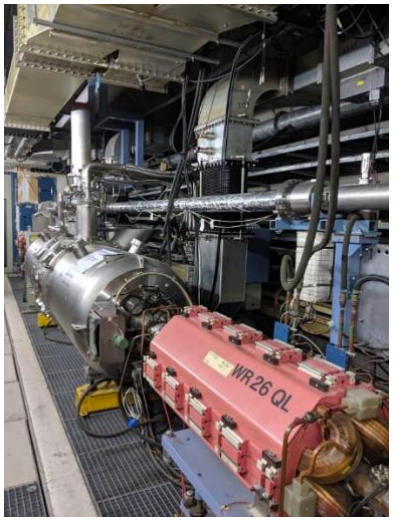
My project itself involved a lot of concentrated studying and coding over a four-week period, with weekly updates and a final presentation at the end. A lot of the physics was new to me, but my supervisors Isabell and Dirk gave me one-to-one tutorials and detailed resources so that I never felt overwhelmed. I was investigating the use of neural networks and decision trees in looking for supersymmetry using data from the CMS detector. Having not had much coding experience, the learning curve was very steep but I had so much support from the whole group that I overcame most of the challenges I faced and the knowledge and technical skills I gained will stand me in good stead for both my masters and the rest of my career, wherever that may be. I honestly can say I have never learnt so much in so little time, not just technically, but also about how a big research institute runs day to day. There were also many supplementary lectures on a range of topics given by visiting professors and discussions on the future of particle and accelerator physics which were fascinating to attend.

There isn't enough time to mention all the great people I met and all the new experiences I was involved in but believe me, there were many. The challenge of living in a foreign country brings by

itself so much independence and has greatly increased my confidence and cultural awareness. Working in diverse groups developed my communication and teamworking skills, while the technical nature of the project improved my resilience and time management skills. Through networking I formed some great contacts and referees and found new perspectives.

The list could go on and on, but suffice to say, if you're wondering whether to have some work experience abroad, what's stopping you? The university has a great network in place to ensure that there are no obstacles to stop you from going for it. My advice is to take advantage the great opportunities available to you and get embrace them, not just for your CV but because you'll have great time too!

For information on DESY please visit **www.desy.de**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