2013 JCCU INDUSTRIAL TOUR TO BEIJING

After British Airway's last-minute cancellation of our flights, we travelled out to China 24 hours later than planned, on the 11th March 2013. We touched down in Beijing mid-morning, and after collecting our baggage, caught the coach to the King's Joy Hostel, which is located 500m from Tiananmen Square and was to be our home for the next 9 days.

Later that afternoon we rendezvoused with Andy Godfrey, Professor of Materials Science at Tsinghua University, and some twenty of his Materials students for a game of bowling and a meal in a local restaurant. This social was a great opportunity to hear how Materials Science is taught in another country and to compare the similarities and differences between the two courses and universities. Many of the students exchanged email addresses and have been sending each other photographs from the night as well as exchanging advice with those that have internships in the UK this summer.

On Wednesday 13th March, we took the coach to Tianjin, an industrial city to the east of Beijing. In the morning we explored the market and had our first experience of haggling for items – two students decided to invest in 'Rolex' watches for a "very good price"! After lunch we arrived at our first industrial visit – Tianjin Pipe Cooperation Ltd. (TPCO) - a world leading manufacturer of seamless and welded steel pipes for fluid transmission applications. Their products are used in 24 domestic oil-fields onshore and offshore in China and exported to more than 100 countries and regions worldwide. After an initial introduction we were given a factory tour which was highly relevant to the macroplasticity lecture course studied in the 2nd Year, during which we had been shown several videos of metal working, and at TPCO we were shown first-hand the processes studied previously.

The next day we arrived at the British ambassador's residence in Beijing at 9am for a presentation from Sam Myers, Research Councils UK's councilor for science and innovation. He gave us an in-depth talk about the UK's involvement in China and research collaborations between the two countries. We were also given an insight into the work of an overseas civil servant, which is an interesting potential post-graduate career option.

Our visit to BIAM, that afternoon, was an eye-opening experience towards the extent that communism is present in China today, and to how it affects people's lives on a daily basis. We were shown in great detail the staffing structure and hierarchy within the company, and told about the centrally organised activities that encourage team building and create a sense of union; staff regularly go on holidays as larger groups to destinations abroad, from which we were shown some of their photos; and every few years a mass wedding is held, attended by the whole company and blessed by the President of BIAM. Sadly we were not shown a lot of the production or R&D that the company undertakes, possibly due to the company wanting to protect their intellectual property, something that is not easily done, with the lack of patent enforcement, in China.

Our third industrial visit was to Baoling Investment Casting Ltd. in Tianjin. This was a huge contrast to the scale of the operations at TPCO since there were only 60 workers fabricating metal components, using the lost-wax process, in three interconnected sheds. The working conditions were very different, and it was fascinating to get so close to the manufacturing methods and see the high quality finished product. After the tour, we were kindly invited to lunch by the manager and were treated to local delicacies and drinks at a restaurant in town. Upon returning to Beijing we once again put our haggling skills to the test on a visit to the Beijing Silk Market. Gifts bought ranged from Jasmine tea to Oakley sunglasses, as well as silk pyjamas and even a tailored suit!

Saturday 16th March was our first free day in Beijing to experience the world famous tourist attractions. In the morning we caught the bus to the Temple of Heaven, a large park with amazingly constructed shrines that were built to worship a good harvest. One of the most interesting aspects of the Temple of Heaven was the density of retired citizens that use the space to exercise, relax and take part in activities like ballroom dancing and choral singing. Two students were persuaded to join in with the dancing and I tried to master a game similar to 'keepy-uppies' (with a shuttlecock) that was made to look effortless by the octogenarians; needless to say they were significantly better than me!

That afternoon we caught the Metro to the Forbidden City and upon arrival found that, as a group of 20 Westerners, we were as much of a tourist attraction as the 600 year-old buildings. Many photos were posed for and taken of us as we wandered around the grounds of the Emperor's residence, and discovered interesting little museums like the Hall of Clocks and the Imperial garden. After visiting the Forbidden City we were diverted around Tiananmen Square as we witnessed the Chinese Assembly disembarking the Great Hall of the People after naming the new Chinese premier - Li Keqiang.

Our seventh day in China took us to one of the engineering wonders of the world; we caught the coach to Badaling, an area where the Great Wall has been restored to its former glory. The sheer scale of this construction was breathtaking as the Wall extended over the horizon, in both directions, displaying some of its steeper sections as it passed over mountainous terrain. Upon returning to the Hostel in the evening we visited the Laoshe tea house and experienced Chinese opera, an acrobatic tea ceremony, story-telling (which, in Chinese, was sadly not so successful without sub-titles) and a Kung Fu show.

The fourth and final industrial visit was to Advanced Technology and Materials (AT&M) Refractory metals and Ceramics division in the industrial Haidian district of Beijing. AT&M is the largest industrial materials science group in China consisting of many companies specialising in both metallic and non-metallic materials. Our visit to the refractory metals division showed both sides of the company – the commercial production of tungsten components and the research and development laboratory working on projects funded by the state and/or initiated by consumer-interest. The tour around the factory showed us the various stages of the sintering and hot-isostatic pressing processes, first the creation of a 'green compact' from the metal in powder form, then the introduction of the component into a furnace to encourage diffusion of atoms across the granules' interface and reduce porosity in the final product. During the Q&A session after the factory tour, AT&M's involvement in the ITER nuclear fusion reactor project (something the University of Oxford is also a part of) was explained to us – they are manufacturing tungsten components for the diverter within the tokomak chamber. Once again we were treated to a meal by the managers at AT&M where we sampled national specialities such as donkey and yak!

After our visit to AT&M we visited the Summer Palace, a UNESCO world heritage site whose Chinese name translates as "Gardens of Nurtured Harmony". Many of the students who came agreed this was the most picturesque of our visits, and took the opportunity to capture 'post card' photos, to send home.

We arrived back at the Hostel and got changed for our penultimate evening in Beijing and the traditional Tour Dinner. Our translator, research student Yunqi Wang, had told us that it was a very nice restaurant but we were not expecting the luxury that greeted us as we stepped out of the lift on the sixth floor of a shopping precinct into the Da Dong Duck Restaurant, Wangfujing. Looking past the ¥35,950 (~£3600) bottles of wine on the menu, we managed to find a local beer at a less crippling ¥15. The food was incredible and quite different to the traditional restaurants we had dined at during the rest of the tour.

On our final day in Beijing we visited the world-famous Zoo and Aquarium, managed to see the pandas, and watched a water show involving a breakdancing walrus. Our flight home was disruption-free, we returned to Oxford very tired, but with a much greater sense of where materials science is used in industry and how our subject applies to the world around us.

Feedback from the students includes:

"I really enjoyed the trip as I was able to get an insight into a different culture and working experiences. The visit to TPCO was the first time I have been in a factory so large and throughout the visit I gained an in depth understanding of the pipe making process."

"I really enjoyed the opportunity to travel to Beijing, not only to see the various companies and cultural sights, but also to have the chance to get to know students in the older years from other colleges. The visit to AT&M/Antai was particularly useful as we were given an in depth tour of many different areas of their industry with detailed descriptions. It was also interesting to hear about their involvement with ITER, their methods of improving production speeds, and their problems with Intellectual Property. I look forward to being able to compare these industrial visits with our second year visits."

"The trip was very well organised, particularly in view of the last minute changes. The accommodation was good, ideal for the trip. The information given prior to the trip about finance, health and cultural considerations was very helpful.
The industrial visit I found the most useful was the trip to AT&M. On the factory tour we saw the different stages of the powder metallurgy process used to manufacture the tungsten components. The person giving the tour was very informative and gave us specific information about the processes. During the Q and A session afterwards we found out about some of the projects AT&M were involved with which was very interesting.
I really enjoyed the trip to Beijing, there was a good mixture of sightseeing, industrial visits and free time."

"This was a fantastic opportunity to see industry in a foreign country with different ways of going about research and manufacturing, whilst experiencing a fascinating culture.
The visit to BIAM was a thought-provoking eye-opener to a government run, Communist factory, and made me consider the pros and cons of this system more closely. It also made me question the benefits of capitalism and whether it is the best way of doing things."

"The trip was fantastic, I thought the balance between activities of academic and leisure nature was just right, I also liked being kept busy the entire time and I felt that you and Miriam ensured that we made the most of the time we had in China.
One of several things I learned from the trip is the contrast between the state-run and privately-run companies - and the visit to Baoling Investment Casting definitely exemplified this. In addition, it was great to be so close to the processes and workers; it was useful to make the link with the Processing work we do in Michaelmas term of our first year.
At no point during the trip did I feel things could have gone better - you two really did a great job organising!"

"I really enjoyed the industrial visit and I'm so glad that I decided to go. The group was really fun and the industrial visits all interesting and informative, whilst it was great experiencing the culture whilst we were site seeing. I found the Baoling Investment Casting especially useful, having studied investment casting earlier in the year it was great to see how the process works in real life."

Miriam Steinmann & Charlie Hirst