CaMPUS Placements: UK Industrial - Reports 2023

Below are reports on the Summer Placements provided by students who participated in the scheme in 2023.

AIXTRON, Swavesey, Cambs.

1. General		
Placement Location	**AIXTRON Ltd, Buckingway Business Park, Anderson Rd, Swavesey, Cambridge CB24 4FQ**	
Arrival and Departure Dates	**03/07/2023 – 01/09/2023**	
No. of working days spent at Institution	**44.5 days**	
2. Financial		
Where did you stay during your placement (town name)?	**College**	
Total cost of daily travel to and from Institution (£)	**£180**	
Total received from Institution (£)	**£3993.86**	
3. Research Project		
Title of Research Project	**Copper Polishing for Graphene Synthesis**	
Written Report submitted to host institution	**No, but presentation submitted**	
Experimental Techniques used:	**Electrochemical polishing, data analysis**	
Interest level of project	on a scale of 1 (low) to 10(high)	**7**
Quality of support provided	on a scale of 1 (low) to 10(high)	**9**
Interaction with other researchers	on a scale of 1 (low) to 10(high)	**10**
Short summary (~ 200 words) of technical content of project:		
Researched and experimented on how electrochemical polishing can improve roughness of copper sheets for graphene synthesis. Designed the experiment and variables, including electrolyte solution and additives, voltage, temperature, time, and cathode material. Also designed and tested various experimental measurement set-ups, including using qualitative (visually inspecting samples, reflectance, and mirror finish) and quantitative measurements (AFM). Utilised these techniques to optimize the polishing process.		

IonScience, Fowlmere, Cambs.

1. General	
Placement Location	**IonScience (Fowlmere, Cambridgeshire)**
Arrival and Departure Dates	**17/7/23-15/9/23**
No. of working days spent at Institution	**40**
2. Financial	
Where did you stay during your placement (town name)?	**Cambridge**
Total cost of daily travel to and from Institution (£)	**£0**
Total received from Institution (£)	**£3080.35**
3. Research Project	
Title of Research Project	**Evaluation of new and existing technologies for mercury vapour measurement**

Written Report submitted to host institution	**Yes, in the form of a design specification for a new product**	
Experimental Techniques used:	**UV spectroscopy, optical microscopy, gas testing and flow systems, SEM image analysis**	
Interest level of project	on a scale of 1 (low) to 10(high)	**9**
Quality of support provided	on a scale of 1 (low) to 10(high)	**8**
Interaction with other researchers	on a scale of 1 (low) to 10(high)	**9**
Short summary (~ 200 words) of technical content of project:		
I began with a technical review of companies' own current product and competitor products for mercury vapour measurement. I then planned and completed testing to characterize the companies' current instrument. For the next generation of the product, I explored alternative technologies including using spectroscopy to compare mercury discharge lamps and UV LEDs, along with testing with the photodiode sensors and mercury vapour. I designed and constructed prototypes for a new, mercury-removing scrubber for use in the new product. This will be regenerated at 800degC, leading to research of suitable materials choice for this as well as consideration of behaviour with mercury and VOCs. I used Comsol to model related to air flow through the scrubbers, and analysed SEM images to form predictions on their performance. I came up with and tested a set-up to allow gas flow and mercury containment during regenerative heating. Once constructed, I tested the scrubbers and a control to see the impact on the device's reading, providing varying concentrations of mercury vapour. Then analysis included their breakthrough, compared to each other and previous testing of competitor products. Outside of my project, I also worked with photo ionization detectors (PIDs), testing with gas injections in a sealed sphere, investigating the change in performance over lifetime, and working on prototypes of new versions.		

Plastometrex, Cambridge

1. General		
Placement Location	**Plastometrex, Cambridge Science Park, Milton Road**	
Arrival and Departure Dates	**26/07/23 – 14/07/23 and 24/07/23 – 25/08/23**	
No. of working days spent at Institution	**40**	
2. Financial		
Where did you stay during your placement (town name)?	**Cambridge**	
Total cost of daily travel to and from Institution (£)	**£0**	
Total received from Institution (£)	**£2800**	
3. Research Project		
Title of Research Project	**Validation testing for HotPIP**	
Written Report submitted to host institution	**No**	
Experimental Techniques used:	**Profilometry-based indentation Plastometry (room temperature and high temperature), tensile testing (room temperature and high temperature), grinding and polishing, optical microscopy.**	
Interest level of project	on a scale of 1 (low) to 10(high)	**8**
Quality of support provided	on a scale of 1 (low) to 10(high)	**9**
Interaction with other researchers	on a scale of 1 (low) to 10(high)	**9**
Short summary (~ 200 words) of technical content of project:		

I ran experiments to test the performance of the company's new high temperature PIP machine, HotPIP. This included measuring temperatures from thermocouples to calculate thermal gradients across the sample. I monitored the temperature of various components to ensure they weren't exceeded their operating temperature. I also did lots of validation testing to show that HotPIP gave the same results as conventional tensile testing. This involved running tensile tests for several different metals at a range of temperatures, and then prepping samples and testing them on the HotPIP machine. The stress-strain curves for both tests were plotted to compare the YS and UTS.