CaMPUS Placements: UK Industrial - Reports 2016

Below are reports on the Summer Placements provided by students who participated in the scheme in 2016.

Granta Design, Cambridge

Report 1

1. General	
Placement Location	**Granta Design Ltd.**
Arrival and Departure Dates	**July 4th- September 10th**
No. of working days spent at Institution	**46**
2. Financial	
Where did you stay during your placement (town name)?	**Romsey Terrace, Cambridge**
Total cost of daily travel to and from Institution (£)	**£0**
Total received from Institution (£)	**£2500 approximately**
3. Research Project	
Title of Research Project	**Educational resources for Material Science and Engineering**
Written Report submitted to host institution	**yes**
Experimental Techniques used:	**Not really an experimental placement. Used computer software and coding mostly**

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)	**10**
Interaction with other researchers	on a scale of 1 (low) to 10(high)	**7**

Short summary (~ 200 words) of technical content of project:
The project consisted of two parts. The first was the creation of an interactive phase diagram tool to be used as a teaching aid in university courses for material science and engineering. I used Adobe Illustrator to create vector graphics images to be used in six interactive diagrams. I then edited the code (written in HTML, Javascript and JSON) in order to implement the tools interactivity.   **The second part was creation of exercises to accompany the release of a new set of database in the CES EduPack, including functional materials and process-property-profiles. I researched styles and formats of questions written in engineering textbooks and exercises released with previous editions of EduPack. Having done this research, I wrote 40 exercises for the new databases, as well as 85 questions that are compatible with Moodle quizzes.**

Report 2

1. General	
Placement Location	**Granta Design**
Arrival and Departure Dates	**04/07 – 09/09**
No. of working days spent at Institution	**50**
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 (£)	2819.04 (net)
3. Research Project	
Title of Research Project	**Manufacturing Database**
Written Report submitted to host institution	**Yes**
Experimental Techniques used:	**Product disassembly and density measurements**

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)	**5**

Short summary (~ 200 words) of technical content of project:
This was a project to create a prototype database for the CES EduPack software focusing on manufacturing and design. The target audience was materials scientists/engineers, product design students and manufacturing students. To make the database interactive, it was developed using HTML.
Content covered material-process combinations, the design features and issued that should be considered, physical science associated with processing and example components in commercial products. The inclusion of products also aims to support product disassembly projects, especially at universities/schools that cannot afford to buy real products.
During the project, I learnt to script using HTML and JavaScript, took and edited photos using Adobe Photoshop, created icons using Adobe Illustrator, and carried out product disassembly and basic material characterization.
The final outcome of the project was a prototype database with a complete sample of each type of page and an outline of the content required for expansion.

Report 3

1. General	
Placement Location	**Granta Design**
Arrival and Departure Dates	**4/7/16 – 10/9/16**
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 (in walking distance)**
Total received from Institution (£)	**~£2200**
3. Research Project	

Title of Research Project	**Data Analysis apps for GRANTA MI (a materials database)**	
Written Report submitted to host institution	**No**	
Experimental Techniques used:	**Programming (python)**	
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)	**10**
Interaction with other researchers	on a scale of 1 (low) to 10(high)	**7**
Short summary (~ 200 words) of technical content of project:		

The project involved me writing a python application to utilize Granta's new MI scripting toolkit, which would interact with a users database. Several application ideas where suggested but a statistical analysis app was chosen as it was the most versatile and beneficial to the company.

The final application had a user sign into their MI database, select the records and attribute they wanted to analyze and a figure would be produced with a boxplot and standard deviations would be produced. The user could also import the statistical data to a given location.

Having never programmed in Python before this project seemed very daunting at first however it was incredibly beneficial, as it has taught me a very useful skill. I have also learnt how to design user-friendly user interfaces, very important for computer applications. The team I was working with had little background in Python so I was working with many different parts of the company. This meant I was able to provide advice and build a teaching program for any new member of the team to learn how to use the python scripting toolkit.

Report 4

1. General	
Placement Location	**Granta Design**
Arrival and Departure Dates	**4th July – 2nd September**
No. of working days spent at Institution	**40 (45 + 5 holiday)**
2. Financial	
Where did you stay during your placement (town name)?	**Cambridge**
Total cost of daily travel to and from Institution (£)	**£0 (cycled)**
Total received from Institution (£)	**£2,367.35**
3. Research Project	

Title of Research Project	**1) Supply Risk Metric for Restricted Substances** **2) Data Products Quality Assurance**	
Written Report submitted to host institution	**Yes**	
Experimental Techniques used:	**--**	
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)	9
Interaction with other researchers	on a scale of 1 (low) to 10(high)	7
Short summary (~ 200 words) of technical content of project:		
The first project involved collecting data on price, number of users and annual tonnage of a number of restricted substances. This data, along with some other data collected from the European Chemical Agency, was then combined into a metric to evaluate the risk of supply obsolescence of those substances investigated. **The second project mainly concerned bug fixing using vba and manual checks in MS excel to ensure good quality data for a software release which occurred during the course of the placement.**		

Frazer-Nash Consultancy, Dorking, Surrey

Report 1

1. General		
Placement Location	**Frazer-Nash Consultancy**	
Arrival and Departure Dates	**27/6/16 – 3/6/16**	
No. of working days spent at Institution	**47**	
2. Financial		
Where did you stay during your placement (town name)?	**Dorking**	
Total cost of daily travel to and from Institution (£)	**0**	
Total received from Institution (£)	**>£2500**	
3. Research Project		
Title of Research Project	**Fatigue and rupture in CMSX-4 turbine blades**	
Written Report submitted to host institution	**Yes**	
Experimental Techniques used:	**None**	
Interest level of project	on a scale of 1 (low) to 10(high)	5
Quality of support provided	on a scale of 1 (low) to 10(high)	7
Interaction with other researchers	on a scale of 1 (low) to 10(high)	8
Short summary (~ 200 words) of technical content of project:		
At Frazer-Nash I was contributing to one of their main projects, which involved creating models of different materials for use in turbine blades, to allow for prediction of failure of various kinds. **The main portion of my work involved trying to fit mathematical models to fatigue and rupture data of the material CMSX-4. The data was provided by a client, and was limiting in some ways. The main complication arose due to the anisotropy of CMSX-4, and I had to investigate methods that would not be affected by this property.**		

The majority of the technical content was therefore in mathematical modelling and related theoretical models for materials such as Ramberg-Osgood curves. Understanding of fatigue, including factors affecting fatigue such as strain ratio was also necessary.

TWI, Great Abington, Cambridge

Report 1

1. General	
Placement Location	**TWI, Granta Park, Great Abington, Cambridge**
Arrival and Departure Dates	**13/07/16 to 23/08/16**
No. of working days spent at Institution	**28**
2. Financial	
Where did you stay during your placement (town name)?	**In college in Cambridge**
Total cost of daily travel to and from Institution (£)	**£3 using commuter bus**
Total received from Institution (£)	**1759.21**
3. Research Project	
Title of Research Project	**No specific title working on 5 or so small projects.**
Written Report submitted to host institution	**Some projects required very short reports but otherwise in the form of images and files.**
Experimental Techniques used:	**XRM**

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)	**7**
Interaction with other researchers	on a scale of 1 (low) to 10(high)	**4**

Short summary (~ 200 words) of technical content of project:

I was placed in NDT (non-destructive testing) and was primarily working with the X-ray CT scanner. They had just taken on a large single client job scanning 350 flexible circuit boards for space electronics application to determine whether any of them had cracks which could cause failure. The scanning process was semi-automated so I just had to load samples into the machine and take a few calibration images and repeat the cycle and the work was shared between a technician and me. Between scans I was using a piece of software called Avizo used for the analysis of the 3D CT scans. I was given short tasks such as identifying cracks within a scanned ceramic and trying to find a relationship between the porosity in an electron welded cladding and its welding parameters. After I had completed projects if there were more data sets to be analysed I would train up a technician to finish the analysis using the software. Felt the placement improved my ability to use computers effectively and understand their capabilities. Did not require much more than a basic understanding of materials science.

Report 2

1. General	
Placement Location	**TWI**
Arrival and Departure Dates	**13/07 - 16/09**
No. of working days spent at Institution	**43**
2. Financial	
Where did you stay during your placement (town name)?	**Christ's College accommodation, Cambridge**
Total cost of daily travel to and from Institution (£)	**3**
Total received from Institution (£)	**2848.06**
3. Research Project	
Title of Research Project	**Capability study of the refill friction stir spot welding process**
Written Report submitted to host institution	**No written report submitted but an oral presentation was made**
Experimental Techniques used:	**Tensile testing and optical microscopy**
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) **4**
Short summary (~ 200 words) of technical content of project:	
The project was to carry out a process capability study of the refill friction stir spot welding process. The technique is new to the company and I was given responsibility for trying new welding parameters and investigating the effect on weld time and strength that the parameters have. This was done for more than one material combination including welding Al to Zn coated steel which had not been tried at the company using this technique before my arrival. My results were to be used as part of an internal report on friction stir spot welding.	