

CaMPUS Placements: UK Industrial - Reports 2015

Below are reports on the Summer Placements provided by students who participated in the scheme in 2015.

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Granta Design, Cambridge

Report 1

1. General

Placement Location: **Granta Design**

Arrival and Departure Dates: **1st July, 18th September**

No. of working days spent at Institution: **48**

2. Financial

Where did you stay during your placement (town name)?: **Cambridge**

Total cost of daily travel to and from Institution (£): **Free - cycled**

Total received from Institution (£): **£2500**

3. Research Project

Title of Research Project: **Data Products Resource Development & Restricted Substances Update**

Written Report submitted to host institution?: **yes**

Experimental Techniques used: **None (data work on the computer)**

Interest level of project: on a scale of 1 (low) to 10(high): **2**

Quality of support provided: on a scale of 1 (low) to 10 (high): **4**

Interaction with other researchers: on a scale of 1 (low) to 10 (high): **6**

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

The project had 3 main parts.

Firstly, developing some electronic component lite records (only a subset of properties filled). This was mainly researching the prices of those components, and some eco-data.

Next, some work into categorizing, and finding properties of various adhesive materials, for a new part of Granta's database. This required lots of work looking into technical data from a variety of adhesives in lots of depth, as well as materials safety data.

Finally, some research on legislation on Restricted Materials. Researching and summarizing the legislation, or industry standard, and creating links to any materials covered by those legislations

Report 2

1. General

Placement Location: **Granta Design**

Arrival and Departure Dates: **1st Jul – 18th Sept**

No. of working days spent at Institution: **58 (11.5 weeks) – includes 6 days holiday**

2. Financial

Where did you stay during your placement (town name)?: **Cambridge - college**

Total cost of daily travel to and from Institution (£): **Free**

Total received from Institution (£): **£2820**

3. Research Project

Title of Research Project: **New Selection Records**

Written Report submitted to host institution?: **yes**

Experimental Techniques used: **Qualitative research, data analysis in Excel, Adobe Illustrator, VBA coding**

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 spent 12 weeks working with the Data Products team, primarily creating new records for Granta's products (such as CESEduPack)

I was given an initial research project researching processes for ProcessUniverse, which involved qualitative research and then focused on economic information (such as tooling cost) along with producing new schematics in Adobe Illustrator.

The main project was to produce new placement was the creation of new MaterialUniverse records for Granta's products such as CES EduPack 16. The data for these records were collected and analysed using a team-produced tool. To fill any gaps, I made estimations from empirical relationships, own knowledge and similar materials and also researched specific grades on producer websites. After my initial analysis of the data, there was a dialogue of review between team members before attributes were finalised.

I was also involved several smaller projects: a team project creating similar records, with daily meetings and progress targets; a project to produce an automated tool for empirical relationship generation and quality-measuring; and a small project updating one of Granta's databases.

I would highly recommend taking a placement at Granta. The most notable aspect is the working environment, where everyone is welcoming and there is continual support where required.

Report 3

1. General

Placement Location: **Granta Design**

Arrival and Departure Dates: **01/07/15 - 18/09/15**

No. of working days spent at Institution: **52**

2. Financial

Where did you stay during your placement (town name)?: **Hatfield**

Total cost of daily travel to and from Institution (£): **£635**

Total received from Institution (£): **£2900**

3. Research Project

Title of Research Project: **ProcessUniverse Educational Development of the Materials and Engineering and Products and Materials Databases**

Written Report submitted to host institution?: **yes**

Experimental Techniques used: **No**

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): **9**

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

The placement consisted of 2 individual projects. Firstly developing a piece of software to support teaching in Materials Science and Engineering with an interactive tool. Development involved the use of HTML and CSS coding, image processing and user interface development relating to Granta's proprietary educational software platform. The second project involved database work in terms of quality control, expansion and data navigation development. Both projects were related to improving and expanding existing products. The project involved working as part of the direct team working on real and useful tasks individually and under guidance. As well as collaborating with key academics, the placement involved regular communication and collaboration with both the supervisors and the remaining Education team. It required the use of both materials science information and processing methodology identification but allowed for developing both of those knowledge bases. As part of the internship, the projects needed to be presented to the company at different times through the internship so communication and presentation skills were important and were also developed as part of the placement. The placement also led to an awareness of design elements and choices so as to convey information in an aesthetically pleasing but clear style.

Frazer-Nash Consultancy, Dorking, Surrey

Report 1

1. General

Placement Location: **Frazer-Nash Consultancy**

Arrival and Departure Dates: **29th June – 4th September**

No. of working days spent at Institution: **48 (Can take five days holiday or sell them. I took one plus there was a bank holiday.)**

2. Financial

Where did you stay during your placement (town name)?: **Epsom**

Total cost of daily travel to and from Institution (£): **£5.55 daily return on train with 16-25 railcard, £8.40 without**

Total received from Institution (£): **£325 per week, plus the first two weeks of accommodation were paid for by the company**

3. Research Project

Title of Research Project: **Creep-fatigue life review in pipework; Condition-based maintenance; Research reviews in oil & gas and wind energy**

Written Report submitted to host institution?: **No**

Experimental Techniques used: **None**

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): **8**

Interaction with other researchers: on a scale of 1 (low) to 10 (high): **8**

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

I was put on real consultancy projects being carried out by Frazer-Nash, but in more of a background research and preparation capacity as may be expected for an intern. In a group of around eight people (and some interaction with other groups), I obtained an insight into engineering consultancy and the wide range of projects being undertaken.

My main task was to modify existing life prediction methods used by the materials performance group to apply to a particular grade of steel used in high temperature pipework in the power

industry. This involved gathering data from the literature, fitting models in Excel and modifying a life-prediction tool in Excel, also using Visual Basic for Applications.

I also provided independent verification on the life prediction model which gave rise to interesting discussions about how stress, strain, creep and fatigue were handled.

Other tasks were to put together research reviews using industry journals, academic papers and conference proceedings. This was in assistance to projects in the oil and gas and offshore wind industries.

Johnson Matthey (Noble Metals), Royston, Herts.

No report received.

TWI, Great Abington, Cambridge

Report 1

1. General

Placement Location: **TWI**

Arrival and Departure Dates: **29 June – 25 September**

No. of working days spent at Institution: **60**

2. Financial

Where did you stay during your placement (town name)?: **Cambridge**

Total cost of daily travel to and from Institution (£): **£2 on Granta Park commuter shuttle from train station**

Total received from Institution (£): **£3750 in form of salary. Not sure if taxed**

3. Research Project

Title of Research Project: **Use of CT scans to determine capabilities and limitations of the Xradia 520 Versa Xray microscope.**

Written Report submitted to host institution?: **No – due to nature of project the “report” is the videos, images, and 3d volume files that they show to clients**

Experimental Techniques used: **Xray microscopy, CT scanning, sample preparation for Xray 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): **9**

Interaction with other researchers: on a scale of 1 (low) to 10 (high): **3 (mostly solitary in microscope room, interaction with researchers when sourcing and determining how to scan samples)**

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

Shortly before I arrived in the nondestructive testing section at TWI, the company acquired a new Xray microscope meant to increase their resolution capabilities for 3D imaging of their clients' samples. My placement was to explore the microscope's capabilities by scanning a wide range of samples. I scanned a variety of internal research samples (conventional and friction-stir welds in

metals, polymers, and composites, as well as fractures in failed components), as well as clients' samples (ranging from characterization of prototypes to imaging of QC-failed samples) and my own samples, which I chose to explore the full range of the microscope's capabilities: wings on a fly, silicon tracks on mems devices, the internal structure of a thistle.

As the microscope was the company's new "toy", it was frequently shown off to potential member companies touring the site. I gave up to six presentations a week showing the basic functioning of the microscope and the 3D images from whichever samples that I had scanned that were most likely to be commercially relevant to the visitors.

Towards the end of my project, the company had a visit from HRH Princess Anne, who was opening a recently-completed building. My supervisor and I showed her the microscope and several samples, including a ceramic one to be used in my 4th year project.

Initially my project also included more sophisticated data processing (segmentation of volumes, videos following a path through a sample) than the built-in microscope software allowed, but due to software license purchasing dates I was unable to do so until the last few days of the project.

Report 2

1. General

Placement Location: **TWI**

Arrival and Departure Dates: **29 June – 4 September**

No. of working days spent at Institution: **50**

2. Financial

Where did you stay during your placement (town name)?: **Cambridge - college**

Total cost of daily travel to and from Institution (£): **£100 (Company offer a bus from cambridge station which is £1 for a ticket so £2 a day)**

Total received from Institution (£): **£3000**

3. Research Project

Title of Research Project: **Investigating the Electromagnetic fields produced by Resistance welding processes. Also worked on analyzing fume concentrations produced from by different welding conditions and analyzing metal weldability.**

Written Report submitted to host institution?: **No**

Experimental Techniques used: **Spreadsheet analysis, SEM, mounting and polishing, taking macros of samples, literature reviews**

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): **10**

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

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

I worked with the arcs, fabrication and welding department at TWI. The main project involved running simulations of the electromagnetic fields produced by several different welding methods with a large range of setup conditions. I had to establish which conditions would reduce the exposure a welder would experience most significantly and ensure the software was running correctly.

TWI encourages researchers and project leaders to collaborate on others projects and so I also worked partly on many other projects. This included: producing graphs for the concentration of fume gases released from welds; SEM analysis of a weld joint to identify how welding affected the phases in different regions of the weld; mounting, polishing and photographing of welds to determine weld performance under different welding conditions; producing a basic database to suggest which British standard group a metal would belong to by its chemical composition; and beginning a literature review of a metal which was previously thought to be non weldable.

Report 3

1. General

Placement Location: **TWI**

Arrival and Departure Dates: **23 June-4 Sept**

No. of working days spent at Institution: **46**

2. Financial

Where did you stay during your placement (town name)?: **Cambridge - college**

Total cost of daily travel to and from Institution (£):**£2 (or £6.40 if wanting to travel at flexible times)**

Total received from Institution (£): **£2700**

3. Research Project

Title of Research Project: **Effects of High pressure on Mechanical testing**

Written Report submitted to host institution?: **Yes**

Experimental Techniques used: **Tensile tests at high pressure**

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): **6**

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 was brought about by an issue with an external company querying the results taken from the hydrogen testing lab at TWI. The standard method for hydrogen testing is to do one test at ambient pressure in air and one at high pressure in hydrogen atmosphere. It was assumed that the effect of pressure on the test would be negligible. The first three weeks of the project were spent compiling information for and writing a literature review into the effect of high pressure on mechanical testing, looking at the effects of pressure on different properties: Yield strength, UTS, Fatigue life, failure strength, natural strain and reduction of area. Where information was available microstructure and compositional effects were also commented on. Most of the studies used far higher pressures than those used in TWI's hydrogen lab but some showed linear trends which were thought to continue to atmospheric pressure. There appeared to be little effect at the pressures used in the hydrogen lab. Unfortunately the rigs were out of action most of the summer so experimental work could only be conducted in the last week and a half of my time there. I chose to look at tensile specimens as they could be produced and tested quickly during the 2 months I was there and also allowed analysis of a range of properties. These were tested to failure in pressures between atmospheric and 100 atm in Nitrogen. Results showed small trends which corresponded with predictions but were not significant compared the the scatter observed. During the time between doing the literature review and testing I worked on a range of projects to help out people in the ferrous alloys and materials performance group varying from researching materials data or possible causes of microstructure to cross checking data in their spreadsheets.