## **Research Report of JSPS Short-term Fellowship**

Research Fellow: Dr. James Coakley. Contact Details: j.coakley06@imperial.ac.uk Host Supervisor: Prof. Masato Ohnuma. Host Insitution: Hokkaido University Research Group: Laboratory of Quantum Beam System Engineering, Graduate School of Hokkaido University. Duration: July 2013 - November 2013

## Research Title: Isothermal omega composition and volume fraction evolution during nucleation and growth in beta-titanium alloys

The use of beta-titanium alloys in industry is steadily increasing due to its attractive properties, particularly its high yield stress and low stiffness. The purpose of this collaboration was to quantify the nucleation and growth of the omega phase in four common beta-titanium alloys using a combination of small angle X-ray scattering and neutron scattering (SAXS and SANS) techniques during low temperature ageing. The growth of this phase is detrimental to mechanical properties, and thus warrants quantification. Prof. Ohnuma of Hokkaido University is expert in these techniques, and SAXS and SANS instruments are located within the Laboratory of Quantum Beam System Engineering.

The collaboration was very productive, and it is anticipated the measurements performed by the fellow and supervisor will result in four separate papers on the rate of omega phase growth, on the relationship to mechanical properties, and also on the compact-SANS instrument being developed at the Hokkaido University Linear Accelerator (LINAC). The students within the laboratory also used the opportunity to discuss their work with the fellow and enjoyed hosting the foreign researcher.

On a personal level, the experience given to me through the JSPS fellowship is one I (the fellow) will always cherish as four incredible months. Ohnuma-sensei was enthusiastic that I enjoy life in Japan, and I must thank him for the time I enjoyed inside and outside of work. The training went beyond materials science, and included amusing tests to educate the fellow to Japanese life. One example was to try various sushi specialties selected by the professors, finishing with shirako (cod-milt)!

I could write pages on what I loved in Japan: the friendliness of the people, the food, the culture, the beauty outside of the cities, and the energy within the cities. I would recommend future fellows to learn some basic japanese before they depart, I did not do this and in hindsight I wish I had. Then all that is left to do is work hard in the lab, reward yourself with a trip to a volcano, try the sea urchin and drink some sake, and sing karaoke with the students (and professors) late into the night. The JSPS fellowship is an exciting opportunity to immerse yourself in Japanese life, and I already hope to return the land of the rising sun.



Figure 1: a) Present and b) future students of the Laboratory of Quantum Beam System Engineering, Hokkaido University.