

Optical Group Student Travel Grant Report

Photonics West
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Photonics West is the flagship meeting of the International Society for Optical Engineering (SPIE). It is an enormous event, with over 15,000 attendees and 875 exhibiting companies. The event was well organised and in addition to the trade fair there was a large number of conferences covering every aspect of optics and its applications.

I was there to present a paper in the *Nanomanipulation with Light* conference (Conference 5736). My talk was entitled *Light induced separation and flow of microscopic and biological particles*. The fifteen minute talk highlighted recent and exciting developments at our group in St Andrews in the new field of optical sorting.

Despite being first on in the morning I had a reasonable crowd and received what I felt was a positive response to my talk. I had a number of enlightening discussions and I came away from the conference with some new ideas that I am now trying to implement in the laboratory.

While the conference was a success it was only a small part of my whole trip. There are a lot of groups in the area around San Francisco working in fields related to mine. In addition to the conference I visited five groups, giving a presentation to each one.

Three of the groups (James Spudich and Steven Block at Stanford and Carlos Bustamante at Berkeley) all use technology very similar to my group at St Andrews. They use it to explore the molecular processes that drive biological cells. All three visits were impressive and enjoyable, however Steven Block's lab was particularly interesting. They have spent a very large amount of time and money in developing a very sophisticated system that circumnavigates many of the problems normally associated with our field. It is likely that our group in St Andrews will move towards building more accurate experiments and the discussions I had with Steven Block and his group may prove to be valuable.

I then visited the group of Stephen Quake, who is also based at Stanford. His work is not as directly related to ours as the previous three groups, however there are many overlaps. A particularly interesting aspect of visiting the Quake group was their location. They are housed in Stanford's new Bio-X facility, which is effectively a giant social experiment to see what happens when biologists, chemists, physicists and engineers are forced to share the same open plan space. I had a number of discussions with senior scientists there about the politics surrounding the new institution. I found this particularly interesting since my own field sits on the fence between physics and biology and I am aware of new protocols in Europe and the UK to build bridges between the two communities.

Finally, I managed to organise a personal tour of the National Ignition Facility (NIF) at the US government's Lawrence Livermore Laboratories. As a laser physicist this has been Mecca to me for a number of years. NIF houses the most powerful laser system in the world. The facility constitutes a major part of the US Department of Energy's roadmap for research into nuclear fusion power. It simultaneously acts as a testing centre for the USA's nuclear stewardship program and also as a facility for general science experiments in extreme conditions. NIF houses the most powerful laser system in the world and is a very impressive project.

Over the course of the two weeks I had in the Bay Area I met a large number of interesting individuals and exchanged quite a few ideas. I was both surprised and pleased to see that my working environment in the UK compares favourably both in terms of staff and resources to the top US institutions. My trip was thoroughly rewarding, both academically and personally.