

## Stevenson Fund Report - Sarah Thomas

Research Placement at Centre National de la Recherche Scientifique  
(CNRS), Paris – Sept-Dec 2016



Thanks to the Stevenson Fund, I had the opportunity to spend three months working at the Centre National de la Recherche Scientifique (CNRS) in Paris. I joined the group of Professor Pascale Senellart at the Laboratoire de Photonique et de Nanostructures (LPN).

Prof. Senellart's research focuses on light-matter interactions with semiconductor quantum dots in optical cavities. These devices have broad applications, from exploring the fundamental physics of light-matter interactions, to the generation of single photons. The latter was the focus of my project. The generation of bright, indistinguishable, single photons is a vital component of quantum networks, and huge progress has been made by Prof Senellart's group using semiconductor quantum dots embedded in micropillar cavities, which enhance the photon emission and enable efficient collection. These photon sources are world-leading and it was an incredible opportunity to learn about their fabrication, alignment and operation first-hand.

During my placement I helped to rebuild the photon source to minimize all forms of loss and improve the stability, and worked towards a high-brightness, high-indistinguishability single photon source. Not only did I learn a lot about quantum optics and solid state physics, but it was a great to see how a different research group operates and gain a different insight into scientific research.

Since my return from Paris, we have formed a collaboration with the Senellart group, to set up a photon source in our lab. I have returned to Paris once already to take some calibration measurements, and will return again early next year to collect the sample. We hope to interface this photon source with our own quantum optics experiments in the near future, which will open many exciting research directions. I am extremely grateful to the Stevenson Fund for this opportunity!