

I'm Martin Hollamby and I'm now a lecturer at Keele University in the UK. From 20th Jan 2011 - 19th Jan 2012 I was working as a JSPS postdoctoral fellow with Dr. Takashi Nakanishi in the Organic Materials Group, National Institute for Materials Science (NIMS), Tsukuba, Japan.

From the double helix of DNA to thickening agents in food, the self-assembly of molecules governs many aspects of our daily life and is fundamental to many scientific fields. One area in which self-assembly is commonly applied is the creation of carbon-based electronic components, known as "organic electronics". These materials can be produced more cheaply than silicon and allow for flexible handheld devices. The use of self-assembled molecules should permit desirable macroscopic properties to be targeted simply by optimizing the way the individual molecules interact and align with one another. Ideally this will be done by simply changing the structure of the molecule ("directed assembly"). However, the ability to control this at the bulk-scale remains a significant challenge.

Current research topics, which I started as a JSPS fellow, are therefore aimed at finding straightforward ways to direct self-assembly over many length-scales. One molecule of interest is C_{60} (buckminsterfullerene) which is a good electron acceptor and often used in organic solar cells. When many C_{60} molecules are arranged close together they can transfer electrons over long distances. We found that adding alkyl chains to molecules like C_{60} , then adding additives to the system, directs their assembly into various structures, ranging from small clusters to long-range gel fibres and liquid crystalline mesophases. These structures were shown to transmit charge: future work will demonstrate their use in active organic electronic devices.

My experience in Japan was almost entirely positive, both scientifically and personally. I was able to form close ties with several Japanese researchers, with whom I intend to continue to collaborate via the JSPS alumni travel grants that are available. Outside of work, I also made many good friends (both with Japanese and foreign nationals) thanks to living in the Ninomiya House, one of two large residences for foreign researchers in Tsukuba, and visiting the local "gaijin" sports bar called "Hot Staff", I learned the joys of "hashing", and made regular excursions to see the more mountainous regions of Japan, such as Nikko National park, shown below.

After the fellowship tenure had finished, I remained in Japan for more than a year, as I became a researcher in the International Centre for Young Scientists in NIMS. This is a clear testament to the kindness and support shown to me by my adopted group in NIMS and the staff of Ninomiya House throughout my stay. I'd therefore thoroughly encourage anyone to apply for a JSPS fellowship and to go to Japan to do scientific research.

I'd be happy for anyone to get in touch with questions. My email is m.hollamby@keele.ac.uk

