

AFM on pore forming proteins, a Master's project conducted at the London Centre for Nanotechnology

By Adrian Hodel, May 2014

In order to earn my M. Sc. in Nanotechnology at the University of Basel, I decided to go abroad for a semester (that turned into 8 months in the end). My personal motivation was to go do good science, improve my English, and learn and live in a new and vivid environment. So I applied to labs in a few metropolitan areas and ended up in London in the end. Bart Hoogenboom of the London Centre of Nanotechnology (which is a joint institute between the UCL and Imperial College and is located on the UCL campus) was so kind to offer me to work on one of his projects. Bart has a small and young group of biophysicists and is on tenure-track. He worked in Basel himself in the past with Andreas Engel and Hans Josef Hug, which probably eased to get in contact with him, together with Daniel Müller as my own reference. His science focuses on AFM work on biological systems and he does that very well. He uses mostly AFM imaging techniques and has various machines at hand. Besides gathering data on living systems he pushes the boundaries of the AFM techniques, working on several advanced methods including Fabry-Pérot Interferometer detectors, high-speed AFM, and magnetic and optic cantilever actuation. From a biological point of view, his work includes studies on DNA, small peptides, the NPC, and pore forming proteins. The project I was working on (under supervision of Carl Leung, Bart's post-doc that, I have to say, provided excellent and absolutely outstanding guidance throughout the whole project) was a collaboration between Bart and Helen Saibil from the around-the-corner Birkbeck College. She is a specialist in electron microscopy and a very experienced and highly reputed scientist. This constellation provided a very broad knowledge and skill basis that was accessible within my project's frameworks. Although I mainly used AFM to assess the properties of pore forming proteins, all details, experiments, and findings were regularly discussed and reconciled with our coworkers. The techniques we used through the course of the project included Matlab (object oriented) programming, PeakForce AFM, Magnetic tapping and phase modulation AFM, Lipid sample preparation, and the usage of the Blender 3D software. Science in England is very straight forward and to the point (the strict regulation of research money might add to that). The people are generally very professional and constructive therefore and provide a good environment to work in. Also, the science topics that were addressed within the institute appeared to be throughout high tier and it is a good place to do serious work (the thesis contributed to a manuscript that is currently under construction and is to be submitted to the journal "Cell"). Even though space was scarcer than in Switzerland, the campus offers vast possibilities to get what one needs, with a lot of public space, events, and extracurricular activities to do (and the food is excellent around there, believe it or not). I would like to especially mention UCL's "Institute of Making", a maker-space that is open for students for a small annual fee that offers all the tools needed to give rein to his own creativity.