

UCL Chemistry Sixth Form Open Day 2013

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Introduction

On Monday 17th June, 50 Year 12 students attended a chemistry open day at UCL Chemistry. The day was designed to showcase the work undertaken by research students within the chemistry department and at the London Centre for Nanotechnology (LCN). It was also a chance for the students to find out more about university life, studying chemistry and UCL itself. The day consisted of interactive demonstrations, tours and presentations lead by EngD and PhD students.



Computational Chemistry

Computational chemistry is important in the physical sciences as a tool not only for verification of experimentally obtained results but also increasingly for their validation. As processing power has exponentially increased in the last few decades, so too have the levels of complexity that computational chemistry can reach towards and explore.

As a significant number of EngD students at UCL Chemistry use computational techniques in their research, an interactive workshop on computational chemistry was offered to the Year 12 students. The students used packing software, Packmol, to order a set of disordered coordinates representing atoms and/or molecules into defined structures, such as micelles and bilayers. The students then visualised these structures using visualisation software, VMD. The structures were then manipulated in VMD and simple structural details, such as bond lengths and angles, were determined.



Inorganic Chemistry

The aim of this session was to enlighten and enchant the sixth form students with a range of exciting experiments focusing on the theme 'Ice & Fire'. Kicking off the session on a rather icy note, we demonstrated the fun but seriously acidic properties of the rather sublime 'dry ice'. Frosty encounters were to follow with a quick dip in liquid nitrogen, but things warmed up a bit with the peculiar 'hot ice'. Temperatures soared with a big pop as we ignited methane bubbles. We finished our whizz through wet chemistry with a hiss; dehydrating sugar and unleashing a carbon snake from amidst the fiery flames. The students were really enthusiastic and particularly enjoyed the interactive nature of this session.



Tours of UCL

The Year 12 students were given an insight into life at UCL through a tour of the chemistry department and the UCL Bloomsbury campus. The students toured the undergraduate laboratories, lecture theatres and postgraduate laboratories. The tour of the UCL campus captured both the historic and modern aspects of the university, as well as visiting various student facilities. This included visits to the main quad, the cloisters, the engineering building, university of london union (ULU), main library and the refectory. The students also had the chance to meet the preserved body of Jeremy Bentham. This session was also a chance for the students to ask questions about university, undergraduate life and UCL.



London Centre for Nanotechnology (LCN)

A number of EngD students undertake work at the LCN, therefore a two-part interactive session was held, consisting of a demonstration of atomic force microscopy (AFM) and a tour of the clean-room facilities.

Atomic Force Microscopy

During the open day, the students were introduced to AFM, and its possible uses, in addition to the exciting research being performed at the forefront of AFM development. These include the first visualization of the DNA double helix in liquid and work on the development of new antibiotics. The students were shown the size and shape of the AFM 'tips' under an optical microscope, and how these are mounted in the AFM for imaging. The AFM was demonstrated to the students by imaging fibrous collagen proteins and comparing the images to those of a DNA double helix. The students were also introduced to the problems that might be faced in imaging a surface as small as the double helix of DNA using an AFM, and how these may be overcome, resulting in lively debate.

Clean-room Facilities

The students were taken on a tour of a Class 1000 cleanroom in the London Centre for Nanotechnology. They dressed in full cleanroom suits and were shown the range of fabrication and characterisation equipment available to LCN researchers including scanning electron microscopes, a range of deposition equipment and an electron-beam lithography system. They were also instructed on how a cleanroom operates, some of the research carried out in the cleanroom and why it is important for researchers to work under those conditions.



The open day was run by 15 EngD and PhD students from the Molecular Modelling and Materials Science Centre (M3S). A big thank you is given to Dr. Z. Du, Prof. N. de Leuw, Dr. D. Lewis and all of our industrial sponsors.