Nanoscience and chemotherapy

We have recently shown that it is possible to study the chemistry of chemotherapy drugs by placing the molecules on a graphene layer. At low temperatures, the molecules stick to the surface. At body temperature the interaction is extremely weak (and at higher temperatures, they do not stick). This study is published in *2D Materials* in 2015.

(http://arxiv.org/pdf/1411.2096v1.pdf)

The weak interaction makes graphene as ideal surface to study these molecules. In this project, we will introduce DNA bases, as well as chemotherapy drugs, such that we can study the reaction which occurs. This is a new method which will allow the chemistry of chemotherapy drugs to be studied as it is happening. We will mostly use XPS and STM to do this.

The Master project will involve:

- preparing samples (optionally using NanoLab)
- depositing the molecules onto the surface using facilities on our surface characterisation lab.
- XPS and STM measurements, both in our lab. and with collaborators in Denmark, Sweden or Ireland.
- Analysis data interpretation.

Our group has a lot of expertise in this field and will help and assist the student wherever necessary. We strongly encourage a supportive and enjoyable atmosphere in the group.

A working knowledge of experimental physics, material science and nanoscience are advantageous.

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Figure: The chemotherapy drug "fluorouracil" on a graphene surface; schematic and XPS measurements.