

## Women in Science – The Lady with the Lamp – 100 years on

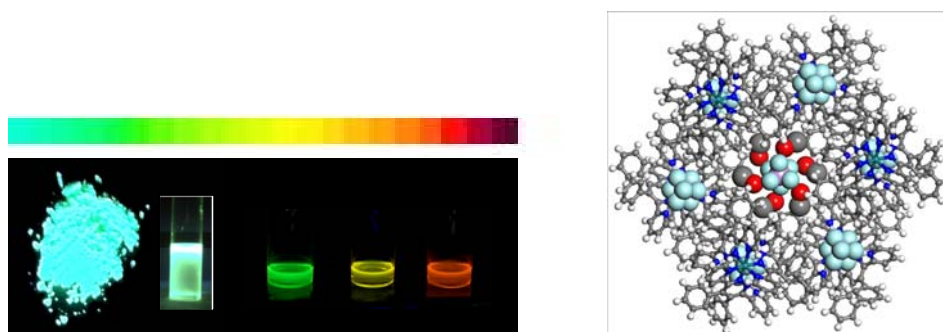
Prof. Sylvia Draper

**Florence Nightingale was an inspiration to the wounded and the dying in the Crimean war and to future generations of women who wanted their contribution to society to extend beyond the home. Today women researchers continue to make ambitious advances in their chosen fields. The torch and the determination have been handed on.**

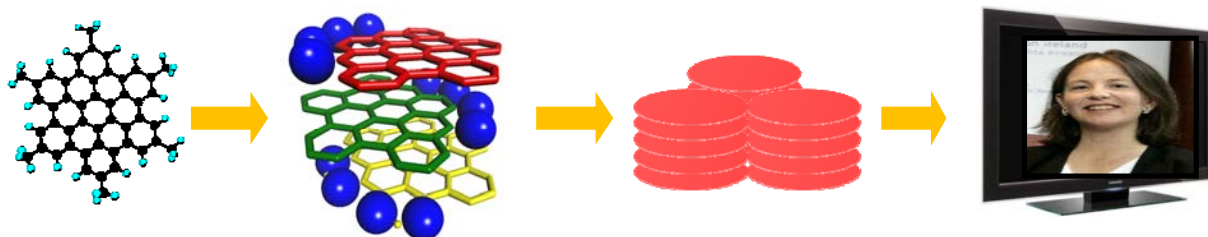
The Faculty of Science, Engineering and Maths is a predominantly male environment, which is research-led and striving for 'academic excellence'. Somewhere back in time, women were allowed to join. This article serves to highlight the views and research of one.

I have been working in the School of Chemistry, Trinity College since arriving fresh-faced from my Ph.D. in Cambridge University almost 20 years ago. At the time it was a culture shock, moving from a department with four NMR spectrometers (the highest being 400 MHz) to one which housed a single, make-shift, 60 MHz machine. The biggest lesson was self-sufficiency. Luckily, research funding bodies came on stream, (Enterprise Ireland, SFI and IRCSET) and large-scale infrastructural change through the HEA, PRTL and EU made possible meaningful strides in synthetic chemical research in Ireland. All that was needed were researchers with good ideas and the ability to express them well.

Research careers are personal: they need dedication and timing, funding and talent. Recognising the potential of molecular graphenes almost a decade ago, I began pushing forward new ways of manipulating them synthetically. Contributors to the on-going Draper endeavour include collaborators, students and researchers from Ireland and beyond. The 'Draper team' develops novel materials with new and expanded applications. The work demonstrates how to convert graphenes and their derivatives, into (a) tunable luminescence materials, (b) versatile ligands to exploit the geometric and optical properties of a metal centre and (c) liquid crystals with the capacity to self-heal. Each of these characteristics takes chemical knowledge a step further and the material closer to a potential end-use.



*(a) an organic dendrimer (blue emitter) and a molecular graphene in 3 different solvents (b) the fac isomer of a Ru(II) polyimine*



*(c) Aggregating planar graphenes and their role in discotic columnar liquid crystals*

Our research looks into the interplay between the absorption or emission of light and the transfer of electrons in a material. These properties lie at the heart of all opto-electronic devices. When light is absorbed, the additional energy can result in the movement of electrons from a lower to higher energy state. Tapping into this conversion of light into current (or vice versa) provides us with the capacity to devise efficient solar cells or Light-emitting devices (LED). These form one arm in the development of sustainable and efficient energy sources. The job of the chemist is to make molecular changes to the structure of the material and to determine the electronic, optical and sometimes practical consequences. Step by step, manipulation by manipulation builds-up a picture of the molecule which in turn allows us to predict how best to exploit it e.g. as an electron transport layer in a thin film device. The picture gains definition from applying different investigative techniques e.g. X-ray diffraction, microscopy, NMR, absorption or emission spectroscopy. Each image gives us important information about whether we are on the right track.

Research ambition in itself is not a noble calling; it distils down into little more than directorships and titles. Academic achievement however is about mothering the minds of future generations and seeing ideas through. If you let it, Chemistry can sink to a dry set of exam worthy facts. Through philanthropic funding it was possible to instigate small group teaching and a team presentation exercise into the undergraduate curriculum. These lift the subject in the minds of students to the science principally responsible for our quality of life. Today as school students and teachers shy away from practical chemistry, I help to breach the gap by on-site demonstrations and introducing chemistry to the masses on RTE radio 1. The torch of learning moves and with it new issues such as life-long learning and up-skilling. Universities and researchers with dwindling resources are seeking innovative ways to offer today's graduates, expertise that stays relevant for tomorrow's problems.

**A burning oil-lamp once an image of hope, is now a metaphor for the global challenges we face. Collectively we need something that shines more brightly, more efficiently and lasts longer than ever before – why not female-LED ? The systematic delivery of hygiene in a war-zone, was neither glamorous nor high-profile but it made a lasting difference. Shine on.**