



# UCL

NEWSLETTER 2011

# UCL Chemistry NEWSLETTER

## Introduction

This newsletter is a new format. It contains a wide range of activity related to the Chemistry Department at UCL. We have included information that related to both 2009/10 and 2010/11 academic years. This is because the previous bulletins were over a year late. In next years letter we will only cover the 2011/12 academic year. Many thanks go to Peter Garratt and Alwyn Davies for their work on previous newsletters. They are currently compiling a book about the department so please feel free to forward anecdotes to them.

This newsletter has been organised by Nicola Best with help from Tracy Hankey at UCL Learning & Media Services. Many thanks go to the both of them. The newsletter is sub divided into eight sections, covering an introduction, student highlights, alumni matters, staff highlights, research highlights, grants, publications and a current staff list. It gives a flavour of the exciting chemistry and family atmosphere achieved by the department. It is not an exhaustive document but can provide a number of contact points to the wide variety of activity that occurs in the department.

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## Welcome to ChemUCL!

Dear All

2010-11 has been an interesting academic year. The department has continued with buoyant recruitment of undergraduates with 105 starting this year; making the whole school the largest it has ever been with over 350 over the four years. The intake were again exceptional in their A-level grades. This number is further swelled by a large cohort of natural science students who chose chemistry streams. Masters recruitment has also increased to some 22 (equally split between the MSc in Chemical Research and the Energy Materials Masters) and Ph.D./Eng.D. recruitment to 52 this year. This is a tremendous achievement especially down to the hard work of Nora De Leeuw (Eng.D./MRes), Dewi Lewis (BSc/MSci) and Julian Evans (MSc).

A number of staff have been honoured with prizes and awards including Geoff Thornton, Paul McMillan and Helen Hailes (RSC). The EPSRC industrial training centre run by Prof De Leeuw on materials science and materials modelling was judged as excellent at the mid-term assessment. A team headed by Andrew Wills and including Prof. Steve Bramwell (Physics & Astronomy) were awarded the Times Higher Education Research Project of the year in 2010 for their work in relating magnetism and electricity in particular for the discovery of "magnetocity".

This year Roy Northeast has retired after 39 years in the mechanical workshop, we wish him well with the fishing. Two fellows, Russell Binions and Mark Crimmin, have left us to take up lectureship appointments at QMUL and Imperial College respectively. We wish them every success in their careers. Three new lectureship appointments have been made in the area of experimental chemistry. Christoph Salzmann joins us from Durham University, he has research interests in graphene and ice polymorphism; Robert Palgrave joins us from Liverpool University, he has research interests in energy materials and XPS and Mathew Powner joins us from Harvard University, he has research interests in organic synthesis especially in relation to protein evolution.

May I wish all of you a happy and successful new academic year. The landscape for Universities will change a lot in the coming year with the introduction of revised student fees and a reduction in research council support. However with the vigour and determination of our staff and alumni we are well placed to overcome these challenges.



*Ivan P. Parkin, Head of Department*

## UNDERGRADUATE DEGREES

Many congratulations go to the following Undergraduate Students who graduated with a First Class Degree from Chemistry in **2009/10**

**MARTIN BACHMAN**  
MSci Medicinal Chemistry

**EDWARD BANNISTER**  
BSc Chemistry with a European Language

**AISULU BOLATBAYEVA**  
BSc Chemistry

**ATIF ELAHI**  
MSci Chemistry

**RYAN ELLWOOD**  
MSci Chemistry

**MEETAL HIRANI**  
MSci Chemistry

**RICKY KARIA**  
BSc Chemistry with Mathematics

**JONATHAN KAY**  
MSci Chemistry with Management Studies

**OLIVER M KIRKBY**  
MSci Chemical Physics

**SACHA M NOIMARK**  
MSci Chemistry with Mathematics

**JOSHUA OWEN**  
MSci Chemistry (International Programme)

**NIKEEL PATEL**  
BSc Chemistry with Mathematics

**PREENA PATEL**  
MSci Chemistry

**DAVID PLUMMER**  
MSci Chemistry

**RIANNA POULOS**  
MSci Chemistry

**HELEN RONAN**  
MSci Chemistry (International Programme)

**CHARLES ROPER**  
BSc Chemistry

**ALEXANDRA SKLAN**  
BSc Chemistry

**RICHARD SMITH**  
MSci Chemistry

**MICHAL SOBIESKI**  
BSc Chemistry with Mathematics

**QING TEO**  
BSc Chemistry

Many congratulations go to the following Undergraduate Students who graduated with a First Class Degree from Chemistry in **2010/11**

**MATT BAKER**  
MSci Chemistry

**MARTIN BERNAT**  
MSci Chemistry (International Programme)

**MARION BROOKS-BARTLETT**  
MSci Chemistry

**THOMAS BYFIELD**  
BSc Chemistry

**TIM CLARKE**  
BSc Chemistry

**VICTORIA CLAUSEN-THUE**  
MSci Chemistry

**EMMA CORKE**  
MSci Chemistry (International Programme)

**JACK DAVIES**  
BSc Chemistry

**OGENEVO ERHERIENE-ESSI**  
BSc Chemistry

**EMILY GASCOIGNE**  
MSci Chemistry

**SAMANTHA GIBLEN-PARSONS**  
BSc Medicinal Chemistry

**LUKE HALE**  
BSc Chemistry with Mathematics

**KATARZYNA HOJCZYK**  
MSci Chemistry

**HAZEL KITCHING**  
MSci Chemistry

**JAMES LEACH**  
BSc Chemistry

**HANNAH OGAHARA**  
BSc Chemistry with a European Language

**JOSEPH OLLER**  
MSci Chemistry (International Programme)

**EDWARD PARSONS**  
MSci Chemistry

**SHARLIN PATEL**  
MSci Chemistry

**LUKE ROBBINS**  
MSci Chemistry

**BEN ROBINSON**  
MSci Chemistry

**MITAL SELARKA**  
BSc Chemistry

**SEBASTIAN SMITH**  
MSci Chemistry (International Programme)

**CHIOU TAN**  
BSc Chemical Physics

**TRANG TRAN**  
MSci Medicinal Chemistry

**MARK WHELAN**  
MSci Chemistry

**DANNIELLE WHITTAKER**  
BSc Chemistry

**ABIDA ZABIN**  
BSc Chemistry

**SITI ZAKARIA**  
BSc Chemical Physics

## MSc DEGREES (2011)

**CHIU, Ka Lo**  
MSc Materials for Energy and Environment

## PhD DEGREES (2009/10)

**DAVY ADRIAENS**  
Theoretical investigations of surface chemistry in space.  
(Supervisor: Wendy Brown)

**NEYVIS ALMORA BARRIOS**  
A computational investigation of the interaction of collagen molecule with hydroxyapatite  
(Supervisor: Nora De Leeuw)

**RAFAEL BOU MORENO**  
The design and synthesis of complexes for the activation of carbon dioxide  
(Supervisor: Jim Anderson)

**LUDOVIC BRIQUET**  
Modelling active sites of supported metal catalysts  
(Supervisor: Richard Catlow)

**KEITH BUTLER**  
Multiscale modelling of proto-zeolitic solutions  
(Supervisor: Dewi Lewis)

**STUART CALDER**  
Investigation of geometric frustration in magnetic oxides  
(Supervisor: Stephen Bramwell, Dept. Physics & Astronomy)

**DENIS COURTIER MURIAS**  
Molecular dynamics in collagen and model peptides  
(Supervisor: Abil Aliev)

**EMILY CULME-SEYMOUR**

Engineering the growth substrate for embryonic stem cell processing  
(Supervisor: Alethea Tabor)

**ZOSO DAVIES**

Application of representation theory to magnetic and structural phase transitions  
(Supervisor: Andrew Wills)

**ANTHONY DEVEY**

Computer modelling studies of mackinawite, greigite and cubic FeS  
(Supervisor: Nora De Leeuw)

**JOHN EDRIDGE**

Adsorption and desorption of model interstellar ices on a dust grain analogue surface  
(Supervisor: Wendy Brown)

**JAVIER GIL LOSTES**

A study of chemosensory effects of volatile organic compounds on humans  
(Supervisor: Michael Abraham)

**JOSEPHINE GOODALL**

Continuous hydrothermal flow synthesis of materials for UV attenuation and photocatalysis  
(Supervisor: Jawwad Darr)

**XIAOLIANG HU**

First principles studies of water and ice on oxide surfaces  
(Supervisor: Angelos Michaelides)

**FARAHJABEEN ISLAM**

The formation of molecular hydrogen in the interstellar medium  
(Supervisor: Wendy Brown)

**KIM JELFS**

Modelling the growth of zeolitic materials  
(Supervisor: Ben Slater)

**YUMIKO KATO**

Studies towards novel aldolase mimics  
(Supervisor: William Motherwell)

**OWAIN KENWAY**

Molecular dynamics simulations of complex systems including HIV-1 protease  
(Supervisor: Peter Coveney)

**HELEN KINNS**

Mapping the molecular structure of the s-layer protein SbsB  
(Supervisor: Stefan Howorka)

**CAROLINE KNAPP**

Synthesis, chemical vapour deposition and structural studies of group 13 alkoxides  
(Supervisor: Claire Carmalt)

**ELSPETH LATIMER**

Experimental studies of surface and gas-phase processes relevant to the interstellar medium and planetary atmospheres  
(Supervisor: Stephen Price)

**CHIEH LEE**

Synthetic approaches to biologically active sultones and sultonamides.  
(Supervisor: Stephen Caddick)

**SANDRA LUENGO ARRATTA**

Intramolecular Ene reactions of functionalised nitroso compounds  
(Supervisor: William Motherwell)

**MARCO MAZZEO**

Lattice-Boltzmann simulations of cerebral blood flow  
(Supervisor: Peter Coveney)

**MARK MICHEL**

Electronic structure study of copper-containing perovskites  
(Supervisor: Furio Cora)

**NICHOLAS MITCHELL**

Application of chemically modified oligonucleotides in nanopore sensing and DNA nano-biotechnology  
(Supervisor: Stefan Howorka)

**ABIGAIL NUNN**

Experimental and theoretical investigations of the photochemistry of styrene and the creation and characterisation of shaped femtosecond ultraviolet laser pulses  
(Supervisor: Helen Fielding)

**DEINIOL PRITCHARD**

Towards the total synthesis of awajanomycin  
(Supervisor: Jon Wilden)

**CHRISTOPHER RYAN**

Advances in organometallic and protein chemistry  
(Supervisor: Stephen Caddick)

**ASHKAN SALAMAT**

High pressure solid state chemistry of C-N-H and Ti-N systems  
(Supervisor: Paul McMillan)

**EngD DEGREES****(2009/10)****SREELEKHA BENNY**

High Temperature Water Gas Shift Catalysts: A Computer Modelling Study  
(Supervisor: Nora De Leeuw)

**MPhil DEGREE'S****(2009/10)****NICHOLAS CALLAN**

Towards the total synthesis of aponeocarcinostatin  
(Supervisor: Stephen Caddick)

**PhD DEGREES****(2010/11)****JENNA AHERN**

Radical hydroacylation of C-C and N-N double bonds in air  
(Supervisor: Stephen Caddick)

**NUMAAN AHMED**

Computer simulations of dipole-dipole interactions towards understanding nanostructure formation  
(Supervisor: Dewi Lewis)

**WILLIAM BISSON**

Crystal structures and magnetism in the jarosites: model kagomé antiferromagnets  
(Supervisor: Andrew Wills)

**ROSEMARY COATES**

Oxidation state ambiguities in cerium organometallics - A computational approach  
(Supervisor: Nik Kaltsoyannis)

**DOMINIK DAISENBERGER**

Transformations among Metastable Amorphous and Crystalline Forms of Silicon  
(Supervisor: Paul McMillan)

**SHEENA DUNGEY**

Modelling of gas transport in porous zeolite modified metal oxide gas sensors  
(Supervisor: Dewi Lewis)

**OLUWABUSOLA EDETANLEN-ELLIOT**

Vinyl sulfonates: A platform for novel substance of biological importance  
(Supervisor: Stephen Caddick)

**LUIS FAZENDEIRO**

Unstable periodic orbits in turbulent hydrodynamics  
(Supervisor: Peter Coveney)

**JAMES GALMAN**

Biocatalytic and organocatalytic approaches to ketodiol synthesis  
(Supervisor: Helen Hailes)

**ALEXANDER JONES**

Studies towards combined chemo-biocatalytic reactions in water  
(Supervisor: Helen Hailes)

## JASKIRANJIT KANG

Native chemical thioesterification: synthesis of peptide and protein thioesters through an N-S acyl shift (Supervisor: Derek MacMillan)

## NURJAHAN KHANOM

Evaluation of Novel Arginine Based Inhibitors of DDAH and Investigations into Radical Hydroacylation of Vinyl Sulfonates (Supervisor: Stephen Caddick)  
**JOHN KILMARTIN**  
Molecular gold clusters as precursors for heterogeneous catalysis  
Supervisor: Gopinathan Sankar

## JIRI KLIMES

Towards an accurate theoretical description of surface processes (Supervisor: Angelos Michaelides)

## ELISABETH KRIZEK

Defects in synthetic aluminium hydroxy-silicates (Supervisor: Furio Cora)

## IZABELA KRUK

Charge ordering and new electronic ground states in some early transition metal oxides (Supervisor: Mark Green)

## JESSICA LOCKYEAR

The gas phase reactivity of doubly-charged ions with neutral species (Supervisor: Stephen Price)

## SAMUEL MANN

New reactions of cyclic oxygen, nitrogen and sulfur acetal derivatives (Supervisor: Charles Marson)

## HUGH MARTIN

Molecular dynamics simulations of nucleotide translocation through  $\alpha$ -hemolysin nanopores (Supervisor: Stefan Howorka)

## JINIT MASANIA

Synthesis of tools for glycoprotein remodelling (Supervisor: Derek MacMillan)

## MATTHEW MILLS

The development of a one-pot 1,4-addition/Nitro-Mannich reaction (Supervisor: James Anderson)

## SHARMARKE MOHAMED

Computational crystal structure prediction and experimental characterisation of organic salts (Supervisor: Sarah Price)

## MEHRNOOSH OSTOVAR

Novel approaches to the synthesis of ether-containing natural products (Supervisor: Charles Marson)

## AMY POOLE

Magnetism in Frustrated Magnets revealed by Neutron Polarimetry or Symmetry, Polarimetry and Frustration (Supervisor: Andrew Wills)

## MOUSSA SEHALIA

Studies towards the total synthesis of tagetitoxin (Supervisor: Michael Porter)

## PAVEL STARKOV

Applications of boronic acids in organic synthesis (Supervisor: Tom Sheppard)

## CHI TANG

Synthetic studies towards Haouamine A (Supervisor: William Motherwell)

## EMILIA TANG

Computational studies of phosphate clusters and bioglasses (Supervisor: Nora De Leeuw)

## LAUREN TEDALDI

Novel methods in [2+2] photocycloadditions and cysteine modification (Supervisor: James Baker)

## LUANNE THOMAS

Nanoparticle synthesis for magnetic hyperthermia (Supervisor: Ivan Parkin)

## TEGAN THOMAS

Chemical vapour deposition of titanium and vanadium arsenide thin films (Supervisor: Claire Carmalt)

## KATHRYN THOMPSON

Automated production and testing of new nanoparticle photocatalysts (Supervisor: Jawwad Darr)

## EngD DEGREES

(2010/11)

### MATHEW WAUGH

The synthesis, characterisation and application of transparent conducting thin films (Supervisor: Ivan Parkin)

## MRes DEGREES

(2010/11)

### RICHARD AINSWORTH

Static first principles study of structural and mechanical properties for crystalline phosphorous pentoxide (P<sub>2</sub>O<sub>5</sub>) (Supervisor: Nora De Leeuw)

## NICOLAS CONSTANTINO

In investigation into the development of a nanowire fabrication process (Supervisor: Paul Warburton)

## SZYMON DARASZEWICZ

Modelling radiation damage in band-gap materials: extending the inelastic thermal spike model (Supervisor: Dorothy Duffy)

## RALPH LEECH

Synthesis of silver nanoparticles and their functionalisation with toluidine blue O (Supervisor: Ivan Parkin)

## JAHANGIR MALIK

A new shell-model potential for Yttrium-aluminosilicate oxides (Supervisor: Antonio Tilocca)

## ATAHL NATHANSON

Diffusion mechanisms of lithium motion in graphite (Supervisor: Neal Skipper)

## NURUZZAMAN NOOR

A novel procedure for the synthesis of fluorine-doped tin oxide films (Supervisor: Ivan Parkin)

## ISAAC SUGDEN

An investigation into carbonates: lithium batteries and boron superstructures (Supervisor: Robert Bell)

## COLIN TAYLOR

A discrete model of a spring linked chain (Supervisor: Heijden Gert Van Der)

## MARCUS TILLOTSON

Investigation into phenotypic changes to mesenchymal stem cell populations in response to roughened hydrophilic titanium surfaces (Supervisor: Peter Brett)

## WILLIAM TRAVIS

Modification of the surface chemistry of activated carbon and the effect on the materials behaviour regarding the adsorption and desorption of carbon dioxide (Supervisor: Xiao Guo)

## MPhil DEGREES

(2010/11)

### DOUGLAS LAZENBY

Spectroscopy and dynamics of autoionising and predissociating Rydberg states of NO (Supervisor: Helen Fielding)

## 2010 PRIZE WINNERS

We would also like to congratulate the following prize winners

### MARTIN BACHMAN

**Parke Davis Prize** - Excellence in Medicinal Chemistry

**Franz Sondheimer Prize** - Excellence in Organic Chemistry

**Charles Vernon Prize** - Excellence in Biological Chemistry

### LAURA FENNER

**Ramsay Medal Winner** - This award is in recognition of your outstanding achievement in winning this year's Ramsay Medal for your presentation titled "Frustration in the Itinerant Ferromagnet Fe<sub>3</sub>Sn<sub>2</sub>."

### KATARZYNA N HOJCZYK

**CK Ingold Prize** - For Excellence in Undergraduate Performance

### ANDREAS ISKRA

**CK Ingold Prize** - For Excellence in Undergraduate Performance

### JASKIRANJIT JANG

**Apley Prize** - For the best abstract for a Ph.D thesis

### OLIVER M KIRKBY

**Neil Sharp Prize** - For Excellence in theoretical (including computational) Chemistry

### JAMES A LEACH

**CK Ingold Prize** - For Excellence in Undergraduate Performance

### CONOR MCKEEVER

**CK Ingold Prize** - For Excellence in Undergraduate Performance

### SACHA M NOIMARK

**Ronald Nyholm Prize** - For Excellence in Inorganic Chemistry

**Ronald Gillespie Prize** - For best student in Inorganic/Materials Chemistry proceeding to a Ph.D. at UCL

**Tuffnell Prize** - For the best student commencing a Ph.D. in the Department of Chemistry

### CRISTINA M PANEA

**Badar Prize** - For best student commencing a Ph.D. in Organic Chemistry

### RIANNA POULOS

**Harry Poole Prize** - For Excellence in Physical Chemistry

### THANASAK SATHITWITAYAKUL

**CK Ingold Prize** - For Excellence in Undergraduate Performance

### CLAIRE V J SKIPPER

**Tuffnell Prize** - For the best student commencing a Ph.D. in the Department of Chemistry, UCL

### TRANG M TRAN

**CK Ingold Prize** - For Excellence in Undergraduate Performance

### JINGYI WANG

**CK Ingold Prize** - For Excellence in Undergraduate Performance

## 2011 PRIZE WINNERS

### MARTIN BERNAT

**Ronald Nyholm Prize** - For Excellence in Inorganic Chemistry

### VIJAY CHUDASAMA

**Ramsay Medal Winner** - This award is in recognition of your outstanding achievement in winning this year's Ramsay Medal for your presentation titled "The use of aerobic aldehyde C-H activation for the construction of C-C and C-N bonds."

### JAMES CUTHBERTSON

**Badar Prize** - For best student commencing a Ph.D. in Organic Chemistry

### VALERIO FERRACCI

**Apley Prize** - For the best abstract for a Ph.D thesis

### EMILY GASCOIGNE

**Charles Vernon Prize** - Excellence in Biological Chemistry

### KATARZYNA HOJCZYK

**Franz Sondheimer Prize** - Excellence in Organic Chemistry

### ANDREAS ISKRA

**CK Ingold Prize** - For Excellence in Undergraduate Performance

### ANDREAS KAFIZAS

**Ramsay Medal Winner** - This award is in recognition of your outstanding achievement in winning this year's Ramsay Medal for your presentation titled "Combinatorial atmospheric pressure chemical vapour deposition for optimising the functional properties of titania thin-films"

### HANNO KOSSEN

**CK Ingold Prize** - For Excellence in Undergraduate Performance

### JOE MANZI

**Ronald Gillespie Prize** - For best student in Inorganic/Materials Chemistry proceeding to a Ph.D. at UCL

### CONOR MCKEEVER

**CK Ingold Prize** - For Excellence in Undergraduate Performance

### ROHAN MERCHANT

**CK Ingold Prize** - For Excellence in Undergraduate Performance

### SASHA NOIMARK

**Tuffnell Prize** - For the best student commencing a Ph.D. in the Department of Chemistry, UCL

### LUKE ROBBINS

**Neil Sharp Prize** - For Excellence in theoretical (including computational) Chemistry

### JUTTA TOSCANO

**CK Ingold Prize** - For Excellence in Undergraduate Performance

### TRANG TRAN

**Tuffnell Prize** - For the best student commencing a Ph.D. in the Department of Chemistry, UCL

**Parke Davis Prize** - Excellence in Medicinal Chemistry

### MARK WHELAN

**Harry Poole Prize** - For Excellence in Physical Chemistry

## PUBLICATION PRIZE WINNERS (2010)

### JAMIE K. CHRISTIE

Aluminosilicate glasses as yttrium vectors for in-situ radiotherapy: understanding composition-durability effects through molecular dynamics simulations  
(Supervisor Prof. Nora de Leeuw)

### LUIS GOMEZ-HORTIGUELA

Molecular insights into the structure directing role of self-aggregating aromatic molecules in the synthesis of nanoporous aluminophosphates: a multi-level approach  
(Supervisor Prof. Claire Carmalt)

### JIRI KLIMES

Chemical Accuracy for the van der Waals functional  
(Supervisor Prof. Nora de Leeuw)

### JESSICA LOCKYEAR

The formation of  $\text{NH}^+$  following the reaction of  $\text{N}_2^{2+}$  with  $\text{H}_2$   
(Supervisor Prof. Stephen Price)

### SAVIO MONIZ

MOCVD of crystalline  $\text{Bi}_2\text{O}_3$  thin films using a single-source bismuth alkoxide precursor and their use in photodegradation of water.  
(Supervisor Dr Chris Blackman)

### DIMITRIS SARANTARIDIS

Potentiometric Detection of Model Bioaerosol Particles  
(Supervisor Prof. Stephen Price)

### MARK E. B. SMITH

Protein Modification, Bioconjugation, and Disulfide Bridging Using Bromomaleimides  
(Supervisor Prof. Stephen Caddick)

### PAVEL STARKOV

An alternative approach to Aldol Reactions: Gold-Catalyzed Formation of Boron Enolates from Alkynes  
(Supervisor Dr. Tom Sheppard)

## PUBLICATION PRIZE WINNERS (2011)

### ANDREAS KAFIZAS

A comprehensive aerosol spray method for the rapid photocatalytic grid area analysis of semiconductor photocatalyst thin films  
(Supervisor: Professor Ivan Parkin)

### XINZHENG LI

Quantum Nature of the Hydrogen Bond  
(Supervisor: Dr Angelos Michaelides)

### CIARAN MOONEY

Development of a new photoelectron spectroscopy instrument combining an elstro spray ion source and photoelectron imaging  
(Supervisor: Professor Helen Hailes)

### MATTHEW PENNELL

A General Procedure for the Synthesis of Enones via Gold-Catalyzed Meyer – Schuster Rearrangement of Propargylic Alcohols at Room Temperature.  
(Supervisor Dr. Tom Sheppard)

### STELLA VALLEJOS VARGAS

Au-nanoparticle functionalised  $\text{WO}_3$  nanoneedles and their application in high sensitivity gas sensor devices.  
(Supervisor: Dr. Chris Blackman)

### RAN YAN

One-pot Synthesis of a 125I-labeled Trifunctional Reagent for Multiscale Imaging with Optical and Nuclear Techniques.  
(Supervisor: Dr. Erik Arstad)

## I'm A Scientist, Get Me Out Of Here!

I'm A Scientist, Get Me Out Of Here is a public engagement activity sponsored by the Wellcome Trust. The scheme allows students from all across the UK to interact with real, working scientists from a variety of disciplines from astrophysics to zoology, and from computer science to chemistry.

In the latest round that took place across two weeks from 13th to 24th June 2011, there were 23 zones, each with five scientists within each one. Each zone was paired up with around eight schools, from the highlands of Scotland to the lowlands of East Anglia and beyond. The schools were able to book in live chat sessions with the scientists of their zone in advance, so that they coincided with their science lessons. During these live chats, they asked the scientists any questions that they liked. The questions were not always necessarily about science and aimed at testing the scientists, but were also about hobbies, likes and dislikes, and even their favourite food. Students were also able to submit questions to the scientists on the I'm A Scientist website, for the scientists to answer at their earliest convenience. The catch was that, during the second week of the scheme, students had to vote to save their favourite scientist, with one scientist being 'evicted' from their zone each day until there was one winner in each zone that had received the most votes over the course of the two weeks. The winner of each zone was awarded £500 from the Wellcome Trust spend on a public engagement activity of their choice.

I was lucky enough to be picked to take part as a scientist in the Energy Generation Zone, based on the fact that I am researching photocatalytic water splitting and solar energy conversion for my PhD. My zone was the only zone to have a women in it. Two of my fellow scientists were studying for their PhDs in cardiovascular medicine and biology, while the other two were well established professors of materials engineering, and mathematics and statistics. As the only chemist, the only female, and only one of six people

from all 115 scientists in the 23 zones from UCL, the pressure was on to do well. The scientists in my zone bonded quickly, as we were thrown in at the deep end with some challenging live chats early on in the first week. Although some of our questions were scientifically very challenging and completely out of our comfort zone of knowledge ('I know the Universe is expanding, but why? Where is it going?'), the students definitely appreciated the fact that we didn't know everything (even if some people did try and offer some questionable answers...!), and were reassured that scientists were actually just normal people. The questions posed to us on the website out of live chat hours were equally challenging, with students asking about our views on the eternal debate of science vs. religion. Some topics were so interesting that they were featured in an article in the Guardian about how even children have some very valid opinions on many of the ongoing political, economical and scientific debates going on globally every day.

The students were interested in what each of us was researching, and often asked challenging questions about the impact of our work, and whether it would ever have an impact on their lives. They all seemed genuinely engaged with our topics of interest, and in science generally, while it has been previously commented by the organisers of I'm A Scientist that often it is the quieter children in class that benefit most from this form of online engagement activity.

After an exhausting first week of questions, answers, and general ramblings (including the discovery by many of the men taking part in I'm A Scientist of who Edward Cullen actually is...), we were rushed into week two with backlogs of questions left to answer, and a slightly nervous feeling about the impending evictions. Although we all started off very positively, encouraging one another and reassuring everyone that it is absolutely about the taking part and not the winning, I think it is safe to say that each and every scientist was nervously F5-ing their computer screen at 3pm each day, nervously awaiting the latest eviction results. The first sad eviction was on Tuesday, with David Ingram, Professor of Computational Fluid Dynamics at Edinburgh, leaving us. On the second day it was the turn of James Marrow, Professor of Energy Materials at Oxford, which was a shock to us all as he had made a really good connection with the students. Thursday, day three of evictions, was a very shaky eviction announcement, as I was convinced that the two young men would win the hearts and votes of the students however amazingly it was Will Eborall, PhD student of biology at York, that was evicted, leaving myself and Mike Dodd, PhD student in cardiovascular medicine at Oxford, to battle it out on the last day. This was a strange feeling, as during the I'm A Scientist journey, Mike and I had become friends, and his fiancée is a fellow UCL post-graduate student.

I had always thought that the further on I went in this process of evictions and survivals, the more relaxed I would feel, knowing that I have been engaging at least some students in science, however, the closer I got to the final, the more nervous I became. I dared never entertain the possibility that I could actually beat four male scientists, and take the Energy Generation Zone crown, not only achieving something for female scientists, but for chemists and for UCL also. At 3pm on Friday 24th June, the results were announced, one zone at a time, in alphabetical order. Amazingly, I won my zone! I have a feeling that it must have been very close in each round, as we all felt very free to chat with the students, and all had something different to offer however, even though the guys were laughing at me, it appears that my science knowledge, engagement skills and knowledge about ballet and Glee paid off in the end, as I walked away with the £500 prize fund!

UCL as a whole was well represented by scientists from a range of subjects, and from the six initial UCL scientists, a post-doctoral researcher at CoMPLEX and I won our respective zones. I gained a great deal from the scheme; I have learned that students aged 12 need a very different level of terminology with which to engage with them than students that are a mere two years older. I have met other scientists from a range of disciplines, and through questions from the students, I have learned an awful lot. It was good to rope friends and family into answering questions, and I can actually give a reasonable explanation as to why the Universe is, indeed, expanding, and also how we are able to measure this! Last but not least, and certainly rather usefully considering I am currently writing my thesis, my average-

words-per-minute typing speed has definitely increased! The scheme has given me a sense of excitement about science as a whole, while also giving me invaluable experience in explaining the details of my own research to a range of audiences, while enjoying the bigger picture, and realising the potential impact of my work, and that of others carrying out their research. With regards to spending the prize money, some of my new found science friends are donating their money to schools in developing countries, in order to aid their science education. Others are investing in their own University's outreach events, and this is something that I am considering doing too. At the drinks reception held by the Wellcome Trust after the event, I was able to meet a teacher and some students from one of the schools that took part in I'm A Scientist in our zone. The teacher's feedback was very positive, and she feels that the students gained a lot from participating, so to receive this favourable feedback made my participation in the scheme even more worthwhile. I would like to thank the team at Gallomanor's IAS HQ for organising such a wonderful scheme, the Wellcome Trust for their funding for the project, my wonderful fellow IAS scientists who were a great support throughout the event, and of course the students for voting for me to win.

*Sujata Kundu  
Postgraduate Student in Chemistry*



## Chemistry and Physical Society (CPS)

For those of you who are new to the department, or do not know, the Chemical and Physical Society (CPS) is the oldest UCL student society founded in 1876. It is the social secretary for the department organised by students but the president and vice-president are traditionally members of staff.

Throughout the Autumn and Spring terms there are weekly lectures on Tuesdays at 6 pm with tea and doughnuts beforehand and wine and nibbles afterwards. This year of talks cracked off to a fiery start (pictured) with 'Bangs and Meringues II' from the ever popular Professor Sella, our resident celebrity. Another popular and thought provoking talk followed from Baroness Greenfield on consciousness and then Dr. Fred Parrett from the Society of Chemical Industry (SCI) with 'The Air We Breathe.' We are very grateful for our continued sponsorship from the SCI for without it speaker expenses, doughnuts and wine would not be possible. Another popular talk by Prof. David Nutt came, at a fortunately topical time, after his paper in the Lancet hit the news. Prof. Frank James gave us our yearly dose of science history with a talk on 'The Life and Work of Faraday' and Leonor Sierra kindly took up the gauntlet to stand in for Dr. Evan Harris to talk about her role with science and the media. Dr. Emily Peters, an alumni of the department, came with her friend Alpha Indraccolo to talk about patents and Dr. Mark Green enlightened us on nanoparticles.

Near the start of the Autumn term we had the reminder of a life outside university with the Careers Evening where an accountant, chemistry teacher, patent lawyer and a representative from The Dow Chemical Company, all with chemistry degrees, presented their careers and personal career paths.

At the end of the Autumn term is always the Christmas Quiz. Cancellation of this activity would probably cause uproar in the department judging by the demand to sign up a team. Sign-up opened in the morning and was closed with a waiting list by 12. Prof. Kaltsoyannis and Dr. Rowley did throat aching jobs as question announcers, mince pies were over ordered and anyone who could not name Dr. Rowley from his childhood photo needed their eyes testing.

The Spring term of lectures included book writers Brian Clegg with a 'History of Infinity' that left your mind whizzing and Dr. Phillip Ball with 'Unnatural: The Heretical Idea of Making People.' There were talks from some famous names like Henry Gee with 'The Unknown' and Stefan Gates with 'How to Build a TV Presenter' who conducted an amazing self-transformation.

There were topical talks on alternative energy from Julian Evans and Chris Warrick, a look at science journalism from Claire Ainsworth and a life story in the chemical industry from Dr. Ian Matthews.

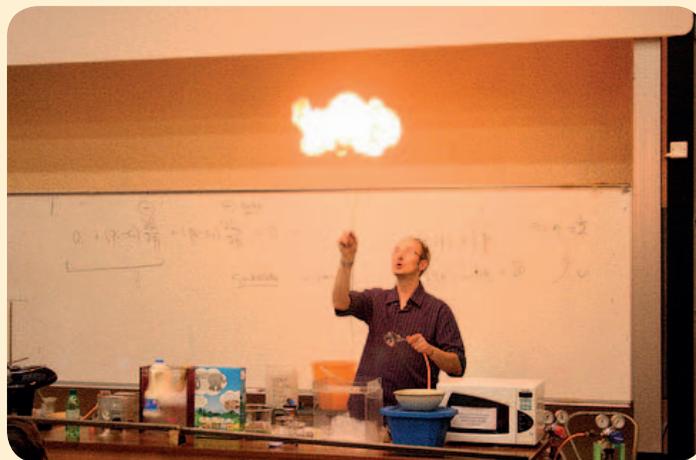
The talks ended with the Presidential Lecture, 'So Long and Thanks for all the Cheese', (on cheese) and some of Dr. Binions hand crafted samples were demolished afterwards. We must say a big thank you to Dr. Binions for his proactive leadership this year.

Events organisers have been incredibly busy this year organising pub-crawls, a curry night, ice-skating and a one off Ramsay Day that somehow brought together a cycle ride, a haggis and the Provost. Yet to come as this goes to print is the first inter-university Sports Day (please no rain) against Imperial College and the first CPS Ball. All events and talks have been enthusiastically advertised across all media and would not be possible without the whole committee (tea making very important) so everyone should congratulate themselves for a successful year.

Claire Skipper  
CPS Secretary  
2005 - 2012



A fiery start



Professor Andrea Sella's lecture on Bangs & Meringues II

## Wellcome Elements **By Dalea Larsen (1990)**

The International Year of Chemistry provides a wonderful opportunity to showcase the excitement and complexity of our subject. One of the more unusual events was an evening entitled “Elements – Kill or Cure”, co-curated by Andrea Sella and the author Hugh Aldersey-Williams, at London’s coolest public science venue, the Wellcome Collection on Euston Road.

The inspiration for the evening was Andrea’s suggestion that Wellcome should run an exhibition about mercury, and the imminent publication of Hugh’s fascinating *Periodic Tales* (Penguin 2011), a book best described as a cultural companion to the elements, which was recently featured as Radio 4’s book of the week. Together Hugh and Andrea created an evening of lectures, music, drama, street science and sci-art that attracted almost 1600 visitors in four hours..

Starting from the idea that few people encounter the elements of the periodic table directly, the evening questioned our relationship with chemistry; with elements in particular. Four elements – arsenic, mercury, iodine and oxygen – were chosen because of the sense that each might be labelled in the minds of the audience as “good” or “bad”. The intention was to try to draw out how simplistic and naïve such simple labels might be and to bring home the complexity of meaning attached to each symbol.

The evening had some fifteen strands running more or less in parallel. Nick Lane, author of “Oxygen – The Molecule that made the World” talked about the element’s role in the development of life on earth. Andrew Meharg spun a cautionary tale about arsenic in the water in Bangladesh. Martin Goodman, author of “Suffer and Survive” gave an interactive presentation on John Scott Haldane (recently profiled in Andrea Sella’s Classic Kit series <http://bit.ly/IFJxTu> in *Chemistry World*) and the self-experimentation he carried out in his quest to understand the physiology of haemoglobin.

Philip Ball used the paintings on display in the Medicine Man gallery to talk about pigments and the importance of the four elements in the development of Western art. He was aided by experts from Cornelissen’s, the pigment makers, who had a magnificent coloured display, supplemented with some spectacular specimens of cinnabar, native arsenic, and orpiment borrowed from the Natural History Museum.

As part of a long-term informal collaboration with Andrea Sella, Manchester-based artist, Antony Hall, assembled a spectacular installation in which a mercury-based automaton throbbed in the darkness, illuminated by a beam of green laser light that cast mysterious patterns onto the walls with Anthony Hardwicke of the ASE on hand to explain the chemistry.

Salisbury-based artist Henny Burnett built a four-part installation exploring how each of the four elements plays a role in lighting, through candles, fluorescents, halogens and LED’s. Antonio Torrisi was on hand with enthusiastic exegesis. Stefan Gates, presenter of the recent BBC1 series “E-Numbers” spoke thrillingly about the importance of additives and of antioxidants in particular. His video clip of his liposuction procedure that gave him enough of his own fat with which to bake a small cake resulted in one member of the audience having to be stretchered out.

In the library, historians of medicine Drs. Karin Ekholm and Andrew Cunningham treated syphilitic patients using guaiac and mercury. The patients themselves were members of the audience elaborately decorated with sores and canchres by medical make-up artist Julia Hyland. Arsenic was also put on trial in the Library – in a short play penned by Hugh A-W – where Richard Hodder and his friends from Spectrum Drama brought to life some of the more lurid cases of poisoning from the nineteenth and early twentieth centuries.

While all this was going on a team of UCL graduate students led by Andrea Sella, Graeme Hogarth, Jessica Lockyear (our stage manager and logistics coordinator) and Frederick Campbell, illustrated the properties and chemistry of iodine, oxygen,

and mercury at a series of “messy play” areas dotted about in the building. Demonstrations ranged from the classic to the more esoteric. Visitors could stare into the iodine peep show where Valerio Ferracci and Mike Parkes helped them to see the tiger stripes in the absorption spectrum of iodine, the result of vibronic coupling. They also showed the peculiar temperature dependence of the colour of toluene solutions iodine. Oscillators and clocks abounded, of course, along with the starch testing ramp, run by Charlene Hunston and Leanne Bloor. Curiously, some visitors were as interested in eating the half-cooked potatoes, rice, and couscous as they were to try out the experiments for themselves. For the first time in any art gallery, liquid oxygen was on display, Graeme Hogarth, Mike Warwick and Katharina Welsler illustrated its feral nature through the “exploding sheep experiment”, as well as showing its magnetism. Davinder Bhachu built on the classic blue bottle experiment, adding the purple, and yellow bottles as well (will we have a whole rainbow soon?).

And in the mercury area, Alex Bour, Mike Ward and Sally Fletcher talked about the weirdness of mercury, eliciting gasps and invocations of the deity when handing visitors a litre jar of the metal. Evangelista Torricelli, in full period costume, made a couple of appearances, talking about how mercury was necessary for the overthrow of the Aristotelian idea of vacuum. And demonstrator extraordinaire, Andrew Szydlo, gave a bravura display about the mysterious Jacobean submarine of Cornelis Drebbel. If anyone thought this chemistry might frighten people off, every corner of the building buzzed with excitement. Even the queues for the oxygen bar.

But with so much going on, it is a real tribute to the sangfroid of the staff at the Wellcome Collection that we were allowed to show off all this chemistry. And there’s more. Andrea and Hugh have been asked to do it again in 2012 when the focus will be the Olympic elements gold, silver, copper and tin. Keep an eye on our blog and our Facebook page. It’s going to be another winner.



Dr Graeme Hogarth dangling one of his appendages into a dewar flask of liquid nitrogen



PDRA Fredrick Campbell explaining the subtleties of oscillating reaction before a rapt audience

### CHARITY RUN BY UCL CHEMISTRY:

Charlie Dunnill, Peter Marchand, Ralph Leech, Ross Coleman, Alison Cross, Nathan Hollingsworth and Davinda Bhachu ran the Bath Half Marathon on 6th March 2011 to raise money for some fantastic charities. The event is now in its 30th year with 11,000 competitors taking part in the 13.1 mile race seen as a warm-up for elite athletes ahead of the London Marathon.

## Lab Dinner 2011

The Annual Lab Dinner was held on 26th November 2010 and was attended by 108 guests. We had a very exciting lecture given by Professor Andrea Sella on "Classic kit; a partial history of practically nothing", which was based on his regular articles in Chemistry World. The toast to The Lab was proposed by Professor Robin Clark, who spoke of the careers of Rutherford and Raman. Guests were unaware of the chaos caused behind the scenes due to the student protests and once again the dinner turned out to be a thoroughly enjoyable experience.

**We hope that many of you will come to this year's dinner, which is being held on Friday 25th November 2011.** The speaker will be Dr Mike Johnson who came to the department as an ICI Fellow and was appointed to the staff in 1961. Many students will remember him as Senior Treasurer of the Students' Union and Warden of both Max Rayne and Ifor Evans Halls. He retired in 1984 to pursue his other interests, particularly in play-writing.

The dinner is preceded as usual by the Thomas Graham Lecture of the Royal Society of Chemistry, which this year is being given by Professor David Phillips O.B.E., of Imperial College, who is the current President of the RSC. His talk is entitled "Prosperity through Chemistry".

More information and an application form to attend this event can be found on-line at [http://www.ucl.ac.uk/chemistry/alumni/lab\\_dinner](http://www.ucl.ac.uk/chemistry/alumni/lab_dinner)

## In Memoriam Sayed Assem 1932–2009



Sayed Assem gained a PhD in medicine from UCL in 1964, and subsequently triple FRCP qualifications (London, Glasgow and Edinburgh). Wellcome Research Fellowships held in the Pharmacology Department led on to an academic career there; he was made a Reader in Immunopharmacology in 1993, Emeritus Reader in Immunopharmacology in 1997.

Sayed continued his clinical and research work as an honorary member of the UCL Departments of Chemistry and Neuroscience, Pharmacology and Physiology. He was a founder member of the International Journal of Immunopharmacology and of the UK Egyptian Medical Society.

The role of histamine receptors and histamine release in allergies and inflammation permeated Sayed's research, early work in collaboration with Heinz Schild disclosing physiological regulators of histamine release; later, Sayed showed the pivotal role of cyclic AMP as a second messenger in the inhibition of histamine release. He developed sensitive and reliable methods for detection, and in some instances, prevention of life-threatening reactions to drugs.

Sayed's research collaborations with the Chemistry Department created a unique bridge between the two sciences of Chemistry and Pharmacology. Sayed studied inhibitors of enzymes that modify chromatin for the potential treatment of asthma and colitis. His own benchwork was characterised by rigour of design and analytical precision. His efforts contributed to UCL's world renown in histamine research, being continued in part by evaluation of new modulators of the latest receptor to be discovered, H4R.

Sayed's unusually wide knowledge of pharmacology and medicine, and his unquenchable enthusiasm made him a respected colleague and a good friend to many, always ready to help. He was active in research to the end, and even found time to learn Spanish.

He died on September 13, 2009, and is survived by his wife, Anna, and their sons Ahmed and Osama.

By Charles Marson

## Calling all Alumni

We would love to hear about your career and life since leaving UCL, with a view to possibly including your story in the next Newsletter.

If you would be willing to write a piece for the next Newsletter, please contact, **Nicola Best** via email: [n.best@ucl.ac.uk](mailto:n.best@ucl.ac.uk) with subject heading "Newsletter Alumni".

## Alumni Highlight

During the first year of my PhD I used to conduct tours for groups of prospective UCL chemistry undergraduates. On one occasion, I conducted a one-on-one tour with a young lady who was interested in joining the Department. She was given a comprehensive tour including an in-depth description of how King's College undergraduates used to "nick" Jeremy Bentham's head and kick it round the quod. This pastime was described with much detail and glee. At the end of the tour I asked her what was her name. She said she was Ms Bentham, and Jeremy was her great-great grandfather! Needless to say, she went to Cambridge.

Romano Giorgi  
BSc Chem 1993—1996  
Ph.D 1996 –2000

## Unveiling of English Heritage blue plaque honouring Sir William Ramsay

An exciting day in which UCL Chemistry celebrated the achievements of Sir William Ramsay, who completed the periodic table through his discovery of the final inert gases, for which he was awarded the Nobel Prize in 1904.

The event started with the unveiling of an English Heritage plaque at his home in Notting Hill, as commemorated on the English Heritage website.

Then a cycle ride to UCL, not attempting to beat his own record of under 20 minutes door to door. Then a series of presentations, including Prof Alwyn Davies (UCL) "The man, the myth and the bicycle", Dr Neil Todd (Manchester) "Ramsay, Rutherford and Radioactivity"; Prof Bill Brook (Leicester) "Victorian Scientists from the wrong side of the park". Finally, a reception at UCL Chemistry, involving bagpipes and a haggis in noble (gases) and Nobel (prize) memory of Sir William, with a memorably delivered address to the haggis. There is now a new link on the chemistry website that details the connection of various Nobel Laureates (six) who have worked or been strongly associated with the chemistry department at UCL. A number of them were connected one way and another with Ramsay.



Prof Alwyn Davies FRS unveils the blue plaque with Baroness Andrews, Chair of English Heritages Commission

## Ramsay Day Never too late for a Plaque

William Ramsay is one of the patron saints of the department. Although our labs are no longer named after him (how many still remember the time when were housed in the Ramsay and Foster laboratories?), Ramsay is the man who more than any other (pace Thomas Graham, Frederick Donnan and Christopher Ingold) is the UCL chemist most likely to be remembered by the general public.

In 1994, for the centenary of the discovery of argon, the RSC organized a symposium on noble gas chemistry in the department. And in the run up to 2004, the centenary of Ramsay's Nobel Prize, Andrea Sella and Alwyn Davies wondered whether there we could erect a more permanent memorial to the man who completed the periodic table, and whose work led others in strange and unimaginable directions, from the

superconductivity that energizes our MRI magnets, to the lasers we use in supermarkets and surgery, and deep into the bowels of the atomic nucleus.

In addition to arranging for an RSC Chemical Heritage plaque to be placed in the Slade School of Art, site of Ramsay's old labs, in early 2003, Andrea and Alwyn also submitted a proposal to English Heritage for the erection of a Blue Plaque to his memory on the fine four storied house in Notting Hill - at 12 Arundel Gardens W11 into which Ramsay and his wife moved shortly after their arrival in London in 1887. At the time, Ramsay wrote enthusiastically to his sister "*I go to town on a bicycle! Right along the Bayswater Road to Oxford Street and to Gower Street. This morning I was at College in eighteen minutes from the house.*" If cycling to work seems something of a no brainer in these days of crowded public transport and congestion charging in Central London, it is worth bearing in mind that the "safety bicycle" (so called to distinguish it from the rather more sporting pennyfarthing) had only just been invented and Dunlop's inflatable tyres would not come into existence until the following year. On the cobbled roads of London, it would have been a ferociously bumpy ride - l'enfer de Notting Hill, as cycling enthusiast Dave Rowley terms it. It shows Ramsay to have been at the cutting edge of both science and cycling technology. Given the time he reported, he must have been a pretty fit. Lycra was almost a century away - the ride would have been in tie, flannels and brogues, with no more than a change of collar at the end of the journey.

It took English Heritage seven years to accept the proposal and a date was chosen in 2011 to coincide with the International Year of Chemistry.

Alwyn accompanied the unveiling with a small exhibit of Ramsay memorabilia in the foyer, including a portrait of Ramsay dating from his cycling days, the blowpipe he used for glassblowing, a number of small ampoules of the gases that Ramsay isolated, and Ramsay's dinner book, open to the page where Dimitri Mendeleev signed his name.

February 11th dawned with an interview with Andrea, on Radio 4's Today Programme, about Ramsay and his significance. Two short videos were

filmed one for the BBC website (<http://bbc.in/f2INa3>) and on the BBC's One Show, for which a mock up of Ramsay's experiment was constructed including the "Ramsay Burner" that made the isolation of argon possible in the first place.

The plaque was unveiled on a prematurely warm and gloriously sunny February afternoon by Alwyn and Baroness Andrews of Southover, Chief Executive of English Heritage. The fanfare provided by a lone but joyously raucous piper drew an enthusiastic crowd of onlookers. With the formalities over, Andrea and twenty intrepid cyclists then set out together to retrace Ramsay's route, pausing to point out the former homes of contemporary neighbours - William Crookes, James Clerk Maxwell, and Edward Frankland, and gazing with stunned disappointment at the site of the Royal College of Chemistry in Oxford Street (now a branch of Next). A time of 43 minutes was recorded, a testament to the number of traffic lights along the way, and the number of stationary buses on Oxford Street. A map of the route is available online (<http://bit.ly/j3pnSQ>)

Back at UCL, Alwyn gave a short talk on "Ramsay: The Man, The Myth, and The Bicycle" which outlined Ramsay's career, from his youth in Glasgow to the heady days of discovery in London, and drew out the significance of his discoveries. Alwyn also sketched out the richness of Ramsay's talents as a poet and composer.

Dr Neil Todd from the University of Manchester gave a fascinating talk on the relationship between Ramsay and Rutherford. If traditional histories see their relationship as having been tense and tetchy, Dr Todd's talk gave a more nuanced view, pointing out the essential role that Ramsay played in Rutherford's unpicking of the puzzle of radioactivity. Because history is written by the victors - physicists in this case - the accounts in textbooks always focus on the clinching parts of the apparatus and not on the crucially important "back-office" operations. It was Ramsay's development of vacuum line methods using Sprengel and especially the Töpler pumps, of which he sent at least two to Rutherford, that was crucial to the latter's success, by providing the technology for separating and purifying the radioactive materials, particularly helium and radon. More chillingly, Todd also alluded to the trail of mercury and radioactivity that Rutherford and his co-workers left behind in the labs in which they worked, and suggesting that there might be surprises lurking in Ramsay's old labs.

Finally, Prof Bill Brock (UCL 1959) gave an account of the personalities active in science who lived in the area north of Kensington Gardens. In addition to Crookes and Frankland, Brock also spoke of Norman Lockyer, who with Janssen is credited with having observed helium in the spectrum of the sun.

It was a tremendous afternoon and after the exertions, physical and intellectual the audience, some ninety strong, retired to the Nyholm Room for refreshment. At 6pm, Malcolm Grant, UCL's Provost, arrived bearing the haggis, to the accompaniment of more pipes. The haggis was addressed in dramatically autochthonous style by Edgar Anderson, and the assembled company fell upon it with enthusiasm.

By Dalea Larsen (1990)

• **Professor Robin Clark** CNZM FRS, Sir William Ramsay Professor Emeritus, UCL, gave the University of Canterbury's premier biennial lecture, the Rutherford Lecture, in the Town Hall, Christchurch, New Zealand, on "Raman's legacy: Spectroscopy in the Cause of Art and Archaeology" on 29 September 2010. The lecture was to celebrate the 80th anniversary of the award to C. V Raman of the Nobel Prize for Physics for 1930, Raman having been nominated by (among others) Rutherford. The lecture was also given at the University of Otago, Dunedin, New Zealand, on 1 October 2010.

• **Professor Robin Clark** was elected in 2010 an International Member of the American Philosophical Society. This is the oldest and most distinguished learned society in the USA, based in Philadelphia, having been founded by Benjamin Franklin in 1743. It has c. 800 Resident Members and 168 International Members. It differs from the US National Academy of Sciences in that it is very widely based, having five Divisions, 1. Mathematical and Physical Sciences, 2. Biological Sciences,

3. Social Sciences, 4. Humanities, 5. The Arts, Professions, and Leaders in Public and Private Affairs. Only 1 or 2 persons are elected International Members each year in each division (8 in total this year, 5 in total last year). Professor Clark was elected via Division 1, and is thought to be the first UCL chemist ever elected.

• **Professor Robin Clark** gave the RSNZ Distinguished Speaker Series of lectures throughout NZ in 2011 (at Auckland, Hamilton, Wellington and Nelson).

3. List of Distinctions, Public and Named Lectures for R.J.H. Clark

• Professor Robin Clark received the Minerva medal and gave the annual Minerva Lecture of the Worshipful Company of Scientific Instrument Makers on "Raman's Legacy: Spectroscopy in the Cause of Art and Archaeology", at the Glaziers' Hall, London on 18 January 2011.

• Professor Robin Clark gave the annual Waitangi Day Address on "The Royal Society, its Fellows, and the Scientific Foundation of New Zealand", at St. Lawrence Jewry-next-Guildhall, City of London, on 3 February, 2011.

• Professor Robin Clark was appointed Royal Society of New Zealand Distinguished Lecturer for the year 2011. He gave Public Lectures in March/April 2011 at Auckland (audience 480), Wellington (audience 420), Hamilton and Nelson on "Rutherford, Raman, and the Scientific Investigation of Art and Archaeology".

• Professor Robin Clark officially opened "The Art of Science" exhibition at the NZ National Portrait Gallery in Wellington, being introduced by Sir Michael Hardie-Boys, former Governor-General of New Zealand. The exhibition consists of a collection of 55 portraits of distinguished NZ scientists, led by its three Nobel Laureates (Ernest Rutherford 1908, Maurice Wilkins 1962, and Alan MacDiarmid 2000), its Fields Medallist (Vaughan Jones 1990), and former Presidents of the Royal Society of New Zealand (founded 1867).

• Professor Robin Clark gave a radio interview to Chris Laidlaw, former NZ Rhodes Scholar, All Black, MP and Ambassador, and other interviews to Rebecca Livingstone (The Listener) and Melody Thomas (the NZ Press Association) in April 2011.

## UCL Chemistry in Parliament

**Dr Therese (Tiz) Coffey BSc (1993) PhD (1997) Member of Parliament for Sussex Coastal**

Chemists rarely get involved with politics but when they do they tend to have a big impact. The father of modern chemistry, Antoine-Laurent Lavoisier, led the way realising for the first time that Cavendish's "flammable air" was in fact a mixture of hydrogen and oxygen and putting together the first extensive list of the elements, while also being a prominent member of the French government. Eleanor Ceauşescu is another who tried the combination purportedly being both a researcher at the Romanian National Institute for Chemical Research and a member of the Politburo of the Romanian Communist Party. Closer to home, Professor Jack Lewis FRS (Baron Lewis of Newnham) a member of the department from 1957-62, currently serves in the House of Lords, while Dr Brian Iddon was a Reader in the Chemistry Department at the University of Salford before entering Parliament in 1997 and serving until 2010. However, probably the best known example in the UK is that of Margaret Roberts who went from studying Chemistry at Somerville College, Oxford, carrying out Part 2 work under the supervision of Nobel Laureate, Professor Dorothy Hodgkin becoming the UK's first female Prime Minister. Alas keeping up a dual scientific and political career can be a difficult task. Baroness Thatcher was famously betrayed by her cabinet in 1990 and after 11 years in power was unceremoniously shunted into the sidings. A worse fate awaited both Ceauşescu and Lavoisier. After the Romanian Revolution the former faced a show trial and was executed by firing squad on Xmas day 1989, while on 8th May 1794 at the height of his powers Lavoisier fell victim to the guillotine. Fast forward some 216 years and May 6th 2010 will go down in the history books as the day New Labour died and the new modern politics of coalition government were born. Locally the day has a special significance as it will be recognised as the first time a member of the lab graduated to the hallowed heights of the Houses of Parliament.

Therese (Tiz) Coffey came to the department as a second year undergraduate in 1992 after taking A levels at St Mary's College, Crosby and a short stay at Somerville College, Oxford. It was clear from the outset that she was a bright and very determined student. I first met Tiz while acting as her year 2 inorganic tutor and can still remember her badgering me to explain Latimer diagrams and Mooser-Pearson plots. Both were taught by Dr Steve Best, who most undergraduates found very difficult to follow - what they didn't realise was that the same applied to most staff and a few external examiners to boot! I'm pretty sure I managed to stall her regarding the Mooser-Pearson plots which thankfully disappeared from the syllabus soon after. Tiz soon made many friends at UCL becoming a stalwart of the UCL Conservative Society and the Chemical and Physical Society famously taking the visiting Professor Harry Gray on a wild night out in the Union during his stay in the department as Gillespie Lecturer. She still stuck with her academic studies, graduating in 1993 with an upper second class degree in Chemistry (it should have been a first I hear you cry - remember these were the days when 69.9 was 69.9). Having carried out a final year project under my supervision (co-supervised by Glyn Forster) which culminated in two publications (Chem. Commun., 1993, 1524 and Polyhedron, 1993, 12, 2741) I was delighted when she agreed to stay on for a PhD. The topic of her PhD closely mirrored that of her UG project centring on attempts to develop molybdenum-imido ( $\text{Mo}\equiv\text{NR}$ ) complexes as nitrene transfer agents akin to the way related metal-oxo species act as catalysts for the conversion of alkenes into epoxides. It was clearly a big ask and some 20 years later this remains a topical problem for organic and inorganic chemists. We chose dithiocarbamates ( $\text{S}_2\text{CNR}_2$ ) as cheap and versatile co-ligands and this spawned a long term research interest that is still active within my group and through collaboration with Dr James Wilton-Ely, one-time Ramsay Fellow at UCL and now a lecturer at Imperial College. Tiz and Glyn Foster found that the dithiocarbamates were not always non-innocent as publication on molybdenum-disulfide ( $\text{S}_2$ ) and thionitrosyl (NS) complexes will attest. In a seminal piece of work Tiz (Dalton Trans., 1999, 4519) was also able to identify that structures of anticipated nitrene-transfer agents  $[\text{Mo}(\text{NR})_2(\text{S}_2\text{CNR}_2)_2]$  were highly dependent upon the nature of the imido-substituent - being either both linear or with one being bent (localised  $\text{sp}^2$ ) and the second bent. Since in solution even at low temperatures the linear and bent bonding modes interconverted rapidly on the NMR timescale we resorted to extensive use of X-ray crystallography and solid-state  $^{13}\text{C}$  NMR spectroscopy to differentiate these structural types, anticipating (correctly) that the linear-bent variety would be far more reactive. In all Tiz was a co-author on nine papers most of which are well-cited. During her time in the lab she made extensive use of the dry-box as many of the imido complexes were readily hydrolysed in air (to the metal oxide and amine). Always one to push things to the limit, on a cold February afternoon in 1997 Tiz carried out the now infamous dry-box destruction experiment. To this day I occasionally wake up in a cold sweat with visions of students running in and out of Andrea Sella's office (then next to mine) while attempting to suggest to me that life was going on as normal. Nearly 15 years later my then pride and joy, a two-man Vacuum Atmospheres dry-box with build in  $-30^\circ\text{C}$  freezer, still doesn't function properly as our new University Research Fellow Dr Mark Crimmin can attest.



Towards the end of her PhD it was clear that Tiz was planning a career away from Chemistry. Since her youth she had been a member of the Conservative Party and at UCL had been a very active member of the Young Conservatives. While working in the marketing department of Mars, rising to Finance Director for Mars Drinks UK, she unsuccessfully contested seats for both the UK and European Parliaments. Never one to give up, in early 2010 she was selected as Conservative candidate for the Suffolk Coastal seat previously held by John Gummer (now Baron Deben) which brings us back to May 6th 2010 when she gained 46.4% of the vote (note all you AV supporters) to become a Member of Parliament. One of her first acts in the house was to sign an Early Day Motion requesting a knighthood for Kenny Dalglish, leaving no doubt about the colour of the wallpaper in her family home in Formby. A number of us from the department met Tiz recently at the RSC launch of the International Year of Chemistry at the Houses of Parliament. Having not seen her for almost a decade I can honestly say that she hasn't changed a bit. She is still as welcoming, boisterous and outspoken as I remember her as a student. She has tremendous energy and enthusiasm and I'm sure she will be a great asset to the democratic process of the country. She certainly doesn't plan to melt into the background as the plum purple suit she is rapidly becoming famous for will attest. And there we come full circle again as I am reminded of William Perkin's heroic efforts in extracting mauveine dye from coal tar in a hut in his garden in East London (in order to keep the discovery secret from Hofmann).

By Graeme Hogarth

## The Case of the Poisonous Socks: Tales from Chemistry

We are delighted to announce the publication of a new book by one of our Alumni; the distinguished historian of chemistry William (Bill) Brock. Some of you will remember his masterly lecture on William Crookes and his talk last year at our Ramsay Blue Plaque celebrations.

Born in Brighton, Bill won a scholarship to read Chemistry at UCL in 1956. While at UCL his interests turned away from the laboratory bench to the history of chemistry. On graduating in 1959 moved to Leicester where he spent most of his career eventually becoming Emeritus Professor.

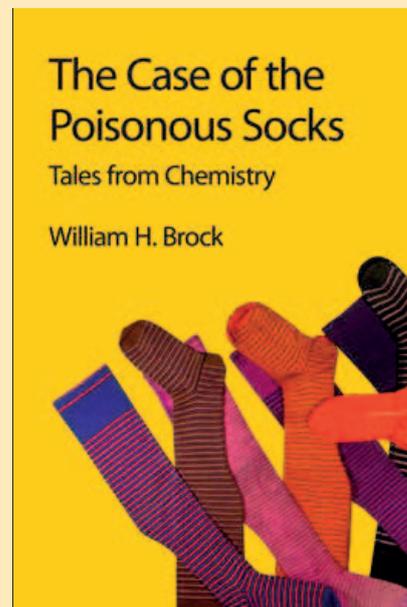
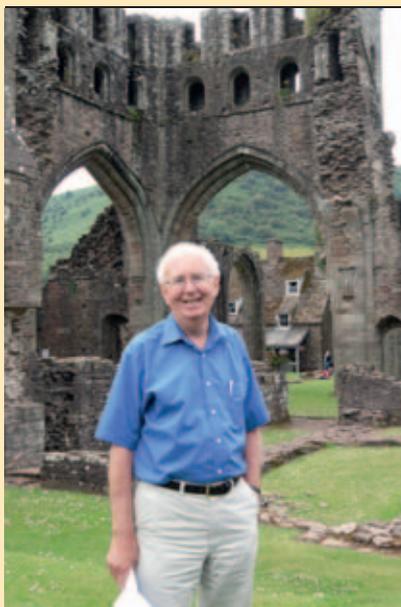
Bill is well known for writing the "Norton/Fontana History of Chemistry" as well as biographies of three notable chemists of the nineteenth century: Crookes, Liebig and Prout. The latter's famous hypothesis that atomic weights were multiples of hydrogen led directly to Ramsay's discovery of the noble gases. Bill's wide interests in the development of 19th century science and its social history as well as of scientific education have led to some 12 books and over 100 papers.

His latest work "The Case of the Poisonous Socks: Tales from Chemistry" tells of how in 1868, The Times reported that poisons contained in dyes were affecting the public's health. A doctor informed a London magistrate that brilliantly coloured socks had caused severe "constitutional and local complaint" to several of his patients. In one case, a patient's foot had become so swollen that his boots had to be cut off. William Crookes, one of the most famous chemists of the day, offered to identify the poison if doctors would send him samples of the deadly socks. The story of how he solved the mystery gives this book its title and forms the basis of the first chapter.

The book is a collection of essays containing 43 tales of chemists and their discoveries from the nineteenth and twentieth centuries. Other topics covered include: the life and chemical adventures of Hilda Ingold, the quirky beliefs of American philanthropist, Thomas Hodgkins the development of the chemical laboratory since the 1830s, and the career of C.P. Snow before he became a novelist.

Its broad coverage and modern approach makes it of interest to chemists, teachers, historians and laypeople with an interest in science. Written with a light style and presented in a series of unconnected vignettes the book gives unconventional and thought-provoking insights into chemistry and its development. Something for the chemist who has everything perhaps?

By Nicola Best



## New Lecturers in Experimental Chemistry



**Matthew W. Powner** obtained his MChem in chemistry and PhD at the University of Manchester, where he worked with Prof. John. D. Sutherland exploring the generational complexity of the canonical pyrimidine ribonucleotides. He continued his research at Manchester as an EPSRC research fellow, before moving to the laboratory of Prof. Jack W. Szostak at Harvard Medical School and Massachusetts General Hospital, first as a Harvard Research Fellow and then a Howard Hughes Medical Institute research associate. In 2011 he was appointed Lecturer of Chemistry at University College

London. His research interests include pH-controlled reactivity, multicomponent reactions and the chemical origins of life. Previously, he has investigated the photochemical reactivity and stability of nucleotides and the chemoselectivity of electrophilic triple bonds (including the selectivity of aqueous Michael reactions and intramolecular nitrile activation). He has developed novel azole, phosphoryl-, and acyl-transfer cascades and chemical syntheses mediated and controlled by general acid-base catalysis. He is also interested in the chemical and physical properties with regards to isolation, delivery, separation, and enantiomeric and diastereomeric resolution. In 2011 he was awarded the ISSOL Stanley Miller Award, for his contributions to understanding the chemical origins of life.



**Dr Robert Palgrave's** research is in solid state chemistry, focussing on functional oxide materials, epitaxial thin films, electronic structure determination and surface characterisation using techniques such as X-ray photoelectron spectroscopy. Epitaxial thin films offer a very useful way to investigate a wide range of materials properties because they are highly crystallographically orientated, and have well defined interfaces and surfaces. By studying these samples, new insight can be gained into properties such as conductivity (electronic and ionic), electronic structure, surface

reactivity, etc. Not only can existing materials be studied, but entirely new materials can be constructed by assembling different epitaxial layers on top of one another. This type of controlled synthesis is guided by crystal chemistry and results in superlattices and artificial solids with properties unlike materials produced through traditional means.

Robert has previously studied epitaxial films using Molecular Beam Epitaxy (MBE) and Pulsed Laser Deposition (PLD), and combined this with electronic structure determination using XPS, depth profiling using SIMS, and a range of other techniques to investigate functional materials such as photocatalysts, mixed ionic/electronic conductors, and magnetic materials. At UCL Robert is looking forward to developing new chemical routes to synthesise epitaxial films and using them to study advanced photocatalytic materials which have applications in solar energy capture and depollution.



**Christoph G. Salzmann** has joined the Department as a Royal Society University Research Fellow and Lecturer in Physical Chemistry. He received his PhD with highest distinction in 2004 from the University of Innsbruck, Austria. After postdoctoral positions with John L. Finney (UCL) and Malcolm L. H. Green (Oxford), he continued his work in Oxford as an APART research fellow (Austrian Academy of Sciences). In 2010, he moved to the Chemistry Department at Durham University to take up a temporary lectureship.

Christoph's research interests are rooted in Physical and Materials Chemistry with a focus on the structure and dynamics of molecular solids, glasses and amorphous solids, and the chemistry of the carbon nanomaterials. Recent research highlights included the discovery of three new phases of ice, named ices XIII, XIV and XV, the preparation of a new graphene nanomaterial and the development of a new kind of dispersing agent for carbon nanotubes in water which does not rely on hydrophobic interactions between the dispersing agent and the tubes.

Future work of his group at UCL will explore the dynamics and chemistry of the various solid forms of water at low temperatures. This will include the matrix isolation of hydrophobic molecules in amorphous ice, protonation reactions in amorphous ice

and the preparation of new metastable materials from hyperquenched aqueous solutions. Work on the carbon nanomaterials will be concerned with the development of new and smart dispersing agents, fundamental studies into the chemistry of graphene and the development of new strategies for the controlled assembly of the various carbon nanomaterials into defined nanoarchitectures.

## New Starters



### Miss Nicola Best

EA to the Head of Department, From University College London (UCL), Department of Electronic and Electrical Engineering



### Dr Jorg Sassmannshausen

Computing Officer, From the University of Strathclyde, Department of Pure and Applied Chemistry

## Leavers

### Adam McKay

RCUK Research Fellow – Now working within the Financial Services

### Russell Binions

RS Dorothy Hodgkin Research Fellow – Taken up a lectureship at Queen Mary's University London (QMUL)

### Mark Crimmin

Rural Society University Research Fellow – Taken up a lectureship at Imperial College (IC)

### Roy Northeast

Workshop  
Retiring after 39 year's service

### Madiha Sajid

Administrator  
Returning to Pakistan to be with her family

## Fellowships

### Martijn Zwinjenberg

EPSRC CA Fellow  
Materials and Inorganic Chemistry

### Andrew Kerridge

EPSRC Career Acceleration Award

### Charlie Dunnill

Ramsay Fellow

### David Scanlon

Ramsay Fellow

### Christoph Salzmann

Royal Society Fellowship

### Professor Richard Catlow

has been elected an **Honorary Fellow** of the Chemical Research Society of India.

**Professor David Crich**, a former member of the Department, has been awarded an **Arthur C. Cope Scholar Award** of the ACS for his contributions to methodology development and mechanistic investigation in the fields of synthetic carbohydrate and free-radical chemistry. He is currently director of the Institut de Chimie des Substances Naturelles (ICSN).

**Athena SWAN:** The Chemistry Department is currently aiming to get a **Silver Athena SWAN award** for good practice in supporting academic women. This award recognises the good practices already in place for supporting women at all stages, including undergraduate, post graduate, post doctoral, and early career academic through to professorial level.

## Promotions

### Promotion to Professor

#### Helen Hailes

Professor in Chemical Biology



#### Research areas of interest include:

- Biocatalysis and chemoenzymatic synthesis
- PI 3-kinase and PKB activators and inhibitors
- Non-viral gene therapy
- Calixarenes and tuberculosis therapies
- Design and synthesis of novel hydrogen-bonded arrays
- Novel signalling molecules
- Organic synthesis in water

#### Jawwad Darr

Professor in Materials and Inorganic Chemistry



#### Research areas of interest include:

- Research areas of interest include:
- Continuous Hydrothermal flow Synthesis
- Nanoceramics
- High Throughput Inorganic Materials Discovery
- Biomaterials
- Scale-up
- Supercritical fluids

#### Andrea Sella

(EPSRC Senior Media Fellow)  
Professor in Materials and Inorganic Chemistry



#### Research areas of interest include:

- Lanthanides
- Early transition metals
- Structure and bonding
- Polymerization catalysis
- Nanostructured materials
- Chemical Demonstrations
- Classic Kit (external link)

### Promotion to Reader

#### Furio Cora

Reader in Computational Chemistry



#### Research areas of interest include:

- Computational solid state chemistry
- Transition metal oxides
- Functional materials
- Zeolites and AlPOs
- Surface Chemistry and Catalysis

#### Derek MacMillan

Reader in Organic Chemistry and Chemical Biology



#### Research areas of interest include:

- Organic Synthesis
- Carbohydrate and glycopeptide chemistry
- Peptide and protein synthesis
- Engineering and directed evolution of proteins
- New Appointments

### Provosts Teaching Award 2011

The excellence of teaching in the Department of Chemistry has been recognised again by UCL with **Dr Chris Blackman** receiving a 'beginning of academic career' Provosts Teaching Award, the fifth award in the five years the scheme has been running.

The Provost's Teaching Awards recognise and reward UCL colleagues who are making outstanding contributions to the learning experience and success of our students.

**They also demonstrate UCL's commitment to:**

- improving teaching, learning and assessment as an ongoing process;
- highlighting and rewarding achievements which support teaching and learning;
- attracting and retaining world-class staff.

Each year Deans, in consultation with Heads of Departments, are invited to nominate staff for the Provost's Teaching Awards. The scheme is run by Professor Michael Worton, Vice-Provost (Academic and International) in collaboration with the UCL Centre for the Advancement of Learning and Teaching and the HR Division.

Previous winners include Dr Mike Porter, Dr David Rowley and Professor Andrea Sella.



## 20 years progress in Organic Crystal Structure Prediction Professor Sarah (Sally) Price

Crystallisation is not always a simple, reproducible experiment. When Abbott Laboratories lost their ability to manufacture the anti-HIV drug ritonavir in 1996 because of the sudden appearance of a previously unknown much less soluble crystalline form in all their production facilities, this brought our inability to control crystallisation due to polymorphism to the world's attention. More recently, the problem of crystallisation occurring in the transdermal patches of rotigotine, a treatment for Parkinson's disease, has shown that despite the huge progress that has been made in the field of the organic solid state since the ritonavir crisis, understanding crystallisation as a simple form of self-assembly is indeed worthy of being one the Grand Challenges in Chemistry.

When **Sarah (Sally) Price** joined UCL Chemistry in 1989, she was already expecting her second child, and at **Richard Catlow's** instigation spent some of her maternity leave writing a grant proposal to develop a computer code capable of modelling organic crystal structures using anisotropic atom-atom potentials to model lone pair and  $\pi$ -electron density. The aim then was just to be able to predict, prior to synthesis, whether a molecule would crystallise with the desired physical properties, for aiding the design of novel organic non-linear optical, conducting or energetic materials. **Maurice Leslie** helped **Dave Willock** and **David Coombes** adapt an inorganic atomistic modelling code to rigid organic molecules. This code, now licensed by UCLB as DMACRYS, has been expanded in functionality over the decades, with Maurice helping **John Mitchell**, **Gareth Welch** and **Alston Misquitta** incorporate increasingly better models for the intermolecular forces, and **Graeme Day** adding the ability to approximate mechanical properties and phonon spectra. Graeme's relationship with **Aileen Gray** (now Day) survived the comparison of his lattice dynamics with her Molecular Dynamics estimates of the vibrational frequencies of two molecular crystals. Although DMACRYS only models rigid molecules, **Panos Karamertzanis** has coupled it with GAUSSIAN, a molecular ab initio code, to treat molecular flexibility and so we can now study flexible pharmaceuticals, albeit using huge amounts of computer time. E-science projects with UCL Computer Science enable us to do preliminary searches for possible crystal structures overnight, using the spare processing capacity of the undergraduate teaching PCs.

As soon as we had the capability of generating a range of potential crystal structures, it became clear that for most molecules there are many more putative crystal structures within the few kJ mol<sup>-1</sup> energy difference associated with polymorphism than observed polymorphs.

Most published structures are those of the first crystal grown that is suitable for study by X-ray diffraction. Thus started the collaboration with **Derek Tocher**, with many joint final year project students and PhD students, such as **Tom Lewis** and **Ashley Hulme**, calculating the crystal energy landscape and trying to grow crystals of new polymorphs. The opportunity to cover more of the interdisciplinary range of experiments needed to probe polymorphism and validate the computational predictions came with the Basic Technology program of the Research Councils UK. The initial Control and Prediction of the Organic Solid State (CPOSS [www.cposs.org.uk](http://www.cposs.org.uk)) project 2004-2008 involved nine investigators over seven institutions, including **Kenneth Harris** (Birmingham/Cardiff) and **Maryjane Tremayne** (Birmingham), funding ten positions. We were fortunate many other academic and industrial research scientists were willing to collaborate, including **Martin Vickers** with powder patterns and **Colin Bedford** doing some custom synthesis, when it proved that we weren't able to buy in all the molecules we wanted for the automated solution crystallisation screening by CPOSS's new robotic platform in Strathclyde's Pharmaceutical Sciences. **Louise Price** coordinated the project, sending information, people and non-descript powders around the country, as **Sarah Barnett** and **Harriott Nowell** tried to use the most appropriate diffraction experiment to characterise samples beyond local capabilities, as well as organising meetings, multi-disciplinary papers and the curation of vast amounts of data. Now that CPOSS is funded for Knowledge Transfer, Louise calculates crystal energy landscapes

for various academic and industrial collaborators. This is part of developing the calculations as a complementary tool to experimental screening for finding the range of crystal forms to allow choice of optimal physical properties.

Joint computational and experimental screening includes Doris Braun's work on hydrates, **Nizar Issa's** on cocrystals (Fig 1),

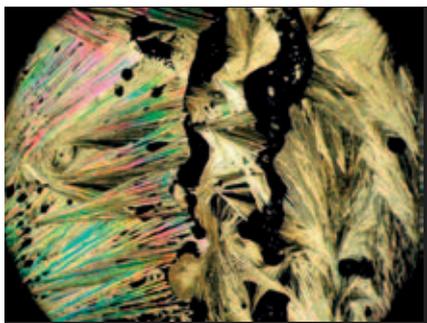
**Sharmarke Mohamed's** on salts versus cocrystals and collaboration with UCL Chemical Engineering on chiral crystallisation. Often, predicting which multi-component structure may form is easier than determining whether it will form. On the other hand, disorder can often prevent the growth of crystals of the size and quality needed to characterise the disorder, and **Matthew Habgood** has been adapting **Ricardo Grau-Crepo's** SOD program to organics, to predict disorder and account for the problems in crystallising caffeine.

One of the answers to the question as to why we over predict polymorphism is that the right experiment has yet to be performed. It has been very pleasing when new polymorphs have been discovered that match structures we've previously published as thermodynamically feasible, as has happened for aspirin, paracetamol, and carbamazepine.

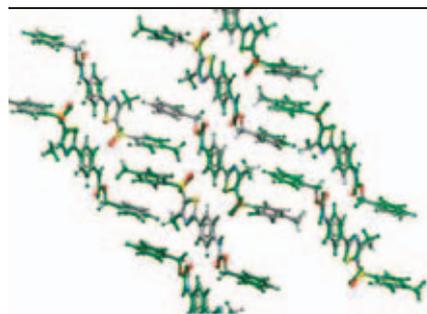
This is why we have developed a database of the computed crystal structures, which currently has entries for over 150 molecules. The other answer, that the right experiment cannot be performed, can be exemplified by the "disappearing polymorph" of progesterone, which **Bob Lancaster** has shown is more long-lived when it contains an irreproducible cocktail of synthetic impurities. An increasing range of ways of targeting predicted structures is being developed, but this needs to build on fundamental insight into the nucleation and competitive growth of different crystal forms. A major challenge for the future comes from our recent extension to much larger, flexible molecules, more typical of modern pharmaceuticals (Fig 2).

Do the same ways of interpreting the crystal energy landscape apply as for small molecules, or has the drug design principle of adding flexible groups made the drug development harder by preventing crystallisation?

Others who have contributed crystal energy landscapes at UCL Chemistry include **Alex Anghel**, **Juliette Pradon**, **Binal Patel**, **Pinki Pridhanani-Jethani** and **Calvin Chu** as undergraduates, **Irene Nobeli**, **Jasbir Bhachoo**, **Helen Tsui**, **Theresa Beyer**, **Michael Brunsteiner** and **Antonio Torrisi** as postgraduates, **Keith Wibley**, **Carole Ouvrard**, **Ian Brown**, **Emiliana D'Oria** as postdocs. **Ogaga Uzoh** has just started an Eng Doc. Those involved in the project from other departments and institutions are too numerous to mention, but most names appear on the CPOSS publication list [www.cposs.org.uk](http://www.cposs.org.uk).



**Fig 1.** Formation of a cocrystal (centre) between succinic acid (left) and diphenylcyclopropanone (right) by hot stage microscopy. From thesis of Nizar Issa, who also studied whether we could predict the structure and formation of cocrystals.



**Fig 2.** Overlay of predicted (green) and experimental structure of a target in the 2010 blind test of crystal structure prediction. Andrei Kazantsev, Claire Adjiman and Costas Pantelides (Process Systems Engineering, Imperial) adapted the computational methods we have been jointly developing to tackle this one, considering over 2.8 million crystal structures and using 120,000 CPU hours.

## Chem's Water Consumption

*UCL's Chemistry Department uses a lot of water. Our activities, from chemical synthesis to ultra-high vacuum work, as well as the more pedestrian cleaning of glassware, require lots of water. The Christopher Ingold Building's water use in 2010 was approximately 60,000 m<sup>3</sup>, enough to fill the new Olympic Swimming pool in East London 23 times over. While this a lot water, it is not wildly different from other Departments of similar size. But we wanted to do something about this.*

*A collaboration was set up between Mass Spec Manager John Hill, Head of Technical Staff Dave Knapp, treehugging staff members Andrea Sella and Steve Price and Tony Overbury of UCL's Estates and Facilities. Our priority was to get data and a tedious process of daily monitoring of water consumption began in July 2010 to get a deeper understanding of the patterns of water use. The numbers we accumulated led the Department to carry out an experiment over the Christmas break 2010/11, when all experiments and instruments were turned off for a period of 10 days. The exercise was a major success allowed us to identify the major uses in the Department, which included not just cooling water for condensers and rotary evaporators, but also water required by the diffusion pumps used for high vacuum spectroscopy and surface science.*

*When experiments were restarted in January users were instructed to minimize their use and to our delight water consumption in 2011 is currently 30% below the rate in 2010, a reduction achieved at little or no effort which has resulted in a very substantial cost saving to the University. We are currently installing water flow monitors for the high consumption instruments, and exploring options for replacing diffusion pumps with alternatives, such as turbomolecular pumps, that have lower running costs.*

*In partnership with UCL's new Sustainability Manager, Richard Jackson, we are conducting a review of our energy usage and management which will allow us to develop a long term strategy to make both the environmental footprint, and the costs, of our Department as low as possible. In times of serious austerity the outcome can only be a win for both the Department and the University as a whole.*

**By Professor Andrea Stella**



*Graduate student Mike Ward posing with the flow meter installed to limit the flow of water cooling his diffusion pumps.*

## 2010 Research Project of the Year Chemistry and LCN Researchers Win the Awards

A team from the UCL Chemistry and the LCN was awarded Research Project of the Year at the Times Higher Education Awards ceremony in London which took place on 25th November 2010.

**Dr. Andrew Wills** and Profs. Aeppli, Bramwell and McMorow beat off strong competition from five other universities, and projects including the first artificial pancreas and new ways of identifying genetic defects in unborn children, with their discovery of magnetricity.

The experimental observation of the magnetic equivalent of electricity is an important advance in physics that could have widespread practical applications.

Magnetic poles usually occur in inseparable north-south pairs. Discrete, separable poles called monopoles had been postulated since 1894 but never observed until an international team led by Andrew Wills, reader in physical materials chemistry at University College London, and including Steve Bramwell, Gabriel Aeppli and Des McMorow, detected them at very low temperatures in a form of crystal known to physicists as spin ice.

The team was also able to use magnetic fields to make the monopoles flow in a similar way to electrons in an electric current. The current was detected by observing the behaviour of subatomic particles called muons created the Science and Technology Facilities Council's Isis facility in Oxfordshire.

The discovery of "magnetricity" reported in the journal *Nature*, hit the headlines last year and was the most-read story on the BBC's website when it was announced on 14 October 2009.

The judges said this breakthrough has changed our understanding of magnetic force. "The team's imaginative exploration of the behaviour of subatomic particles crosses the disciplinary boundaries of chemistry and physics, and has the potential for wider application in information technology, MRI scanners and other crucial technologies".



The award was presented by a representative of its sponsor, the IPGroup PLC (far left), Dr Andrew Wills, Dr McMorow, Dr Bramwell and Gabriel Aeppli

## Experimental apparatus to study the chemistry of dications: Molecules that have two positive charges

Professor **Stephen Price** is part of a UCL team that has developed a piece of experimental apparatus to study the chemistry of dications: molecules that have two positive charges.

Recent studies of the layers at the top of the atmospheres of Earth, Mars, Venus and Titan have proposed that such doubly-charged molecules are present in these environments and that the chemistry of these energetic species affects the composition of these atmospheric regions.

Professor Price explained: "Most molecules are electrically neutral; they carry no net charge. However, the presence of the two positive charges on a simple molecule makes such species highly energetic, short lived and potentially very reactive."

"The experiment has to operate at very low pressures to allow us to control the behaviour of these charged species and rapidly observe their chemistry before they fall apart."

Results from recent studies have been published in *Chemical Science*, the *Royal Society of Chemistry* journal, and *Angewandte Chemie*.

## Institution of Chemical Engineers (IChemE) Innovation and Excellence Award

At the end of 2010 the multidisciplinary BiCE team (Biocatalysis-Chemistry-Engineering interface programme) were awarded the Institution of Chemical Engineers (IChemE) Innovation and Excellence Award for Bioprocessing. BiCE is an internationally recognised multidisciplinary research team that was established in 2004 with the overall aim to develop a framework and tools for constructing multi-step enzymatic processes rapidly and efficiently, to speciality chemicals and pharmaceuticals.

The team is comprised of multidisciplinary academics from three UCL faculties and include Helen Hailes (Chemistry), John Ward (Structural and Molecular Biology), Gary Lye, Paul Dalby, Frank Baganz (Biochemical Engineering), and recent staff additions to the team that bring in expertise in bioreactor engineering and automation (Martina Micheletti), microfluidics (Nicolas Szita) and synthetic biology (Darren Nesbeth). The BiCE team were also awarded the 2010 Rita & John Cornforth Award from the Royal Society of Chemistry Chemical Biology Interface Forum for the use of key chemical biology and synthetic skills, interfaced with molecular biology and process engineering to achieve stereoselective enzymatic synthesis with potential for industrial scale-up.

IChemE CEO David Brown said: "The IChemE Awards are globally recognised and attract entries from all over the world. Winning an award really does demonstrate work of the highest standard and there are plenty of winners from previous years that have used their success at the IChemE Awards as a springboard to greater things." Paul Dalby, Frank Baganz, me, Nicolas Szita, John Ward, Martina Micheletti, Gary Lye

By Professor Helen Hailes



From Left to Right: Paul Dalby, Frank Baganz, Helen Hailes, Nicolas Szita, John Ward, Martina Micheletti, Gary Lye

## UCL/IC Collaboration

UCL and Imperial College Chemistry Departments held a joint meeting on the 7th of July at the Royal College of Physicians, London.

The aim of the meeting was to identify ways the two departments could work more closely together, particularly in the context of the ongoing changes to research funding by RCUK.

The day consisted of overviews of both departments, short talks by recent appointees, discussions and networking sessions. 87 academic, post-doctoral and administrative staff attended the event, with a near 50:50 split from each institution.

The feedback received from attendee's was very positive with the majority indicating that one of the most useful aspects of the day were the presentations on "PDRA Development" and "Changes to RCUK funding".

Special thanks goes to **Professor Tom Welton** (HoD, Imperial College) and **Professor Ivan Parkin** (HoD, UCL) for initiating this collaboration and to **Maria Tortelli** (PA to the HoD, IC), **Nicola Best** (EA to the HoD, UCL) and **Madiha Sajid** (Assistant Administrator, UCL) for organising a successful event.

## UCL Chemistry-led Research on the Origin of Water on Earth

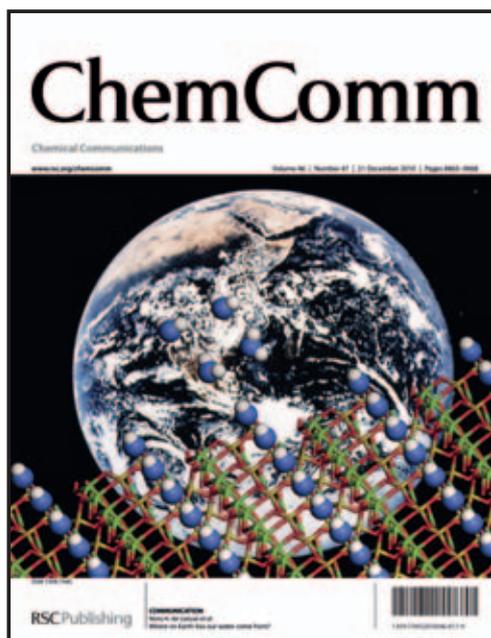
Published as front cover in RSC Chemical Communications, was featured in the New Scientist and selected as an RSC Chemical Science Highlight

Computational research led by Nora de Leeuw has validated a new theory on the source of terrestrial water. The origin of water on our planet is not only of interest for our understanding of the evolution of our own planet and life thereon, but even more so for the increasing exploration of other planets within our solar system and the discovery of potential planetary systems in other galaxies.

Having spent half a life-time teaching his students the accepted versions of the origin of our planetary water, which increasingly did not fit the available evidence, Mike Drake at the University of Arizona suggested an alternative hypothesis, where water was already present at the surfaces of interstellar dust grains, when they accreted to form our planet. Although this hypothesis fitted with all available evidence, it would only work if the adsorption of water to the dust grains was sufficiently strong to survive the harsh conditions in the accretion disk.

Computer simulations by De Leeuw and colleagues in UCL, Arizona and Muenster on the chemisorption of water to surfaces of the olivine mineral, which is ubiquitous in interstellar dust clouds, show that the kind of highly fractal surfaces found on the interstellar dust grains are indeed suitable for the strong retention of water under the extreme temperatures and pressure conditions prevalent in the accretion disk during planetary formation. This work thus provides very strong evidence that the new hypothesis as to the delivery of water is correct; water was indeed present at the birth of our planet Earth rather than a late-comer once the planet had been formed.

The full paper is available on the RSC Chemical Science website at <http://pubs.rsc.org/en/Content/ArticleLanding/2010/CC/C0CC02312D>, whereas the New Scientist article is available on <http://www.newscientist.com/article/mg20827853.800-earth-may-have-had-water-from-day-one.html> and the RSC 'Chemical Science Highlight' can be found here [http://www.rsc.org/Publishing/ChemScience/Volume/2010/11/Earth\\_water.asp](http://www.rsc.org/Publishing/ChemScience/Volume/2010/11/Earth_water.asp)



## Rita and John Cornforth Award

BiCE Team UCL

The Royal Society of Chemistry's Chemical Biology Interface Forum has awarded the 2010 Rita & John Cornforth Award<sup>1</sup> to BiCE2 Team UCL, with Helen Hailes in Chemistry as the Team Leader, together with John Ward in SMB, Gary Lye, Nicolas Szita, Paul Dalby, Frank Baganz and Martina Micheletti in Biochemical Engineering and John Woodley now at the DTU. The award is for the use of key chemical biology and synthetic skills, interfaced with molecular biology and process engineering to achieve stereoselective enzymatic synthesis with potential for industrial scale-up. The award consists of £2000 and a medal, which will be presented to the team at a symposium arranged by the Chemical Biology Interface Forum.

The BiCE research programme is an internationally recognised multidisciplinary research team that was established in 2004 with the overall aim to develop a framework and tools for constructing multi-step enzymatic processes rapidly and efficiently, ultimately for industrial synthesis. Comparison to available chemical routes and chemo-enzymatic integration where appropriate is also important.

The team is comprised of a core of multidisciplinary academics at UCL, with a long history of working together towards common goals that contribute to the delivery of the BiCE aims. Collaborative doctoral and post-doctoral projects have been established, funded by a combination of BBSRC, EPSRC, Technology Strategy Board and CIF awards and industry. The team operates via a close collaboration with significant cross talk and PDRAs and students work in more than one laboratory and gain interdisciplinary research skills. The impact of the BiCE research is evidenced by the take up of BiCE enzymes and engineering approaches for industrial use.

The use of biocatalysts for the synthesis of biologically active compounds is of increasing interest

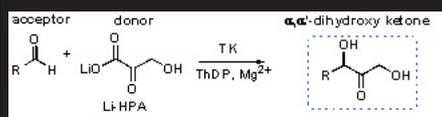
to the chemical, pharmaceutical and industrial biotechnology sectors in the search for sustainable, cost effective, synthetic strategies. We are now using synthetic biology approaches to building new biosynthetic pathways and integrating these with the hosts metabolism.

One key focus has been the enzymatic preparation of 2-amino-1,3-diols, a motif found in a range of biologically active compounds such as sugars, sphingosines, antibiotics and antivirals. Our integrated approach has delivered a highly effective route to the aminodiol diastereoisomers and ketodiol intermediates using available biocatalysts, transketolase (TK) and transaminase (TAm) that operate in mild aqueous conditions. Furthermore, chemical synthesis and assay development, pathway engineering, enzyme evolution and process development within an interdisciplinary team enabled this to be delivered from a starting point without available assays, mutant TKs or suitable TAm enzymes.

*The UCL BiCE team fits well within the ethos at UCL of encouraging interdisciplinary research to address challenges that individuals cannot otherwise pursue.*

<http://www.rsc.org/ScienceAndTechnology/Awards/ritaandJohnCornforthAward/2010winners.asp>

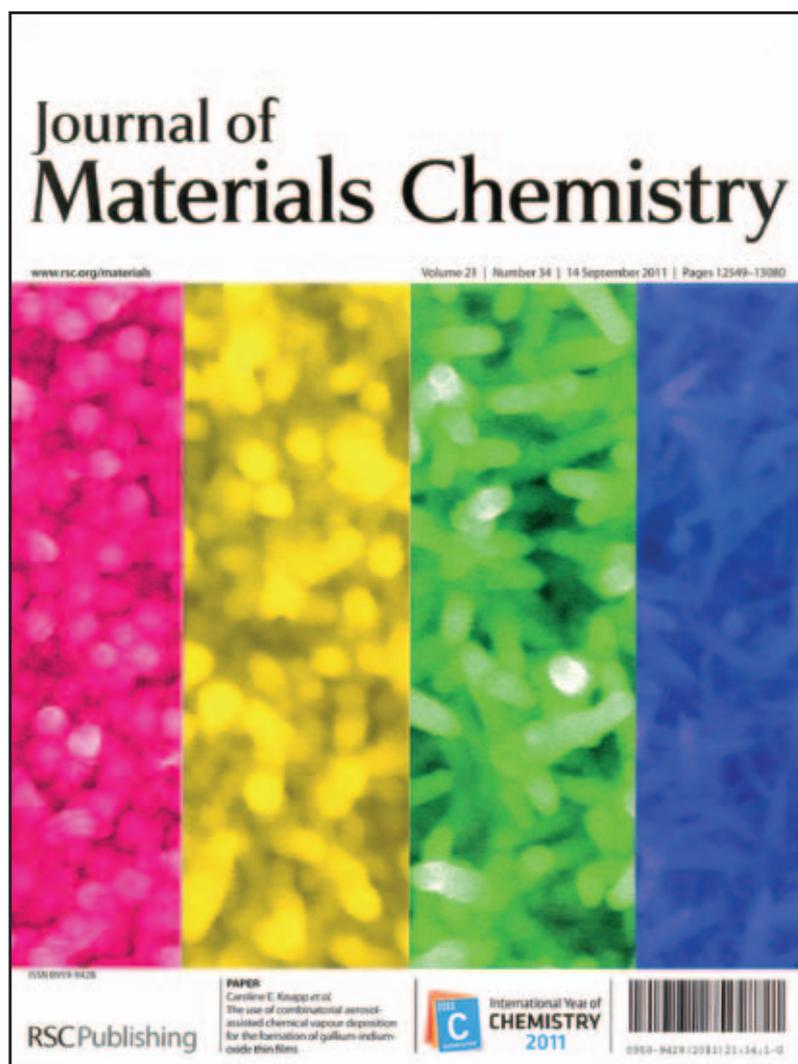
2 BiCE = Biocatalysis integrated with Chemistry and Engineering (<http://www.ucl.ac.uk/biochemeng/industry/bice>).



## The Use of Combinatorial Aerosol-Assisted Chemical Vapour Deposition for the Formation of Gallium-Indium-Oxide Thin Films

Claire J. Carmalt and Ivan P. Parkin

This paper describes the use of combinatorial aerosol-assisted chemical vapour deposition (CVD) to deposit gallium-doped indium oxide thin films. A range of gallium-indium-oxide compositions,  $\text{Ga}_x\text{In}_{2-x}\text{O}_3$ , were deposited on the glass substrate in the region between the two inlets. This allowed for a systematic investigation on the effect of doping on gallium and indium oxide and a direct relationship between composition and conductivity of the films was observed. Gallium-indium-oxide films are a relatively unexplored family of transparent conducting oxides. Their transmittance has been shown to exceed all other oxides, including indium-tin-oxide, which is used as an anode in OLED screens and in a range of other applications. This new technique combines aerosol-assisted CVD, in which volatility and thermal stability restrictions are removed, with combinatorial CVD, the advantage of which is rapid deposition and analysis of a compositional gradient. The method provides a rapid route to investigating the effect of a dopant on the functional properties of materials and, since it's a solution-based technique, films with a range of compositions could be deposited even if volatile precursors are not available.



## THE JOY OF GRANTS

For any academic a successful grant application is a thrill and, in the current funding climate, a precious one. In the case of my recently awarded Leverhulme Trust grant, there is an extra tingle of excitement. What we will be able to do is to develop a technique to identify stretches of DNA in a sequence-specific manner by using electrical nanopore measurements. In this new strategy, individual DNA molecules are threaded through a single pore in an artificial membrane. Each time a molecule slides in, there are tiny, but very detectable changes in the ionic current through the pore. It is an approach that has the potential to miniaturize sensing equipment for fast on-site DNA analysis where delayed analysis in a centralised laboratory is not an option. Our funding is to develop the technology specifically to detect DNA at crime scenes and in home defence settings. In particular, we will use small chemical tags to amplify the signals of the minute ion currents through the channel, a process that will allow us to count the number of short DNA repeats which are of forensic relevance.

Apart from enabling research, the funding is also a testament to the open and collaborative atmosphere within the department which fosters sharing experience on how to structure a good grant application. As observed by Ivan Parkin who has a lot of experience by sitting on research council panels, one key element of a successful proposal is to base it on a previous publication in a high-impact journal. In my case, I selected an *Angewandte Chemie* paper (doi:10.1002/anie.200800183) which described the chemical tagging technology, and was featured on the inside cover of the journal. Another ingredient is to focus on a clear societal need, and to apply science to deliver improvements within this niche. The formula of combining publication and application has been used in other grant proposals, and I eagerly await their outcome. But in the meantime, I am happy that I got lucky this time and enjoy the prospect of using the current funding to do some exciting new science.

Dr Stefan Howorka  
Organic Chemistry and Chemical Biology

## GRANTS AWARDED 2010-2011

The application of Bromomaleimides in drug conjugates, and novel pro-drug strategy (PFIZER LTD) £32,100  
PI: Baker, Dr Jamie

Theoretical and experimental investigations of artificial spin ice arrays (UNIVERSITY OF UPPSALA) £31,128  
PI: Banks, Dr Simon

RAP1 inhibition and respiratory disease (GLAXOSMITHKLINE) £21,000  
PI: Caddick, Prof Stephen

Sensor for the detection and identification of bioaerosols (EPSRC) £176,934  
PI: Caruana, Dr Daren

Hybrid quantum mechanical/molecular mechanical studies of active sites in solids and on their surfaces (SCIENCE & TECHNOLOGY FACILITIES COUNCIL (EX-PPARC)) £30,000 PI: Catlow, Prof Richard

Bio-inspired (FE, NI)s Nano-catalysts for CO<sub>2</sub> conversion (NETHERLANDS ORGANISATION FOR SCIENTIFIC RESEARCH) £30,000  
PI: Catlow, Prof Richard

## AWARDS



### Professor Paul F McMillan

Paul F McMillan has been selected to receive the **2011 Peter Day award by the Royal Society of Chemistry**. His research covers new areas in solid state and materials chemistry including high pressure synthesis and studies of new materials including nitrides, liquid and glassy polyamorphism and semiconductor clathrates and nanoparticles. He will deliver one lecture at an awards symposium organised by the RSC in Birmingham in November 2011, and will also present lectures at Strathclyde and Nottingham universities.



### Professor Geoff Thornton

Geoff Thornton garnered the **2011 RSC Surfaces and Interfaces Award**. This is awarded annually for outstanding and innovative research on the behaviour of chemical systems at surfaces or interfaces. Geoff's nomination was for the pioneering use of synchrotron radiation techniques and scanning probe methods to explore the surface chemical physics of metal oxides. The same week as he received the RSC award, Geoff also learned of the award of a European Research Council Advanced Grant. This is a single investigator five year grant, for about 2.3 million euros. The subject is Energy Functional Surfaces of Metal Oxides. In addition to synchrotron radiation and scanning probe work, the project involves a collaboration with Helen Fielding and Wendy Brown on time-resolved photoemission using the fs-laser set up on the second floor in the CIB.

From fundamental understanding to prospective design of layered nanomaterials (QATAR NATIONAL RESEARCH FUND) £168,911 PI: Coveney, Prof Peter

Open petascale LB3D (FUJITSU LABORATORIES OF EUROPE LIMITED) £45,000  
PI: Coveney, Prof Peter

P-medicine: From data sharing and integration via VPH models to personalised medicine (EUROPEAN COMMISSION FP7) £612,105  
PI: Coveney, Prof Peter

VPH-Share – virtual physiological human: sharing in healthcare – a research environment (EUROPEAN COMMISSION FP7) £236,305  
PI: Coveney, Prof Peter

Inbiomedvision – promoting and monitoring biomedical informatics in Europe (EUROPEAN COMMISSION FP7) £83,171 PI: Coveney, Prof Peter

MAPPER - Multiscale Applications on European e-Infrastructures (EUROPEAN COMMISSION FP7) £258,848 PI: Coveney, Prof Peter

A new approach to science at the Life Sciences interface (EPSRC) £54,109  
PI: Coveney, Prof Peter

Helium bubble nucleation, growth and subsequent effects on the physiochemical properties of palladium tritide (ATOMIC WEAPONS ESTABLISHMENT (AWE)) £30,000  
PI: De Leeuw, Prof Nora

Molecular modelling for energy efficiency (ROYAL SOCIETY) £150,000  
PI: De Leeuw, Prof Nora

Oxidative and reductive properties of rare-earth metal oxides: co oxidation and no reduction (JOHNSON MATTHEY PLC) £22,500 PI: De Leeuw, Prof Nora

Modelling the structure and rheology of a global chassis platform for hair colorants (PROCTER AND GAMBLE TECHNICAL CENTRE LTD) £30,000  
PI: De Leeuw, Prof Nora

The role of solution chemistry in controlling molecular crystal polymorphism (ROYAL SOCIETY) £84,307 PI: Di Tommaso, Dr Devis

Towards a fundamental understanding of smart windows coating based on doped vanadium oxide (EPSRC) £86,303 PI: Grau Crespo, Mr. Ricardo

Next generation activated carbon adsorbents for the pre-combustion capture of CO<sub>2</sub> (EPSRC) £153,161  
PI: Guo, Prof Xiao

The supergen biological fuel cells consortium 2010-2014 (CORE) (EPSRC) £94,606 PI: Guo, Prof Xiao

The supergen5 biological fuel cells consortium (EPSRC) £342,082  
PI: Guo, Prof Xiao

Synthesis of compounds with enhanced potential for the oral treatment of asthma (GLAXOSMITHKLINE) £32,000  
PI: Hailes, Prof Helen

Use of transaminase enzymes for the synthesis of pharmaceutical intermediates (CHIROTECH TECHNOLOGY LIMITED) £17,600  
PI: Hailes, Prof Helen

Generation and physicochemical investigation of peptide and protein assemblies (NPL MANAGEMENT LTD) £65,635 PI: Howorka, Dr Stefan

Investigating peptide assemblies with mass spectrometry (NATIONAL PHYSICAL LABORATORY) £11,865  
PI: Howorka, Dr Stefan

Sizing forensic nucleotide repeat sequences with nanopores (LEVERHULME TRUST) £113,001  
PI: Howorka, Dr Stefan

Semi-synthesis of glycoproteins (DEXTRA) £32,000  
PI: Macmillan, Dr Derek

Ligating the missing link (ROYAL SOCIETY) £12,000  
PI: Macmillan, Dr Derek

Design of novel and isoform-selective inhibitors of histone deacetylase (HDAC)11 (GLAXOSMITHKLINE) £32,000 PI: Marson, Prof Charles

The use of light-activated antimicrobial agents for reducing healthcare-associated infections (ONDINE INTERNATIONAL HOLDINGS LTD) £24,000 PI: Parkin, Prof Ivan

Noncrystalline water splitting photodiodes II: device engineering, integration and scale up (TECHNOLOGY STRATEGY BOARD) £499,400 PI: Parkin, Prof Ivan

Separation of gas phase titanium and vanadium chlorides (TIOXIDE GROUP EUROPE LTD) £22,279  
PI: Parkin, Prof Ivan

The electrical double layer in pure ionic liquid next to an electrode surface (LEVERHULME TRUST) £109,332  
PI: Perkin, Dr Susan

Molecular-resolution studies of structure and lubrication (INFINEUM UK LTD) £43,754 PI: Perkin, Dr Susan

Self-assembly in ionic liquids (LEVERHULME TRUST) £58,197  
PI: Perkin, Dr Susan

Generation and analysis of organic crystal energy landscapes (CAMBRIDGE CRYSTALLOGRAPHIC DATA CENTRE) £30,000  
PI: Price, Prof Sally

Ex site and insitu studies of iron containing zeolitic solids used for selective oxidation of benzene using SR based techniques (DIAMOND LIGHT SOURCE LTD) £32,538  
PI: Sankar, Prof Gopinathan

In situ studies of catalytic materials using synchrotron radiation techniques (JOHNSON MATTHEY PLC) £30,000  
PI: Sankar, Prof Gopinathan

Development of selective inhibitors of NAV1.7 sodium channels (EISAI(LONDON) RESEARCH LABORATORIES LTD) £108,560  
PI: Tabor, Dr Alethea

Energy SURF: Surgence of energy functional metal oxides (EUROPEAN COMMISSION FP7) £1,773,511  
PI: Thornton, Prof Geoff

A more rational design of bioactive glasses based on computer modelling (ROYAL SOCIETY) £342,789  
PI: Tilocca, Dr Antonio

HPC simulations of complex solids and clusters using static lattice techniques (EPSRC) £272,438  
PI: Woodley, Dr Scott

## 2010 PUBLICATIONS

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Zwijnenburg M A, Sousa C, Illas F and Bromley ST (2011) **The fate of optical excitations in small polyhedral ZnS clusters: a theoretical study of the excitation and localization of electrons in Zn<sub>4</sub>S<sub>4</sub> and Zn<sub>6</sub>S<sub>6</sub>.** J CHEM PHYS, 134 (6) 064511. 10.1063/1.3536501.

Raman Microscopy as a Structural, Analytical and Forensic Tool in Art and Archaeology, by Robin J.H. Clark, Chemistry in New Zealand, 2011, 13–20.

Professor Robin Clark has been elected an International Member of the American Philosophical Society. This is the oldest established learned society in the USA, based in Philadelphia, having been founded by Benjamin Franklin in 1743. It has c. 800 Resident Members and 168 International Members. It differs from the US National Academy of Sciences in that it is very widely based, having five Divisions, 1. Mathematical and Physical Sciences, 2. Biological Sciences, 3. Social Sciences, 4. Humanities, 5. The Arts, Professions, and Leaders in Public and Private Affairs. Only 1 or 2 persons are elected International Members each year in each division (8 in total this year, 5 in total last year). Professor Clark was elected via Division 1. He is the first Member of UCL's Chemistry Department to be elected since Sir William Ramsay in 1899.

Professor Robin Clark gave the biennial Sir George Stokes Lecture of the Royal Society of Chemistry on "The Scientific Examination of Pigments in Art and Archaeology by Raman Microscopy" on Wednesday 10 March at the University of Sheffield, Sheffield.

Professor Robin Clark gave the biennial Sir George Stokes Lecture on "Raman Microscopy and Pigments: where Science meets Art and Archaeology", and was presented with the Stokes Gold Medal, at the Royal Society of Chemistry's Award Symposium and AGM of the Analytical Division at the University of Hull, Hull, on 19 May 2010. He is the first member of UCL's Chemistry Department to win this award.

Professor Robin Clark, as Chairman of the University of Canterbury NZ Trust, lectured on "How to bring Science into the Arts" to the Alumni Association UK Branch of the University of Canterbury NZ at PricewaterhouseCoopers, London, on 18 June 2010.

Professor Robin Clark gave a plenary lecture on "Science meets Art: Investigating Pigments in Art and Archaeology" to the Spanish Chemical Society NoSIC Meeting in Prullens, near Barcelona, on 10 June 2010.

Professor Robin Clark gave the first joint Royal Academy of Arts/Royal Society of Chemistry Public Lecture on "Science Meets Art: Investigating Pigments in Art and Archaeology" in the large (175 seat, and full) Geological Society Lecture Theatre, Piccadilly, London on 3 June 2010. This lecture initiated a programme in the Public Understanding of Science linking Chemistry to the Arts.

Professor Robin Clark gave the University of Canterbury's premier biennial lecture, the Rutherford Lecture, in the Town Hall, Christchurch, New Zealand, on "Raman's legacy: Spectroscopy in the Cause of Art and Archaeology" on 29 September 2010. The lecture was to celebrate the 80th anniversary of the award to C. V Raman of the Nobel Prize for Physics for 1930, Raman having been nominated by Rutherford. The lecture was also given at the University of Otago, Dunedin, on 1 October 2010.

Professor Robin Clark gave the University of Canterbury's premier biennial lecture, the Rutherford Lecture, in the Town Hall, Christchurch, New Zealand, on "Raman's legacy: Spectroscopy in the Cause of Art and Archaeology" on 29 September 2010. The lecture was to celebrate the 80th anniversary of the award to C. V Raman of the Nobel Prize for Physics for 1930, Raman having been nominated by Rutherford. The lecture was also given at the University of Otago, Dunedin, on 1 October 2010.

Frank D King, Stephen Caddick **Triflic acid-mediated phenylation of N-acylaminoalkyl diethylacetals and N-acyl-2-phenyl cyclic amides** *Organic & biomolecular chemistry*. 06/2011; 9(11):4361-6

Frank D King, Abil E Aliev, Stephen Caddick, D A Tocher **A novel synthesis of (di)-benzazocinones via an endocyclic N-acyliminium ion cyclisation** *Organic & biomolecular chemistry*. 03/2011; 9(5):1547-54

C.R. Ganellin **Personal Reflections on Sir James Black (1924-2010) and Histamine Inflammation Research**, 2011, 60, 103-110

## Staff

### Departmental Structure

#### Head of Department:

I. P. Parkin

#### Deputy Head of Department (Research):

N. De Leeuw

#### Deputy Head of Department (Teaching):

D. A. Tocher

#### Head of Physical Chemistry & Chemical Physics Section:

S.D. Price

#### Head of Inorganic Materials Chemistry Section:

C. J. Carmalt

#### Head of Organic Chemistry & Chemical Biology Section:

J. C. Anderson

### Computational Chemistry

#### Professors:

R. Catlow, P. Coveney, N. de Leeuw, N. Katsoyannis, S. L. Price

#### Readers and Senior Lecturers:

R. Bell, F. Cora, D. Lewis

#### Lecturers:

R. Grau Crespo, B. Slater

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C. Mellot-Draznieks

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M. Habgood

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A. Tilocca

#### Research Associates:

J. Buckeridge, D. Chang, J. Christie, D. Di Tommaso, D. Groen, A. Haidar, O. Henrich, B. Jefferys, L. Kaban, A. Kerridge, R. Nash, A. Roldan Martinez, F. Schiffmann, N. Shublaq, A. Sokol, J. Suter, S. Wan, D. Wright.

#### PhD Students:

S. Cox, N. Dzade, T. Erinosh, K. Hassomal Birj Kumar, I. Kirker, K. Rigby

### Materials & Inorganic Chemistry

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C. Carmalt, J. Evans, Z. Guo, G. Sankar, D. Tocher, P. McMillan, I. Parkin

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M. Vickers

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F. D. King

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