

A Centre for Excellence in Teaching and Learning



The teaching of Chemistry at Bristol University is set to be transformed by the recent announcement of funding worth £4.5 million from the Higher Education Funding Council for England (HEFCE), which will be supplemented by a further £16.3 million from the University.

This funding will be used to create a Centre for Excellence in Teaching and Learning (CETL) called Bristol ChemLabS (Bristol Chemical Laboratory Sciences) which will provide completely rebuilt and re-equipped teaching laboratories. Bristol ChemLabS will aim to transform the student experience of learning practical chemistry by creating a major national resource for the teaching and learning of the experimental sciences. It will establish professional-standard practices with state-of-the-art instrumentation and facilities for the e-learning of modern laboratory chemistry including dynamic laboratory manuals and electronic laboratory notebooks.

Dr Kim Howells, Minister for Higher Education, who visited the School of Chemistry on Thursday 27 January, said: "I want to congratulate Bristol University on its successful bid for this funding. It will further advance the teaching and learning opportunities for students in the Schools of Chemistry and Medical Sciences (a CETL in Medical Sciences was announced on the same day). I am delighted to be visiting the School of Chemistry on the day the funding is announced. The School of Chemistry shows us how our Universities can be



Dr Kim Howells, Minister for Higher Education, watching students Emma Grange, left, and Alex Griffin conduct an experiment during his visit to the School of Chemistry. Also pictured, Professor Guy Orpen, head of department.

at the forefront of science teaching, rivalling the very best in the world and I wish them every success in the future."

The CETL funding will also be used to host Fellowships for seconded school-teachers, establish University Teaching Fellowships and develop outreach programmes to engage pre-university students and the general public. New ways of teaching and learning practical science will be disseminated nationwide through links with the Royal Society of Chemistry and the Higher Education Academy.

Professor Guy Orpen, Head of Department, School of Chemistry, said: "This is great news for the Bristol School of Chemistry. Thanks to HEFCE and the University, we will have world-class facilities for students to learn practical chemistry – matching the outstanding research labs we now have in place.

Students will get to learn chemistry the best way – by doing it and by doing it as it is done in industrial or research labs: the professional way. We will be in a position to use these 21st-century labs for teaching and reaching out to younger students from schools in the region, and to older students – school teachers and technicians, industrial chemists and members of the public. These are exciting times for chemistry at Bristol."

Professor Eric Thomas, Vice-Chancellor of the University, said:

"State-of-the-art teaching is as important to us as world-class research. This money will help us to give students the excellent teaching they deserve and to keep producing some of the UK's most outstanding graduates."



Professor Guy Orpen
Head of School

VIEW FROM THE TOP

In the October issue of "Chemistry News" I noted that we hoped to establish a national Centre for Excellence in Teaching and Learning (Bristol ChemLabS CETL) in the School with substantial HEFCE and University funding. As our cover story makes clear the School's bid was successful. I am proud to note that ours is the only chemistry-focused CETL of the 74 announced in late January. The success of our bid was the result of a major team effort and recognition of the excellence of both staff and students right across the School and over many years. The award officially marks Bristol as one of the premier – perhaps the premier – place to study Chemistry in the country. Early indications are that this may have a substantial impact on our attractions to undergraduates – we may see record numbers of new students come October.

Now that the celebrations have died down we have to deliver on our promise to establish the best facilities for learning practical chemistry in the country. This will involve a massive collective effort led Nick Norman, Paul Wyatt and Dudley Shallcross (as Bristol ChemLabS Chief Executive, Director and Outreach Director respectively).

The Bristol ChemLabS CETL funding has triggered associated University investment on a tremendous scale which will allow us to complete not only the new teaching laboratories but also to

redevelop a substantial amount of research space and completely re-clad the giant cube that is West Block. Mike Ashfold has taken on the onerous task of coordinating this huge project for the School over the next 2 years.

The opportunities these new facilities open up are remarkable – on both research and teaching fronts. The vibrancy and diversity of our research is well reflected in the present issue and the continued development of our staff – the core to the success of the School. Recent months have seen more arrivals among our academic staff – Dr Charl Faul took up his Lectureship in Inorganic and Materials Chemistry in January and Dr Fred Manby, Royal Society University Research Fellow in the School of Chemistry, has been appointed to a Lectureship in Physical and Theoretical Chemistry. Finally and as highlighted elsewhere we are delighted to see Ian Manners returning to Bristol, after 20 years away, in a blaze of glory with two very prestigious awards to his name. Exciting times indeed!

Guy Orpen

CONVOCAATION AWARD

Jill Meadows, a third year PhD Chemistry student has won one of the University's Convocation awards for outstanding contributions made to university life. Jill was a former President of the Postgraduate Society (2002-3), Postgraduate Senate Representative (2002-4), and Departmental Research Student Representative (2002-5). She has represented postgraduates at every level in the University and Students' Union and has played a vital role in raising the Union's awareness of postgraduate issues.

TAKING THE WRAPS OFF ANIMAL MUMMIES



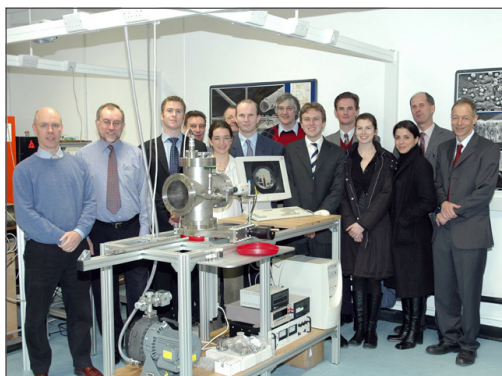
The ancient Egyptians seem to have taken as much care with mummifying animals as they did humans, according to new research published in *Nature* last Autumn. Professor Richard Evershed and colleagues in the School of Chemistry have discovered that the mixture of balms used in the tissues and wrappings from Pharaonic cat, hawk and ibis mummies is of comparable complexity to those used to mummify humans. It was previously generally believed that animals were mummified simply by being wrapped in coarse linen bandages and/or dipped in 'resin'. However, the research suggests that more complex procedures were sometimes employed, using beeswax and bitumen, animal and vegetable fat, sugar gum, coniferous resin and resin from the pistacia tree – all fairly exotic substances. The finding fits with the knowledge that ancient Egyptians treated animals with great respect, regarding them as both domestic pets and representatives of the gods: for example, the cat symbolised Bastet, the hawk, Horus, and the ibis, Thoth.

DIAMOND RESEARCH



Diamond, the sp^3 bonded allotrope of carbon, has long held a special place in the hearts and minds both of scientists and the public at large. In the late 1980s it became possible to grow diamond in thin film form using chemical vapour deposition (CVD) methods. Mike Ashfold, Paul May and Keith Rosser, together with colleagues in Aerospace Engineering, began investigating CVD of diamond thin films in Bristol in late 1991. Activity in this area has since expanded hugely, and has inspired collaborative projects with the groups of Jason Riley (electrochemistry with doped diamond electrodes), Andrew Orr-Ewing (laser diagnosis of diamond growing plasmas) and Jeremy Harvey (quantum chemical calculations of the gas-surface chemistry involved in diamond film growth) in Chemistry.

The last six months have seen three notable funding successes for the Bristol diamond team. The first is sponsored by the Royal Society and involves a collaboration with Yuri Mankelevich and colleagues at Moscow State University together with Element Six Ltd (formerly De Beers Industrial Diamond Ltd). In this project a special microwave reactor (on loan from Element Six) is being used at Bristol to provide a uniquely detailed picture of the gas phase chemistry underpinning diamond growth in such environments.



David Jones

The Nanofed team together with Magnus Gittins (CEO, Advance Nanotech, sixth from right) and three colleagues in the newly refurbished S111 laboratory in Chemistry – at the time of the first project quarterly review meeting.

Christmas came early for the Diamond group. Early December 2004 saw the announcement of a £1M collaborative project (NANOFED) with US company Advance Nanotech, to develop a new emissive display technology based on diamond dust. The Bristol team is led by Senior Research Fellow Dr Neil Fox, supported by Mike Ashfold and by David Cherns, Head of the Microstructures group in Physics.

Hard on the heels of this good news, the Royal Society announced a £152K award to Ashfold, May and Riley under its Royal Society Wolfson Laboratory Refurbishment Grants Scheme, to enable refurbishment of the laboratory environment available for the NANOFED and related diamond research.

IAN MANNERS TO JOIN THE SCHOOL OF CHEMISTRY

Professor Ian Manners, has accepted a position in the School of Chemistry as Professor and Chair of Inorganic, Macromolecular and Materials Chemistry in the Inorganic and Materials Chemistry Section.

Ian comes to us from the University of Toronto. His research interests are in the areas of main group chemistry of rings, chains and polymers, catalysis, functional metal-containing rings and polymers, supramolecular materials, and nanoscience.

His appointment is supported by the award of a Marie Curie Chair from the European Union and by a Royal Society Wolfson Research Merit Award.



STUDENTS WIN INDUSTRIAL PRIZES

■ The Society of Chemical Industry (SCI) Bristol and South West Section held its annual Prize Symposium at the end of 2004. The SCI Prizes were awarded to Zoe Roberts, Arthur Dabrowski and Zoe Schnepp, three students from the Chemistry with Industrial Experience degree programme who gave the best presentations at the Mike Rothwell Symposium in April last year. These students also gave their short talks again to the symposium audience.

TEACHING & LEARNING

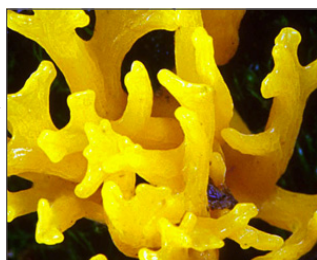
■ Dr Paul Wyatt and Dr Rich Pancost have won the Faculty of Science 2004 Teaching and "Rising Star" Awards, respectively.

■ Professor Andrew Orr-Ewing has been awarded the Clifford Wharton Prize for 2004. This prize is sponsored by an alumnus, Clifford himself, and is awarded annually to a member of staff to reward excellence in undergraduate teaching within the School of Chemistry.

MAGIC MUSHROOMS



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Many compounds used in human and veterinary medicine are derived from microorganisms – fungi and bacteria found in the environment. These compounds have made a very large impact on public health – from antibiotics discovered in the 1940s and 50s such as penicillin, to so-called lifestyle drugs such as lovastatin used to treat elevated cholesterol levels in the affluent West. These compounds are made by filamentous fungi – close relatives of mushrooms and the moulds we are familiar with in our own fridges! Until recently it was not well-understood how these organisms made such useful chemicals – this knowledge could allow the future production of new types of drugs and chemicals from fungi.

Recent research from the School of Chemistry, funded by

the EU, has made significant progress in addressing this area. In collaborative work, the groups of Professor Tom Simpson FRS and Dr Russell Cox in Chemistry, and Dr Colin Lazarus and Dr Andy Bailey in Biology have developed a rapid method for discovering genes in fungi which are involved in the synthesis of complex drug-like molecules. In a parallel development, they have also been able to transfer these newly discovered genes into host organisms and “switch the genes on”. The host organisms then make new compounds, directed by the new genes, which can be isolated, purified and identified. In this way they are beginning to understand the relationship between the gene-sequence and the chemical structure of the compounds produced. This is the first step in a longer programme to make genetic modifications in a rational way, in order to direct fungi to make desirable new compounds with important

biological properties – such as new antibiotics or drugs.

In addition, we have been successful in obtaining further funding worth €1.2 million from the EU to set up a Marie Curie Early Stage Training Centre. Led by Dr Russell Cox, the group includes Professors Tom Simpson and Chris Willis and Drs Matt Crump and John Crosby from Organic and Biological Chemistry, Dr Adrian Mulholland from Physical and Theoretical Chemistry and Dr Andrea Hadfield from Biochemistry. The Centre, known as BRISENZ, has funds for seven PhD students over four years and will investigate how enzymes from bacteria and fungi are involved in making biologically active compounds in these organisms.

This is an exciting development, bringing together different parts of the School of Chemistry, the School of Biological Sciences, and the Department of Biochemistry for an intensive and multidisciplinary research effort.

SCHOOLS LIAISON NETWORK

CHeMneT is an outreach programme run by Dr Dudley Shallcross, the School's Liaison Officer for the School of Chemistry. It was established in 2000 and has grown into a network of around 100 secondary schools. CHeMneT engages with teachers to provide teaching and learning opportunities in Chemistry for students (primarily in year 9-13). There is also an active primary school programme in general science. In all our events we work closely with teachers to ensure that our programmes are matched to students ability, needs and expectations. We also support

teachers continuing professional development and run masterclasses in spectroscopy and support the newly established MSc in Science Understanding, Research & Education (MSURE), a Masters course designed for teachers who have at least 3 years experience. MSURE is coordinated by the Graduate School of Education at the University of Bristol. In addition, CHeMneT runs courses with the recently opened Science Learning Centre South West (SLCSW). The SLCSW is a partnership between the Universities of Bristol and Plymouth and Explore@Bristol.

CHeMneT is free. If you would like your school to join the network please e-mail our secretary Sue Williams (sue.williams@bris.ac.uk) or liaison officer Dudley Shallcross (d.e.shallcross@bris.ac.uk), supplying your school's name, status (primary or secondary), address, telephone number and contact e-mail address. You will then be notified of forthcoming events and will be able to contribute to the development of new ones. Further information can be found on our new website at:

www.chm.bris.ac.uk/schools



David Jones

Dr Chris Wormald giving a Christmas Lecture on energy to nearly 300 year 12 and 13 students on December 12 and 13 students on December 17th 2004. The lecture was sponsored by the Royal Society of Chemistry and the EPSRC LASER Portfolio Award.