

Reactions

Issue 4 | Autumn 2008



Chemistry and art working together, page 7

Chemistry for our Future (CFOF) held its second National Conference at the Aston University Business School on 1 July 2008. Nearly 100 delegates attended the event representing **CFOF** partners, the Higher Education Funding Council for England (HEFCE), Aimhigher, schools and colleges, industry and universities.

Bill Rammell MP (Minister of State for Lifelong Learning, Further and Higher Education) provided a pre-recorded speech for the opening presentation in which he outlined how **CFOF** fits into the wider context of provision for Strategically Important and Vulnerable Subjects (SIVS).

The morning presentations reflected the variety of projects being undertaken as part of **CFOF** and how they link to each other, including **Chemistry: The Next Generation (CTNG)**, the **Teacher Fellowship** scheme and higher education curriculum development.

Chris Milward from HEFCE outlined the HEFCE approach to SIVS.

The afternoon session gave delegates the opportunity to discuss a variety of issues in a series of workshops, covering areas such as using interactive tools in engaging students, maths for chemists and outreach through using university laboratories.

The conference closed with the launch of the **Discover Chemistry** initiative, by the RSC Chief Executive Richard Pike. **Discover Chemistry**, a Pfizer funded programme, is a three year initiative aimed at ensuring existing programmes in schools and colleges equip young people with the skills required for a future career in chemistry. It will build on current education provisions to design new programmes and will fully compliment **CFOF** activities.

The presentations from the conference are available on the RSC website at <http://www.rsc.org/Education/CFOF/SBP/NC/2ndCFOFconf.asp>



Towards a future in science

In one of its major cross-cutting themes **CFOF** is committed to ensuring schools have access to high quality careers information and resources.

As part of this continued commitment **CFOF** – with support from UCAS, Careers from Science and Futuremorph hosted a careers event in London in

June 2008 aimed at teachers, Connexions staff and school careers advisers. The event provided attendees with an unique insight into the vast range of careers available with a science qualification and the diverse range of HE courses that are possible. It also gave delegates the opportunity to meet academics and industrialists to discuss issues such as careers in science, university applications, work-experience and accessing up-to-date labour market information.

The **CFOF** programme also involves showing school students how the

chemical sciences impact on their lives, the wide range of careers that is available with a chemical sciences qualification and which courses are available at universities. **CFOF** ran three careers events for school students in Norwich, Paignton and Birmingham. The events included talks and demonstrations, and students also had the opportunity to talk to chemists from a range of different jobs.

The feedback from all of the events has been very positive and **CFOF** will use this to further develop these events in 2009.



Chemistry initiative, an outreach programme based on **SIAS** is being set-up at the University of East Anglia. Activities are being developed for both GCSE and A-level students and will include practical experiments with spectroscopy and chromatography as well as an introduction to the 3D visualisation of molecules.

It is important to continue to publicise the **SIAS** project and on 7 March 2009 University College London is hosting the UCL/London Chemistry Teachers Consortium (LCTC) symposium for chemistry teachers where, along with many other activities, there will be a presentation about **SIAS** in London and a demonstration of the equipment www.chem.ucl.ac.uk/schools/events.html#teacherssymp

An accompanying website *SpectraSchool* www.le.ac.uk/spectraschool has also been developed to support the **SIAS** initiative and is in its second phase of development, with the aim to re-launch the updated site at the Association for Science Education (ASE) Annual Conference in January 2009.

Taking spectroscopy into schools

Over the past 12 months **Spectroscopy in a Suitcase (SIAS)** has been providing schools and colleges with access to state-of-the-art spectroscopy equipment; contextualising the subject, bringing it to life and engaging both GCSE and A-level students.

To date **SIAS** has interacted with over 1000 students from over 20 schools in London, the East Midlands and the North East of England.

The pilot phase of the **CFOF** initiative ended in August 2008 and funding for the extension phase – September 2008 – July 2009 – will continue to support **SIAS**. During this time **SIAS** equipment will be located at universities in London, the East Midlands, the South East and the North

East. The challenging hands-on experiments give students the opportunity to learn about modern spectroscopy in an exciting context. The equipment available to schools includes optical spectrometers, UV-Visible spectrometers, infrared spectrometers and a time-of-flight mass spectrometer. The activities that have been done include using IR and UV in a forensic investigation and using UV to analyse food dyes.

As part of the RSC/Pfizer **Discover**

Factors affecting chemical science careers

Important cross-cutting themes of the **CFOF** programme focus on careers advice and guidance and sharing good practice in all strands of the programme.

In October 2007, as part of this continuing effort, CFOF commissioned a team from the Institute of Employment Research, led by Professor Kate Purcell and including input from Dr Charlie Ball at the Higher Education Services Unit, to investigate the factors affecting the employment of chemical science graduates in the UK. The investigation looked at data already

available from secondary sources and initiated three new investigations:

- An on-line survey of final year undergraduates.
- Interviews with a sample of second year chemical science students included in the **Futuretrack** research programme.
- A telephone survey of employers that had advertised specifically for

chemical science graduates, or where both undergraduate and postgraduate chemical science students were eligible to apply.

The overall objective of the research is to map the characteristics and variables that influence the careers of chemical science graduates and the extent to which they satisfy employers' demands for graduates with the right skills and qualifications.

The full report will be published by the end of 2008 and will be available on the RSC website: <http://www.rsc.org/Education/CFOF/index.asp>

What's the way forward for Bologna?

The RSC, as part of **CFOF**, has been involved in a two-year project to investigate the views UK chemistry departments have on the Bologna Process and how these views might form a compelling strategy to present to UK funding bodies.

A SWOT (strengths, weaknesses, opportunities and threats) evaluation was performed as part of the project, which involved visiting selected UK university chemistry departments. Eleven chemistry departments were chosen on the basis of their size, their teaching figures and whether they offered full or part-time study. SWOT workshops were run in January 2008 and participants provided open and honest perspectives on the Bologna Process. Large amounts of data were collected and a number of key findings and concerns were raised.

Initial findings suggest that institutions feel that to fully align with the Bologna Process there needs to be significant

‘I was impressed with the openness of our colleagues to explore the range of possibilities concerning responses to the Bologna Process.’ Dr M Rawlins

increases in both funding and resources, both of which are major hurdles. Institutions also believe that the incorporation of an extra-year into the current system, at Masters level, will place additional pressure on existing infrastructures and staffing. Universities want a consistent approach to the Bologna Process where the UK chemistry community moves forward as a cohesive group.

Dr Mike Rawlins, the SWOT facilitator, commented, ‘I was impressed with the openness of our colleagues to explore the range of possibilities concerning responses to the Bologna Process. John (Murrell) and I picked up a strong desire from the departments we visited to create a robust and coherent “chemistry UK” approach that would enable the UK to maintain and improve its competitive academic standing in the world’.

The final report will be available on the RSC website in autumn 2008.



Get in touch...

Chemistry: The Next Generation (CTNG) has been growing in strength and numbers since it began in 2004. We are now very proud that local teachers see the **CTNG** logo as a stamp of quality and will go direct to the Regional Coordinators when looking for chemistry outreach. For **CTNG** enquiries please contact Kate Burrell (burrellk@rsc.org) or get in touch with your Regional Coordinator.



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‘I liked it that we were all involved in the activities and we had a general look at what happens in Pfizer.’ Student

‘A big thanks for organising a fantastic chemistry workshop. Our pupils (and staff) thoroughly enjoyed the event.’ Teacher

‘Excellent day of science, many thanks.’ Teacher

‘[The students] were very impressed by the trip to Pfizer itself. For some it may have been their first experience of the workplace.’ Teacher



Creating chemistry

In July Pfizer Global R&D hosted **Creating Chemistry** in partnership with the **Chemistry: The Next Generation (CTNG)** south east region and COGENT sector skills council.

The event was organised by the south east **CTNG** Regional Coordinator Jenny Hider, and Pfizer’s Associate Director of Public Affairs/Academic Liaison, James Graham, and involved over 140 Year 8 students from 15 schools across South East England.

The event was opened by ex-Pfizer employee and South Thanet MP, Dr Stephen Ladyman.

The students were treated to a range of exciting interactive demonstrations presented by scientists from the

universities of Surrey, Sussex, Southampton, Reading and Oxford. The day began with a demonstration lecture by Prof Gill Reid from the University of Southampton that included experiments with molecules and coloured flames. The hands-on activities included electroplating a bookmark, making polymers and a forensic investigation with paper chromatography.

The students had the opportunity to visit Pfizer’s state-of-the-art research facility where they got first hand experience of an industrial laboratory, heard how 3D visualisation helps in discovering new medicines and took part in an interactive quiz using hand-held response units. The teachers were also catered for and took time out to share their experiences and learn about new chemistry education resources.

‘It was an absolutely brilliant day.’ Student



Mission to Mars



CTNG recently collaborated with several departments from the University of Leicester, Genetics Education Networking for Innovation and Excellence (GENIE) and the Colleges-University of Leicester Network (CULN) on a STEM-based activity for A-level students.

The activity – based around the theme of a Mars Lander – challenged the students from two local schools to explore the physics, engineering, chemistry and genetics involved in staging such a mission.

The day started in the Physics and Astronomy department with students thinking about the physics of how to get to Mars, including escape velocity, launch windows etc. Students also had the opportunity to use a remote control robot on a simulated martian surface. Moving to the Engineering department

the students had the chance to drive remote controlled vehicles to collect dust samples and then think about the best design for an effective and reliable Mars Lander. The samples collected were then analysed in the Chemistry department using IR spectroscopy, NMR spectrometry and atomic absorption spectroscopy to confirm the presence of metals and possible examples of the chemical precursors to life.

The final hands-on session – in the GENIE Centre for Excellence in Teaching and Learning – was used to

investigate the possibility of finding evidence of life on Mars by looking for DNA in samples using a Polymerase Chain Reaction (PCR). The day finished with an inspiring lecture – Is there life or was there life on Mars? – by Dr Daniel Thompson from the Space Research Centre.

The event offered the students the opportunity to work across a variety of disciplines giving them an insight into the type of collaboration that is needed to launch a successful mission to Mars.

Chemistry and art working together

Silicone fish, body art inspired by carbon allotropes and pneumatic structures were among some of the experiences shared by 60 Year 9 students from Aimhigher schools in London at this year's Synthesis: Art and Chemistry summer school.

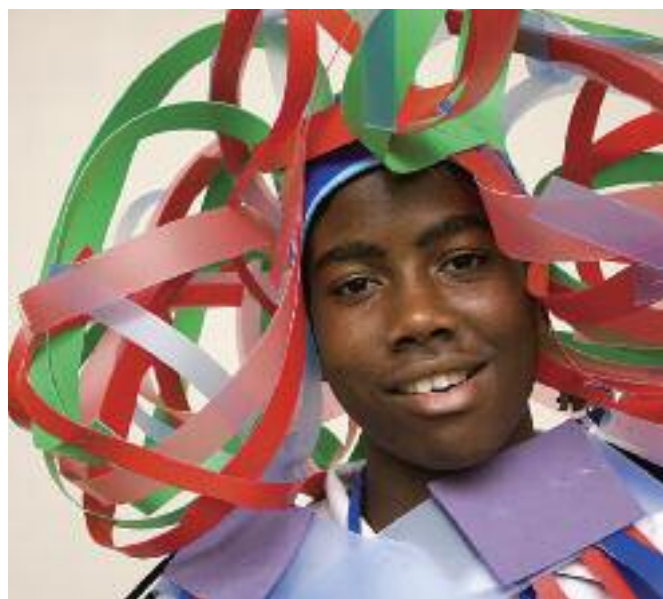
CTNG supported the event in collaboration with University of the Arts London (UAL), Young @ Art, Imperial College (IC) and University College London (UCL). Students enjoyed three days of hands-on workshops, challenges, a demonstration lecture and plenty of fun activities, successfully illustrating the artistic side of chemistry.

Alethea Tabor (UCL), Jacqueline Cullen and Rebecca Chitty (UAL) delivered a workshop about building molecules, exploring repeating units in three-dimensional space from both chemistry and visual arts.

The silicone workshop was presented by Dan Martin (UAL) and Dora Tang (IC), where the students experimented with thermochromic pigments and silicones, and were given problem solving activities to make a finished three-dimensional puzzle.

As well as the student event there were also one day workshops for science and art teachers on cosmetic science presented by Gabriela Daniels, London College of Fashion and life-casting presented by Paul Carey, Wimbledon College.

The event finished with an exhibition, including a catwalk show of the students' original body art. This was attended by parents, teachers and all those involved over the course of the three days.



‘Many thanks for a thoroughly enjoyable workshop. I can honestly say it was the best one I have attended in my teaching career.’

Teacher from La Sainte Union School.



‘Nothing could be improved everything was first class.’ Student





New resources

Last year a series of resources aimed at 5–18 year olds was developed from the **CTNG** programme. These resources are intended to be a guide for industrialists and academics to deliver tried and tested outreach activities, which were initially run in London, the North West and the East Midlands. The resources cover activities such as Aspirin, The wonder drug; Making your own electrochromic polymer; and Murder in the lab; and provide detailed practical and financial information on organising the event and the resources that are required.

CTNG will continue to be an integral part of the **CFOF** initiative during the extension phase (September 2008 – July 2009) and so more resources are being developed from events that have been running in the six **CTNG** regions.

New resources available in autumn 2008:

- *Synthesis and spectroscopy*
- *Year 9 chemistry day – Chemistry of very large molecules*
- *The salt cellar mystery – A forensics investigation*

Future resources will include *The Chemistry of dentistry*, *Colour chemistry* and *Snap, crackle and snot*.

The current resources are available on the RSC website at www.rsc.org/Education/CFOF/CTNG/CTNGresourcepacks.asp

Ionic Sudoku puzzle

In ionic Sudoku you need to use logic to work out the formulae of the compounds in the blank squares.

Every row, column and 2 x 2 box contains a chloride, and compound where the negative ion (anion) is X^{a-} , Y^{b-} and Z^{c-} . You will need to deduce the magnitude of the charges a, b, c etc.

Each 2 x 2 box is based on compounds with the **same positive ion** – eg the top left box contains compounds containing Na^+ . You will need to work out the charge on the positive ion in the other cases. (**Hint: You can work out the charge from the formula of a compound if you know the charge of the anion.**)

NaZ			Mn_3Y_2
			MnX
	ScZ_3		$HgCl_2$
	ScY		

(Hint: Start by working out the charges of all the ions, do this before filling in any boxes.)