

# Bristol ChemLabS

A Centre for Excellence in Teaching and Learning

Annual Report 2007–08



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# 1. Introduction

*Nick Norman*

Since the last Bristol ChemLabS Advisory Board Meeting a year ago, much has happened including the publication of the Bristol ChemLabS CETL Interim Review 2005-2007. This 'glossy' report was based on the Second ChemLabS Annual Report, which was produced for the previous Advisory Board Meeting and provides a comprehensive account of all of Bristol ChemLabS activities to date. Copies can be downloaded from <http://www.chemlabs.bris.ac.uk/Publications>. Also produced this last year was the University of Bristol CETL Interim Evaluation Report prepared by the University's Education Support Unit for submission to HEFCE; a PDF version can also be downloaded from the weblink above. This self-evaluation report combines information about the progress of both the ChemLabS and the AIMS CETLs particularly in terms of how well they have met their stated objectives. More information is provided in Section 5 on Evaluation.

A number of high profile events and visits have taken place in the last year most notably the official opening of the ChemLabS and AIMS CETLs by Professor David Eastwood, CEO of HEFCE, and Professor Eric Thomas, Vice Chancellor of the University of Bristol, on 21 November 2007. Other visitors to Bristol ChemLabS included our local MP Stephen Williams, the Rt Hon John Denham MP, Secretary of State for the Department of Innovation, Universities and Skills (DIUS), and Sir Keith O'Nions, Director General of Science and Innovation also based at DIUS. Sir Keith was sufficiently impressed with the sustainable Outreach activities being carried out by Bristol ChemLabS to have asked for a Case Study to be prepared for wider dissemination within DIUS.

Since Bristol ChemLabS is now more than halfway through the period of HEFCE funding, it was decided that an 'Away Day' would be useful in order to map out strategies for the future. A number of outcomes and actions were agreed when this event took place in January, with a view to reporting on the status of each action at this meeting of the ChemLabS Advisory Board. They were as follows:

1. The preparation of a plan for dissemination of ChemLabS educational developments including identification of selected departments to trial aspects of the DLM, to be ready and in place by the end of the current academic session
2. Drawing up of a list of key influential visitors to invite to visit ChemLabS (some in association with AIMS)
3. The preparation of a detailed and fully costed business plan for all Outreach activities with projections of up to 5 years, to be ready by Easter
4. The preparation of a detailed and fully costed business plan for all ChemLabS activities with projections of up to 5 years, to be ready and in place by August 2008
5. A review to be carried out of all levels of personnel support for the labs (laboratory managers, technical staff, secretarial staff) and recommendations made for new appointments as deemed necessary, to be ready by Easter
6. Teaching Laboratory Managers to prepare an annual statement of likely laboratory costs including projected capital replacement costs

Item 1 is addressed in Section 4, which focuses on all of Bristol ChemLabS educational activities, and item 2 is an ongoing action. Items 3-6 all relate to the long term financial sustainability of Bristol ChemLabS beyond the period of the HEFCE recurrent funding stream and form part of the overall financial strategy embodied in item 4. Thus a detailed financial/business plan for the entire Bristol ChemLabS/School of Chemistry Teaching Laboratory operation is being prepared which will seek to identify all costs (on a fEC basis) and also to identify all sources of revenue. In the latter case, this will include a proportion of the School's HEFCE grant for teaching and student fee income as well as funds raised through sponsorship and commercial activities (see Section 6).

Outreach continues to expand in both scope and volume led by Outreach Director Dudley Shallcross and School Teacher Fellow Tim Harrison. The outcome of item 3 above will enable all Outreach activities to be fully costed in order that they can be carried out sustainably in the long term. It is this model which was so attractive to Sir Keith O'Nions.

## 2. Teaching and Learning

*Paul Wyatt*

### **DLM Level 1**

All of the videos for Level 1 were reshot over the summer in 2007. This allowed us to refine the videos generally, shoot them in the new fume cupboards and show the laboratory workers making manipulations without gloves. Prelab tests have been updated and reviewed (more questions were added). New experiments, which didn't run last year, are running this year for the first time. Some simulations are being modified to reflect new apparatus (e.g. the N<sub>2</sub>O<sub>4</sub> experiment and the vapour pressure of methanol)

### **DLM Level 2**

The Level 2 DLM is now complete but some updates and modifications are still being made. Many of the new simulations transparently display a greater level of complexity than the Level 1 simulations. Cross-Sectional meetings were held to identify the range of simulations that were needed for the whole laboratory. Individuals met as necessary to explain the simulations to John Eastman of Learning Science Ltd. Efficiency was gained as unnecessary Sectional divisions were removed. For example, the Inorganic and Organic Sections met to converge their practices with a double-manifold vacuum line. With this agreed, only one simulation needed to be produced. Not only was this sensible from an efficiency point of view, it also made sense educationally.

### **DLM Level 3**

Construction of the DLM for Level 3 is underway. This will contain more sophisticated techniques (e.g. flash chromatography, 2D TLC), general simulations (NMR spectroscopy) and simulations of specific equipment. A useful feature to be incorporated into the DLM would be a system for booking equipment. Monitoring safety is more complicated at Level 3 since students are expected to complete their own COSHH forms (rather than answer a set of online questions) and have free rein over the experiments they undertake. Discussion is underway to find the best way to solve this problem.

### **Hardware**

The video projectors have been working since October 2007 both in the tutorial area and in the laboratories themselves. The level of provision of PCs has been investigated at Level 2. In synthetic areas, where the level of provision is one PC per student, it has been found that the PCs tend to go unused and that a ratio of 3 : 1 students : PC tends to work better. For non-synthetic experiments the ratio of 1 : 1 is maintained.

### **Level 2**

The new Level 2 course is now underway. The DLM and the 'red box/green box' system for safety is now operating. Students only have one attempt at the prelab test but still two attempts at safety. Students who do not complete the test in advance of the lab are sent away to do it before they allowed back to the lab.

### **Level 2 Techniques Course**

The new Techniques Course began in October 2007. Some of the skills which were previously introduced in the Level 2 Techniques Course were found to be rather trivial by students and were moved to the 1A course last year (the introduction to Word, ChemDraw and Excel). Several entirely new components including Molecular Modeling (which uses Spartan) and a Scientific Writing course, to support laboratory report writing, take the place of those that have been removed, while other aspects of the Techniques Course have been updated.

### **Level 3 Experiments 2007**

The new Level 3 integrated laboratory began in October 2007 complete with the new timetable and operating procedures. Although the Sectional differences at Level 3 tend to be more pronounced than at levels 1 and 2, the Working Party remained committed to the development of the laboratory as a whole and converging Sectional practice where possible to make sensible use of resources. Many of the experiments are entirely new but several others will be replaced in the 2008/9 session together with new equipment. As with Level 2 last year, students were employed over the summer to help develop some of the new experiments for Level 3.

Demonstrator cover is working well (2 postgrads, 1 staff member and a laboratory manager). Students are being less herded as they are left to their own devices. Demonstrators are tending to work in a cross-sectional manner too and not restricting themselves to their particular area of expertise. In-lab marking has been very challenging for demonstrators and more detailed information is really needed for demonstrators if this is to work as smoothly as it does at Level 2. There are now 40 students in the lab

but initially, due to the way the timetable worked with the computational experiments, 20 were in place at the start of the lab. The policing of students so that they do only two experiments at a time is working but is not being monitored electronically in any way. There has been some discussion about whether this might be organised via the DLM in future.

### **Level 3 Experiments 2008**

Experiments, and the equipment necessary for those experiments, have been identified and this development is ongoing. The ability to drive this matter forwards, crucially in the area of equipment tenders, is limited by the time available to Tom Podesta but some new equipment is now in the School of Chemistry ready for October 2008 – most notably the teaching-dedicated 400 MHz NMR machine.

### **Evaluation**

Questionnaires were circulated in the laboratories to levels 1 and 2. These questionnaires probed the students on laboratory experience in more depth than the usual questionnaires and asked, for example, whether students felt they were prepared for the laboratory session and whether they felt PhD demonstrators enjoyed demonstrating. Post-mortem sessions were held in the last two weeks of term for both levels 1 & 2. Everyone involved had the opportunity to comment on how the year had gone and make suggestions for improvements next year. Input was from students, staff and PhD demonstrators, technicians and the laboratory managers. Several changes were made as a result. For example, demonstrators in the 1A laboratory now arrive 15 minutes before the start to provide face-to-face feedback to students from the previous week.

### 3. Outreach

*Tim Harrison and Dudley Shallcross*

#### International Outreach

##### To Singapore

In December 2007, Bristol ChemLabS, in association with Assistant Professor Chuah Gaik Kuan of the National University of Singapore (NUS), took an outreach team of Tim Harrison and three postgraduates to Singapore to work with Singaporean students aged 13-17 in a series of two- and one-day 'winter schools'. For further details see our website ([http://www.chemlabs.bris.ac.uk/outreach/chemnet/Chemnet\\_Singapore\\_report07.html](http://www.chemlabs.bris.ac.uk/outreach/chemnet/Chemnet_Singapore_report07.html)) and the University's News website (<http://www.bris.ac.uk/news/2008/5761.html>). The team worked alongside academic staff from NUS and some postgraduates and a post-doctoral research assistant to deliver practical work and lectures developed at Bristol. This exercise is expected to be repeated in December 2009. It is hoped that the experience will eventually lead to a self-sustaining outreach programme in Singapore. All activities were financed by NUS (travel, accommodation etc.) except Tim Harrison's time. As a pilot scheme this was acceptable. In future years Tim Harrison's time will also be costed into the project.

##### From Singapore

Plans are underway to host a pilot summer school for Singaporean students at the University of Bristol in July 2008, with students from Raffles Junior College plus other potential Junior Colleges. Once this summer school has been confirmed we will invite the Singaporean ambassador to visit and Dudley Shallcross will liaise with Barry Taylor regarding University of Bristol logistics associated with such a visit.

##### Turkey

A delegation of four Turkish academics and a representative of the Turkish Ministry of Education under the leadership of Dr Mustafa Erol visited Bristol ChemLabS in February 2008 for one week. This visit was to gain an understanding of the outreach capability of Bristol ChemLabS and AIMS in delivering (1) practical science to rural primary (7-14) schools in central Turkey and (2) teacher training for those teachers involved. Bristol ChemLabS has been invited to give lectures on outreach in a number of Turkish HEIs in 2009.

For further details see our website (<http://www.chemlabs.bris.ac.uk/outreach/News/>) or the University's News website (<http://www.bristol.ac.uk/news/2008/5819.html>).

##### Slovenia

Following a visit by Dr Nataša Gros of Ljubljana University, Slovenia plans are underway for EU funded work on practical chemistry and teacher training using an inexpensive version of UV-visible spectrometers. The University of Bristol is to be one of 3 partners in this project.

##### India

After a request from Julian Eastoe, Tim Harrison visited Professor Sarkar of the Indian Association for the Cultivation of Science (IACS) in Calcutta. The IACS is India's oldest science Institution. It recently revived its desire to participate in schools outreach work after several decades of not doing so. Tim Harrison presented Bristol ChemLabS outreach work to several of the department and to Calcutta's first meeting of the equivalent of CHeMneT. Here the interest in having a summer school at Bristol was deemed appropriate with IACS to find funding for 2009. An invitation to present a week of outreach lecture demos in October/November (Calcutta) and December (New Delhi) for schools and undergraduates by Tim Harrison and/or Dudley Shallcross and some postgraduates in the region was made. IACS will fund this through their own sources while the group in New Delhi will approach UKIERI. Dudley Shallcross will approach the Indian High Commission to discuss these possibilities.

##### Malta

A very successful week-long visit to Malta was made in October where Tim Harrison and Dudley Shallcross lectured to more than half the senior school chemists in the country in 10 lectures and gave an evening of teacher training on climate change. This has resulted in a request to go back and complete the task in late 2009. There has also been a request by the University of Malta to spend a day in teacher training of practical work with their B.Ed. Science teachers. As a result of the visit a party of

27 post 16 students will be joining the Bristol Trinity Summer School in July 2009. Dudley Shallcross will invite the Maltese Ambassador to visit during this event (liaising with Barry Taylor).

### **Hungary**

A plan to work with Etvos University, Budapest in joint teacher training in practical Chemistry and in Outreach activities have been set back to 2009 at Etvos University's request.

### **Brunei**

Plans to adopt and adapt Bristol ChemLabS outreach activities and deliver them in Brunei are in hand. The MSc SURE course student body has a representative of the Brunei Ministry of Education's Science, Technology and Environment Partnership (STEP) Centre, Jauyah Tuah. Her dissertation is on how to transplant Bristol ChemLabS ideas into Brunei Darussalam. A visit by Bristol ChemLabS outreach has already been muted for 2009.

### **Jersey**

Whether Jersey should be classed as domestic or international is debatable. In late March a team from Bristol ChemLabS and AIMS will engage in a week-long outreach onslaught on the island. There are to be five days of primary science workshops, twenty lecture-demonstrations for secondary schools, a teacher training evening session and a week's use of the Mobile Teaching Unit by AIMS for both primary and secondary schools. In effect Bristol ChemLabS and AIMS have created a Science Week for Jersey. Jersey's Education Department is paying for the whole operation.

## **Domestic Outreach**

### **Primary Schools**

The level of participation in primary schools' 'Science Days' continues to grow. Dr Alison Rivett is to take over primary science days completely from the end of March. The demand for such activity continues to rise with schools already making repeat bookings. Plans are underway to train postgraduates from other departments to work in primary schools.

The first ever conference for primary school students (Y5 & 6) was held in February for around a hundred students with their teachers or parents. This was organised in conjunction with an officer from Bristol Child Services. It is expected that this is the first of a series of termly conferences.

Chem@rt 2008 has commenced.

### **Secondary Schools – External Work**

Activities continue to grow. Performances of 'A Pollutant's Tale' in all its formats are estimated to have easily passed 200! Schools are increasingly keen to host these lectures for multiple performances. Bristol ChemLabS' ability to take postgraduates out to give additional lecturettes to make up a 'mobile schools' conferences' is also beginning to find a warm welcome. [This is potentially a massive advertising strategy to promote Bristol Science]. A big investment has been made into building on the perfume chemistry workshops from last year.

### **Secondary Schools – Internal Work**

The use of our undergraduate teaching labs for the Open Laboratories Programme has hit the limits of what is possible with current technical staffing levels. A basic menu of workshops has been devised and equipped and is being polished. The addition of the electronic voting system equipment (clickers) to the workshops to obtain pre- and post- event feedback will augment the visits. Schools' conferences continue to be well attended.

Work has commenced on the A-Level version of the Dynamic Laboratory Manual (DLM). It is hoped that a six-experiment AS-Level version will be available from September 2008. Tim Harrison and Dudley Shallcross are investing considerable time in this activity and are drawing on CHeMneT for rapid and expert feedback.

A second lecture-demonstration on kinetics is being planned for a launch in the summer. Lecture demonstrations are increasingly in demand and schools are covering at least basic costs.

### **Working with AIMS**

Bristol ChemLabS continues to liaise closely with AIMS on joint outreach planning and activities at both primary and secondary school level.

## **Working with the Wider Community**

Adult taster days are being developed but are not the main priority at present, Dudley Shallcross continues to develop workshops for visually impaired adults and obtained a small seed corn grant to develop two workshops in collaboration with the National Science Learning Centre.

The first visit by members of the Womens' Institute is to take place in the summer term. The visit will involve a workshop on some consumer chemistry and talks by postgraduates.

We continue to support the seven RSC School Teacher Fellows (STFs) and Dr David Read, the STF at Southampton University.

## **Finance**

A general grant application to EPSRC received very favourable reviews and we await the outcome from the panel.

A separate application to EPSRC for Chem@rt funding received two 'outstanding' and two 'adequate' reviews, the 'adequate' reviews were because they were unclear on how we would liaise with so many schools. This is easily answered and was described in the bid, Tim Harrison and Dudley Shallcross will reformulate the bid and resubmit it for the next EPSRC Public Understanding of Science (PUS) round in July.

A number of other grants have been applied for, e.g. Wellcome and Drapers Trust.

In addition to Chem@rt we will also be applying to EPSRC to sponsor outreach to visually impaired adults for their July round.

We already have CfoF support for the laboratory programme, though there are difficulties obtaining the money and this has caused the outreach budget to be overspent this year and for there to be unnecessary problems with cash flow.

## **Publications**

Articles on outreach and for schools continue to be written and published. A list, including those produced with postgraduates, may be found on <http://www.chemlabs.bris.ac.uk/Publications>.

## **4. Dissemination and Publicity**

*Dr David Smith*

Bristol ChemLabS continues to receive regular visits from individuals and parties from across the wider scientific and educational community. Highlights have included the visit of Professor David Eastwood, as part of the joint Bristol ChemLabS–AIMS opening event and visits from MP Stephen Williams, the Rt Hon John Denham MP, Secretary of State for the Department of Innovation, Universities and Skills (DIUS), and Sir Keith O’Nions, Director General of Science and Innovation also based at DIUS. Bristol ChemLabS has also hosted a meeting from a delegation from the Open University who are interested in making use of the CETLs facilities and resources for residential summer schools. All visits are documented in Appendix 2 that accompanies this annual report.

Presentations on the Bristol ChemLabS project have also been given by Professor Norman and Dr Smith at the November Heads of Chemistry (HCUK) Meeting and at a Learning and Teaching Away Day organized by the Department of Chemistry at the University of Edinburgh. Both presentations were very well received and have led to further discussions on how aspects of the project can be adopted at other institutions.

Dr Podesta and Dr Smith have also agreed to lead sessions at a forthcoming two-day workshop, organised by the Biological Sciences Subject Centre of the Higher Education Academy and sponsored by AstraZeneca, on reinvigorating practical teaching in the Biological Sciences.

Articles on the Bristol ChemLabS project and the challenge of funding outreach activities are currently in preparation for publication in *Education in Chemistry*.

## 5. Finance

*Nick Norman*

A spreadsheet showing ChemLabS CETL recurrent funding spending for Years 1 and 2 and estimates for Year 3 is provided in Table 1.

**Table 1.**

<b>Bristol ChemLabS (CETL)</b>	<b>CETL Year</b>			<b>Total spends to date</b>
	<b>1</b>	<b>2</b>	<b>3</b>	
	<b>01/04/05 31/3/06</b>	<b>01/04/06 31/3/07</b>	<b>01/04/07 31/3/08</b>	

### **Staff Expenditure**

University Teaching Fellow	15000	15000	15000	45000
University Teaching Fellow	8638	24496	21100	54234
Teacher / Outreach Fellows	28399	50470	54500	133369
CETL Manager	31619	51716	53130	136465
Secretary/administrator	14243	23567	25498	63308
Evaluators/Academic Auditor	46	0	627	673
CETL Chief Exec honorarium	2796	3942	4108	10846
CETL Director honorarium	1902	2129	2295	6326
CETL Chief Executive research support	10991	25259	29110	65360
CETL Director research support	11467	30938	32053	74458
Teaching Laboratory manager	18839	34710	37261	90810
Teaching Laboratory manager	9387	9697	9963	29047
Technical staff	36000	46313	47702	130015
Indirect cost	97000	0	0	97000

### **Non Staff Expenditure**

IT development and maintenance	119151	140677	252035	511863
lab costs (School)	15900	15000	20000	50900
IT Infrastructure costs	6130	474	2358	8962
Office/Administration costs (CETL)	18547	7406	4277	30230
Office/Administration costs (School)	5249	3461	3565	12275
Travel/Entertainment	0	1577	5305	6882
Audit (Finance Office)	2000	2000	2000	6000
Dissemination/Publicity	6527	4054	8854	19435
Outreach	24939	35812	37242	97993
<b>Total Expenditure</b>	<b>484770</b>	<b>528698</b>	<b>667983</b>	<b>1681451</b>

Total Recurrent Funding	500000	500000	500000
<b>Running Balance</b>	<b>15230</b>	<b>-13468</b>	<b>-181451</b>

## 6. Financial Support and Commercial Activities

*Nick Norman*

### Financial Support

- The two confirmed agreements to date are with Shimadzu UK and Sigma-Aldrich, who have pledged £50,000 and £25,000 respectively over a five year period. Gift recognition agreements have been signed with both Companies making explicit what benefits accrue to them as a result of this level of financial support. All such activities are carried out in consultation with the University of Bristol Campaigns and Alumni Relations Office and with reference to the fact that Bristol ChemLabS is one of the University of Bristol 2009 Centenary Campaign Projects.
- Negotiations are continuing with other Companies of this type which can be classed as 'suppliers' either of instrumentation or consumables.
- Negotiations are also continuing with many of the large pharmaceutical Companies for sponsorship of ChemLabS activities generally.
- A number of gifts from Alumni have also been received including both regular donations and more occasional larger gifts. In total, this is currently in excess of £10,000.

### Commercial Activities

- In September 2007, a training course was run for 30 industrial placement students from GSK (Stevenage and Harlow), for which the full economic cost of the course was recovered in the price charged along with £7,000 'profit', which was counted against a GSK financial support target. At this time, a verbal agreement has been reached to run a similar course for summer 2008 and negotiations are currently underway with regard to both the content of the course and financial remuneration.
- Plans are being discussed to offer similar training courses to other Companies.
- A contract is close to being signed between the University of Bristol (acting for Bristol ChemLabS) and Learning Science Ltd (the Company which has developed the Dynamic Laboratory Manual, DLM) to develop and market to schools an A-Level version of the DLM. Learning Science will handle development, marketing, sales and after sales service with Bristol ChemLabS, primarily through the Outreach Team, who will provide content, act as consultants and make available the resources of their CHeMneT schools network. Bristol ChemLabS will receive a share of the revenue of sales. A Memorandum of Understanding is also being constructed which will relate to future markets (e.g. overseas) and products (e.g. a GCSE version).

### Business Plan

A detailed Business Plan is currently being constructed which will seek to identify all of the costs associated with the running of Bristol ChemLabS (by which is now meant the entire Teaching Laboratory operation of the School of Chemistry) along fEC lines. All sources of income will be identified including those noted above, a proportion of student fee income and a proportion of the School of Chemistry HEFCE grant for teaching. A detailed and fully costed Outreach Business Plan is also being prepared as part of this process.

It is expected that ChemLabS operations will run under this Business Plan from August 2008 which is seen as crucial in the ambition to become financially sustainable in the long term.

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## Appendix 1: Membership of Boards and Committees

### Membership of Bristol ChemLabS Management Board

Chair: Head of School of Chemistry	Prof T C Gallagher (SoC)
Bristol ChemLabS Chief Executive	Prof N C Norman (SoC)
Bristol ChemLabS Director	Dr P J Wyatt (SoC)
Bristol ChemLabS Outreach Director	Prof D E Shallcross (SoC)
Bristol ChemLabS Manager	Dr D M Smith (SoC)
School of Chemistry Director of Administration	Dr D W Thompson (SoC)
School of Chemistry Director of Undergraduate Studies	Dr P J Wyatt (SoC)
University Teacher Fellow	Dr R J Cox (SoC)
School Teacher Fellow	Mr T G Harrison (SoC)
Director of Graduate School of Chemistry	Prof A J Orr-Ewing (SoC)
Teaching Laboratory Managers	Dr T M Obey (SoC)
	Dr T J Podesta (SoC)
Student representatives (from SSLC and GSC)	Mr J Elsworth (PG, SoC)
	Miss J Vickery (PG, SoC)
	Miss J Howells (UG, SoC)
	Miss L Smith (UG, SoC)
Director of the Education Support Unit	Ms G Clarke (ESU)
Faculty of Science Education Director	Mr J Bailey (SoGS)
Senior representative of Graduate School of Education (GSoE)	Dr S Erduran (GSoE)
Representative of HEA Subject Centre in Physical Sciences	Mr P Chin (HEA)
Chief Executive of the University of Bristol AIMS CETL	Prof J Harris (AIMS)
Academic Director of E-Learning	Dr J Davis (ESU)

PG = postgraduate, UG = undergraduate, SoGS = School of Geographical Sciences, SSLC = Staff-Student Liaison Committee, GSC = Graduate School Committee, AIMS = Applied and Integrated Medical Sciences. DCE = Department of Civil Engineering.

### Membership of Bristol ChemLabS Advisory Board

Pro-Vice Chancellor for Education, University of Bristol	Professor A E Waterman-Pearson
Dean of Faculty of Science, University of Bristol	Professor A G Orpen
Royal Society of Chemistry	Mrs L Steele
Society of Chemical Industry	Mr A Ladds
School of Chemistry Industrial Advisory Board	Dr D Lathbury (AstraZeneca)
Chair of HCUK (Heads of Chemistry UK)	Professor S Chapman (Edinburgh)
Students' Union President, University of Bristol	Mr T Webb (UoB Union)
External Academic Evaluator	Dr S Warren (Cambridge)
The Association of the British Pharmaceutical Industry (ABPI)	Mrs S Jones

## **Membership of Bristol ChemLabS Laboratory Working Party**

Chair: Bristol ChemLabS Director  
Bristol ChemLabS Manager  
Teaching Laboratory Managers

Technical Staff Representative  
School of Chemistry Director of Administration  
Academic Staff Section Representatives

Dr P J Wyatt (SoC)  
Dr D M Smith (SoC)  
Dr T M Obey (SoC)  
Dr T J Podesta (SoC)  
Mr S Croker (SoC)  
Dr D W Thompson (SoC)  
Dr I Bull (SoC)  
Dr C P Butts (SoC)  
Dr J Charmant (SoC)  
Dr R J Cox (SoC)  
Professor R P Evershed (SoC)  
Dr E McGarrigle (SoC)  
Professor A Orr-Ewing (SoC)  
Dr C A Russell (SoC)  
Dr C M Western (SoC)

## **Membership of Bristol ChemLabS Evaluation Working Party**

Chair: Bristol ChemLabS Manager  
Bristol ChemLabS Chief Executive  
Senior representative of Graduate School of Education  
Director, University of Bristol Teaching Support Unit

Dr D M Smith (SoC)  
Professor N C Norman (SoC)  
Dr S Erduran (GSoE)  
Ms G Clarke (TSU)

## **Appendix 2: Bristol ChemLabS Events Log May 2007 – February 2008**

***Awards***

***Dissemination***

***Outreach***

***Outreach Meetings***

***Publications***

***Publicity***

***Reports and Meetings***

***Visitors***

***Table of Acronyms***

## Awards

<b>Date</b>	<b>Title</b>	<b>Awarded to</b>
14 December 2007	University of Bristol Faculty of Science Teaching Support Award 2007/8	Steve Croker
14 December 2007	University of Bristol Faculty of Science Teaching and Learning Prize 2007/8	Russell Cox
02 January 2008	University of Bristol Engagement Award in the Faculty of Science 2007/8	David Smith

## Dissemination

Date	Location	Title	Event Description
26 April 2007	University of Bristol	Meeting with Dr Emma Robinson, Department of Pharmacology	Discussion of the DLM and Marks and Absences system - the Department of Pharmacology looking to introduce pre-lab questions and on-line tests
27 April 2007	Manchester	ChemLabS visit	Visit of new laboratories and DLM presentation
04 May 2007	University of Bristol	Faculty e-Learning group meeting	Presentation to the Faculty e-Learning group on ChemLabS by Paul Wyatt
03 July 2007	Aston Business School	Chemistry for our Future 1st National Conference	Presentation by David Smith about ChemLabS, Nick Norman also in attendance
25 July 2007	Bristol ChemLabS	Dynamic Laboratory Manual (DLM) Demo Now Available	
30 August 2007	Leicester	'The Dynamic Laboratory Manual: A VLE Supporting the Real Learning Environment'	Talk by Paul Wyatt at the HEA's 'Variety in Chemistry Education' 2-day conference
08 September 2007	School of Chemistry	Doors Open Day 2007	Tours of the new teaching laboratories
14 November 2007	Burlington House, London	Presentation to Heads of Chemistry UK (HCUK) meeting	Presentation on ChemLabS by Nick Norman and David Smith at this meeting organised by the RSC

<b>Date</b>	<b>Location</b>	<b>Title</b>	<b>Event Description</b>
21 November 2007	School of Chemistry	Grand Opening of the Bristol CETLs	Official opening of the University of Bristol's CETLs performed by the Chief Executive of HEFCE, Professor David Eastwood, together with the University of Bristol's Vice-Chancellor, Professor Eric Thomas
28 November 2007	Cardiff	BioProcessing Conference	Faculty of Science represented by George Banting from the Biochemistry Department including ChemLabS literature
13 December 2007	Edinburgh	Presentation to the University of Edinburgh, School of Chemistry Teaching and Learning Away Day	Presentation on ChemLabS at this event by David Smith and Nick Norman at the University of Edinburgh's invitation
08 January 2008	University of Bristol	Bristol ChemLabS exhibit	Display of the DLM held at the 2007 University of Bristol Learning and Teaching Exhibition Tim Obey and Bill Heslop
08 January 2008	University of Bristol	Innovative assessment methods in the teaching of practical science	Talk given by Paul Wyatt at the 2007 University of Bristol Learning and Teaching Exhibition

## Outreach

date	title	location	audience category	how many participants
<b>2007</b>				
01/05	Primary Science Visit	Kimpton, Thruxton and Fyfield Church of England Primary School	Y3-4	55
02/05	Using Demonstrations and Practicals to Enthuse KS3 & KS4 Chemistry Students	School of Chemistry	Secondary teachers	
02/05	Using Demonstrations and Practicals to Enthuse KS3 & KS4 Chemistry Students	School of Chemistry	Secondary teachers	
03/05	Primary Science Visit	Mary Elton Primary School, Clevedon	Y5	2 classes
09/05	'The excitement of practical chemistry'	Trinity College Dublin		
16/05	Structure and Bonding Half Day Workshop	School of Chemistry	Y11	60
21/05	Five Polymer Chemistry Days for Y10 Chemistry Students	School of Chemistry	Secondary students, teachers & technicians	379
22/05	Polymer Chemistry Day for Y10 Chemistry Students	School of Chemistry	Secondary students, teachers & technicians	405
23/05	Polymer Chemistry Day for Y10 Chemistry Students - including visit by Dr David Read, School Teacher Fellow University of Southampton	School of Chemistry	Secondary students, teachers & technicians	405
24/05	Polymer Chemistry Day for Y10 Chemistry Students	School of Chemistry	Secondary students, teachers & technicians	405

<b>date</b>	<b>title</b>	<b>location</b>	<b>audience category</b>	<b>how many participants</b>
25/05	Polymer Chemistry Day for Y10 Chemistry Students	School of Chemistry	Secondary students, teachers & technicians	405
04/06	Primary Science Fair	Stroud High School, Gloucestershire	Primary	80
06/06	Polymer chemistry workshops and 'A Pollutant's Tale'	Cheltenham Science Festival	Secondary & general public	
08/06	How Science Works - Bringing Cutting Edge Science into the Classroom: Climate Change	Yorkshire and Humberside Science Learning Centre based at Sheffield Hallam University.	Teachers	21
12/06	Visit from Ruth Williams, Head of chemistry, Clifton College Bristol	School of Chemistry		
14/06	Primary Science Visit	Nailsworth C of E Primary School Gloucestershire	Y5-6	200
19/06	Primary Science Visit	Pontnewydd Primary School, Gwent	Y3-6	Whole school
19/06	Primary Science Visit	Backwell Church of England Junior School	Y3-6	250
19/06	Primary Science Visit	Bishop Sutton Primary School	Y3-6	60
26/06	Polymer Chemistry Days for Y10 Chemistry Students	School of Chemistry	Y10	49
27/06	Bristol Schools Chemistry Induction Day	School of Chemistry	Y11	35

<b>date</b>	<b>title</b>	<b>location</b>	<b>audience category</b>	<b>how many participants</b>
28/06	University Open Day	Bristol University		
02/07	Medicine and Science Open Day Display	School of Chemistry	Prospective university students	
03/07	Schools Organic Practical Trial Day for Post-16 Students	School of Chemistry	A-Levels	
03/07	Sutton Trust Summer School Chemistry Lecture Demonstration	School of Chemistry	Y12	
03/07	Infants Science Day	Air Balloon Hill Infants School, Bristol	Y2	3 classes
09/07	Bristol ChemLabS/Trinity College Dublin Chemistry Summer School	School of Chemistry/Trinity College Dublin	Secondary	27
09/07	Bristol ChemLabS Trinity College Dublin Chemistry Summer School 2007	School of Chemistry/Trinity College Dublin	Y11-12	
10/07	Chem@rt Visit	Chalford Hill Primary School, Gloucestershire	Y5-6	60
13/07	Careers Talk by David Smith	Katharine Lady Berkeley's School	6th Form	30
16/07	Salters' Chemistry Camp - 2-day Summer School	School of Chemistry	Y10	50
18/07	Salters' Chemistry Camp - 2-day Summer School	School of Chemistry	Y10	50
18/07	Chem@rt Visit	Waycroft Primary School	Y2, 5 & 6	180
18/07	Chem@rt Visit	Waycroft Primary School	Y 2, 5 & 6	180

<b>date</b>	<b>title</b>	<b>location</b>	<b>audience category</b>	<b>how many participants</b>
23/07	NAGTY Summer School 'Into the Heart of Matter'	School of Chemistry	Members of the National Academy for Gifted & Talented Youth (NAGTY)	20
23/07	Primary Science Visit	Welton Primary School, Midsomer Norton	Primary	50
29/08	RSC Teacher Fellowship Induction Day	School of Chemistry		
13/09	Spectroscopy Visits	School of Chemistry	Post-16	67
14/09	Spectroscopy Visits	School of Chemistry	Post-16	67
17/09	Teacher Visits to Undergraduate Teaching Laboratories	Bristol ChemLabS	Teachers	
17/09	Teacher Visits to Undergraduate Teaching Laboratories	School of Chemistry	Secondary teachers	
17/09	Spectroscopy Visits	School of Chemistry	Post-16	67
18/09	Spectroscopy Visits	School of Chemistry	Post-16	67
19/09	Spectroscopy Visits	School of Chemistry	Post-16	67
21/09	Evening performance of 'A Pollutant's Tale'	King's College Taunton	6th Form students & staff	100
21/09	'A Pollutant's Tale'	King's College Taunton	6th Form	100
24/09	Spectroscopy Visits	School of Chemistry	Post-16	67
25/09	Aimhigher Day for Thomas Hardy School, Dorset	School of Chemistry	Y12	20
26/09	Organic Chemistry Day - First Day of the Schools Laboratory Programme (SLP)	School of Chemistry	Y12-13	

<b>date</b>	<b>title</b>	<b>location</b>	<b>audience category</b>	<b>how many participants</b>
26/09	RSC Top of the Bench Competition	School of Chemistry	Secondary	
28/09	Independent State Schools Partnership Event	Brunel University	Y10	40
01/10	'A Pollutant's Tale'	Kingswood School, Bath	Secondary	
04/10	Primary Science Visit	Dursley C of E Primary School, Dursley	Y5-6	250
05/10	Primary Science Visit	Bishop Sutton Primary School, Bristol	Primary	60+
08/10	Polymer Session	Children's Hospital, Bristol	Secondary-age hospital patients	
09/10	Primary Science Visit	St Augustine of Canterbury Primary, Bristol	Primary	295
12/10	Canford Chemistry Conference	Dorset		
15/10	Primary Schools Visit - part of "Raise The Game" Science & Technology Day	Westfield Community School, Somerset	Y9	90
15/10	'A Pollutant's Tale'	Newent School, Gloucestershire	Y10-11	400
16/10	'A Pollutant's Tale'	Strode College	A & AS-Level Chemistry	85
21/10	Schools Lectures - 5-day tour	Malta	Secondary	1200
25/10	RSC Higher Education Teaching Award Lecture by Dudley Shallcross	University of Manchester		
31/10	KS4 Alternative Fuels - Badminton School, Royal Society Project	School of Chemistry	Y10 & teachers	46

<b>date</b>	<b>title</b>	<b>location</b>	<b>audience category</b>	<b>how many participants</b>
06/11	Free Climate Change Course for Teachers	School of Chemistry		
07/11	Mature Students' Open Afternoon	School of Chemistry	Wider Community	
07/11	Schools' 'Chemistry Week 2007' Conference	School of Chemistry	Y10-13	60
09/11	77th Bristol Scout Group, Whiteladies Road	School of Chemistry	Wider Community	
12/11	Scouts Meet Science	School of Chemistry	Wider Community	500
14/11	Science Communicators Tour and Talk	School of Chemistry	Wider Community	12
14/11	Spectroscopy Tours	School of Chemistry	Y13	90
20/11	Primary Science Visit	Shirehampton Primary, Bristol	Primary	Whole school
21/11	Y12/13 Organic Chemistry (SLP)	School of Chemistry	Y12-13	45
23/11	SCI Lecture - 'A Pollutant's Tale'	Westonbirt School, Tetbury	Y10-13	200
27/11	Primary Science Visit	St Andrew's Junior School, Congresbury	Y5-6	
28/11	Y12-13 Drugs Synthesis Chemistry (SLP)	School of Chemistry	Y12-13	
04/12	Primary Science Visit	Christ Church Primary School, Bristol	Primary	150
05/12	Christmas Chemistry Conference 2007	School of Chemistry	Y10-13	390
05/12	Caffeine Extraction Morning (SLP)	School of Chemistry	Y10-11	24

<b>date</b>	<b>title</b>	<b>location</b>	<b>audience category</b>	<b>how many participants</b>
10/12	4 Days of Chemistry Workshops and Talks	National University of Singapore	13-17-year olds	150
<b>2008</b>				
09/01	Aspirational Chemistry Visit (SLP)	School of Chemistry	Y10	54
10/01	Gloucestershire Gifted and Talented Primary Science Day	Winchcombe School	Y6	40
11/01	Science Communicators Chemistry Presentations	Badminton School, Bristol	Y10	
16/01	Chemistry Day	St Antony's Leweston School, Dorset	Y9	37
18/01	'A Pollutant's Tale' - part of Science Day	Bradley Stoke Community School, Bristol	Y9	120
21/01	'A Pollutant's Tale' x 3	Sir William Romney's School, Gloucs.	Y9, 10 & 11	360
23/01	Y13 CREST Gold Award	Badminton School	Y13	
25/01	Regional SCI Lecture	Clifton College, Bristol		30
30/01	GCSE Chemistry Day for Triple Science	School of Chemistry	Y10	60
31/01	6th Form Chemistry Lectures	Thomas Hardy School Dorset	6th Form	
05/02	'Meet the Scientists Day',	Thomas Hardy School, Dorset	Y9-11	

<b>date</b>	<b>title</b>	<b>location</b>	<b>audience category</b>	<b>how many participants</b>
07/02	'A Pollutant's Tale' x 2	St Bede's Catholic College, Laurence Weston, Bristol	KS4 & Y9	220
11/02	Modular Mobile Education: Science Experiments (MOBILIM) Visitors from Turkey	School of Chemistry	Wider Community	4
12/02	AIMS-ChemLabS Joint Primary Science Visit	Cam Woodfield Junior School, Gloucestershire	Y5-6	225

## Outreach Meetings

Date	Location	Title	Event Description
19 May 2007	School of Chemistry	Mr and Mrs Graham Bromley, Mackay North SHS, Mackay Queensland, Australia	Tour of Teaching Labs for Mr and Mrs Bromley with a view to future summer school for 'gifted and talented' students from that region
05 June 2007	Manchester Metropolitan University	"Maths taught in the context of chemistry, a success story for non-A level chemists"	Talk by Dudley Shallcross at The Higher Education Academy Physical Sciences Centre Professional Development Workshop "Maths for Chemistry Special Inters Group Meeting" as part of the "Chemistry for our Future" programme
12 June 2007	School of Chemistry	Visit of Teaching Labs by Stephen Holliday & John Brown of QEH	Meeting with Tim Harrison, Tim Gallagher and Nick Norman in light of QEH's proposed redevelopment of their science labs, to talk about potential use of ChemLabS in 2008 and to establish firmer links
26 June 2007	Washington DC	Poster Presentation at ACS Green Chemistry and Engineering Conference	Presentation of a poster on Bristol ChemLabS Outreach activities at the Annual ACS Green Chemistry and Engineering Conference on 26-29 June alongside research poster by Breen Fellowship Awardee Zoe Schepp.
31 July 2007	School of Chemistry	Susan John, Somerset SetPoint (StemPoint)	Meeting with Tim Harrison to discuss the promotion of ChemLabS at primary and secondary level with both her schools and SetPoints in Devon and Cornwall
02 August 2007	School of Chemistry	2-day visit from Assistant Professor Dr Natasa Gros, Ljubljana University, Slovenia	Discussion of joint application for EU bid for using inexpensive uv-vis spectrometers - ChemLabS to trial the sensors in outreach work at SoC, with teachers undertaking MSURE, in school visits and possibly with final year projects

<b>Date</b>	<b>Location</b>	<b>Title</b>	<b>Event Description</b>
04 August 2007	School of Chemistry	Meeting with Ben Pearson of CfBT, Development Manager - Excellence Hubs - Young, Gifted and Talented	Presentation of Outreach by Tim Harrison and Dudley Shallcross and a discussion of what CfBT is to do as a broker of services for gifted and talented students -now 4-19 (rather than NAGTY 12-16). Bristol ChemLabS is to become a provider of G&T services 4-19 in Chemistry
30 August 2007	School of Chemistry	RSC Teacher Fellowship Induction Day	
18 September	School of Chemistry	Meeting with Joy Parvin, Primary Projects Manager, Chemical Industry Education Centre	Discussion of ChemLabS primary outreach work and possible future collaboration with Tim Harrison, Dudley Shallcross and David Smith
19 December 2	Singapore International Convention & Exhibition Centre (Suntec Singapore)	Singapore International Chemistry Conference 5 (SICC5)	Talk entitled 'University-School Partnerships, a Win-Win Situation?' by Dudley Shallcross, invited as a Keynote Speaker at the Chemical Education Workshop of this conference

## Publications

publication	author	description
Physics Education, Volume 42, Number 3, May 2007	Tim Harrison	'The reality of university science'
Science in School, Summer 2007, Issue 5	Tim Harrison	Review of ChemMatters CD-ROM
Higher Education Academy Physical Sciences Centre's New Directions in the Teaching of Physical Sciences Issue 3 October 2007	Tim Harrison and Dudley Shallcross	'The impact of Teacher Fellows on teaching and assessment at tertiary level'
Higher Education Academy Physical Sciences Centre's New Directions in the Teaching of Physical Sciences Issue 3 October 2007	G Walton, Rednock Comprehensive School, Dursley, Gloucestershire and Dudley Shallcross	'What's in a grade? The real meaning of mathematics grades at GCSE and A-Level'
Higher Education Academy Physical Sciences Centre's New Directions in the Teaching of Physical Sciences Issue 3 October 2007	Tim Harrison and Dudley Shallcross	'Why bother taking university led chemistry outreach into primary schools? Bristol ChemLabS Experience'
Physics Education, Volume 42, Number 6, November 2007	Dudley Shallcross and Tim Harrison	'Climate change made simple'
Science in School, Winter 2007, Issue 7	Alex Griffin, Tim Harrison & Dudley Shallcross	'Primary circuses of experiments'

## Publicity

Publication	Description
The Veseyan Newsletter May 2007	Article about 20 February performance of 'A Pollutant's Tale' by Tim Harrison and Dudley Shallcross
Dursley Gazette 03 May 2007	Review by Heather Witham of 'A Pollutant's Tale' following its performance at the Thornbury Arts Festival
St Bede's Catholic College Website May 2007	Article about the Structure and Bonding Workshop and Revision lecture this school participated in on 16 May
University of Bristol Press Releases Webpage 23 May 2007	Article about the Mobile Teaching Unit prior to one of its first school visits - an AIMS event but the article mentions joint ownership/funding with ChemLabS
Next Step Spring/Summer 2007	'Spotlight on chemistry' in the University of Bristol's Schools & Colleges Newsletter including photo of 16 June Perfume Chemistry workshop
South Wales Argus 21 June 2007	Article about 19 June visit to Pontnewydd Primary School, Gwent including photos
Azom.com 26 June 2007	Appearance of the University's press release on the launch of the Schools Laboratory Programme on 27 March
ACS Green Chemistry and Engineering Conference Website June 2007	Paragraph about Bristol ChemLabS Outreach ahead of Zoe Schnepf's poster presentation
University of Bristol Press Releases Webpage 29 June 2007	Press release about the A-Level Chemistry 'taster' day on 27 June
CfoF Website July 2007	Article about Chemistry for our Future including a section about ChemLabS and its use of the undergraduate labs for school students
University of Bristol Press Releases Webpage 16 July 2007	University press release on the 2007 Salters Camps

Publication	Description
Science On Stage Website July 2007	Description of 'A Pollutant's Tale' (which featured in Science On Stage 2007) with Tim Harrison and Dudley Shallcross' contact details
Azom.com 17July 2007	Appearance of the University's press release on the 2007 Salters Camps
Bristol Evening Post 18 July 2007	Article about Salters' Chemistry Camps
RSC News August 2007	Article about Chemistry for our Future featuring an insert about Bristol ChemLabS use of undergraduate teaching labs for outreach activities
Chemistry in Action issue 82 Summer 2007	Article about the 2007 Bristol ChemLabS/Trinity College Dublin Chemistry Summer School
Various, Autumn 2007	Links to this document from and use of information contained in it by other organisations' (including STEM Support Centres & Grow Your Future Workforce) following from PSCI-Com & BIG-Chat Mailing post by Tim Harrison.
2007-2008 Leaflet by King's College, Taunton	Announcement of 'A Pollutant's Tale' Performance by Tim Harrison and Dudley Shallcross at this school including a photo of them
Hardenhuish School Website September 2007	Article about the school's team coming close second in the Top of the Bench heats held at ChemLabS
Triple Science Website October 2007	Downloadable resource file on Bristol ChemLabS, one of the 40 Triple Science Networks established to support practitioners in implementing Triple Science GCSEs
Bristol Evening Post 17 November 2007	Article about the Mobile Teaching Unit
Bristol Evening Post 21 November 2007	Article about the Bristol CETLs Grand Opening
University of Bristol Press Releases Webpage 21 November 2007	Article about the Bristol CETLs Grand Opening

<b>Publication</b>	<b>Description</b>
CSCB News December 2007	Article about the 2007 Bristol ChemLabS/Trinity College Dublin Chemistry Summer School
Times of Malta 09 December 2007	Article about the week-long ChemLabS Outreach visit to Malta
Gloucestershire Echo 16 January 2008	Article about 10 January Primary Science Visit hosted by Winchcombe School's science department
RSC Policy Bulletin Issue 08 February 2008	Mention of the use of Bristol undergraduate labs in article about the Chemistry for our Future programme
HULIQ.com 11 February 2008	The University press release about the Turkish visit appeared on this website

## Reports and Meetings

Date	Location	Title	Event Description
06 June 2007	School of Chemistry	Bristol ChemLabS Management Board Meeting 4	
15 July 2007	School of Chemistry	University of Bristol CETL Interim Evaluation Report	Report submitted to HEFCE as part of CETL commitments
21 November 2007	School of Chemistry	Bristol ChemLabS CETL Interim Review 2005-2007	Glossy review of the CETL's first two years
12 December 2007	School of Chemistry	Bristol ChemLabS Management Board Meeting 5	

## Visitors

Date	Visitor(s)	Event Description
30 April 2007	Alan Palmer, HEFCE	Discussion of dissemination cost-recovery
22 May 2007	Members of teaching and technical staff from the University of Sheffield Chemistry Department	Tour of ChemLabS Facilities on top two floors of West Block and general discussion of project
06 July 2007	Lancaster/OU CETL Evaluation	Tour of the labs and meetings with ChemLabS staff and students
20 July 2007	Stephen Williams MP	Tour of one of the Salter's/GSK Chemistry Camps in Pharmaceutical Chemistry for Y10 students from all over the UK
03 September 2007	Sally Heslop (Education Director and Graduate Dean from Engineering Faculty) and Dr John Davis (Academic Director of E-Learning, Education Support Unit)	Presentations/discussions about ChemLabS and the DLM with Paul Wyatt
14 September 2007	Julian Knight, University of Newcastle	Presentation on the DLM (and the second year DLM) by Paul Wyatt
23 November 2007	Secretary of State John Denham MP	Tour of the new laboratories by the Vice-Chancellor of the University of Bristol, Professor Eric Thomas, and Bristol ChemLabS Chief Executive Professor Nick Norman for the Rt Hon John Denham MP, Secretary of State for the Department of Innovation, Universities and Skills (DIUS)
19 December 2007	Dr Lee Reilly, University of Warwick	Tour of the labs, DLM demonstration and lunch with David Smith, Tom Podesta and Steve Croker

<b>Date</b>	<b>Visitor(s)</b>	<b>Event Description</b>
10 January 2008	Visit from Sir Keith O'Nions	Tour of the new laboratories, demonstration of the DLM and presentation about Bristol ChemLabS Outreach activities for Sir Keith O'Nions, Director General of Science and Innovation based at the Department for Innovation, Universities and Skills (DIUS)
28 January 2008	Dr Martin Todd from AstraZeneca and Mr Ian Hughes of The Higher Education Academy Centre for Bioscience	Meeting to discuss dissemination of ChemLabS ideas into the teaching of biosciences in Higher Education

## Table of Acronyms used in Events Log

ABPI	Association of the British Pharmaceutical Industry
ASE	Association for Science Education
BA	British Association for the Advancement of Science
BETT	British Educational Training and Technology (BETT) Show
CETL	Centre for Excellence in Teaching and Learning
CfoF	Chemistry for our Future
CHeMneT	The School of Chemistry's secondary school chemistry teachers network
CREATE	Centre for Research, Education and Training in Energy
CSCB	Centre for Synthesis and Chemical Biology
DLM	Dynamic Laboratory Manual
EVA	Denmarks Evalueringsinstitut - Danish equivalent of the QAA
LLAS	Subject Centre for Languages, Linguistics and Area Studies
LTSS	Learning and Teaching Support Unit
NERF	National Education Research Forum
QAA	Quality Assurance Agency for Higher Education
QCA	Qualifications and Curriculum Authority
SEAs	Science and Engineering Ambassadors
TSU	Teaching Support Unit
VAM	Valid Analytical Measurement
WISE	Women Into Science, Engineering and Construction