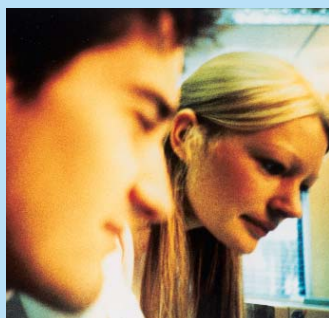


Free Residential Conference for  
State School Science Teachers

Sunday 30th July –  
Thursday 3rd August 2006

# Durham University Teachers on Track

Supporting excellence and innovation in science  
education and professional development.



# Science Innovation and Durham University

Founded in 1832, Durham University is England's third oldest University and offers a unique blend of history and progress. Leading this innovation and development is the Faculty of Science, which currently teaches over 60 degree programmes, spanning 11 subject areas. During this conference, teachers in the areas of Chemistry, Computer Science, Earth Sciences, Engineering, Mathematics and Physics will receive a combination of up to date subject advancement information alongside practical professional development which will equip teachers with the latest knowledge and expertise in science education.

All departments involved in **Teachers on Track** have been rated as either National or International Centres of Scientific Research in the latest Research Assessment Exercise.

## Professional Development

Durham University is building on the success of this established Teachers on Track conference and offering State School Science Teachers the opportunity to attend a FREE residential conference, aimed at enhancing both Professional and Academic Development and encourage widening participation.

Practical sessions include assessment for learning, developments in online learning and problem based learning. These, combined with practical professional development and Higher Education admissions advice from some of the world's leading scientific departments, will provide science teachers with enhanced knowledge and practical resources to take back into the classroom.

Taking place within the unique and historical City of Durham, this conference will offer delegates a chance to see innovation in action, find out about the latest developments in their subject area as well as receive updated advice and guidance about Higher Education.

## Programme Content

Delegates are invited to attend sessions in two different subject areas, with each academic strand aimed at informing delegates on the latest developments within their chosen subject, as well as offering a chance to refresh knowledge on the nature and content of Higher Education programmes in science.

Delegates will attend Professional Development Sessions, focussing on the way forward for progression from Science A-Levels through to Undergraduate study, as well as providing a forum for delegates to discuss with University academics and admissions staff any issues relating to Higher Education progression.

## Higher Education Guidance and Support

Advice for delegates on supporting students applying to Higher Education, and especially supporting students applying to science subjects and competitive institutions. The topics covered will include what makes a good personal statement, the ideal reference, HE opportunities, and Student Finances for 2006 and beyond.

## Residential Arrangements

Based in St Aidan's College at Durham University, this conference package includes four nights en-suite, full board accommodation and all social activities. Due to the generous support of The Sutton Trust, the University is able to offer this conference at no charge to delegates; however, it is unable to cover travel costs.

**“Science is about us. It explains who we are, how we got here, what is all around us and where we fit in space. All the great questions that human beings have wondered about since time immemorial. We are all fascinated by, interested in, ourselves, so science is there to help us”.**

**Dr Bill Bryson,  
Chancellor,  
Durham University**



## Academic Sessions

Please note that delegates will be required to pick two academic departments and will spend one day in each.

### Chemistry

#### The “state of the art” in Chemistry research.

This session will contain three short lectures, focussing on current research topics in Chemistry at the interfaces with Biology, Materials and Physics. There will also be a tour of the 5\* Research Facilities and updates on some of the newest advances in equipment, including NMR spectroscopy and Mass Spectrometry.

#### “From A-level to Degree” – what students can expect.

This session will take an outline of A-level Chemistry specifications and follow through to 1st year Chemistry modules, and onwards to final year courses. Themes through the subject will be traced, and the connections between A-level and degree will be explored. There will be a discussion of university chemistry admissions issues and an opportunity to see undergraduate teaching facilities.

### Computer Science

#### The Changing Discipline

Computer Science is a rapidly changing discipline and this rate of change and development can often pose a challenge to prospective applicants. There is, also, a great range Computing/IT qualifications which students can take and a correspondingly great diversity in the university courses they feed into.

The British Computer Society has done a great deal of work over the last year with schools, universities and industry to see how best to create a continuum between schools and Higher Education.

The first part will look at how a high-demand university assesses the wide spectrum of applicants and how schools and the department can work together for their mutual benefit and the benefit of the students.

The second part will look at the application of current Computer Science research (in particular, Software and Algorithms & Complexity) and its impact on curriculum development. Areas of Computer Science which are fundamental – but which also cause many problems for students – will also be looked at. These will include:-

- Programming
- Mathematics and Reasoning
- Group Work
- Individual Projects.

As the country’s only Centre for Excellence in Teaching and Learning in Computing, Durham has a crucial role in researching into students’ **Active Learning in Computing**.

### Earth Sciences

#### How the Earth Works!

This full day program will highlight the importance of geology in our every day lives. A field trip to a local quarry in the North Pennines Geopark will take place providing examples of geological exercises that can be undertaken in the field or classroom. This will be followed by a practical workshop emphasising the application of Earth Sciences in the national curriculum and a tour of the new purpose built department offering the state-of-the-art research facilities.

## Engineering

### Introduction to Engineering

This session will describe the undergraduate engineering perspective and a talk on recent advances in New and Renewable Energy. Delegates will then have the opportunity to take part in practical sessions covering Electrical Machines, Bridge Design, and experiments with Transonic Flow.

A session on Engineering Mathematics will start with talks on current research in Civil and Bioengineering. Delegates will then have a choice of theoretically driven practical activities in Robot Design, Engineering based Mathematical Puzzles, and the Mathematics of Fluid Mechanics.

### Mathematics

#### Learning Technologies

We will touch on two learning technologies that we use to teach. We will look at our Virtual Learning Environment (Blackboard) and specifically how it is used in the final-year module “Mathematics Teaching” module to allow students to reflect on their school visits and to give them ideas on their essays. We will also look at a symbolic computer package, Maple, which has allowed Mathematicians to study, analyse and prove previously unthinkable problems. Time will be spent in the computer classroom to allow participants to follow their own interests.

Issues around final-year projects will be discussed, for instance Wikipedia, posters and the typesetting package LaTeX – projects will be available to view. Finally, results from a recent pan-european study of students entering University to study Science will be summarised.

### Physics

#### Particle Physics Primer

This session will start by reviewing the standard model of particle physics and the questions that remain to be answered. One of the key questions is the origin of mass which may be explained by the Higgs mechanism. Large Hadron Collider sited at CERN and due to start operation in 2007, is designed to look for the Higgs boson. We will take a visual tour of the ATLAS experiment and delegates will have the chance to identify particles using an event simulator. Following this session, there will be an open session on A-levels and University Admissions, where various issues of A-level physics/maths and the bridge to university physics degree courses, admission processes at Durham, feedback to schools and colleges will be discussed.

#### Cool Things to do with Lasers

During the last fifteen years dramatic developments in the field of atom-light interactions have revolutionised atomic physics. It is now possible to produce the coldest gas in the universe through the process of laser cooling. Room temperature atoms (with typical speeds comparable to a jumbo jet, 300 m/s) can be cooled to microKelvin temperatures (typical speeds of mm/s). The fundamental physical processes underlying this exciting field of modern physics will be demonstrated in the lecture.

# Application Form

Please note that this conference is for state school teachers only.

## Subject choice

Please select a first and second academic choice from each list:

<u>List 1</u>	<u>1st Choice</u>	<u>2nd Choice</u>
Computer Science	<input type="checkbox"/>	<input type="checkbox"/>
Earth Science	<input type="checkbox"/>	<input type="checkbox"/>
Physics	<input type="checkbox"/>	<input type="checkbox"/>

## List 2

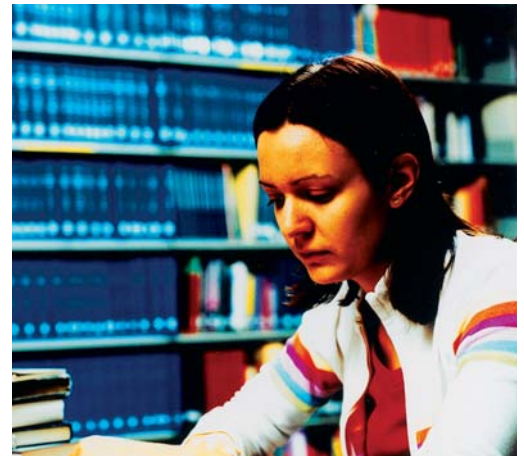
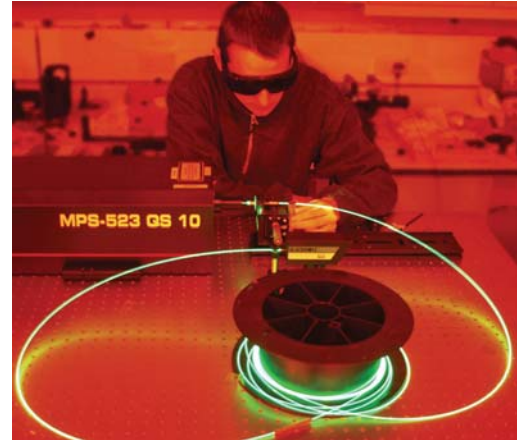
Chemistry	<input type="checkbox"/>	<input type="checkbox"/>
Engineering	<input type="checkbox"/>	<input type="checkbox"/>
Mathematics	<input type="checkbox"/>	<input type="checkbox"/>

Places will be allocated on a first come, first served basis. If your first choice is unavailable, we will try to offer you your second choice.

## Science Learning Centre North East Session

Please select three sessions from the list below:

<u>Please tick</u>	<u>1</u>	<u>2</u>	<u>3</u>
Assessment for Learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effective Discussions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Problem Based Learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ICT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# Application Form

**Please note that this conference is for state school teachers only.**

## Application Process

Please complete this application form and return it in the pre-paid envelope provided or to the address below by **Friday 16th June 2006**. Please note due to limited places available, places will be allocated on a first come, first served basis.

**Teachers on Track  
Undergraduate Admissions Office  
Durham University  
University Office  
Old Elvet  
Durham  
DH1 3HP**

Further information and downloadable copies of this brochure can be found at [www.durham.ac.uk/undergraduate](http://www.durham.ac.uk/undergraduate) or by contacting Jennifer Barton on **0191 334 6059** or [Jennifer.barton@durham.ac.uk](mailto:Jennifer.barton@durham.ac.uk).

## Education and Qualifications

1st Degree .....

Awarding University .....

2nd Degree .....

Awarding University .....

Any other qualifications .....

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## Personal Details

Name .....

Date of Birth .....

Home Address .....

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Home Telephone No. ....

Mobile No. ....

Email Address .....

## School Information

School Name .....

School Address .....

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School UCAS Code .....

School DFES Code .....

Average Attainment at A-Level .....

Subject Taught .....

(Please state your main subject and any other subjects you may teach)

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Normal Age Range Taught .....

Do you have any other responsibilities in school?  
(e.g. careers guidance, G&T co-ordination)

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# Programme of Events

**Teachers on Track** is a free residential conference at Durham University; a world class research university.

Our aim is to inform teachers across the science spectrum of the latest developments and innovations in science teaching and enable them to give their students the best possible guidance and support when considering higher education.

## Sunday 30th July 2006

4.00 – 5.00  
Arrive and register

5.30 – 6.00  
Welcome and Campus Tour

7.00 – 8.30  
Evening Meal

## Monday 31st July 2006

### Science Learning Centre North East

9.30 – 10.30  
Key note speech by Professor Herbie Newell, Scientific Director of the Northern Institute for Cancer.

10.30 – 11.30  
Professional Development in Action: Practical sessions for the classroom. Delegates will have a choice of 3 sessions\* to attend through out the day which focus on practical implementation of the latest developments in science education. A number of hands on sessions will be available such as:

- Assessment for Learning
- Online Learning and ICT
- Problem Based Learning
- Effective Discussions

\*Please indicate session choice on application form.

1.00 – 2.00  
Lunch

2.00 – 3.00  
Professional Development in Action: Practical sessions for the classroom. Continuation of sessions.

6.30 onwards  
Wine Tasting / Ghost Walk.

## Tuesday 1st August 2006

### Academic Department 1

9.30 – 12.00  
Academic Department

12.00 – 1.00  
Lunch in Academic Department

1.00 – 3.30  
Academic Department

6.30 onwards  
Free time / Evening in Newcastle

## Wednesday 2nd August 2006

### Academic Department 2

9.30 – 12.00  
Academic Department

12.00 – 1.00  
Lunch in Academic Department

1.00 – 3.30  
Academic Department

6.30 onwards  
Gala Dinner in Durham Castle

## Thursday 3rd August 2006

10.00  
Higher Education Update and Conference Plenary

12.00  
Lunch

1.00  
Depart

Every effort is made to ensure that all information is accurate at the time of printing. However, changes may occur and Durham University reserves the right to amend or change any information contained in this brochure at any time.

[www.durham.ac.uk/undergraduate](http://www.durham.ac.uk/undergraduate)