

# TEACHERS ON TRACK

4th - 8th APRIL 2004

UNIVERSITY OF DURHAM

Professional Development at a World  
Class Research University



# TEACHERS ON TRACK



## Overview

The University of Durham is for the first time, offering Science Teachers the opportunity to attend a FREE, five-day residential conference, aimed at enhancing both Professional and Academic Development.

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.

## Science and the University of Durham

Based in the North East of England, the University of Durham offers a unique blend of history and progress. Leading this innovation and development are 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, Psychology, Biological Sciences, Mathematics, Engineering and Physics will receive up to date subject advancement information, professional development and Higher Education admissions advice from some of the world's leading scientific departments. All departments involved in the Teachers on Track Programme have been rated as either National or International Centres of Scientific Research in the 2001 Research Assessment Exercise.

## Programme Content

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

All delegates are invited to attend Professional 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.

## Professional Development

### Session One - *Standards, Science and the Secret of School Improvement*

The morning will consist of plenary and workshop sessions covering questions such as: Are science A levels the hardest? Are A-level standards rising or falling? What kinds of students choose science? Are some teaching approaches more effective than others? What can value-added analyses offer? Has the DfES got it right yet? Can school improvement be scientific? How do we know what works?

### Session Two - *Higher Education Guidance and Support*

Advice for delegates on supporting students applying to Higher Education, including what makes a good personal statement, the ideal reference, HE opportunities, and Student Finances.



## Biological Science

### Session One - *Cell and Molecular Biology: The Latest Advances*

Delivered by one of Durham's Professorial staff from the 5\* rated School of Biological Sciences, this session focuses on the latest advances in this area, as well as providing a 'hands on' laboratory session, demonstrating some of the latest imaging and microscopy techniques.

### Session Two - *Ecology and Environmental Biology*

This session will discuss the latest advances in the field of Ecology and Environmental Biology, as well as a chance to take part on a laboratory session and field session.

## Chemistry

### Session One - *The 'state of the art' in Chemistry Research*

Three short lectures focussing on Current research topics in Chemistry at the interfaces with Biology, Materials and Physics. This session will be followed by a tour of the 5\* Research Facilities and updates on some of the newest equipment advances.

### Session Two - *'From A-Level to Degree'- What students can expect.*

A short synopsis of the 1st year inorganic, organic and physical chemistry courses and the issues around Mathematics. This session will be followed by a discussion, where teachers will be invited to give their feedback on the content and challenges of the transition from AS to A2 and finally onto degree.

## Computer Science

### Session One - *Computer Science in Schools*

Delivered by Professor Iain Stewart, this session looks at the definition of Computer Science Research and the structure and content of Computer Courses at Undergraduate Level. The teaching and development of computer science in a school environment will also be discussed, as well as providing the opportunity for delegates to take part in an open discussion on Undergraduate Admissions and the way forward regarding the partnership between Schools and Universities.

### Session Two - *What will they do when they get here?*

A more detailed look at some of the specifics of the content and teaching methods of a Computer Science Degree. Topics include: Hands on Introductory Java Programming, Mathematics within Computer Science, Software Engineering Group Projects and Individual Final Year Projects.

## Engineering

### Session One - *Biomedical and Renewable Engineering*

This session will encompass presentations on Biomedical Engineering and Renewable Engineering followed by a choice of 5 demonstration/practical sessions, including:

- Semiconductor fabrication in the clean room
- Bridge design and construction
- A demonstration on Programmable Hardware (FPGAs)
- Concrete beam testing
- Electronic CAD (PSPICE)
- Mechanical CAD (SolidWorks)
- Flume based experiments.

### Session Two - *Engineering Admissions*

This session will firstly give an update on issues affecting Admission to Engineering Degrees, as well as information on the Admission Process itself. Following the Solar Car Challenge, delegates will have a choice of five practical sessions to test their knowledge and expertise.

## Mathematical Science

### Session One - *Symbolic Computation*

Symbolic computer packages have allowed Mathematicians to study and analyse previously unthinkable problems. This will be demonstrated via some case studies at undergraduate and school levels where students actively learn in the computing environment.

### Session Two - *Back Tracking from Final Year Modules to A- Level Studies*

Back tracking from final year modules to A-level: Case studies of the prerequisites of course material at a final year level will be traced back through the degree programme to A-level. Also, results from a recent pan-European study of students entering University to study Science will be summarised.

## Physics

### Session One - *The Incredible Shrinking World of Nanotechnology*

A quiet revolution is occurring in science laboratories throughout the world that will change virtually every aspect of our lives. Scientists are learning how to control the smallest building blocks of our world - atoms themselves. While once people disputed whether atoms exist, now we can pick them up, move them around and build the most minute structures. This lecture I will demonstrate how microchips can be made using laser light and what happens if you try to squash light. I'll also show how atoms can spontaneously arrange themselves into organised patterns, how to write your name with electrons and how to copy all of the books in the world onto a postage stamp. Other highlights include new types of microchips, potential cures for cancer and security tags that are impossible to forge.

### Session Two - *A Recipe for a Universe*

Our ideas about the make-up of our universe and the way in which it will evolve in the future have undergone a marked change in the last few years. A wide diversity of experiments have now shown that the universe is dominated by a mysterious 'dark energy', and that the normal matter which makes up the stars, planets and ourselves accounts for only a small fraction of its total mass and energy content. This talk will describe some of the latest experimental results which are helping to change our view of the universe by revealing its dark nature.

## Psychology

### Session One - *Latest advances in developmental psychology*

The growth of the human mind has proved to be a topic of endless fascination for psychologists. In this session, video footage of infants and children will demonstrate how psychologists are currently investigating development in several key areas. These include theory of mind (children's understanding that other people have mental states that are different to their own), language development, and private speech (where children talk to themselves as a way of 'thinking through' a problem).

### Session Two - *Admission to psychology*

Following a session on developments in undergraduate Psychology study, a question and answer session will provide a forum for an exchange of ideas with academic staff from the Department of Psychology.



# Application Form

## Booking & Application



### Personal Information

Name

Date of Birth

Home Address

Home Telephone No.

Mobile No.

Email Address

### Education and Qualifications

1st Degree

Awarding University

2nd Degree

Awarding University

Any other qualifications



# Application Form

## Booking & Application



### School Information

School Name		
School Address		
School UCAS Code		
School DFES Code		
Average Attainment at A-level		
Subject Taught	Main	Any others
Normal Age Range Taught		
Do you have any other responsibilities in school (e.g. careers guidance, G&T co-ordination?)		

Due to places being limited on each of the sessions, please state which sessions you would like to attend:

<b>Monday (am)</b>	<i>Please tick selection</i>	<b>Monday (pm)</b>	<i>Please tick selection</i>
Plenary Session		Chemistry Session One	
		Psychology Session One	
		Computer Science Session One	
<b>Tuesday (am)</b>		<b>Tuesday (pm)</b>	
Chemistry Session Two		'Higher Education and the Way Forward'	
Biology Session One			
Mathematics Session One			
<b>Wednesday (am)</b>		<b>Wednesday (pm)</b>	
Biology Session Two		Physics Session One	
Mathematics Session Two		Psychology Session Two	
		Engineering Session One	
<b>Thursday (am)</b>		<b>Thursday (pm)</b>	
Physics Session Two		Depart	
Engineering Session Two			
Computer Science Session Two			

**Completed booking forms should be sent to:**  
 Teachers on Track, Undergraduate Admissions Office,  
 University of Durham, Old Elvet, Durham DH1 3HP

Informal enquiries regarding this conference can be directed to Mr Matthew Andrews on [m.p.andrews@durham.ac.uk](mailto:m.p.andrews@durham.ac.uk) or by telephone on 0191 334 6051.





## Conference Programme

4th - 8th April 2004

	AM		PM	Evening
<b>Sun</b>		2 pm Arrival and Registration	Registration	Welcome Drinks and Evening Meal. Bar Quiz. Bar Available.
<b>Mon</b>	Plenary Session: Department of Education Professional Development Seminar	Lunch	Chemistry Session One Psychology Session One Computer Science Session One	BBQ and Evening Cruise on the Prince Bishops River Cruiser down the River Wear taking in views of Durham and surrounding areas. Bar Available.
<b>Tue</b>	Chemistry Session Two Biology Session One Maths Session One	Lunch	'Higher Education and the Way Forward' - An update on Admissions and Higher Education Guidance from the University of Durham Undergraduate Admissions Office	Evening Meal. Evening Activities to include a choice of Ten Pin Bowling or Ghost Tour of Durham. Bar Available.
<b>Wed</b>	Biology Session Two Maths Session Two	Lunch	Physics Session One Psychology Session Two Engineering Session One	Formal Conference Meal & Celidh. Bar Available.
<b>Thu</b>	Physics Session Two Engineering Session Two Computer Science Session Two	Lunch	Depart	

## Residential Programme

Based in St Aidan's College within the University's Durham Campus, 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.

Teachers on Track, Undergraduate Admissions Office,  
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