

KEY ● Biology ● Chemistry ● Computing ● Geography/Geology ● Mathematics ● Physics ● Science ● Technological Studies ● Other curricular areas

LASERS AND THEIR APPLICATIONS ●● S5 - S6

This presentation will demonstrate just what makes lasers work, what makes them so special and what applications they have around us, from optical communications to medical diagnostics.

- Presented by Dr Nigel Langford, University of Strathclyde

YEAST AND BIOTECHNOLOGY; FROM BREAD TO BSE ●● S1 - S6 (tailored to suit)

Yeast is man's oldest microbial friend, used for baking and brewing for thousands of years. Now yeast is a modern biology research tool, helping researchers understand more about cancer, BSE (mad cow disease) and ageing. This talk describes our view of yeast today, its use both in research into human disease and in modern and traditional biotechnologies.

- Presented by Dr Ian Stansfield, University of Aberdeen

WHAT HAVE SCOTTISH PHYSICISTS DONE FOR US? ●● S1 - S6 (tailored to suit)

An informal review of the impact of Scottish scientists on everyday life through the ages.

- Presented by Dr Nigel Langford, University of Strathclyde

FROM THE DEEPEST TO THE DRIEST PLACE ON EARTH ●● S3 - S6 (tailored to suit)

Organisms from extreme environments seem to produce the best drugs. Why is this? This talk will explore extreme environments from the deepest ocean trenches to the driest deserts and explain why they are such excellent sources of chemical diversity and possible new drugs.

- Presented by Professor Marcel Jaspars, University of Aberdeen

WAVES: FROM ULTRASOUND TO ULTRAVIOLET ● S5 - S6

This talk will help the audience to understand the many different waves which affect our everyday lives and appreciate how many of these waves have been harnessed for our benefit in applications such as musical instruments, ultrasound scanners, DVD and CD players, optical communications, security monitoring of banknotes and more.

- Presented by Dr Nigel Langford, University of Strathclyde

ANTARCTICA: YOU CAN GO FAR WITH PHYSICS ●● S1 - S6 (tailored to suit)

The Antarctic is a remarkable continent - remote, hostile, and uninhabited yet it is of key importance to our understanding of how the world works. For early explorers Antarctica was the ultimate survival contest. For scientists it remains a place of intellectual challenge. Find out what kind of science is carried out in the Antarctic. Meet a physicist and meteorologist and find out how physics took her to Antarctica and what life there is like.

- Presented by Alison McLure, Institute of Physics

HOW OUR HEALTH DEPENDS ON BIODIVERSITY ●● S3 - S6 (tailored to suit)

Our fascination with things we can see may be affecting our relationship with those we can't. Buried, deepsea and microscopic creatures have a profound impact on life as we know it, from cleaning water, removing carbon dioxide and making the next wonderdrug. We are losing all kinds of biodiversity before it is even identified. Can this be rectified? Do we even know what we are losing? This talk will explain how humans are affecting biodiversity in many unintended ways and what could be lost.

- Presented by Professor Marcel Jaspars, University of Aberdeen

RENEWABLE ENERGY WHEEL OF SCIENCE ●● S1 - S2

The Live Wire Renewable Energy Wheel of Science 2011 challenges its young secondary school audiences' knowledge about the problems and benefits of solar, wind and water as alternative energy sources.

Enthusiastic, competitive groups will compete in the new Sustainable Energy Challenge Game Show where informative punchy Live Wire presenters address the students.

- Presented by Live Wire Productions

URBAN WATER AND URBAN ECOSYSTEMS - GLOBAL AND LOCAL PERSPECTIVES ON WATER AND ECOLOGY IN CITIES ●● S1 - S2

50% of the worlds population now live in cities. In the UK nearly 90% of people live in cities. Urban populations make large demands on water resources and other ecosystem services.

This talk will focus on water as an ecosystem resource, will explore the human impacts on the urban water environment, flooding and climate change and will discuss ways that we can manage water and greenspaces in cities more sustainably.

- Presented by Dr Rebecca Wade, University of Abertay Dundee

HISTORY AND PHILOSOPHY OF SCIENCE ●● S5 - S6

Topics include:

The epistemological status of scientific knowledge - how our ideas have developed **minimum 1 hour**

Is the current search for a "theory of everything" a realistic project or an unattainable chimera? **1 hour**

How can we explain what Eugene Wigner called "the unreasonable effectiveness of mathematics"? **1 hour**

Is there any real conflict between science and religion? If so, can this ever be resolved? **minimum 1 hour** (preferably whole morning or whole afternoon)

Does the "neo-Darwinian synthesis" still give a satisfactory explanation of evolution as we currently understand it? **1 hour**

Has our understanding of the "mind/body problem" made any real advances since the time of Descartes? **1 hour**

How can we protect and preserve the environment without giving up our comfortable lifestyles? **1 hour**

How will we meet our future energy needs? Should we be taking a fresh look at the "nuclear option"? **1 hour**

How has our picture of the structure of the universe evolved over the past 3000 years and how has this influenced our ideas regarding our place in the universe? **1 hour**

- Available in Aberdeen City and Aberdeenshire
- Presented by Professor Henry Ellington, Emeritus Professor, The Robert Gordon University

HIGHLAND TOUR

This year's tour will be called From Cells to Cellphones. Offered from the 29th August to 2nd September, the Highlands and Islands area have an exclusive chance to see a fantastic demonstration from three presenters. We aim to offer presentations to schools in remote areas, and hope that schools visited by the tour will be willing to act as hosts to other local schools.

If you are interested in having the tour visit your school, please contact Calum Scott on 01224 274799, or calum.scott@abdn.ac.uk

SO YOU WANT TO BE A DOCTOR? **FREE**



September 8th and 9th 2011

This event is for S4 pupils from Aberdeen City, Aberdeenshire and Moray interested in studying Medicine. Pupils will have the opportunity to take part in hands-on workshops and talk to doctors as well as finding out more about how best to prepare for applying to study Medicine. Over lunchtime pupils will be able to chat to current medical students about their lives, studies and future careers.

Note: This event is held at the University of Aberdeen and requires booking, with a maximum of 5 pupils from each school. Deadline for booking is Friday 1st July.

For further information, please contact Shawn Webster on 01224 273117 or email shawn.webster@abdn.ac.uk

STEM AMBASSADORS

Interested in getting some support to enhance the STEM provision within your school? STEM Ambassadors are a free resource that can help you excite and inspire your pupils about Science, Technology, Engineering and Mathematics - we have ambassadors from a diverse range of backgrounds and workplaces waiting to get involved.

Contact TechFest-SetPoint on 01224 273955 or email ambassadors@abdn.ac.uk for further information.

Join us on Facebook and Twitter



DISCLOSURE POLICY

TechFest-SetPoint supports disclosure for all people who work in schools. All our presenters have been advised that they must complete disclosure procedures. However we are unable to confirm if they have complied with this advice. Schools should check with the presenter, make their own risk assessment and ensure that members of the teaching staff are present throughout all presentations.

DISCLAIMER

All details in this programme are correct at the time of going to press. TechFest-SetPoint reserves the right to alter the programme information and events without prior notice.

2011 Secondary Schools Outreach Programme

TECHFEST IN SEPTEMBER

Festival of Science, Technology, Engineering and Mathematics

Secondary Schools Outreach Programme

Joint Principal Funders



Organised by

TECHFEST-SETPOINT
Promoting Science, Technology, Engineering and Mathematics
Scottish Charity No. SC010349

www.techfestsetpoint.org.uk/tis

ALL PRESENTATIONS FREE • ALL PRESENTATIONS FREE • ALL PRESENTATIONS FREE

Shell and BP are delighted to return as Joint Principal Funders of TechFest In September 2011, Aberdeen and the North East of Scotland's 18th annual festival of Science, Technology, Engineering and Mathematics (STEM).

We recognise the opportunity to engage in STEM activities for all young people and to develop their skills to contribute to STEM-based industries in the future.

By supporting TechFest-SetPoint we are not only investing in our own future but also that of our children. Our programme is aimed at enhancing the classroom work currently delivered by the Curriculum for Excellence.

Bernard Looney
Managing Director
BP Exploration North Sea in Europe

Glen Cayley
Vice President - Technical
Shell Exploration & Production

www.techfestsetpoint.org.uk/tis/secondary



www.techfestsetpoint.org.uk/tis/secondary



TechFest In September

SECONDARY SCHOOLS PROGRAMME 2011

Provided to meet the underlying aims of the Curriculum for Excellence to enrich and enhance pupils' learning experiences.

These presentations have been compiled to provide a resource to explore and enhance topical science subjects within your school; we hope that you will enjoy the selection.

Presentations will be offered in your school (unless otherwise stated) at **NO COST** and on a day and time convenient to you. Presenters have given dates on which they can offer their presentations during September. Most are available during the whole month, others are limited to certain dates within September.

- Some popular presentations have limited availability and we hope that schools making bookings will be willing to act as hosts to groups from other schools.
- Presentations last 45 - 60 minutes unless otherwise stated.
- Presentations can be searched by subject or year group on our website www.techfestsetpoint.org.uk/tis/secondary
- For booking details please either complete a booking form (downloadable from the above website) or contact **Calum Scott** on **01224 274799** or email calum.scott@abdn.ac.uk

THE INSTITUTE OF PHYSICS SCHOOLS LECTURE



FROM X-RAYS TO ANTIMATTER: THE SCIENCE OF SEEING INSIDE YOUR BODY

S3 - S6

Find out how physicists build machines that do what our eyes can not see inside the human body. This inspiring lecture will reveal how:

- Over the past hundred years physicists have developed increasingly sophisticated techniques to see inside the body.
- This technique uses x-ray, radioactive molecules and magnetic fields to produce images of the body.
- These images allow doctors to better diagnose and treat illness and disease.
- Presented by *Dr Michael Wilson*
- 5th to 8th September
- Glasgow, Edinburgh, St Andrews and Aberdeen consecutively

Booking is essential. Details of the venues and booking can be found on the IoP website: www.iop.org/education/teacher/extra_resources

THE ROYAL SOCIETY OF EDINBURGH LECTURE



GHOST, MEMORIES AND THE INTERNET OF THINGS

ART
S5 - S6

Dr Chris Speed is a Lecturer at Edinburgh College of Art, a reader of digital spaces across the School of Architecture and Landscape architecture and an artist and designer.

He will deliver a talk discussing the development of networked objects and their implications upon social memory.

The talk will refer to the research project www.talesofthings.com and its collaborations with the National Museum of Scotland.

- Presented by *Dr Chris Speed, Edinburgh College of Art*
- Supported by the Royal Society of Edinburgh
- Tuesday 6th September

KEY

● Biology ● Chemistry ● Computing ● Geography/Geology ● Mathematics ● Physics ● Science ● Technological Studies ● Other curricular areas

THE MAGNIFICENT MOULD, THE FRIGHTENING FUNGUS

S5 - S6

From yeasts to mushrooms, fungi affect our daily lives and are vitally important in nature. From single microbes to huge colonies the size of villages that have survived for a thousand years, they represent one of the most fascinating groups of life. We harvest their many amazing properties for our own good but we also struggle to keep them in check as they become more common agents of disease. Most people turn up their noses at the humble fungus - if only they knew what they have to offer. This lecture will introduce you to these surprising and wonderful microbes.

- Presented by *Professor Neil Gow, University of Aberdeen*

PARAFFIN YOUNG

S3 - S4

Dr James "Paraffin" Young enlightens each class with his in-depth knowledge of geological formation of oil, fractional distillation, alkanes, alkenes and the modern petroleum industry, providing a memorable and unique insight to fuels and hydrocarbons.

- 40 - 50 minute presentation
- Presented by *Live Wire Productions*

NANOPOSITIONING SYSTEMS, CHALLENGES AND APPLICATIONS

S5 - S6

As we enter the age of miniaturization and sub molecular scale studies, developing high performance nanopositioning systems has become an interesting research topic. Nanopositioning systems enable scientists to work in a multitude of areas such as nano-mechanics, scanning probe microscopy, microbiology and nano-metrology. Such developments seek for fast, accurate, high resolution and larger range of motion nanopositioning systems. In this talk we will see the challenges and problems in this fascinating subject.

- Presented by *Mohammad Namavar, University of Aberdeen*

THE WEIRD AND WONDEFUL LIFE OF MICROBES AND BUGS!

S1 - S6
(Adapted to suit)

Insects, particularly blood suckers, kill millions of people every year; but are they a force for good?

Estimates suggest that insects have caused the deaths of half of all people who have ever lived. Yet without insects we may all be dead. Monstrous and cute, deadly yet life-giving, insects really are the most remarkable animals on the planet.

- Presented by *Dr John Baird, University of Aberdeen*

PLANTS AS DRUGS

S4 - S6

This talk will give examples of anti-cancer drugs, anti-inflammatory drugs, anti-microbial drugs and recreational drugs of plant origin - their mode of action and any adverse side effects. It will also include discussion of how drugs are discovered and developed, why some drugs have been withdrawn from the market and the role of pharmacologists in drug discovery and development.

- Presented by *Professor Gabrielle Hawksworth, University of Aberdeen*

WHAT DO SCIENTISTS DO? WHY SCIENCE AT SCHOOL IS IMPORTANT AND CAREERS IN SCIENCE

CAREERS
S2 - S6

(tailored to suit but may be of most use for pupils choosing school subjects or university courses)

This talk is aimed at highlighting what science actually is and what professional scientists do. It aims to indicate why school science is important even if you end up not pursuing a career in science. It will make use of real world examples and try to give a feel for scientific career options.

- Presented by *Dr David McGloin, University of Dundee*

STUDYING THE ATMOSPHERE ONE PARTICLE AT A TIME: TRAPPING AEROSOLS WITH LIGHT

S3 - S6
(tailored to suit)

What is the atmosphere made of and where does this stuff come from? Students will make a cloud and then see how we can trap cloud 'particles' using laser beams in order to understand how atmospheric processes work.

- Presented by *Dr David McGloin, University of Dundee*

NUTRITION - FROM CAVES TO CAMPAIGNS

HOME ECONOMICS
S1 - S6
(tailored to suit)

This talk takes an historic (and prehistoric!) look at human food consumption to get pupils engaged with how food issues are more important for us than ever.

- Available in Aberdeen City and Aberdeenshire
- Presented by *Dr Fiona Comrie, Food Standards Agency In Scotland*

WHEN I GROW UP I WANT TO BE A CANCER CELL

S5 - S6

"So you want to be a cancer cell? That's easy. You need to grow uncontrollably, knock out DNA repair systems, avoid suicidal cell death and build your own blood vessels. Oh and you also need to become immortal!" How do we get cancer? Can we blame genes or should we blame the environment?

- Presented by *Dr Andy Schofield, University of Aberdeen*

EVOLUTION IN A TEST - TUBE: ROLE OF THE WRINKLY SPREADER

S5 - S6

The evolution of bacteria can take a matter of days rather than millennia. This talk will present the rise of the wrinkly spreader in artificial microcosms and discuss the underlying molecular biology and ecological success of this novel evolved genotype.

- Presented by *Dr Andrew Spiers, SIMBIOS Centre, University of Abertay, Dundee*

SOAPBOX ENTERPRISE

ENTERPRISE
S1 - S2

An enterprising activity which allows groups of pupils to form a business and then design, make and market their own brand of soap.

- Workshop duration 90 minutes
- Available in Aberdeen City, Aberdeenshire, Moray and Highlands
- Presented by *Satrosphere Science Centre*

GUIDED TOUR OF THE UNIVERSE

S1 - S4
(tailored to suit)

This highly popular lecture takes pupils on a fascinating journey that starts in the Solar System, then moves to the stars and the Milky Way, of which they form a part, and finishes up in the furthest reaches of the extragalactic universe. This presentation incorporates images from the Hubble telescope.

- Available in Aberdeen City and Aberdeenshire
- Presented by *Professor Henry Ellington, Emeritus Professor, The Robert Gordon University*

KEEP SMILING

PHILOSOPHY, HISTORY AND CULTURE
S1 - S6
(tailored to suit)

What makes a good smile and what do we need to keep smiling? This workshop investigates an holistic view of a smile, integrating the social, cultural and historic aspects of a smile together with biological and medical issues necessary to keep us smiling.

- Presented by *Dr Morag McFadyen and Dr Lesley Diack, The Robert Gordon University*

DRUGS FROM THE DEEP

S1 - S6 (tailored to suit)

More than 60% of the drugs used today, such as penicillin, are derived from natural sources or are based on molecules found in nature. The oceans provide a rich source of new organisms, such as sponges and soft corals, which can be explored for their potential to produce compounds which can fight diseases.

- Presented by *Professor Marcel Jaspars, University of Aberdeen*

SKELETONS OUT OF THE CLOSET

S1 - S6
(tailored to suit)

Although we may think of the skeleton as an inactive scaffold, in reality our bones undergo continual repair through a process known as remodelling. When this goes wrong, bones become weak and fracture easily, for example in the disease osteoporosis. This presentation will use microscopic images and animations to illustrate these concepts and demonstrate how we can potentially improve the treatment of osteoporosis by studying bone structure and remodelling in the laboratory.

- Presented by *Dr Fraser Coxon, University of Aberdeen*

UNDERSTANDING WIND ENERGY

S1 - S6
(tailored to suit)

The UK has over 2700 wind turbines installed generating enough electricity to supply over 2 million homes. This presentation will introduce the idea of wind energy, explain how a wind turbine works and demonstrate how this resource can contribute to our energy needs.

- Presented by *Mr Colin Bothwell, Mr Malcolm MacDonald, Mr Jonny Flowers, Mr Euan George and Mr Kieran Seery, Renewable Energy Systems*

WHAT'S GOING ON UP THERE? IMAGING VOLCANOES WITH A PORTABLE RADAR

S1 - S6

How can you predict when a volcano is going to erupt if you can't even see it? Learn about the St Andrews AVTIS volcano imager; a portable radar and thermal imager designed to peer through cloud and smoke to record volcanic activity in any weather. This talk can be accompanied by a fast-scanning, high resolution radar that maps the venue and audience in real time.

- Presented by *Dr David Macfarlane, University of St Andrews*

FINGERPRINT IDENTIFICATION

S1 - S4

Learn how police investigators use their sense of sight to identify fingerprint patterns. We all have them, and they are all different! Pupils will have a go at dusting for fingerprints and make copies of their own fingerprints to take home.

- Presented by *Dundee Science Centre*