

UNIVERSITY OF
BIRMINGHAM

The British Science Festival

The University of Birmingham Programme



UCL B



Fuel cells technologies will have an enormous impact across all energy markets. The University of Birmingham is the catalyst for this revolution in sustainable technologies.

Dr Bruno G Pollett

Create impact.

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BIRMINGHAM
14-19/09/2010

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The British Science Festival

The annual British Science Festival is visiting Birmingham this year and the University of Birmingham is heavily involved in supporting the Festival and the Young People's Programme during the week-long activities (14–19 September 2010).

The British Science Festival is one of Europe's largest organised events focusing on Science, Engineering and Technology, and is organised by the British Science Association. The 2010 Festival will see more than 250 events hosted around the city aimed at families, students and members of the general public.

The University of Birmingham's excellence in research and innovation will be highlighted throughout the Festival with events taking place at the Edgbaston campus, alongside other sites at Aston University and Thinktank. Leading academics will discuss their latest research findings and demonstrate how the University is helping us to understand the world in which we live.

As part of our continued focus to support the teaching and learning of young people at schools and colleges, the University will be running its Young People's Programme

at the Edgbaston campus on Thursday 16 September. The Programme will feature a series of keynote lectures and interactive workshops designed for young scientists of the future. The activities are specifically designed to support students from Year 10 to Year 13 and will be delivered by academic staff who are leaders in their field. Please see section one of this programme for more details.

Friday 17 and Saturday 18 September will see the focus switch to academic sessions aimed at members of the general public who are interested not only in the research that happens at the University, but also who have a general interest in science. An extensive programme of sessions will be delivered by academic staff on the University's Edgbaston campus. For more information, please see section two of this programme. Alongside the events running on the Edgbaston campus, the University's academic staff will also be delivering sessions



all over the city in support of the Festival. Section three of this programme highlights the full range of sessions that will be delivered at other festival venues such as Aston University and Thinktank.

Sections at a glance

The Young People's Programme on the University of Birmingham Edgbaston campus

Events for the general public on the University campus

University of Birmingham academic staff delivering sessions off-campus



The Young People's Programme

Highlights from the Young People's Programme include keynote lectures on searching for black holes with lasers; hydrogen fuel cells and the University's cutting-edge research investigating renewable energies; using Mathematics to help with infertility; and looking at the early mysteries of the universe with our Particle Physics research group. The academic sessions at the University will run from 9.45am–2.45pm.

Ticket concessions for the Young People's Programme only

Schools can book onto any University of Birmingham activities for the full day or part of the day. The Young People's Programme is also taking place in the city centre at Thinktank and associated venues. The cost

of a one-day ticket will also allow **you to access those activities during the day.**

The standard cost of a ticket for schools is £6.00 per student, per day, for the Festival. However, as part of the University's commitment to our partner schools and colleges, we will contribute £2.00 towards the cost of every ticket for schools and colleges that book onto all, or part of, the University of Birmingham Young People's Programme events on the 16 September 2010.

Further concessions of £2.00 per ticket are also available for schools in the Birmingham and Solihull area if the school has more than 50% free school meals.

How to book

All tickets for the Young People's Programme are booked directly through Thinktank on the booking hotline. Alternatively, please contact Mohammed Ansar at the University of Birmingham for more information by emailing m.ansar@bham.ac.uk

**Booking hotline
(for Young People's
Programme only)
0121 202 2207**

| Time | Title | Description | Speaker(s) |
|--------------------------|--|--|-------------------------------|
| 16 September 2010 | | | |
| 9.45am | Particle Physics and the Mysteries of the Early Universe: interactive lecture | Discover how experiments at the world's highest-energy particle accelerator, Geneva's Large Hadron Collider, are trying to answer fundamental questions about the universe and our existence. See the key concepts illustrated using familiar household objects, explore the latest results, and hear what's planned for the future. | Dr Cristina Lazzeroni |
| 11.00am | Particle Physics and the Mysteries of the Early Universe: interactive workshop | Wander around activity stands where you can see particle detectors in action, chat with researchers about their work, take a tour of a replica experiment control room, and have fun with a new Particle Physics Manager game, designed to demonstrate what it takes to become a successful particle physicist. | Dr Cristina Lazzeroni |
| 11.00am | History of Medicine | The history of medicine is littered with battles between researchers and diseases that have been causing misery for the human population. This interactive session will chart the battle to eradicate disease from Earth and a demonstration of what diseases such as small pox and bubonic plague actually look like on human flesh. | Julia Hyland |
| 11.00am | Renewable Energies and Hydrogen Fuel Cells | The hydrogen and fuel cell session will introduce you to the exciting world of tomorrow's power generation. Hydrogen and fuel cell technology is earmarked as 'the next big thing', and it will play a significant role in the reduction of gases such as CO ₂ . This interactive session will show participants hydrogen-powered vehicles and how the technology is developed by researchers. Learn about the hydrogen revolution and experience tomorrow's technology today! | Dr Aman Dhir |
| 12.00pm | Looking for Black Holes with Lasers | Black holes are very difficult to see directly, but if two black holes collide they send shockwaves through the fabric of our universe, strong enough to be detected many galaxies away. With interactive games and open sessions with experts, you will learn how we use lasers to discover black holes by observing the gravitational radiation that they emit. | Dr Alberto Vecchio |
| 1.00pm | Creating Elemental Stardust | How are all of the elements that we are formed from created? How was matter created at the beginning of time? What is the heaviest possible element? How can we study these processes on Earth in experiments? These are the essential questions that will be explored in this lecture. | Professor Martin Freer |
| 1.00pm | Controlling Properties in Carbon Fibre Composites | Increasing use is made of carbon fibre composites in aerospace, automotive, biomedical and sports applications. The first part of this activity will involve laying-up of pre-preg to form different laminates by the students. As these take up to 6 hours to cure, the different behaviour of these will be assessed in the second part of the activity using pre-cured samples. (The hands-on nature of this limits numbers to around 12 and no-one with a sensitivity to solvents should take part.) | Dr Martin Strangwood |
| 2.00pm | The Virtual Sperm and Mathematics | Experimental research has allowed us to develop a virtual sperm using simple everyday mathematics, which will aid us in understanding human infertility and contraception. This research will support new treatments in the future and diagnoses will have huge quality of life benefits. | Dr David J Smith |

General audience

Edgbaston campus, University of Birmingham

| Time | Title | Description | Speaker(s) and venues |
|--|---|--|--|
| 17 September 2010 | | | |
| 10.00am–12.00noon | Particle Physics and the Mysteries of the Early Universe | Discover how experiments at the world's highest-energy particle accelerator, Geneva's Large Hadron Collider, are trying to answer key questions about the universe and our existence. Listen to a short interactive talk then wander around activity stands. See particle detectors in action, take a tour of a replica experiment control room and have fun with a new manager game. | Dr Cristina Lazzeroni The Bridge Study, Watson Building (R15) |
| 10.00am–12.00noon | From Drug Design to Cancer Diagnostics: tour of Birmingham's national magnetic lab | This tour of the UK's largest superconducting magnet facility includes talks by three distinguished scientists (Chris Bunce, Andrew Peet, and Ulrich Gunther) showing how proteins behave, drug molecules are designed and disease markers are identified. These scientists lead cancer biology and biochemistry labs that are discovering new sites for intervention and markers for earlier detection of cancer incidence. | Professor Michael Overduin Front Hall, Henry Wellcome Building (B8) |
| 10.00am–5.00pm | Looking for Black Holes with Lasers | Black holes are very difficult to see directly, but if two black holes collide they send shockwaves through the fabric of our universe, strong enough to be detected many galaxies away. With interactive games and open sessions with experts, you will learn how we use lasers to discover black holes by observing the gravitational radiation that they emit. | Dr Andreas Freise and Dr Alberto Vecchio Physics West Building (R8), Rooms 117/125 |
| 10.00am–5.00pm | Tackling Tuberculosis: From the Laboratory to your GP. UK Symposium for TB researchers and clinicians | The symposium is aimed at highlighting UK TB research by providing a common forum to researchers, industry and clinicians working on TB drug development and vaccines. | Professor Eric Rubin, Dr David Barros, Professor Mark Pallen, Dr Helen McShane School of Biosciences (R27), Room NG08 |
| 10.00am–5.00pm (This event is open all week (Tues–Fri 10–5, Sat 10–4 and Sun 11–4)) | The Art of Iridescence: Beauty in the Eye of the Beholder | This eye-catching SciArt exhibition captures, for the first time on canvas, the rainbow colours of Nature's iridescence. Mimicking iridescent structures of butterflies, the artist Franziska Schenk has collaborated with the School of Biosciences to adapt revolutionary colour-shifting nanoparticles – to inject a dynamic dimension into painting. With butterfly eyespots as examples, relationships between colour and perception are explored. | Franziska Schenk and Clare Mullett Rotunda Gallery, Aston Webb Building, (R6) University of Birmingham and School of Art, Foyer Gallery, Birmingham City University, (Margaret Street) |
| 11.00am–3.00pm | Postgraduate research exhibition | This exhibition will highlight some of our very best postgraduate researchers and their work. Refreshments will be available. | Graduate School Chancellor's Court Marquee, University of Birmingham |
| 12.00noon–2.00pm | Hydrogen-Powered Narrow Boat | In the next few years we expect to see rises in temperature, sea levels and energy costs to help pay for combating these problems; as well as frequent power cuts unless we do something to alleviate the situation now. The current generation of scientists and world leaders are putting structures in place to combat these expected crises, but it will take another two or three generations to do the job properly. We need to get our youngsters interested now in saving the planet for the future. Come and view our Hydrogen-Powered Narrow Boat to learn more about the future of hydrogen energy. | Professor Rex Harris School of Metallurgy and Materials (G6) |
| 1.00–4.00pm (This event consists of a 45min talk and three circulating lab tours) | Viruses and Cancer: from Cause to Cure | Infection is estimated to cause around 20% of all cancers. However, viruses can provide crucial insights into basic causes of cancer as well as opportunities for intervention such as vaccines and gene therapy. Through tours and talks we will show viruses as 'tools' for understanding; illustrate how some viruses cause cancer; and explain how immunotherapy can be used to destroy virus-induced tumours. | Dr David Blackburn and Dr Sally Roberts Cancer Sciences Building (B5), Seminar Room S104 |

General audience

Edgbaston campus, University of Birmingham continued

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|------------------------------|---|--|--|
| 2.00– 4.00pm | Stem Cells in Medicine: Hype or Hope? | This interactive discussion provides a clear outline of what stem cells can realistically achieve in clinical practice, and allows people to better understand the ethical issues surrounding their use. Stem cells do have a potentially positive and beneficial role in medicine, but their use has to be underpinned by good science and careful clinical translation. We will highlight examples where stem cell research has already been successful, alongside work in progress and cases where it has been over-hyped. We will cover the different types of stem cells and the ways in which they may be exploited for clinical benefit. We will also cover the ethical issues surrounding their use. | Dr Phil Newsome and Professor Jon Frampton Medical School Building (B1), Room WF15 |
| 2.00– 5.00pm | In your Dreams: Science and the Creative Imagination in France (1880–1930) | A selection of case studies showing how the imagination in France responded to paradigmatic shifts in scientific thinking at the start of the 20th century. From the Decadents to the Surrealists, the tales of Alfred Jarry and Villiers de l'Isle-Adam to Dada filmmaking – new technologies and ways of conceiving the material world, and man's relation to it, inspired fresh concepts of body and mind. | Dr Jennifer Birkett and Dr Stephen Forcer Main foyer, Muirhead Tower (R21) |
| 2.00– 4.00pm | Local Innovations with Global Impact – guided tours | A guided tour highlighting the special achievements of notable individuals associated with the University of Birmingham. Find out about important scientific discoveries, artistic creations and inventions of international significance that have taken place at Birmingham. | Robert Whitworth and Franziska Schenk The Barber Institute of Fine Arts (R14) |
| 2.00– 6.00pm | Fuel for the Future | There are scientific challenges for the development of new sustainable energy sources. The underpinning science necessary to make advancements in this field can be made accessible to a wide audience. Visitors at this interactive and engaging event will have the opportunity to experience for themselves the latest cutting edge developments in our quest for the fuels of the future. | Dr Melanie Britton and Michael Grove Lecture Theatre 203, Haworth Building (Y2) |
| 2.10– 3.00pm | From Stein to Steinway: 200 Years of the Piano | How did the pianos of Beethoven's day differ from Chopin's or Rachmaninoff's? International concert pianist Kenneth Hamilton answers this question by presenting and playing the University's unique collection of historical instruments. He will discuss how mechanical and musical innovation went hand in hand, and perform a selection of pieces by Beethoven, Chopin, Liszt and Rachmaninoff. | Dr Kenneth Hamilton The Barber Institute of Fine Arts (R14), Concert Hall |
| 3.15– 4.15pm | Matthew Boulton and the Celebration of Industrial Technology | Birmingham manufacturer Matthew Boulton was conscious of his role in creating a new industrial society during the Industrial Revolution. His Soho factory was the world's largest when it was built, and with James Watt, he developed and manufactured steam engines. This talk will look at Boulton as a contributor to a culture of modernisation which celebrated manufacturing and industrial technology. | Dr Malcolm Dick The Barber Institute of Fine Arts (R14) |
| 5.30– 7.30pm | How Should We Keep The Lights On? | The UK will need to spend up to £200 billion over the next decade to replace ageing power stations, to meet our goals for renewable energy and climate change. How we might achieve this forms the basis for this debate. Leaders from the world of politics, the power industry and environmental organisations will come together to discuss these important issues. | Professor Richard Green Lecture room 101, Haworth Building (Y2) |
| Saturday 18 September | | | |
| 10.00am– 5.00pm | Looking for Black Holes with Lasers | Black holes are very difficult to see directly, but if two black holes collide they send shockwaves through the fabric of our universe, strong enough to be detected many galaxies away. With interactive games and open sessions with experts, you will learn how we use lasers to discover black holes by observing the gravitational radiation that they emit. | Dr Andreas Freise and Dr Alberto Vecchio Physics West Building (R8), Rooms 117/125 |
| 10.00am– 5.00pm | Mars to the Milky Way – a Space Traveller's Guide | Build and test paper rockets, listen to some of today's leading researchers or take a guided tour of the skies from the planetarium. An exciting day of hands-on activities and talks by physicists and astronomers exploring how we uncover the secrets of the universe and what the future of physics, astronomy and space exploration holds. | Dr Somak Raychaudhury Physics West Building (R8), Room 125 |

Sessions by University of Birmingham research leaders at the Festival – off-campus

Tuesday 14 September

What's so bad about stress? What can science tell us?

Room MB146, Aston University Campus,
2.00–3.00pm
Dr Anna Phillips

Wednesday 15 September

Life everlasting? The science and philosophy of ageing research

Room MB461, Aston University Campus,
1.00–5.00pm
Professor Richard Faragher/
Professor Janet Lord

Thursday 16 September

Regulating Genetics: An urgent necessity or an impossible challenge?

Library Theatre, Central Library,
10.00–11.30am
Panel debate with Professor Jean McHale,
Professor Heather Widdows, Dr Stephen
Smith and Dr Hardev Pall

How do scientists find out what babies think?

Room MB108, Aston University Campus,
10.00am–12.00noon
Dr Ian Apperly

A sight for sore eyes

Room MB155, Aston University Campus,
10.00am–1.00pm
Professor Philip Murray, Dr John Curnow
Dr Alistair Denniston

In connection with this event, please also visit
'The body in health and disease exhibition',
Great Hall, Aston University
Tuesday 14 September, 2.00pm–7.00pm
Wednesday 15 September, 10.00am–4.00pm
Thursday 16 September, 10.00am–5.00pm



Do we need more scientists?

Room MB461, Aston University Campus,
4.00–5.00pm
Professor Stephen Gorad

Friday 17 September

Obesity and Metabolism: New research in the West Midlands region?

Room MB146, Aston University Campus,
10.00am–12.00noon
Dr Jeremy Tomlinson

What can go wrong inside your joints and what can be done about it?

Wellcome Trust Clinical Research Facility,
UHBFT, 2.00–4.00pm
Dr Karim Raza

Human Guinea Pigs – dispelling the myths of human research

Wellcome Trust Clinical Research Facility,
UHBFT, 2.00–4.00pm
Dr Julie Williams

Events in addition to printed programme:

Past Worlds – Lost Worlds – Digital Worlds

Room MB554, Aston University Campus,
2.00–4.00pm
Professor Vincent Gaffney,
Ms Helen Moulden, Dr Henry Chapman

The truth about trials

Electric Cinema, 5.00–7.00pm
Professor Ashley Martin

The Geometry of the Industrial Revolution

Thinktank lecture theatre, Millennium Point,
6.30–7.30pm
Dr Christopher Sangwin

Saturday 18 September

Battling the Birmingham Bulge

Centenary Square, 11.00am–5.00pm
Dr Jeremy Tomlinson

'The Machinery' – has science really improved our lives?

The Library Theatre, Central Library,
1.30–2.00pm
Dr Caroline Radcliffe with external
partner Sarah Angliss

What does it take to make really helpful robots?

Room MB404 C+D, Aston University Campus,
2.00–4.00pm
Professor Chris Miall

Sunday 19 September

Battling the Birmingham Bulge

Centenary Square, 11.00am–5.00pm
Dr Jeremy Tomlinson



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