

April 2013

AWE • 15 April, 7.30 p.m. • Jonathan Allday

The Turin Shroud

The Turin Shroud has been carbon dated and declared to be a medieval fake. Starting from that assumption Jonathan will assess evidence from the image, along with known and speculated history to see if there is good reason to doubt the carbon date and the technical ability of a medieval forger to produce such an image.

MILTON KEYNES • 16 April, 7.30 p.m. • Dr Susanne P Schwenzler

Mars Rover Curiosity at Gale Crater

The Mars Science Laboratory Mission Rover Curiosity landed in Gale Crater, Mars, on 6 August 2012. Since then it has checked its instruments and begun to explore its landing site. Starting with the Glenelg area and sediments, the rover will proceed to the central mound of the crater to investigate the geology, hydrous history and the potential for habitable conditions of Gale Crater. What has it found?

LONDON • 24 April, 6.30 p.m. • Prof. Jonathan Butterworth

The Large Hadron Collider: Latest News from the Energy Frontier

The Large Hadron Collider at CERN is using collisions between protons to explore physics at higher energies than ever before. This is the region where the weak and electromagnetic forces unify and where mass originates and where a new boson, which may well be the Higgs, has been discovered. Prof. Butterworth will give an update on the current status – whatever it might be!

May 2013

MILTON KEYNES • 14 May, 7.30 p.m. • Dr Marialuisa Aliotta

Nuclear Reactions, Stars and the Creation of Elements

Our bodies are mostly made up of six elements: oxygen, carbon, hydrogen, nitrogen, calcium and phosphorous, with traces of others. All are necessary for life. A key question for nuclear astrophysics is: how, when and where in the universe are these elements created? The answer takes us on a journey through the inner workings of stars and shows our intimate connection with past fierce stellar explosions. Dr Aliotta will reveal how nuclear physics takes centre stage in the quest to understand our origin and place in the universe.

LONDON • 15 May, 6.30 p.m. • Prof. Alan Davies

Science in the Cinema

There are many scenes in movies where science crops up. Prof. Davies will discuss the science or maths, showing clips from well known films such as *Die Hard* and *Cast Away* together with clips from some not-so-well-known movies. He will ask “Why is the science there?” “Is it correct?” “If not, why not?”

June 2013

LONDON • 5 June, 6.30 p.m. • Prof. Steve Roberts

Materials Challenges for Fusion Power

Development of nuclear fusion as a power source is moving forward rapidly, with the ITER experimental reactor currently under construction. The first power-generating reactor, “DEMO”, is moving towards the design stage. Some of the major obstacles to be overcome before fusion can be an economical power source lie with the materials used for critical reactor components. In this talk Prof. Roberts will review some of these problems and outline the state of current research aimed at solving them.

AWE • 10 June, 7.30 p.m. • Prof. Frank Close
Neutrino – to be confirmed. See website for details

MILTON KEYNES • 11 June, 7.30 p.m.

To be confirmed – see website for details

Information

All of our lectures are free to all and last about one hour. There is usually 10 to 15 minutes afterwards for the audience to ask questions. **School parties are most welcome but please register numbers beforehand with the relevant venue organiser (see below).**

All venues are wheelchair accessible.

The lecture programme is subject to possible alteration, but changes and updates can be found at our website <http://london.iop.org>.

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Lecture venue information and times are as follows

London

Refreshments are served from 6.00 p.m. on the day of the lecture. Lectures are held at 6.30 p.m. at Institute of Physics, 76 Portland Place, London, W1B 1NT. *Closest tube stations:* Great Portland St, Regents Park & Oxford Circus. Please book your place at least one day in advance by e-mailing londonsoutheast@physics.org. If you do not have access to e-mail, telephone Alex McDowell on 020 8845 2295.

AWE

Refreshments are served from 7.00 p.m. on the day of the lecture. Lectures held at 7.30 p.m. in the William Penny Theatre, AWE, Aldermaston, Reading RG7 4PR. The theatre entrance can be found on the A340 Basingstoke to Newbury road, just before the Heath End Roundabout at Tadley. E-mail David Parkes at iop.lectures@awe.co.uk, or tel 0118 9814111, for further information.

Herts

Lectures usually held in the Lindop Building, University of Hertfordshire, College Lane, Hatfield, AL10 9AB. For further information on this season's events, contact Diane Crann (e-mail d.crann@herts.ac.uk, tel 07770 444614).

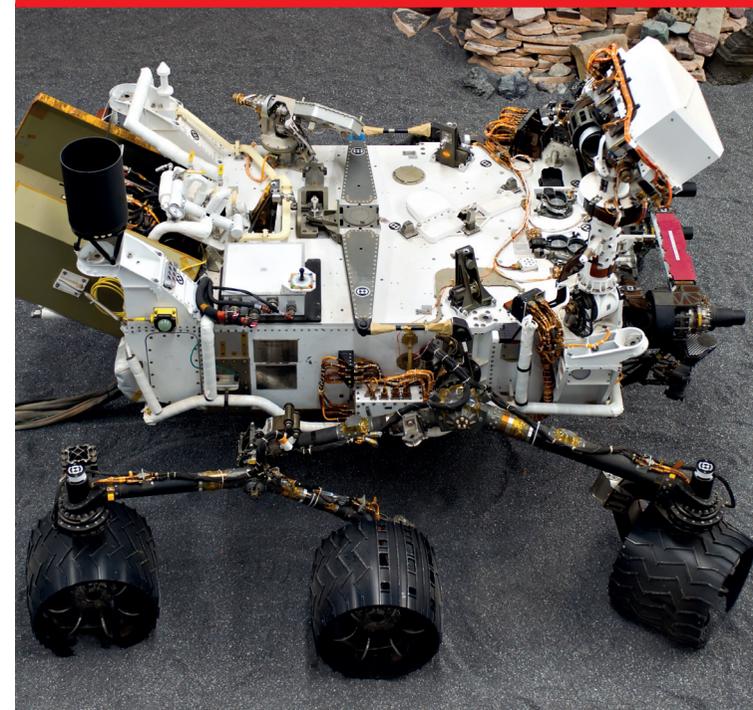
Kent

All lectures held at 7.30 p.m. in Rutherford Lecture Theatre 1, University of Kent, Canterbury CT2 7NZ. Further information can be obtained from Dr Cyril Isenberg (e-mail c.isenberg@kent.ac.uk, tel 01227 823768).

Milton Keynes

Lectures held at 7.30 p.m. in the Berrill Lecture Theatre, Open University, Walton Hall, Milton Keynes MK7 6AB. For further information contact Prof. Ray Mackintosh. E-mail r.mackintosh@open.ac.uk. Changes and updates to lectures can be found at <http://london.iop.org>, tel 01908 655169.

London & South East Branch



Public Lectures January–June 2013

Please visit our website <http://london.iop.org>

IOP Institute of Physics

London and South East Branch Public Events

January 2013

KENT • 22 January, 7.30 p.m. • Prof. Paddy Farrell

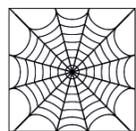
Why do Social Networks Perform so Well?

Answer: Correcting Errors in Digital Information

There are now more mobile phones in the world than landlines. The old telephone system is being replaced by the still rapidly growing mobile-radio system. Users can now transmit and receive not just audio, but also video and data signals, which has led to the creation of many social networks (Facebook, YouTube, LinkedIn and Twitter, etc). Amazingly this huge complex system performs very well most of the time. One crucial reason is that the information transmitted and stored in the system is protected against mistakes by powerful error-correcting codes. Prof. Farrell will explain how these codes work and highlight their error-correcting power, with a practical demonstration.

LONDON • 23 January, 6.30 p.m. • Prof. Fritz Vollrath

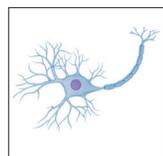
Unravelling Spider Silks



Spider silks, like the silks of other arthropods, use proteins as the structural components and water as the solvent. Protein and water combine and separate to make silk thread, which can be so tough that it outperforms even the best synthetic fibre. So far, our studies of spider silks and webs have led to a number of important discoveries. These range from tuneable nanoscale composites and complex, self-assembling micro-machines all the way to the building of complex webs that absorb energy aerodynamically. Nature's "design by evolution" is powerful but takes place over millennia, to produce highly functional, energy efficient materials, devices and systems. Prof. Vollrath will explain how silks are not only interesting as highly evolved materials but have a bright future both as models to guide our understanding of energy-efficient bio-polymers and also as prototype models to guide the design of novel polymer systems in medicine and engineering.

HERTS • 30 January, 7.00 p.m. • Victoria Vaccaro

The Secret Life of Neurons



Many neuroscientists believe that in order to understand advance processes such as memory, perception and decision making we need to first understand the basic functions of individual neurons. This talk will look at how neurons might allow the brain to accomplish such tasks and how scientists gain this information from a variety of research tools.

February 2013

KENT • 5 February, 7.30 p.m. • Prof. Wade Allison

Radiation and Reason: a Fresh Look at the Effect of Radiation on Life



Ever since the Cold War with its threat of nuclear holocaust, we have held radiation in awe. Very few people die in nuclear accidents and the scientific basis of radiation safety is ripe for fundamental re-examination, not because of nuclear power's expansion, but because it asks the wrong questions. Prof. Allison, who recently returned from Fukushima and is the author of *Radiation and Reason: the impact of science on a culture of fear* (www.radiationandreason.com) will address these questions.

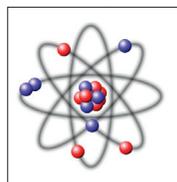
LONDON • 6 February, 6.30 p.m. • Dr David S Berman

Theoretical Physics and String Theory

Theoretical physicists around the world dream of finding a unified theory of fundamental physics. In his talk, Dr Berman will review this goal and discuss how string theory might one day achieve this objective.

MILTON KEYNES • 12 February, 7.30 p.m. • Prof. Paddy Regan

Nuclear Spectroscopy: From Natural Radioactivity to studies of the most exotic isotopes



Prof. Regan discusses recent measurements that have revealed atomic nuclei that are very different from those in "normal" matter on Earth. Understanding these exotic nuclei is important for fundamental physics and understanding the synthesis of chemical elements when stars explode as supernovae. The techniques used can also measure radiation in the human environment – for example, after nuclear incidents such as Chernobyl and Fukushima.

AWE • 18 February, 7.30 p.m. • Dr Andrew Norton

Exoplanets and How to Find Them

20 years ago, planets around other stars were the stuff of science fiction; yet today that fiction is a reality and we know of around 800 so called exoplanets, with thousands of further possible ones identified. Dr Norton will tell a little of the history of this remarkable advance, and show just how exoplanets are discovered, using a range of models and demonstrations. Some highlights from recent discoveries will be discussed, including those from the SuperWASP project which staff at the Open University are involved with, and the prospects for future discoveries of habitable Earth-like planets will be outlined.

LONDON • 20 February, 6.30 p.m. • Dr Steve Kane

The Physics of Finance



Many physical systems involve elements of randomness or uncertainty. Physicists have developed many techniques for modelling and controlling this randomness. Over recent years many of these techniques have been used in trying to model financial markets. This presentation gives an overview of how physics is being used in the world of finance.

HERTS • 27 February, 7.00 p.m. • Prof. Malcolm Smith

The Inerter for Control of Mechanical Systems



Image: David Acosta Allely – Shutterstock.com

Prof. Smith will describe the theory and physics of the inerter device and its development from a theoretical concept to deployment in Formula One cars.

March 2013

KENT • 5 March, 7.30 p.m. • Prof. John Ellis CBE FRS

The Higgs Boson and Beyond

Prof. Ellis has spent most of his career at CERN involved in the phenomenological aspects of particle physics. He has also made important contributions to astrophysics, cosmology and quantum gravity.

LONDON • 6 March, 6.30 p.m. • Dr Edwin Aird

Radiotherapy: the Invisible Life Saver



Soon after their discovery, X-rays were used in medicine. Following a series of technological advances over the last century, radiotherapy now treats a wide range of cancers. Recent advances in imaging at the time of treatment and the use of particle beams instead of X-rays have continued to drive progress and provide a highly effective and efficient treatment for millions of patients worldwide.

MILTON KEYNES • 12 March, 7.30 p.m. • Prof. Jonathan Butterworth

The Large Hadron Collider: Latest News from the Energy Frontier

The Large Hadron Collider at CERN is using collisions between protons to explore physics at higher energies than ever before. This is the region where the weak and electromagnetic forces unify and where mass originates. It is also where a new boson, which may well be the Higgs, has been discovered. Prof. Butterworth will give an update on the current status – whatever it might be!

KENT • 19 March, 7.30 p.m. • Prof. Seb Oliver

Smoke Signals From the Distant Universe – joint meeting with SEKAS



The cosmic history of star formation had a profound role, not just in the origin of celestial bodies, but in the origin of chemicals like carbon that are needed for life. The growth of mass concentrations in the universe, under the action of gravity, is now reasonably understood. However, our knowledge of more complex process of star formation is frustrated by enshrouding smoke-like dust, obscuring the view of conventional telescopes. Prof. Oliver will demonstrate how infrared cameras on telescopes in space can detect signals from this "smoke" and probe the underlying star formation in distant galaxies. He will also discuss what we have learned from these studies about when and where stars were formed.

LONDON • 20 March, 6.30 p.m. • Dr Gregory Wurtz

The Optics of Very Small Stuff

This presentation will give a broad introduction of the optics of metallic nano-objects. How does the shape, size and environment of these objects, or even the way we observe them, change their colour or give the illusion of their absence? These are a few questions that will be answered in this presentation.

HERTS • 27 March, 7.00 p.m. • Dr Stuart Clark

The Day Without Yesterday

The dramatic story of Einstein's struggle with general relativity, set against a backdrop of World War I and the rising tide of anti-semitism. For further information, see www.stuartclark.com.