

# Welcome to the Science Gala!

University of Warwick- Science Concourse

Wednesday 30<sup>th</sup> January 2019

5.00-8.30pm

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## Talks

Seats allocated on a first come first served basis.

### For Key Stage 2 (Ages 8-12 years) 6:00-6:30pm in PLT

Ally Caldecote, Senior Teaching Fellow (Outreach Officer), Physics Department, University of Warwick

#### **'Full of Wind'**

*Ally Caldecote will demonstrate some experiments that help us understand the surprising effects of the air that is all around us.*

### For Key Stages 3 and above (12yo and above) 6:40-7:10pm in PLT

Dr Martine Barons, Director of the Applied Statistics and Risk Unit, University of Warwick

#### **'Using maths to save the bees (and us)!'**

*"Professor Einstein, the learned scientist, once calculated that if all bees disappeared off the earth, four years later all humans would also have disappeared." Abeilles et fleurs, June, 1965. It is unlikely that Einstein said this, but it is certainly true that loss of pollination services would make human life very difficult. It is estimated that 70% of important food crops are insect-pollinated, including fruits, nuts, vegetables, seeds, spices and coffee.*

*In recent years there has been much concern about declining insect pollinator populations, particularly honeybees. This led to the production of the UK's national pollinator strategy and a temporary Europe-wide ban on the use of Neonicotinoid insecticides.*

*The insect pollinator system is typical of today's ever more interconnected world, where decision-making in dynamic environments is often extremely difficult despite vast streams of data, huge models and ever-growing disparate domains of expertise. How can we use maths to overcome this problem? How can we use structured expert judgement as a robust and systematic way to derive probability distributions?*

*I will outline the answers to these questions through the example of food security and pollination.*

### For Key Stages 3 and above (12yo and above) 7:20-8:10pm in PLT

Prof. Don Pollacco, Astronomy and Astrophysics Group, Physics Department, University of Warwick

#### **'Exoplanets and the search for life in the universe'**

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## Tours

All our tours have limited availability and are on a first come first served basis. Please queue up in the designated area.

Chemistry Teaching Laboratories – duration approximately 20minutes - suitable from KS3

Chemistry Laser Laboratories - duration approximately 10 minutes - suitable from KS3

## Workshops/Shows

Spaces allocated on a first come first served basis.

**For Key stages 1 and above – 5:00-8:30, 15 minutes/show, room PS1.28**

### Planetarium

*'Join us in our journey to the centre of our galaxy, a 5 minute planetarium show to discover how astronomers investigate what lies at the heart of the Milky Way using powerful telescopes.'*

**For Key stages 1 and 2 – 5:00-8:30, 20 minutes/workshop, room B201  
(Workshops will run every half-hour)**

### Flux Dance

*'Look around you. What can you hear, see or feel? Is anything moving? All around us, energy enables change and makes things happen. It even allows us to move! Join Flux Dance as they explore the different types of energy around and within us through movement, games and lots of fun.'*

**For Key stages 1 and above (adult supervision required) – 5:00-8:30,  
25 minutes/workshop, (Workshops will run every half-hour) room B203**

### It's a matter of Crystals

*This workshop is aimed at young scientists with a passion for science (all age groups are welcomed). Let's imagine and build the inner structure of salt and snow crystals, have a look a display of crystals grown in the Physics Department at Warwick and learn how you can grow salt and sugar crystals at home.*

**For Key stages 1 and above– 5:15-8:30, 15 minutes/show, Lecture Theatre L5**

### Let's Make A Deal – The Monty Hall Problem

*'How can understanding probability help you win chocolates and avoid cabbages? Prizes to be won...'*

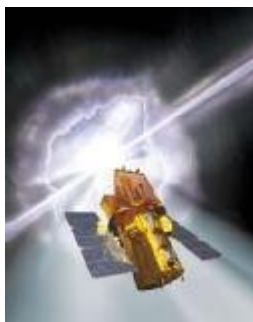
## Exhibition Stands

**XMaS**



The student winners of XMaS Scientist Experience 2018 will share their experiences of winning the competition to visit XMaS at the European Synchrotron Radiation Facility (ESRF). They will discuss what they have learnt and give details of this year's competition, which is now open.

**Astronomy  
and  
Astrophysics**



Get a taste of the research being carried out by the Astronomy group at Warwick, and learn about some of the telescopes that we use in our work. We'll even have a live link to our observatories in the Canary Islands and Chile! Group members will be on hand to answer your questions on topics ranging from the discovery of distant planet, to chasing gravitational waves, to tackling the problem of space debris.

**ATLAS**



At 46 meters long, 25 meters tall and weighing over 7,000 tonnes, ATLAS is the world's largest particle physics detector. The detector is situated 100 meters underground on the ring of the 27 kilometre circumference Large Hadron Collider, where it has been recording the results of sub-atomic proton-proton collisions at the highest energies ever achieved in a laboratory. Experience the vast scale of the ATLAS detector by viewing a 3D recreation of it in virtual reality and learning how the various parts of the detector record different properties of the collisions. In addition, learn about ghostly neutrino particles and how they are detected in the giant Super Kameokande experiment, deep underground in Japan with the Ghosts in the Universe virtual reality exhibit.

**Chemistry  
Department**



*When we think about science, more often than not we tend to picture somebody wearing a white coat, busy with either colourful flasks or huge pieces of equipment. And yet, theoretical and computational scientists do not have labs at all: they harness instead the power of computers to get molecular-level insight into processes happening on time/length scales so short/small that even cutting-edge experiments struggle to tackle them.*

*On the night, you will get a taste of what computational chemistry is all about - by simulating in real time the binding/unbinding of pharmaceutical compounds to some of our proteins... with just a few clicks of the mouse!*

**Chemistry Society**



We provide a range of activities and workshops to help young people discover their future potential in STEM subjects. The project allows university students to volunteer, working with local schools, clubs and groups both on and off campus, all free of charge.

**CFSA**



Research at the Centre for Fusion, Space, and Astrophysics (CFSA) focuses on plasma physics applied to the grand challenges of magnetic and inertial fusion power, space physics, solar physics, and astrophysics. Visit us to learn what it's like to be a researcher in the field of plasma physics, see the latest movies and images of the Sun from NASA's Solar Dynamics Observatory and perform experiments that tell us about the physics of plasmas, the Sun, and other stars

**Diamond Science and Technology CDT**



We all know diamond is a rare, precious gem, but did you know that we can grow diamond in a lab?

Would you like to build your own diamond? ...Or use diamond to cut through ice, like a knife through butter? Come and meet our scientists to discover the amazing properties of diamond, and how we can use it in exciting new ways.

**Engineering Society**



See Electrical Engineering in action with Warwick Engineering Society! We can use everyday materials as conductors to play games and make music!

**Warwick Estates**



Staff and students are researching various issues around sustainability, be that energy generation or how manmade climate change might affect our world. We all have a part to play in making a positive impact, so come along to learn about some of the simple actions you can take and also learn what is truly at stake

**Flux: Moving Science**



Look around you. What can you hear, see or feel? Is anything moving? All around us, energy enables change and makes things happen. It even allows us to move! Join Flux Dance as they explore the different types of energy around and within us through movement, games and lots of fun.

**WMG -  
HVM**



### “Smart Utopia” Cyber Security Demonstrator

In the Smart City of the future, citizens will enjoy cyber-enabled services such as smart transport systems, instant information about the bus they are on, access the Smart Grid for power, work in offices controlled by intelligent building management systems and more. As we connect together services, there is more and more that could be attacked unless things are adequately secured. Vulnerabilities in the systems controlling citizen services – some of which may be due to issues with hardware, firmware or software – but often a result of a misconfiguration or leaving default settings intact, can leave a service open to abuse with some graphic consequences.

The Cyber Security Centre has built a demonstrator based on a fictional town called Utopia to show just what might happen if a badly set up system is attacked.

The IET is one of the world’s largest engineering institutions with over 168,000 members in 150 countries. It is also the most multidisciplinary – to reflect the increasingly diverse nature of engineering in the 21st century.

**IET**



Come and make some real lightning, measure voltage, try out our table-tennis ball launcher and our burglar alarm, or solve the maths behind the card trick!

**Imagineering  
Foundation**



The Imagineering Foundation is an independent education charity that aims to enthuse and nurture young engineers of the future. Its main activities are after-school Imagineering Clubs for 8-13 year olds, public events, such as the Imagineering Fair, special projects on behalf of engineering companies and in-school challenges demonstrating the applications of technology. At the XMaS Science Gala, the Imagineering display focuses on computer controllable robotic vehicles and electricity generation from renewable energy.

**Innovative  
Manufactur-  
ing GRP**



The Innovative Manufacturing Global Research Priorities core areas of Circular Economy, Agri-Manufacturing, Industrial Biotechnology and Industry 4.0, are all aligned to both national and international priorities for industry and society. This GRP brings together engineers, chemists, physicists, computer scientists, mathematicians, statisticians and life scientists to position Warwick as a global centre of excellence in the multidisciplinary research that underpins these innovative

manufacturing priority areas.

Come and visit our area and experience some of our associated initiatives. Sponsoring student interns and projects brings theory to life.....can you make an eco-friendly and cost effective crash structure to protect an egg dropping at high speed??? Think of a driver in a high speed racing car!!

**Institute of Physics**



The Institute of Physics is a leading scientific society. It is a charitable organization with a worldwide membership of more than 30,000, working together to advance physics education, research and application.

This stand will welcome all age groups and interest levels - from doing fun little experiments to receiving advice on your university or career options.

**Lanchester Interactive Archive**



Visit the pop-up Lanchester Interactive Archive where you can have a taste of the full exhibition and discover more about this little-known local hero. Genius and engineer Frederick Lanchester is probably best known for creating the first all-British four-wheeled motor car in 1895 and his hundreds of patents for concepts like turbo-charging, four-wheel drive and aeroplane winglets are still in use today.

See Lanchester's ideas come to life through amazing augmented reality; explore the online archive of unique sketches and patents that shape our lives today; play our games, challenging your engineering, flying and driving skills and find out more about the full exhibition and the link with STEM subjects today in Coventry University's Lanchester Library.

**Warwick Mathematics Institute**



A new mind-bending toy. The **Triple Gear** offers entertainment in three different forms. Whether on its own, on a stick or with a motorised base, the Triple Gear is your companion from morning till night. World leading mathematicians, Dr Saul Schleimer and Dr Henry Segerman from the Universities of Warwick and Melbourne have created a new, education based toy, the Triple Gear.

**Medical Mavericks**



Come and meet the Medical Mavericks and discover some amazing careers by having a play with some real medical kit! You can try key hole surgery, see inside your eye ball on an iPhone, scan the veins under your skin with a vein scanner and discover if you're going to grow taller with an ultrasound!



**Physics Society**



For students, by students. The Physics Society provides both academic support to its 300+ undergraduate members through mentorship schemes and specialized help sessions, as well as a social platform for physics students through a wide variety of regular social events. There is no other place where the Physicist stereotype is so firmly reinforced and completely dispelled at the same time!

Using maths to save the bees (and us)!

Dr Martine J Barons

Director of the Applied Statistics and Risk Unit  
University of Warwick

**Department of Statistics**



**STEMtastic**



STEMtastic is an education consultancy with a focus on Science, Technology, Engineering and Maths founded by Kirsty Bertenshaw. STEMtastic aims to initiate or develop a school's STEM provision by integrating a well planned and resourced programme of inter and extra- curricular activities, training staff and demonstrating good practice. As each school's requirements are different, STEMtastic offer a bespoke service to meet your needs.

**School of Engineering**



From soap bubbles to engineering

Engineering ideas presented by engineering students

**School of Life Sciences**



**Your Amazing Brain**

The human brain is enormously complicated. There are around 86 billion nerve cells (neurones) in your brain, as well as a similar number of supporting cells (glia). The neurones communicate with each other at specialised junctions, of which there may be as many as 10,000 per neurone, giving rise to an astronomical 860 TRILLION connections between neurones! Amazingly, the number of connections can change with experience, such as learning a musical instrument, and with ageing where a gradual decline in the number of connections is seen. At this demonstration, hosted by Neuroscientists from Warwick's School of Life Sciences, you'll be able to see microscopic images of the fine structure of the brain, and use anatomical models to help understand the workings of the brain and nervous system. This will also be an opportunity to talk to brain scientists about topical issues in brain health and well-being, such as Alzheimer's disease, epilepsy and stroke.

**School of Life Sciences**



“Touching proteins with your virtual hands”

**Warwick Antimicrobial Interdisciplinary Centre (WAMIC)**



What is Synthetic Biology and what can it do for our futures? Come and meet our scientist who will help you explore the world of Synthetic Biology with enlightening end results!

**WISB**



### **Biological Circuits – where’s the logic?**

The concepts behind electronic logic gates are being used in biology. By doing so, scientists are better able to control how cells behave. In fact, doing so allows scientists to programme cells in the same way computers can be programmed. Come along to make your own OR, AND and NOR logic gates, and hear how they work in cells.

**WMG Outreach**



Use our computer game to adapt a car to your design and race your vehicle round a track. You can even try out Computer Aided Design software to design your own wheels to use on the car in the game.

**Warwick Racing**



Interested in Formula 1, motorsport, and racing? Visit Warwick Racing for the exciting opportunity to see our Formula Student vehicle, built and raced around the world by students here at the university.

Race a Scalextric car round the track, see components of the Warwick Racing car and video footage!

**Warwick Rail Challenge**



We are the 2018/19 Warwick Rail Challenge Team. We compete every year at the IMechE rail challenge to design, manufacture and run a 1/5th scale locomotive. Our competition include teams from industry such as Ricardo Rail, Transport for London, Network Rail, SNC Lavalin and many more. Last year we placed 7th. We are a multidisciplinary team made up of mechanical, electrical and civil engineers. We aim to take on some of the engineering design challenges currently faced in the UK rail industry. This year we are looking to produce a composite chassis to replace the current steel one and also introduce an electrical power regeneration system.



**Warwick  
Robotics**



We are the 2018/19 Warwick Mobile Robotics (WMR) team. A diverse group of MEng students from the University of Warwick designing and building an Urban Search and Rescue Robot is a research group at the University of Warwick specialising in the development of urban search and rescue robots for use in surveillance, disaster zones and safe monitoring of hazardous sites? Come and control a Robot.

**Warwick  
Sub Team**



Warwick Submarine is a 4th year engineering project, each year a team of students undertake the challenge to develop and test a human powered racing submarine. It competes annually at submarine races worldwide; this year at the 15th International Submarine Race in the USA.

Today there is an opportunity to create your own propeller and test how it moves!

***Thank you for attending and to all the helpers that made this event possible.***

***And special thank you to our sponsors:***

