

**HOSTED BY:**

Broadoak Mathematics and Computing College

Logo by Anita Gardner

**Committee:**

*Soroptimist International : Ruth Thomas, Melanie David, Susan Long and Anne Graham*

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**HANDS-ON INSPIRING SCIENCE**

Organised by:  
Soroptimist International

Hosted by:  
Broadoak Mathematics and  
Computing College




**18 June 2015**  
**At**  
**Broadoak**  
**Mathematics and**  
**Computing College**




Draft Programme








## Timetable




9.30 – 9.45	<b>Arrival</b>
9.50 – 10.10	<p><b>Introduction</b></p> <p>Both our opening speakers are PhD students in the Advanced Composites Centre for Innovation and Science at the University of Bristol.</p> <p><b>Anna Baker</b> has a chemistry background and currently working on hydrogel actuators.</p> <p><b>Camilla Osmiani</b> has a civil engineering background and is studying z-pinning techniques and related finite element models.</p>
10.20 – 11.25	<b>Workshops – Slot 1</b>
11.25 – 11.30	<b>Change over</b>
11.30 – 12.30	<b>Workshops – Slot 2</b>
12.30 – 13.00	<b>Lunch (for girls)</b>
13.05 – 14.05	<b>Workshops - Slot 3</b>
14.05 prompt	<b>Departure</b>

<i>Workshop No</i>	<i>Description</i>
<p><b>14</b></p> <p></p>	<p><b>WATER FOR THE WORLD</b> <i>Natalie Price</i></p> <p>This workshop deals with the topic of providing access to clean water in developing countries, drawing on the experience of one of the biggest civil engineering companies in the world, ARUP. It begins with an interactive presentation, which encourages you to think about where water comes from, how much we use and the problems in developing countries. We also talk about what relevance engineers have in providing water. For the practical part of the workshop: you will work in teams to build a small water filter in a plastic bottle for the country you have been assigned, taking into account restrictions of cost and literacy and education rates.</p>
<p><b>15</b></p> <p></p>	<p><b>BLOOD; WHO, WHAT, WHY?</b> <i>Dr Anna Morris</i></p> <p>Think pathology is just dead bodies? Well think again! In this workshop pathologist Dr Anna Morris will explore why pathology is so important in your healthcare before you have a chance to learn about haematology through a range of fun, practical activities. Squeamish beware this is blood like you have never seen it before!</p>
<p><b>16</b></p> <p></p>	<p><b>HOLD BACK THE FLOOD!!</b> <i>Clare Jones</i></p> <p>Civil Engineering is about understanding what the public needs and wants – and then making it happen in an environmentally friendly way, from the design and construction of buildings and bridges, to the management of water resources and waste. This activity will look into the modern day problems civil engineers have to deal with due to climate change and the rise of natural disasters, from increased flooding, to earthquakes, and erupting volcanoes.</p> <p>Join our exciting activity where you will be designing and building your own homes to be resilient to these natural disasters – and be prepared to have your designs tested!</p>

<b>Workshop No</b>	<b>Description</b>
<b>11</b> 	<b>Rolls-Royce RACING AIR ENGINES</b> <b><i>Matt Griffiths, Patricia Patilla Sanchez, and Rosie Wilson</i></b>  Have you got what it takes to work as a team to build and complete a winning air engine? Find out how engines work and then create your own to power your vehicle across the finishing line. The winning team will win a small prize.
<b>12</b>   Centre for Quantum Photonics	<b>QUANTUM CRYPTOGRAPHY</b>  Security of our digital data is becoming ever more important in our highly connected world. Most of the classical ways we currently keep our information safe will become completely breakable and transparent once we build a quantum computer. One thing we work on is ways to encrypt data where the security rests on the laws of quantum mechanics. During the demo we'll try and give you a feel for what security means, some of the properties of photons (particles of light) which are what we use to distribute secure keys used to lock and unlock information, and for the devices used to exchange keys. You will get to see a live demo and break up into two teams to perform a quantum key exchange between the two groups, finishing by one group encrypting a message and the second decoding it.
<b>13</b>   Mobile Teaching Unit	<b>SEPARATING BLOOD!</b> <b><i>Alex Thompson, Samantha Moore and Ingeborg Hers</i></b>  Meet biomedical/medical scientists who research blood. Find out about how blood moves around the body, the contents of blood and why we don't bleed to death when we cut ourselves. Students will get to : <ol style="list-style-type: none"> <li>1. Use pulse oximeters to measure their heart rates and oxygen content of their blood.</li> <li>2. Perform an experiment using Gilson pipettes and size exclusion chromatography to separate proteins found in blood.</li> </ol>

<b>Workshop No</b>	<b>Description</b>
<b>1</b> 	<b>CAN YOU BE A DESIGN ENGINEER?</b> <b><i>Danya Walker</i></b>  Can you skewer a balloon without popping it? How about coating a nail in copper? And what happens when you plug a clock into a potato? These challenges will stretch your brains, get you hands on and help you to develop the skills you need to be a design engineer. They've been tested by students – and thought up by the design engineers at Dyson.
<b>2</b> 	<b>NEW DIMENSIONS IN OPTICS</b> <b><i>Carla House and Katie Morris</i></b>  The New Dimension workshops are hands-on sessions in which students can find out all about the world of eye testing, eye health and how the eye works – and, more importantly, how these form the basis of optometrists' and dispensing opticians' jobs. You'll test the workings of your own eyes, marvel at mind-bending optical illusions and find out whether you've got what it takes to cut it in this exciting profession.'
<b>3</b> 	<b>THE CHEMISTRY OF PERFUME</b> <b><i>Dr Lynne Thomas</i></b>  Ever wondered what makes an orange smell like an orange? This interactive workshop explores our sense of smell and some of the chemistry behind designing fragrances. You will get the chance to extract essential oils from different natural materials and use them to blend your own perfume to take away with you.
<b>4</b> 	<b>ROBOTS vs ANIMALS: HOW NATURE INSPIRES ROBOTICS</b> <b><i>Corra Boushel, Jessica Meyer and Alia Abdul Ghaffar</i></b>  Find out about how engineers are studying nature in order to solve problems and design robots. We will show you what it takes to design and build a robot, and what robots are learning from ants, fish and birds. You will get to understand how robots might help us build, move and live in the future!

<b>Workshop No</b>	<b>Description</b>
<p><b>5</b></p> 	<p><b>MESSING WITH MAGNETS AND MOTORS!</b>  <b>Dave Collingwood, Rebecca Bound and Sam Buckland</b></p> <p>Motors, magnets and batteries are now fundamentals of daily life, but what can we “magic up” with them in just an hour? This hands on workshop starts with some Magnetic Magic and the theory behind it. Then you test your engineering skills as you build and race your own “toothbrush” racer and finally compete to engineer the wackiest monopolar motor!</p>
<p><b>6</b></p> 	<p><b>BODY ARMOUR</b>  <b>Dr Aimée Helliker</b></p> <p>Body Armour saves lives. There are not just applications within the military but also within the police and the civilian world for people such as security guards. They protect against not only bullets, but knives and have helped protect in road traffic incidents. The main focus of this workshop is the role within the military. Currently the UK service body armour is highly effective, but that comes at a price, weight and the ability to move. The aim of this workshop is to assess the form, fit and function of various styles of armour and see if there are possibilities for improvement.</p>
<p><b>7</b></p> 	<p><b>BUILD YOUR OWN ROBOT</b>  <b>Jason Hill, Jonathan Barnett</b></p> <p>If you had a robot that could do anything for you, what would it do?  Would it serve you ice-cream in the summer and mow your lawn?  Would it do your homework for you?  Need someone to walk the dog for you?  Imagine all the possibilities robots could have in the future”  Science can be fun, this is a workshop looking at building your own robot. Learn how to create your own robot using Lego Mindstorms Design a robot that follows lines and be the first to complete the maze. Can you design the fastest robot of the day?  Looking for a future in engineering then this is for you.</p>

<b>Workshop No</b>	<b>Description</b>
<p><b>8</b></p> 	<p><b>“TICKLE THOSE TASTEBUDS”</b>  <b>Ms Carole Taylor</b></p> <p>An introduction to Sensory Evaluation. This workshop will show how the 5 senses affect the way we taste food and drink. The workshop will involve tasting, smelling and visual evaluation.  <b>Please note that this workshop is not suitable for anyone who has a milk allergy.</b></p>
<p><b>9</b></p> 	<p><b>THE CABINET OF CURIOSITIES</b>  <b>Dr Jenny Slaughter</b></p> <p>How can chemistry help unravel the contents of a Victorian medicine cabinet and what do the findings tell us about Victorian medicines? During this workshop you will explore some of the curious medicines within a Victorian medicine cabinet, found at Tyntesfield House, near Bristol. You will be the chemists in charge of finding what's in the cabinet, carrying out some practicals to investigate the contents and discover some of the odd things people used to consider medicines.</p>
<p><b>10</b></p> 	<p><b>PLANE CABIN DESIGN</b></p> <p><b>Your Task – Design an A320 Cabin</b>  As a design team, you must design a passenger cabin for one of our aircraft.</p>