

# Skirting Science!



**HANDS-ON INSPIRING SCIENCE**

Organised by:  
Soroptimist International

Hosted by:  
Broadoak Mathematics  
and Computing College

**23 June 2016**

**at**

**Broadoak  
Mathematics and  
Computing  
College**

*Programme*



# Timetable

9.30 – 9.45

***Arrival***

9.50 – 10.10

***Introduction***

**Lucy Ackland**

Lucy started working for Renishaw in 2004 when she was 16, completing a number of NVQs and a foundation degree in mechatronics engineering. She graduated with a first class honours degree in mechanical and mechanical engineering in 2012. In 2014, Lucy won the Women in Engineering award.

10.20 – 11.25

***Workshops – Slot 1***

11.25 – 11.30

***Change over***

11.30 – 12.30

***Workshops – Slot 2***

12.30 – 13.00




***Lunch (for girls)***




13.05 – 14.05


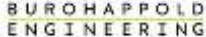
***Workshops - Slot 3***




14.05 prompt




***Departure***

Workshop No	Description
<p data-bbox="274 256 288 277">1</p> 	<p data-bbox="409 256 866 284"><b>CAN YOU BE A DESIGN ENGINEER?</b></p> <p data-bbox="409 293 583 320"><i>Danya Walker</i></p> <p data-bbox="409 352 967 507">You will be tackling the following challenges: Lava Lamps, Floating Paperclips and Scared Pepper, Non-Newtonian Fluid, Balloon Kebabs, Lenz Law, Cardboard Chair, Spaghetti Bridges and Geodesic Domes.</p> <p data-bbox="409 517 967 576">They've been tested by students – and thought up by the design engineers at Dyson.</p>
<p data-bbox="274 639 288 660">2</p> 	<p data-bbox="409 639 766 667"><b>NEW DIMENSIONS IN OPTICS</b></p> <p data-bbox="409 708 967 991">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.</p>
<p data-bbox="274 1007 288 1027">3</p> 	<p data-bbox="409 1007 911 1066"><b>CATALYSTS - HERO SUPPORT FOR THE MOLECULAR SCIENCES</b></p> <p data-bbox="409 1075 583 1102"><i>Dr Natalie Fey</i></p> <p data-bbox="409 1144 967 1390">You will be involved in an experimental investigation of different catalysts for the decomposition of hydrogen peroxide. Working in groups as physical, synthetic and computational chemists. You will then discover and develop the best catalytic route for a selective reaction, this time using props and models rather than chemistry equipment.</p>

Workshop No	Description
<p data-bbox="236 196 253 220">4</p>  <p data-bbox="202 488 286 520"><b>G3</b></p>	<p data-bbox="370 196 714 228"><b>WHO CARRIES THE GENE?</b></p> <p data-bbox="370 233 544 260"><i>Corra Boushel</i></p> <p data-bbox="370 308 930 563">You will be tasked with completing a family tree, undertaking biochemical and genetics tests and determining who in the family may be afflicted with (the imaginary) Vader's Disease. You will use micro-pipettes to load a genetic sample and carry out biochemical assay for the genes product. The DNA analysis of the family will help them discover who is a carrier of the mysterious disease.</p>
<p data-bbox="236 643 253 667">5</p>  <p data-bbox="202 962 286 994"><b>A4</b></p>	<p data-bbox="370 643 925 675"><b>MESSING WITH MAGNETS AND MOTORS!</b></p> <p data-bbox="370 679 557 707"><i>Rebecca Bound</i></p> <p data-bbox="370 754 930 842">Motors, magnets and batteries are now fundamentals of daily life, but what can we “magic up” with them in just an hour?</p> <p data-bbox="370 850 930 906">This hands on workshop starts with some Magnetic Magic and the theory behind it.</p> <p data-bbox="370 914 930 1042">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 data-bbox="236 1085 253 1109">6</p> <p data-bbox="146 1121 342 1257">Royal United Hospitals Bath NHS Foundation Trust</p>  <p data-bbox="202 1353 286 1385"><b>G2</b></p>	<p data-bbox="370 1085 792 1117"><b>A SCIENTIST’S VIEW OF DISEASE</b></p> <p data-bbox="370 1121 546 1153"><i>Nicola Hodges</i></p> <p data-bbox="370 1201 930 1321">This workshop puts you in the place of the scientists in pathology, you will have a look at a patient’s symptoms and pathology results and try to diagnose the patient’s disease.</p>

Workshop No	Description
<p data-bbox="274 196 288 220">7</p>  <p data-bbox="241 676 322 703"><b>A3</b></p>	<p data-bbox="409 196 757 223"><b>BUILD YOUR OWN ROBOT</b></p> <p data-bbox="409 234 527 260"><i>Jason Hill</i></p> <p data-bbox="409 276 966 331">If you had a robot that could do anything for you, what would it do?</p> <p data-bbox="409 341 966 429">Would it serve you ice-cream in the summer and mow your lawn? Would it do your homework for you?</p> <p data-bbox="409 438 844 464">Need someone to walk the dog for you?</p> <p data-bbox="409 474 966 529">Imagine all the possibilities robots could have in the future”</p> <p data-bbox="409 539 966 627">Science can be fun, this is a workshop looking at building your own robot. Learn how to create your own robot using Lego Mindstorms</p> <p data-bbox="409 636 966 724">Design a robot that follows lines and be the first to complete the maze. Can you design the fastest robot of the day?</p> <p data-bbox="409 734 966 790">Looking for a future in engineering then this is for you.</p>
<p data-bbox="274 839 288 863">8</p>  <p data-bbox="241 1203 322 1230"><b>G7</b></p>	<p data-bbox="409 839 742 866"><b>HOLD BACK THE FLOOD!!</b></p> <p data-bbox="409 911 966 1230">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 data-bbox="409 1240 966 1362">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>

Workshop No	Description
<p data-bbox="236 196 250 220">9</p>  <p data-bbox="202 344 284 373"><b>A6</b></p>	<p data-bbox="370 196 656 225"><b>PLANE CABIN DESIGN</b></p> <p data-bbox="370 260 743 285"><b>Your Task – Design an A320 Cabin</b></p> <p data-bbox="370 293 930 349">As a design team, you must design a passenger cabin for one of our aircraft.</p>
<p data-bbox="228 424 258 448">10</p>  <p data-bbox="185 496 344 528"><b>Rolls-Royce</b></p> <p data-bbox="202 683 284 711"><b>G9</b></p>	<p data-bbox="370 424 815 453"><b>Rolls-Royce RACING AIR ENGINES</b></p> <p data-bbox="370 499 910 560"><b><i>Joy Hyde, Patricia Patilla Sanchez, and Rosie Wilson</i></b></p> <p data-bbox="370 604 919 759">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.</p>
<p data-bbox="228 807 258 831">11</p>  <p data-bbox="152 975 337 1031"><b>Mobile Teaching Unit</b></p> <p data-bbox="174 1217 314 1321"><b>Rear Car Park</b></p>	<p data-bbox="370 807 654 836"><b>SEPARATING BLOOD!</b></p> <p data-bbox="370 844 745 904"><b><i>Naomi Cave, Samantha Moore and Ingeborg Hers</i></b></p> <p data-bbox="370 933 930 1088">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 :</p> <ol data-bbox="421 1114 930 1353" style="list-style-type: none"> <li data-bbox="421 1114 930 1203">1. Use pulse oximeters to measure their heart rates and oxygen content of their blood.</li> <li data-bbox="421 1228 930 1353">2. Perform an experiment using Gilson pipettes and size exclusion chromatography to separate proteins found in blood.</li> </ol>

Workshop No	Description
<p data-bbox="266 197 297 225">12</p>  <p data-bbox="238 363 325 391">(ACCIS)</p> <p data-bbox="241 504 322 531"><b>G5</b></p>	<p data-bbox="409 197 932 225"><b>SMART PLASTICS FROM EVERYDAY LIFE</b></p> <p data-bbox="409 236 869 296"><b><i>Anna Baker, Olivia Leao Carvalho and Bethany Russell</i></b></p> <p data-bbox="409 344 966 563">Plastics are all around us in everyday life, ever wondered how they work and they can be made “smart”. This workshop will look at some of the “smart” ones and give you a chance to play and understand the chemistry behind them. Interactive activities will include Slime, instant snow, Polymorph, bullet-proof plastics and few others.</p>
<p data-bbox="266 609 297 636">13</p> <p data-bbox="213 676 351 770">High Tech Bristol and Bath CIC</p>   <p data-bbox="241 1209 322 1236"><b>A7</b></p>	<p data-bbox="409 609 917 681"><b>THE WORLD OF ROBOTICS HAS NEVER BEEN MORE FUN TO ENTER!</b></p> <p data-bbox="409 699 583 726"><b><i>John Bradford</i></b></p> <p data-bbox="409 780 966 836">Try out your hand at coding a line following robot! Detect and avoid obstacles!</p> <p data-bbox="409 892 966 1046">Using the popular Raspberry Pi and open source software, you can code a robot in minutes. Employ IR &amp; ultrasonic sensors to understand the world from a robot's perspective. Learn how servo-motors (mis)behave and how to control them.</p> <p data-bbox="409 1102 966 1294">We have 10 Tiddlybot, each powered by a Raspberry Pi and programmed through a laptop connected by WiFi directly to the robot. We have simple projects (move forward &amp; stop when there's an obstacle) right up to complex line following and avoidance challenges.</p>

## **HOSTED BY:**

Broadoak Mathematics and Computing College

*Logo by Helen Davies*

Committee:

Soroptimist International Weston-super-Mare

*Ruth Thomas, Melanie David, Anne Graham and Susan Long*

***A special thank you to all, Colleagues and others, who gave their support to this project.***