



science4u  
**Survival**  
showcasing exciting careers in science



**#science4u2015**



**science4u.info**  
showcasing exciting careers in science

**UNIVERSITY OF  
WESTMINSTER**

**Science for Survival**  
The 12th Annual Schools Science Conference | Presented by science4u.info in collaboration with University of Westminster | 22nd April 2015



**Superbugs**  
Antimicrobial resistance (AMR)

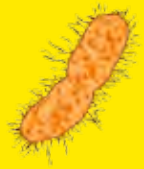


**Staphylococcus aureus (MRSA)**

Antibiotic resistance is one of the biggest threats facing us today. Without effective antibiotics, Setting broken bones, basic operations and chemotherapy all rely



**Clostridium difficile**



**Klebsiella pneumoniae**

## Welcome!

### Continuing Professional Development

This event is accredited with 6 CPD points for Scientists by the Institute of Biomedical Science



### Welcome to the 12th Schools Science Conference – Science for Survival

**Science for Survival** was chosen to link into sustainability as well as healthcare topics and will range from antibiotic resistance to engineering solutions for water and food for all. There are 4 exciting sessions...

#### Blood and Bugs



Discover the healthcare innovations that occurred during WWI and the crucial role of pathology in healthcare today and in the foreseeable future

#### Science in Practice - Sessions 1 & 2



An interactive session in which you can meet scientists, find out what they do, make assessments, and learn how science is applied to healthcare

# Introduction

We are delighted this year that the **University of Westminster** has graciously offered to host the **science4u** schools day. They have lent us the use of their facilities, many of their staff are participating in the programme and the secondary school students will experience what a university environment is like. Previously The Royal College of Pathologists (RCPath) hosted this event and with RCPath moving into temporary accommodation, we are grateful that the **University of Westminster** has partnered with us. We are delighted that RCPath remains involved and is running the workshop **Blood and Bugs**. We would also like to thank all our sponsors and supporters who enable us to provide this event. We hope you have an educational day in these spacious surroundings.



**Remember to complete your evaluation forms which will be put into a prize draw!**

#### Kimberly Gilmour

Kimberly Gilmour  
Chairman of the Organising Committee



We are delighted to be hosting the 12th Annual Schools Science Conference and to be collaborating with **science4u** in promoting to you the many exciting opportunities for you to become career scientists.

For over 175 years the **University of Westminster** has been pioneering the understanding of how to apply emerging science and technology to addressing the world's problems. As a scientist working on sustainable water management, **Science for Survival** is a theme close to my heart, be it survival of the individual or society. Please enjoy and make full use of your day and keep in touch.

#### Geoff Petts

Professor Geoff Petts  
Vice-Chancellor of the University of Westminster



*Escherichia coli*  
(E coli)



*Mycobacterium tuberculosis* (TB)

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many routine treatments will become increasingly dangerous. on access to antibiotics that work.

## Prizes

Feedback on the Conference is essential for us to improve future events and helps with funding.

As an incentive, we will put your completed evaluation form into a prize draw with a number of prizes.

**Remember to hand in your completed evaluation form before the Round-up & Prize Giving at 15:00!**

**Students' evaluation — yellow form    Teachers' evaluation — orange form**



## Science for Experimentation



Present your own work to compete for **The Association for Clinical Biochemistry & Laboratory Medicine Trophy for the Don Henderson Award**

## Dr Sheena Cruickshank

Keynote speaker

### Parasites - The master manipulators



Sheena Cruickshank is a Senior Lecturer in the Manchester Immunology group in the Faculty of Life Sciences at the University of Manchester & a trustee in the British Society of Immunology. Her research focuses on how immune responses start and on predicting why some people are resistant to infection and others are not and get long term or chronic inflammation. Her background is in immunology and parasitology and her training has taken her from an undergraduate degree and work experience in Strathclyde University, to a PhD in Cancer Immunology in Leeds to postdoctoral work in gut immunology at Leeds University.

**Parasites are the most common type of life of our planet and have existed from the time of the dinosaurs. Today Sheena is going to talk about some of the ways parasites manipulate their hosts to promote their own survival.**



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## Organising Group 2015

**Don Henderson (Founder & Co-Chair)**

**Kimberly Gilmour (Chair)**

Great Ormond Street Hospital For Children NHS Foundation Trust

**Sue Alexander (Secretary)**

The Royal Marsden NHS Foundation Trust

**Manfred Almeida (Treasurer)**

Imperial College Healthcare NHS Trust

**Sarah Armstrong**

The Royal Marsden NHS Foundation Trust

**Mike Carter**

Public Health England

**Jamie Harris**

British Society for Immunology

**Lucie Houghton**

The Royal College of Pathologists

**Patrick Lees**

University of Westminster

**Ayuen Lual**

Public Health England

**Rebecca Macrae**

University College London Hospitals NHS Foundation Trust

**Maria Rossini**

British Science Association

**Sharon Gage (Event Organiser)**

SRG Project Management

# Science for Survival

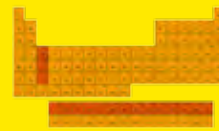




**Energy supply**  
How to meet our needs without increasing CO<sub>2</sub> - growing demand means we need greater supply, cleanly-generated



**Managing resources**  
Oil, gas and coal (our traditional energy sources) are finite; it's only a matter of when fossil fuels run out



**Rare earth metals**  
In 2011, costs rose 750%, hindering development of green technologies such as solar panels and wind turbines



**Deforestation**  
Causes extinction, climatic change & desertification - more than half of all plant and land animal species live in tropical forests

# Programme Timetable

**Smooth running**



Please refer to the programme times to help the day run smoothly

A member of the organising group will accompany you around the venue and help direct you to the appropriate areas

## Red Group



**10:15 Launch & Keynote speech**  
Large Lecture Theatre Level 2

**10:45 Science in Practice - 1**  
1.15 / 1.16 Level 1

**11:45 Blood and Bugs**  
Pavilion Level 1

12:30 Lunch break - **The Refectory** Lower Ground

**13:15 Science for Experimentation**  
Small Lecture Theatre Level 1

**14:15 Science in Practice - 2**  
2.14 / 2.15 Level 2

**15:00 Round-up & Prize Giving**  
Large Lecture Theatre Level 2

## Green Group



**10:15 Launch & Keynote speech**  
Large Lecture Theatre Level 2

**10:45 Science in Practice - 2**  
2.14 / 2.15 Level 2

**11:45 Science in Practice - 1**  
1.15 / 1.16 Level 1

12:30 Lunch break - **The Refectory** Lower Ground

**13:15 Blood and Bugs**  
Pavilion Level 1

**14:15 Science for Experimentation**  
Small Lecture Theatre Level 1

**15:00 Round-up & Prize Giving**  
Small Lecture Theatre Level 1

## Workshop Blood and Bugs

Presented by the Royal College of Pathologists



Based on activities delivered as part of the BBC **WWI At Home** roadshow, we will take you on an interactive journey exploring medical developments from 1914 to 2014. You will gain insight into the contribution that pathology has made in healthcare as a result of the discoveries and innovations that occurred during WWI and discover the crucial role of pathology in healthcare today and in the foreseeable future.



## Exhibits Exploring pathology & how the body works Science in Practice - 1 & 2

Sponsored by Society for Applied Microbiology



A hands-on interactive session where you meet scientists, try out some scientific equipment, undertake scientific assessments, answer questions for prizes and learn how science is applied to healthcare. AND don't forget to ask scientists what they do and why they love their jobs.





### Food supply

Although we can relieve hunger through technical measures, the political causes require solutions as well



### Water management

780 million people still lack access to clean water; thousands perish daily for lack of it

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## Blue Group



10:15 **Launch & Keynote speech**  
Small Lecture Theatre Level 1

10:45 **Science for Experimentation**  
Small Lecture Theatre Level 1

11:45 **Science in Practice - 2**  
2.14 / 2.15 Level 2

12:30 Lunch break - **The Refectory** Lower Ground

13:15 **Science in Practice - 1**  
1.15 / 1.16 Level 1

14:15 **Blood and Bugs**  
Pavilion Level 1

15:00 **Round-up & Prize Giving**  
Large Lecture Theatre Level 2

## Purple Group



10:15 **Launch & Keynote speech**  
Large Lecture Theatre Level 2

10:45 **Blood and Bugs**  
Pavilion Level 1

11:45 **Science for Experimentation**  
Small Lecture Theatre Level 1

12:30 Lunch break - **The Refectory** Lower Ground

13:15 **Science in Practice - 2**  
2.14 / 2.15 Level 2

14:15 **Science in Practice - 1**  
1.15 / 1.16 Level 1

15:00 **Round-up & Prize Giving**  
Large Lecture Theatre Level 2

## Teachers' Workshop

11:45 **Red Group**

11:45 **Green Group**

14:15 **Blue Group**

14:15 **Purple Group**  
C2.11 Level 2

### Workshop Young Scientists present their own work

## Science 4 Experimentation

The Association for Clinical Biochemistry & Laboratory Medicine

Prior to today's event we asked you to undertake a research project that you will present to the other schools in your group. All presentations will be competing for **The Association for Clinical Biochemistry & Laboratory Medicine**

**Trophy for the Don Henderson Award.**

In the final round-up session we will present the award to the winning team.



The Association for **Clinical Biochemistry & Laboratory Medicine**

Produced a great project? **Why not get recognition for your work by submitting it for a CREST Award?**



### Workshop Taking the buzz back to the classroom

## Teachers' Workshop

Presented by Kimberly C Gilmour



This is an interactive workshop where you will be provided with resources and information about science careers for your students. In addition you will undertake several easy experiments based on the interactive stands that you can then share with your classes.

#### Outcomes:

- Increased knowledge of science career resources
- Ability to undertake experiments based on health science that can then be shared with students

# Programme



**Global temperature rise**  
10 warmest years since 1880 in last 12 years - small changes in temperature correspond to enormous changes in the environment



**Declining ice sheets**  
Rapid decline in decades Antarctica and Greenland have been losing an estimated 405 billion tonnes per year



**Sea level rise**  
Global sea rose 17cm in the last century 39% of the world's population live within 100km of the shoreline



**Warming oceans**  
Rising 0.3 degrees Fahrenheit since 1969 - ecosystems are very sensitive even to modest change

# After the conference ...

## science4u.info

If you've enjoyed the conference, then visit the [science4u.info](http://science4u.info) website

View photographs of the event, see how much you learned today by trying the 2015 Quiz, tour the Virtual Laboratory, take part in *Battle of the Devices* and submit your Conference Report.

### Reporter Competition

Simply write a report (500 to 1000 words) describing today's event.

Entries will be published on the website and the best report will win a prize!

The report should include:

- What you found exciting and interesting
- What might inspire you to continue to study science
- What might encourage you to take up a healthcare profession

**Closing date 8th May!**

### Virtual Laboratory

If meeting and speaking with scientists has got you interested in a career in science then tour the Virtual Laboratory.

- Try your hand at diagnosis with the case studies
- See the wide range of tests in the immunology laboratory
- Discover what it is like to be a scientist in a number of video interviews!



### Battle of the Devices

Each year, millions of patients find their lives are changed or saved by medical technology. Our experts go head-to-head to try to convince you that their chosen medical device is the most innovative technology in healthcare today. Who deserves to win the **Battle of the Devices**? You decide.

## westminster.ac.uk

### UNIVERSITY OF WESTMINSTER

University of Westminster  
Faculty of Science and Technology

It may be early days for you to decide about a career but not for developing your interests.

Opportunities change fast, particularly in London where business drives and is driven by technology - only a small number of professionals have job titles as recognisable as doctor or lawyer. We can help you keep yourself informed about the many opportunities and possible career paths that there are, in the rapidly changing sciences.

Our central London site is dedicated to the teaching and research of Science and Technology where we offer a full range of professionally certified courses in:

**Biomedical Sciences Biosciences  
Business Information Systems  
Complementary Medicine Computer and Network Engineering  
Computer Science and Software Engineering Electronic Engineering  
Multimedia and Games Computing  
Nutrition Psychology**

We aim to find the best ways for you to become effective in your chosen area: being able to think, communicate, innovate and influence positively with opportunities to work creatively with your colleagues in our technologically advanced spaces or, if you chose, in a relevant external organisation.

Check out our website: [www.westminster.ac.uk](http://www.westminster.ac.uk), take the online virtual tour, come to an open day, and ask your teacher if you would like us to customise a visit for students in your school.





pH 8.14



**Ocean acidification**

Increased 30% since Industrial Revolution - corals, plankton, shellfish and some fish could be gravely affected



**Marine plastic**

Toxic plastic pieces are eaten by fish; fish are then consumed by humans, resulting in ingestion of toxins

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# Acknowledgements

**Thanks to the following organisations and their staff for this year's event**

- British Science Association
- British Society for Immunology
- Buckinghamshire Healthcare NHS Trust
- Cambridge Hands-On Science (CHaOS)
- Central London Community Healthcare NHS Trust
- Centre of the Cell
- East Lancashire Hospitals NHS Trust
- Frimley Health NHS Foundation Trust
- GlaxoSmithKline
- Great Ormond Street Hospital for Children NHS Foundation Trust
- Guys and St Thomas' NHS Foundation Trust
- Hounslow and Richmond Community Healthcare NHS Trust
- Imperial College Healthcare NHS Trust
- Institute of Biomedical Science
- Institute of Physics and Engineering in Medicine
- King's College Hospital NHS Foundation Trust
- London Ambulance Service NHS Trust
- London Metropolitan University
- London Pharmacy Education and Training
- London School of Hygiene and Tropical Medicine
- NHS Blood and Transplant
- Public Health England
- Royal Brompton and Harefield NHS Foundation Trust
- Royal Free London NHS Foundation Trust
- School of Engineering and Materials Science, Queen Mary University of London
- Society of Biology
- South West London Pathology - Kingston Hospital NHS Foundation Trust
- St George's University Hospitals NHS Foundation Trust
- The Institute of Cancer Research Clinical Trials and Statistics Unit
- The Royal College of Pathologists
- The Royal Marsden NHS Foundation Trust
- The University of Manchester
- University College London
- University College London Hospitals NHS Foundation Trust
- University of Cambridge
- Wellcome Trust Sanger Institute

Science for Survival has been made possible thanks to the very generous support of our key sponsors



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**CA Redfern**  
Charitable Foundation



**Philip King**  
Charitable Trust



Gold



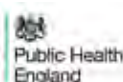
Silver



**Holmes Hines**  
Memorial Fund

Bronze

**Thanks also to the following organisations for their generous support**



Supporters

# Acknowledgements



**Healthcare  
Science  
Ambassadors  
of the Year  
2015**

science4u.info  
won the NHS  
Chief Scientific  
Officer's award for  
**Healthcare Science  
Ambassadors  
of the Year 2015**

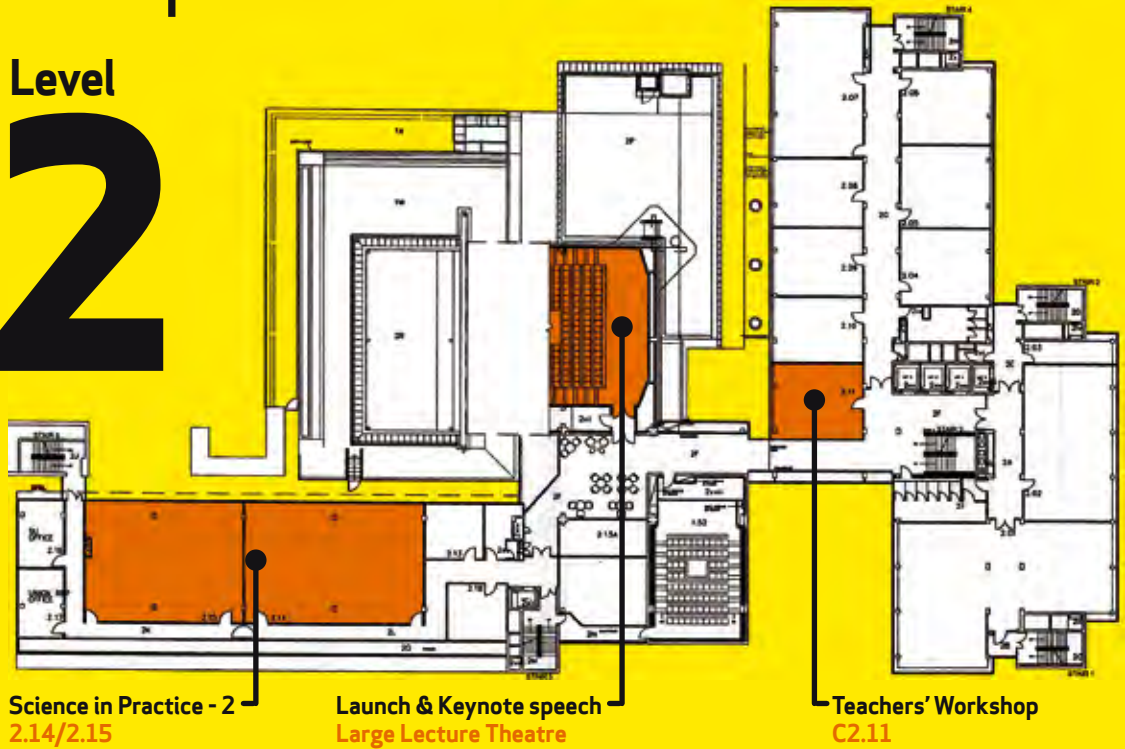
This recognizes  
both the work of  
the organising  
group and all  
our programme  
volunteers past  
and present  
without whose  
help and support  
these events would  
not take place.

# Floorplan

## Floorplan

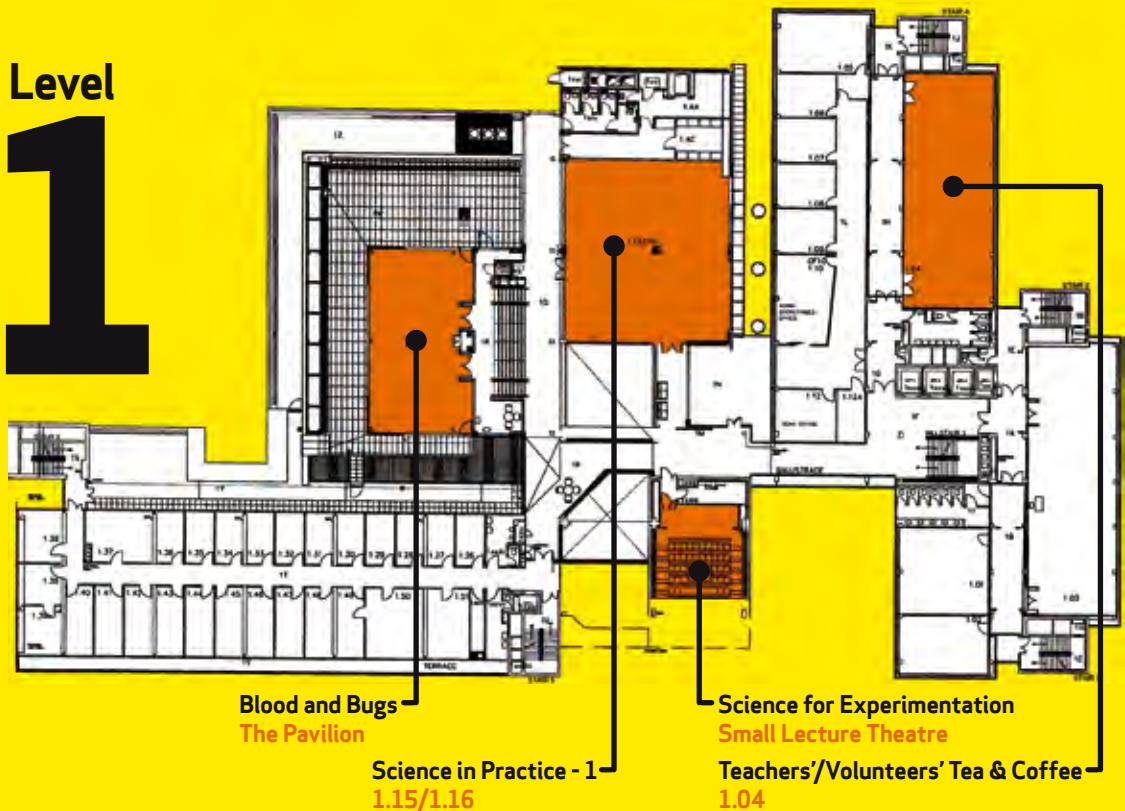
Level

# 2



Level

# 1



Ground

Reception, Café

Lower Ground

The Refectory (seating area), Prayer Room