



# Discover Science Day

Saturday 9 March 2019

10am-4pm

A day of science exploration and discovery at  
Royal Holloway, University of London

[royalholloway.ac.uk/sciencefestival](http://royalholloway.ac.uk/sciencefestival)



ROYAL  
HOLLOWAY  
UNIVERSITY  
OF LONDON

# Principal's welcome



Welcome to Royal Holloway Science Festival. We have run our hugely popular annual Science Open Day for over 20 years, celebrating science and attracting large audiences each year.

We have a thriving science community here at Royal Holloway, with world-class pioneering research, so this is a great opportunity for everyone to come along and discover some of the exciting things that we are up to.

In an evolving world science is at the heart of our future, and it's important that we continue to engage the next generation in these subjects and make it fun. Through the range of activities at Royal Holloway Science Festival, we can demonstrate the wide-ranging impact of science and explore the latest technological advances together.

**Professor Paul Layzell**

## Science at Royal Holloway

Royal Holloway is one of the UK's leading universities. We have a distinguished history of internationally excellent research in areas from particle physics and dark matter in space, to cyber security, the decline of bees and the communities that live in the Amazon rainforest.

Royal Holloway Science Festival invites you to be inspired by the wonder of science and experience some of our world-changing research first hand.

Royal Holloway co-ordinates a broad range of outreach activities for local schools, and sixth form and FE colleges as well as the wider public, presenting a varied programme of talks, demonstrations, visits, and hands-on workshops. We also provide a point of contact and resource for anyone working in education to inspire the teaching of science to all ages.

We hope you enjoy today's event!

For more details visit our website:  
[royalholloway.ac.uk/studying-here/schools-and-colleges](http://royalholloway.ac.uk/studying-here/schools-and-colleges)

**Share your day #RHSF2019**



Follow us on Twitter @RHULScience

## British Science Week 2019



Coming soon

**Attention and Awareness –  
from the lab to the real world**

**Professor Polly Dalton,  
Psychology Department**

Attention shapes our awareness of the world but how do we achieve a fine balance of attentional control?

**Thursday 21 March, 6.15pm  
Boilerhouse Auditorium**















Contact:  
[royalholloway.ac.uk/events](http://royalholloway.ac.uk/events)

## Festival of History

**Sunday 9 June, 10.30am-4.30pm  
Founder's Building North Quad**

A family-friendly programme of talks, performances, music, re-enactments and children's activities bringing to life the struggle for liberty and democracy over the last 800 years.

# Today's programme

Discover science at today's special talks and activities			Location
	Exploring sound with a pipe organ Professor David Howard, Electronic Engineering	10.30-11am	S
	The Unexpected Maths of Juggling Colin Wright	10.30-11am	W
	The Other Magellan: A Circumnavigation of Venus Dr Richard Ghail, Earth Sciences	11-11.30am	Q
	Look UP! Roadshow Simon Watt	11.15-11.45am	W
	Big Bang Experience Dr Stephen Gibson, Physics	11.30-12.30pm	S
	Royal Institution: Energy LIVE! show	12.15-1pm	W
	The Other Magellan: A Circumnavigation of Venus Dr Richard Ghail, Earth Sciences	1-1.30pm	Q
	The Unexpected Maths of Juggling Colin Wright	1.15-1.45pm	W
	Exploring sound with a pipe organ Professor David Howard, Electronic Engineering	1.30-2pm	S
	Look UP! Roadshow Simon Watt	2-2.30pm	W
	Big Bang Experience Dr Stephen Gibson, Physics	2.30-3.30pm	S
	Royal Institution: Energy LIVE! show	3-3.45pm	W
	Planetarium shows*	shows every 40 minutes	F
	Wizard Lab* at Biological Sciences	10.30am, 11.30am, 12.30, 2pm, 3pm	B

These events require free tickets, available on a first come first served basis, from the Windsor Building information point. Tickets for events marked with \* are available at the door of the event location.

Morning event tickets will be released at 9.45am on the day and afternoon (events from 1pm) tickets will be released at 11.45am.

## Science Festival Passport

### A treasure trail for younger visitors

Hunt for a letter at each main venue to complete your science passport then find the hidden word. Bring your completed passport back to the Windsor Building information desk to collect a prize.



## Women in science

Meet some real life science heroines across campus. Many remarkable women have contributed to breakthrough science through the ages. Can you find them?

Pick up your passport leaflet from today's information point. Good Luck!

# General information



## Windsor Building

### **W Windsor Building**

Our main information point today is located at the Windsor Building foyer for:

- Tickets and passport prizes
- Campus guides
- First Aid by SafeSavvy
- Lost property
- Lost children meeting point



Toilets are located in each building.

## Refreshments

A wide range of food and drink will be available throughout the day



- X Founder's Square all day**  
The Van serving hot street food, and an ice cream van
- C Café on the Square all day**  
Starbucks coffee, cakes and sandwiches
- B Boilerhouse Café 8am-4pm**  
artisan style coffee, cake bar, vegan and veggie
- H The Hub 11.30am-2.30pm**  
Wok theatre, rotisserie, burgers, brunch and salad bars
- S Union shop open all day**  
snacks, drinks, fruit etc
- X Union Plaza 11am-3pm**  
Hot food market with tastes from around the world



Picnic areas by the Students' Union Building and at Founder's Square.

See map for locations on page 10

Please note that professional filming and photography will be taking place throughout the day on Saturday 9 March. Footage and images will be used as part of Royal Holloway promotional materials including our website and social media channels. For children under 16, we endeavour to seek permission from parents or guardians wherever possible. Programme correct at time of publication 02/19.



## Interested in studying here?

Visit our stand at the Windsor Building foyer and pick up a Royal Holloway prospectus and find out more.

We would like to thank all our Science Festival partners for their generous support



Wi Fi is available across campus for today's visitors – select: **Open Day WiFi**

# Highlights

Some of today's activities have limited spaces and require free tickets for entry. Performances last 30–45 minutes and are suitable for all ages unless stated.

## Royal Institution Lectures The Royal Institution Science Lives Here

### Energy LIVE!

An exciting audience-led show, delving into the different stores of energy and how they affect our lives. Lively fire-based demos will get you fired up about energy!

**W Windsor Building Auditorium**  
Two performances, 12.15 and 3pm

### The Unexpected Maths of Juggling

Come and marvel at a mathematical aerial display by Dr Colin Wright

**W Windsor Building Auditorium**  
Two performances, 10.30am and 1.15pm

### The Other Magellan: A Circumnavigation of Venus

Out of this world talk by Dr Richard Ghail

**Q Queen's Building Lecture Theatre**  
Two Performances, 11am and 1pm

### Wizard Lab

10.30am, 11.30am, 12.30pm, 2pm, 3pm

**B Bourne Building (ages 7+ with an adult)**  
Tickets from Bourne foyer



## Big Bang Experience

Thrilling show by physicist  
Dr Stephen Gibson

**S Shilling Building Auditorium**  
Two performances, 11.30am and 2.30pm  
(1 hour show)

## Look UP!

Science presenter Simon Watt celebrates and explores the science behind space exploration. Which planet is hottest? Which would float in a swimming pool? And just how much space is in space?

**W Windsor Building Auditorium**  
Two performances, 11.15am and 2pm



## Exploring sound with a pipe organ!

Super sounds and spectra by Professor  
David M Howard

**S Shilling Building Lecture Theatre**  
Two performances, 10.30am and 1.30pm

## Planetarium

Discover the cosmos with our  
planetarium show. Shows every  
40 minutes from 10.30am, last show 3.10pm.

**F Founder's Dining Hall, (tickets at the door)**



## All day activities – no tickets required

### Wiggly Wild Show

Explore the world of minibeasts,  
bugs, reptiles and  
creepy crawlies!

Come and meet them at the drop in stand  
in the Windsor Building

**W Windsor Building**



## How Steam Railways work

Live steam engines  
presented by the  
Gauge 1 Model  
Railway Association,  
Surrey and Royal Holloway's  
Computer Scientists.

**BH Boilerhouse Theatre**



# Faculty of Science



## Biological Sciences

- Pollinators in peril
- The wonderful world of seeds
- Fun with Fungi
- Bacterial Bear Hunt
- Become a DNA scientist for the day
- **Special guests:**  
Institute of Cancer Research, Institute of Biomedical Science and the Field Studies Council.

**B Bourne Building**

## Ticketed activities

- **Wizard Lab** – Hands on experiments and up close demonstrations to bring chemistry alive!

Activities in small groups

(7+ with accompanying adults)

Bourne Lab 10.30am, 11.30am, 12.30, 2pm and 3pm

Tickets available from Bourne foyer

**B Bourne Building**



## Computer Science

All day drop in activities demonstrated by students from our Computing Society

- Connect Four Robot
- Rubik's cube solving robot
- Magic light box
- Empathy in AI

**W Windsor Building 102-103-104**

- **Balancing robots – how do they work?**  
(ages 8 to 12)

A hands-on activity where you can control a balancing robot via a mobile phone.

**Mc McCrea Building 125**

- **Lego lines (ages 10 to 14)** – Robots can be used for so many incredible tasks – from search and rescue to exploring distant environments out in space – but how do they know what to do? Join us, and programme a Lego Mindstorm robot, giving it the ability to follow a path and respond to sounds.

**Mc McCrea Building 103**



Bird of Prey – Come and meet some giants of the sky located at Founder's South Quad.  
(map **F**)



Steam Trains – Learn about mechanical computing and visit the Charles Babbage exhibition at the Boilerhouse  
(map **BH**)



## Earth Sciences

- How much methane do YOU produce?
- Dr Rebecca Fisher demonstrates how we have been measuring the methane levels in the air for 30 years and the important role this plays in tackling global warming.
- Explore a Geological Timeline.

**Q Queen's Building**

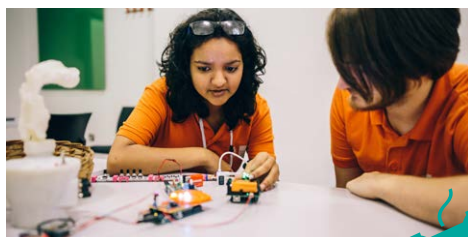
## Ticketed activities

### The Other Magellan: A Circumnavigation of Venus

Dr Richard Ghail

NASA's Magellan spacecraft arrived at Venus in 1990 and its Radar has produced images that reveal a planet that is both very familiar and very alien. From metallic snow to huge, spider-like structures hundreds of kilometres in diameter, this talk will introduce you to a stranger world than any other in the Solar System.

**Q Queen's Building Lecture Theatre,**  
11am and 1pm



## Electronic Engineering

- Circuit Wizards – Build your own electronic circuits using kits that clip together like lego
- Renewable Energy Kits
- BBC Micro:bit demonstration
- Arduino demonstrations
- 3D Printers
- Laser Cutter key fobs
- Meet Bob the Robot and friends
- Line following robots
- Leap Motion interactive demo – use your bare hands to interact with a virtual world

**S Shilling Building**

## Ticketed activities

### Virtual Reality demonstration

Experience a convincing roller-coaster ride from the safety of terra firma. (10 years and over)

**S Shilling Building 108, (tickets at the door)**

### Exploring sound with a demonstration of a pipe organ

Professor David M Howard

**S Shilling Building Lecture Theatre,**  
10.30am and 1.30pm





## Geography

- Discover the Ice Ages – see bones and stone tools from past ice ages and Interglacial times
- Explore the story from an ongoing excavation of Britain's past environment
- Make your own cave art
- Making and building an Aerocene explorer
- Discover past climates from lake records

### **Q** Queen's Building



## Mathematics

- Curve stitching and box making
- Board games and mathematical puzzles
- Harmonograph – make fantastic drawings using the power of harmonic motion.
- See bubbles and balloons in mathematical shapes.
- Galton board – be inspired by beautiful patterns made by random processes.

### **Special guest:**

Cryptography exhibition by Jeremy McCarthy. Be wowed by the Enigma code breaking machine from Bletchley Park

### **W** Windsor Building 102-103-104

## Look out for...

### **D** Davison Building

Visit our library drop-in activities: Space Race Trail discovering connections with moon landings plus Caption Competition – Science pictures from the archives and The Sorting Hat for books – find out how it works.



## Don't miss

- **Sphere Science** – get hands on and interactive with science experiments.
- **Eton College Natural History Museum** – discover three centuries of explorers, Joseph Banks, Charles Darwin and Robin Hanbury-Tenison.

### **W** Windsor Building Foyer





## Physics

### • Imagine, invent and inspire through Physics

Get hands on with experiments and watch impressive demos at the Physics Lab!

### • Cryogenic demos

Join the coolest demo on campus! Dr Andrew Casey presents cryogenic shows with liquid nitrogen. What does -180 degrees of Celsius feels like?! Room T125 all day.

### Special guest:

Exhibits from the National Physical Laboratory (NPL).

**T** Tolansky Building

## Helium balloons and nerf guns!

Explore our Rutherford experiment at the Davison event space.

**D** Davison Building – all day

## Ticketed activities

### Big Bang Experience

Discover the wonders of the Hadron Collider and what happens when particles collide. Presented by Dr Stephen Gibson

**S** Shilling Building Auditorium

11.30am and 2.30pm (1 hour talk)

## Planetarium

Discover the cosmos with our planetarium show. Shows every 40 minutes.

**F** Founder's Dining Hall



## Psychology

### • Visual illusions: never again believe what you see...

### • The science of eye tracking

### • Mapping children's reading habits

### • Body illusions : see how eye and touch together fool common sense

### • Should I stay or should I go? Discover whether you would succeed as a hunter-gatherer.

### • Wiring up the sleeping brain!

### • Bird brain: play a game using your brain!

**W** Windsor Building 002-003

## Art Alive!

Discover the links between art and science. Circumnavigate the gallery to find the secrets in our

paintings. Craft activities to make and take home. Performances by Lady Jane Franklin. Her husband set off to discover the north-west passage in 1845 but vanished in the Arctic. Watch out – she's quite a character!

Performance times: 11-11.30am, 12-12.30pm, 1.30-2pm, 2.30-3pm

Booking is not required

**PG** Picture Gallery



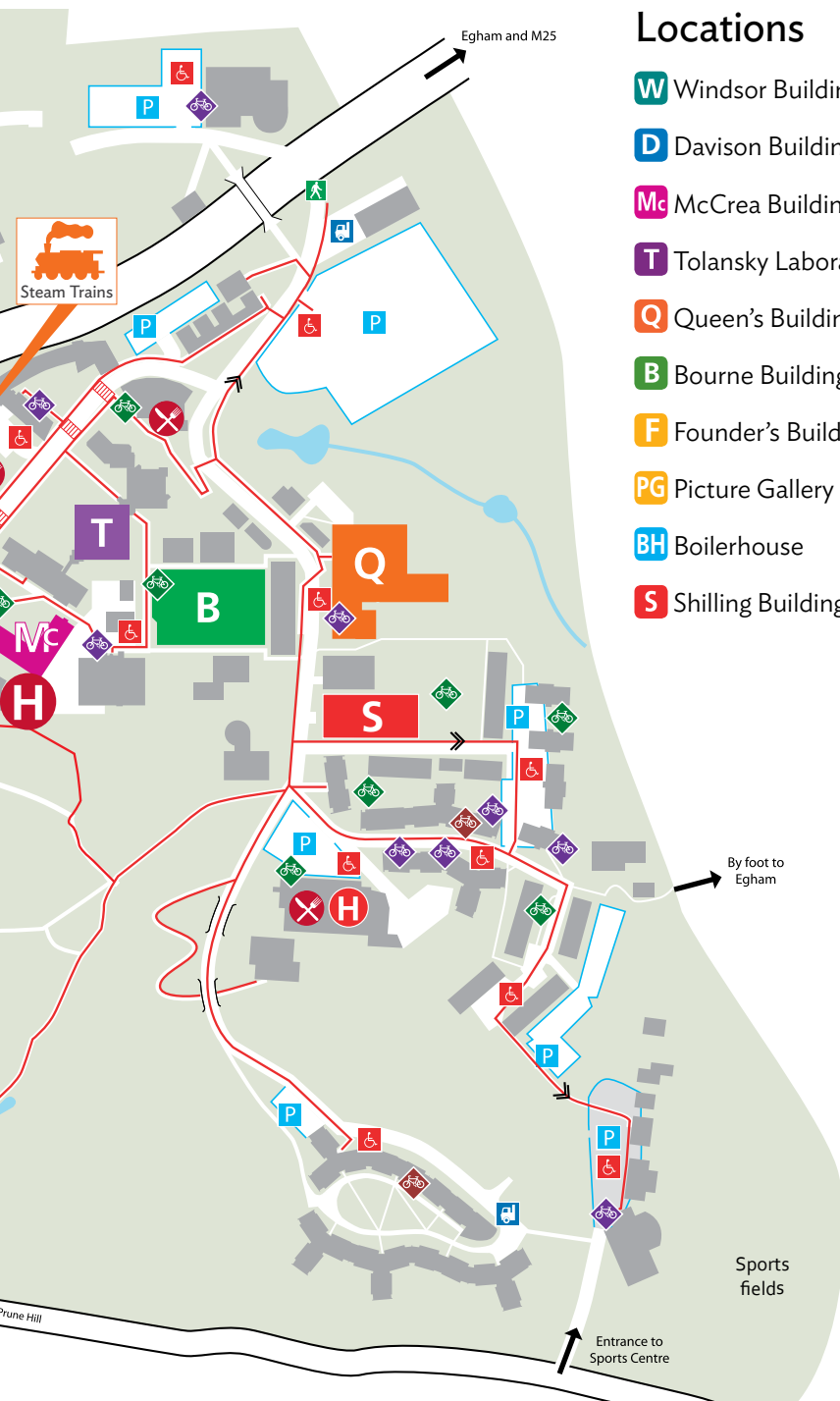
### Key

	Campus buildings		Information
	Car parks		Pedestrian access only
	Accessible route		Bike rack - internal
	Gradient direction		Bike rack - covered
	Zebra crossing		Bike rack - uncovered
	Accessible parking space		



## Refreshments

- Café on the Square
- Union shop
- The Hub
- Catering outlets



## Locations

- W** Windsor Building
- D** Davison Building
- Mc** McCrea Building
- T** Tolansky Laboratory
- Q** Queen's Building
- B** Bourne Building/Laboratories
- F** Founder's Building Dining Hall
- PG** Picture Gallery
- BH** Boilerhouse
- S** Shilling Building

# Open Days

Our Open Days are a great way to get a feel for life at Royal Holloway. Look around the campus, meet our students and teaching staff, and find out more about studying and living here.

Open day dates for 2019

- Friday 14 June
- Saturday 15 June
- Saturday 28 September
- Saturday 19 October

**Find out more and register to attend at**

**[royalholloway.ac.uk/opendays](http://royalholloway.ac.uk/opendays)**

**[opendays@royalholloway.ac.uk](mailto:opendays@royalholloway.ac.uk)**



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