WITH SPECIAL THANKS TO ALL OUR SUPPORTERS

**HEADLINE SPONSOR**

![EDF Energy](edf-energy.png)

**PRINCIPAL FUNDING PARTNERS**

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**MAJOR FUNDING PARTNERS**

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**MEDIA PARTNER**

![The List](the-list.png)

**TRANSPORT PARTNER**

![Lothian Buses](lothian-buses.png)

**VENUE AND PROGRAMMING PARTNERS**

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<td>The University of Edinburgh</td>
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We choose to go to the moon. We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win.

John F Kennedy
Rice University, September 12, 1962

50 years ago Neil Armstrong and Buzz Aldrin became the first humans to set foot on a celestial body beyond Earth. Homo sapiens walked on the Moon and, almost in an instant, our horizons expanded like never before. In honour of this breaking of completely new ground, Edinburgh Science Festival takes Frontiers as the theme of its 31st edition.

At the heart of all Science lies an unquenchable curiosity; a deep urge to explore and explain the unknown and to push the frontiers of our knowledge into ourselves, the world around us and our place in the wider Universe. From the depths of the oceans to the furthest reaches of space and the intricate pathways of the human brain, the 2019 Festival explores the cutting edge of science and technology of all sorts.

We celebrate the ideas and the individuals that are expanding our collective knowledge, pushing the boundaries that define our sense of the ‘known’, to reveal ever more about the ‘unknown’. With new venues and partners and a programme packed full of inspiring events, we are taking to deep and exciting new directions. From 6–21 April as we take some small steps into familiar territory and some giant leaps in some new and exciting directions.

Embrace this spirit of adventure and enquiry and join us. We celebrate the ideas and the individuals that are expanding our collective knowledge, pushing the boundaries that define our sense of the ‘known’, to reveal ever more about the ‘unknown’. With new venues and partners and a programme packed full of inspiring events, we are taking to deep and exciting new directions. From 6–21 April as we take some small steps into familiar territory and some giant leaps in some new and exciting directions.

Amanda Tyndall
Festival and Creative Director

Join us at the Frontier
EVENTS FOR FAMILIES
(P.8–29)

Join us for exciting, engaging and educational events and activities the whole family can enjoy. Events are listed by date and then by venue, with recurring events highlighted each day.

Most family events carry a minimum age recommendation and, to ensure the best possible experience for all our visitors, we ask parents to bear these in mind when choosing events for their children.

EVENTS FOR ADULTS
(P.32–57)

Our programme of events for adults includes discussions, debates, workshops, screenings and nights out, all with a scientific twist. Events are listed by date and then by time.

Most of our adult events are designed for audiences aged 14+, unless an age restriction or guideline is listed. This is a recommendation only and younger audiences are welcome, except where marked.

Please note that all events where alcohol is served will be marked AGES 18+ due to licensing restrictions. Under 18s cannot be admitted to these events and proof of age may be required.

Where To Find the Science Festival (P.6–7)

Each Easter, we transform spaces in and around Edinburgh into Science Festival hubs for discussion, debate, experimentation and discovery. In 2019, you’ll find our programme of events at City Art Centre, the National Museum of Scotland, Pleasance, Royal Botanic Garden Edinburgh, Summerhall, Dynamic Earth and more.

Reduced Price Tickets

For our family events that offer a reduced price for three tickets or more, this must include at least one child under the age of 16. Students and teachers can also take advantage of our #scifive discount: see p.37 for more details.

EDINBURGH SCIENCE FESTIVAL
POWERED BY EDF ENERGY

EDF Energy is proud to power Edinburgh Science Festival and its Generation Science primary schools’ touring programme. This headline partnership is part of our wider commitment to science, technology, engineering and mathematics (STEM) education in Scotland.

As well as being Scotland’s largest producer of low carbon electricity, EDF Energy is investing in engaging and inspiring the next generation of Scottish minds.

Each year, EDF Energy welcomes thousands of school children through the doors of our visitor centres at Hunterston B and Torness, where our guides talk them through how electricity is made before taking them on a tour to the heart of the power station.

We also support SmartSTEMs; an outreach initiative that aims to link industry with education. Since the start of the partnership, we’ve inspired more than 3,000 young people across Scotland to enter into a career in STEM.

During the Festival, you’ll find us at the City Art Centre with our Energy Makers wind turbine workshop open to children aged five and above. Back by popular demand, from 13–21 April, is our Inside a Nuclear Reactor film that allows you to shrink to the size of an atom and journey with EDF Energy to the core of a nuclear reactor.

We hope you and your family have a great Festival and enjoy the wealth of activities that are available.
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Useful information (P.58)
Turn to the back of this brochure for more information about booking tickets, Festival venues and more information about Edinburgh Science Festival.
**DYNAMIC EARTH**

**What’s On?**
Interactive exhibits and events for families. Times and dates vary, see event listings for details.

*DURING THE SCIENCE FESTIVAL* we transform Dynamic Earth’s gallery spaces into a sensational science playground for families, packed with workshops, shows and interactive activities.

**Venue Sponsor**
Every day, hundreds of millions of consumers worldwide rely on Cirrus Logic audio and voice technology at home, in their car and on their mobile devices. From their headquarters in Austin, Texas and major facilities in Edinburgh, London and Newbury in the UK, Cirrus Logic connects us with the world to deliver a great audio experience. Make your voice heard — through Cirrus Logic technology.

[www.cirrus.com](http://www.cirrus.com)

**ROYAL BOTANIC GARDEN EDINBURGH**

**What’s On?**
Interactive activities for families. Times and dates vary, see event listings for details.

*THE BOTANICS* is a world-renowned centre for plant science and education, aiming to explore, conserve and explain the world of plants for a better future. Working as part of the SEFARI collective of Scottish Environment, Food and Agriculture Research Institutes, the Garden offers a programme of family-friendly activities reflecting current research.

Look out for the series of food-themed talks that are part of the Garden’s Food Forever exhibition exploring the role of plant and animal diversity in securing the future of food production.

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**SUMMERHALL**

**What’s On?**
Art exhibitions, bookable talks and interactive events for families and adults. Times and dates vary, see event listings for details.

*THE FORMER ROYAL DICK SCHOOL OF VETERINARY STUDIES* is now a major creative venue for the arts with a host of studio and workshop spaces. During the Science Festival you’ll find art exhibitions, artist talks and theatre and tours all under one roof.

Enjoy the history of Pickering’s Gin in *The Science of Gin and Tonic*, take in artist talks from Louise Mackenzie, Russell Beardsmore and Stephen Kavanagh and watch the return of sell-out Fringe show *EGG* about IVF and egg donation.

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**NATIONAL MUSEUM OF SCOTLAND**

**What’s On?**
Free drop-in activities, workshops and exhibitions for families and adults. Bookable workshops, talks and shows for all ages.

*ONE OF EDINBURGH’S MOST ICONIC BUILDINGS*, the National Museum of Scotland houses treasures from around the world, all under one roof. During the Science Festival you’ll find special events and exhibits for all ages. There are also bookable shows and workshops.

In the evenings, don’t miss our exciting programme of discussions and debates. From debunking myths of *The Gendered Brain* to *The Future of Cyber Security, Data and AI*, we’re exploring a huge range of key issues.

**VENUE SPONSOR**
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[www.cirrus.com](http://www.cirrus.com)

**CITY ART CENTRE**

**What’s On?**
Workshops and activities for children and families. A day pass allows you to access all events.

*OPEN SATURDAY 6 APRIL—SATURDAY 20 APRIL* (NOT SUNDAYS), 9.30AM—4.30PM

During the Science Festival we transform City Art Centre’s gallery spaces into a sensational science playground for families, packed with workshops, shows and interactive activities.

**Venue Sponsor**
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**SUMMERHALL**

**What’s On?**
Workshops and activities for children and families. A day pass allows you to access all events.

*OPEN SATURDAY 6 APRIL—SATURDAY 20 APRIL, 9.30AM—4.30PM*

During the Science Festival you can take part in exciting hands-on activities, workshops and talks in and around our popular Science Festival Dome Nights. Join us to explore the last frontier of planet Earth: the ocean. Meet scientists, conservationists and artists and learn more about the amazing environment from our local shorelines to the cold, dark depths.

Enjoy the history of Pickering’s Gin in *The Science of Gin and Tonic*, take in artist talks from Louise Mackenzie, Russell Beardsmore, Stephen Kavanagh and Aurélie Fontan or watch the return of sell-out Fringe show *EGG* about IVF and egg donation.

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[www.cirrus.com](http://www.cirrus.com)
Alongside our core venues, you'll find a vast and varied selection of events during the Festival at venues around the city and beyond – the perfect solution for an inspiring scientific day (or night!) out. You'll find a full list of venues and more information on our website at sciencefestival.co.uk/venues

**NATIONAL MUSEUM OF SCOTLAND**

**WHAT'S ON?**
Free drop-in activities, workshops and exhibitions for families and adults. Bookable workshops, talks and shows for all ages. Times and dates vary, see event listings for details.

**OPEN SATURDAY 6 APRIL—SUNDAY 21 APRIL 10AM—5PM AND EVENINGS FOR EVENTS**

One of Edinburgh's most iconic buildings, the National Museum of Scotland houses treasures from around the world, all under one roof. During the Science Festival you'll find special events and exhibits for all ages. There are also bookable shows and workshops.

In the evenings, don't miss our exciting programme of discussions and debates. From debunking myths of The Gendered Brain to The Future of Cyber Security, Data and AI, we're exploring a huge range of key issues.

**PLEASANCE**

**WHAT'S ON?**
Free drop-in activities and an outdoor exhibition for families and adults. Shows and activities for families and young people, discussions, debates and interactive events for adults. Times and dates vary, see event listings for details.

**OPEN SATURDAY 6 APRIL—SUNDAY 14 APRIL 10AM—11PM**

Pleasance is one of Edinburgh's best-loved festival venues and this year Edinburgh Science Festival can be found serving science, innovation and creativity across its spaces. Our time-travelling police boxes Moments in Time will be in the courtyard for the duration of the Festival and our special hands-on science zone The Experimentarium will be running Tuesday 9–Wednesday 10 April.

**FACILITIES AND ACCESS**

- Wheelchair access throughout
- Elevator
- Ramp access
- Level access throughout
- Accessible toilet
- Changing places toilet
- Lowered counters
- Access aware staff
- Hearing loop
- Exhibition transcripts
- Assistant dogs welcome
- Low lighting
- Mobility scooters and wheelchairs available to book in advance
- Cafe
- Bar
- Packed lunch area
- Water available
- Cloakroom
- Buggy park
- Baby changing
- Parking

* Monday 8 April and Saturday 13 April only
THROUGHOUT THE FESTIVAL

STREET SCIENCE

AROUND EDINBURGH
TIMES VARY | DROP-IN | VARIOUS DATES THROUGHOUT THE FESTIVAL | FREE
With mind-boggling experiments and dazzling science demonstrations, our busking bikes take street performance to a whole new level. Witness explosions, weirdness and plenty of mess. Look out for our Street Science team around town in the run up to and during the Science Festival. Follow us on Twitter @EdSciFest for real-time updates.

Supported by

A HUMAN TOUCH

THE SCOTTISH PARLIAMENT
DAILY | DROP-IN | WED 20 MARCH–WED 8 MAY | FREE
This stunning large-scale, open-air photography exhibition will take you on a fascinating journey exploring the effect of human activity on our planet, how modern practices are changing our landscapes and are impacting on the environment, and looking at some of the steps taken to cope with a rapidly changing world and dwindling resources. Learn about the urgency of environmental degradation and ways to make a difference.
In association with The Scottish Parliament
Images: Jassen Todorov
Supported by

FAMILY EVENTS

ONLINE BOOKING: SCIENCEFESTIVAL.CO.UK
BOOKING HOTLINE: 0131 226 0005

SATURDAY 6 APRIL

VENUE SPONSOR:

CIRRUS LOGIC

EDINBURGH AIRPORT

CITY OF EDINBURGH COUNCIL
SAT 6 – SAT 20 APRIL (NOT SUN)
9.30AM – 4.30PM | ALLOW 4–5 HOURS FOR YOUR VISIT

£8 ADULT | £9.50 CHILD AGED 7+
£7 CHILD AGED 3–6 | FREE CHILD UNDER 3
£5 DISABLED | £5 REGISTERED UNEMPLOYED

(FOR EACH FAMILY MEMBER UP TO 6 PEOPLE, ID REQUIRED)

Ticket prices for City Art Centre include a voluntary 10% donation to support our work. For UK tax payers, this enables us to also claim Gift Aid. If you do not wish to make a charitable donation, the admission prices for City Art Centre are £7.20 adult / £8.65 child aged 7+ / £6.36 child aged 3–6.

Edinburgh Science Festival at City Art Centre is the perfect, inspirational day out. Explore five-floors packed with shows, workshops and interactive events perfect for kids up to 12 years old. Parents can join in the fun too with drop-in workshops, Science Mini Cinema and City Art Centre’s art exhibitions, The Modelmakers and Art Meets Science.

TETRACOLOURS

NEW

AGE 3+

CITY ART CENTRE
9.30AM – 4.30PM | DROP-IN

Colourful creatures wanted for this fun creative shapes activity. Discover a world of new shapes, blend them together to stretch your imagination and create anything you can think of. You can even design tesselating patterns which could go on forever!

WEE WONDER WORLD

AGE 3+

CITY ART CENTRE
9.30AM – 4.30PM | DROP-IN

Journey through our special space for smaller scientists. Explore why things float, enjoy story time with a scientific twist, construct a tremendous tower, build your own spinning toy or create a musical instrument. It’s all possible with some simple science!

LITTLE GIANTS

NEW

AGE 3+

WORKSHOP

CITY ART CENTRE
10AM – 4PM (HALF HOURLY) | 20 mins

BOOKING REQUIRED

Buzzy the giant honeybee leads you into the wonderful world of bees in this delightful, interactive show. Learn how a bee’s body is different from ours and find out how bees and flowers work in harmony together. Take a tour of a beehive, make pretty pollen-trail patterns and suck up nectar just like a real-life bee.

LITTLE SPARKS

AGE 3+

CITY ART CENTRE
10AM – 4PM (HOURLY) | 45 mins | BOOKING REQUIRED

Get stuck into circuits and discover what electricity does as we challenge you to create an electric-powered device! Start with a simple Electro Dough circuit, before advancing to the next level with a Snap Circuit board. Finish by using all the skills and knowledge you can muster to build a fantastic final electrical device!

SPLAT-TASTIC

AGE 3+

CITY ART CENTRE
10AM – 4PM (HALF HOURLY) | 20 mins

BOOKING REQUIRED

Get your goo on in this interactive chemistry workshop and design your very own slime. Test its thickness and stickiness under the extreme conditions of our Splat-o-Meter and check out how the appearance and properties of materials change when a chemical reaction takes place.

Supported by

ENERGY MAKERS

NEW

AGE 3+

CITY ART CENTRE
10AM – 4PM (HOURLY) | 45 mins | BOOKING REQUIRED

Discover the wonderful world of wind turbines! Learn how air can exert force and why the blades of a wind turbine spin. Get blown away by our awesome wind tunnel and chart the different speeds and directions of the wind. Finally, create your own turbines and test them in our tunnel in this great introduction to renewable energy!

Supported by

COLOUR INVESTIGATIONS

NEW

AGE 3+

CITY ART CENTRE
10AM – 4PM (HALF HOURLY) | 20 mins

BOOKING REQUIRED

Learn all about colours and how they are made by solving a mystery using chromatography to uncover which pen drew the missing trousers. Pop on your detective hat and predict which colours were mixed to create a new colour of felt-tip pen.
**BOOKING HOTLINE:** 0131 226 0005

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**WILD VETS**

**AGE:** 7+

**CITY ART CENTRE**

10AM–4PM (HOURLY) | 45 MINS | BOOKING REQUIRED

Take on the role of an animal conservationist in our totally wild workshop. Discover more about Scottish wildlife heritage by exploring the animals that used to live here and the work being carried out to reintroduce animals - like the beaver - to Scotland!

Supported by Heritage Lottery Fund

---

**ZOOM BOX**

**AGE:** ALL AGES

**CITY ART CENTRE**

9.30AM–4.30PM | DROP-IN

Zoom in, it’s time to get up close with the world around you! Use your smartphone camera with our special microscope tables to get a closer look at scientific samples. Create your own Zoom Box and pair it up with your smartphone camera to create a microscope for you to take home.

---

**BLOOD BAR**

**AGE:** 7+

**CITY ART CENTRE**

9.30AM–4.30PM (HOURLY) | DROP-IN

Pull up a chair in our Blood Bar and be prepared for things to get gory! Have a go at making your own scabs, mix up a gooey blood clot and even touch a real heart. Explore the science of blood and see how we can diagnose disease with cutting-edge technology. Take a closer look at the heart, lungs and oxygen in our Don’t Hold Your Breath activity and find out what really happens when we get cuts and bruises in the Scab Lab.

---

**SCIENCE MINI CINEMA**

**AGE:** ALL AGES

**CITY ART CENTRE**

9.30AM–4.30PM | DROP-IN

Sit down, relax and enjoy our Science Mini Cinema where you can observe our world in a bit more detail. From slow motion to timelapse, explore the frontiers of science through a series of short films.

---

**ER SURGERY**

**AGE:** 10+

**CITY ART CENTRE**

10AM–4PM (HOURLY) | 45 MINS | BOOKING REQUIRED

Paging all surgeons to the emergency room - we need all hands on deck! Scrub up in the ER and help diagnose your ‘patient’, before performing life-saving surgery on the knee, abdomen and brain. Get involved using endoscopes supplied by Karl Storz - but be quick, every second counts! Please note, this workshop is closed with no viewing area for parents.

---

**VIRTUAL WORLDS**

**AGE:** 10+

**CITY ART CENTRE**

9.30AM–4.30PM | DROP-IN

Warning – for intrepid explorers only! Transport yourself to another world through one of our fantastic virtual reality headsets! Ever wondered what it’s like to walk on the Moon, or to stand in the middle of a piece of art you just created? Get a taste for adventure just by popping on a headset.

---

**MARS MASTER CONSTRUCTORS**

**AGE:** ALL AGES

**CITY ART CENTRE**

9.30AM–4.30PM | DROP-IN

Humanity’s first Mars colony needs your help! Help by building pods, vehicles, labs and anything else you decide is important. Our team made a start but the rest is down to you for a successful move to our new home planet.

---

**CUBESAT CREATOR**

**AGE:** 7+

**CITY ART CENTRE**

10AM–4PM (HOURLY) | 45 MINS | BOOKING REQUIRED

Ready, set, lift off! Come and build a CubeSat, a tiny satellite which can be used to carry out tasks in space. Decide what your device should include and what tasks it needs to undertake – then figure out the best place in space for your miniature machine to complete its mission.

---

**ROBO CONSTRUCTORS**

**AGE:** 7+

**CITY ART CENTRE**

10AM–4PM (HOURLY) | 45 MINS | BOOKING REQUIRED

Welcome to the world of Cubebots! Building your own robot has never been easier – just snap the robot blocks together and let the magnetic faces do the rest. Become a mini-robot engineer in this fun, fast-paced workshop and create your own wacky and useful robots!

---

**GEO EXPLORERS**

**AGE:** ALL AGES

**CITY ART CENTRE**

10AM–4PM (HOURLY) | 45 MINS | BOOKING REQUIRED

Be a geologist, an engineer or a driller to discover current and future methods of energy generation. Learn about oil and the methods used to find it and extract it from the Earth. Explore rock formations and ways of surveying the Earth and finally work together to construct a scale-model drilling rig.

---

**ART MEETS SCIENCE**

**AGE:** ALL AGES

**CITY ART CENTRE**

9.30AM–4.30PM | DROP-IN | SAT 6–SAT 20 APRIL (NOT ON SUN) | FREE WITH CITY ART CENTRE DAY PASS

For the first time a selection of works from the city’s art collection, including a suite of prints by contemporary Scottish artists which explore the legacy of Edinburgh born scientist D’Arcy Wentworth Thompson (1860-1948). His pioneering theories on the growth of organisms inspired many artists as well as scientists. Please note that City Art Centre is a family venue and as such adults are welcome to enjoy the exhibition while their children attend workshops and activities.

Presented by City Art Centre

Image: Dalziel + Scullion, Primates, 2013 (City Art Centre, Museums & Galleries Edinburgh, © the artists)
THE MODELMAKERS

ALL AGES
EXHIBITION

CITY ART CENTRE

9.30AM–4.30PM | DROP-IN | SAT 6–SAT 20 APRIL
(NOT ON SUN) FREE WITH CITY ART CENTRE DAY PASS

Edinburgh-based artist John Brown presents an exciting new exhibition that visualises various phenomena on a small scale. In each image, a ‘modelmaker’ is fabricating a miniature object or scene in order to elaborate on a scientific, technological, theoretical or political idea. The paintings also show the by-products of construction to recognise that the scene of fabrication is sometimes as interesting as the finished object.

Please note that City Art Centre is a family venue and as such adults are welcome to enjoy the exhibition while their children attend workshops and activities.

Presented by City Art Centre

CITY ART CENTRE

EARLY BIRD OFFER

Book over the phone or in person before Monday 25 March and get £1 off all day passes on Saturday 6, Monday 8 and Tuesday 9 April.

BOOKING YOUR CITY ART CENTRE DAY PASS

A day pass gets you into City Art Centre to explore as many events as you like. The events are a mixture of bookable and drop-in sessions. Pre-booking your day pass and a selection of bookable events is strongly advised to avoid queues and disappointment. You can browse the events at City Art Centre below. When you’re ready to book your tickets you can add a selection of bookable activities to eligible child day passes. Drop-in activities don’t need to be reserved and can be enjoyed by all the family throughout the day.

Please note: when attending City Art Centre, children must be accompanied by an adult and unfortunately we do not issue tickets to lone adults. If you would like to discuss large group bookings for City Art Centre please call our Box Office on 0131 226 0005 and they will be happy to help you plan your visit.

GIFT AID SCHEME

Edinburgh Science Foundation, which runs Edinburgh Science Festival, is an educational charity. All ticket prices for City Art Centre include a voluntary 10% donation to support our work. For UK tax payers, this also allows us to reclaim the tax you pay through the Gift Aid Scheme; every pound you pay is worth £1.25 to us. If you do not wish to make a charitable donation, the admission prices for City Art Centre are as follows: £7.20 adults/£8.65 child aged 7+/ £6.36 child aged 3–6. For more information about our charitable work please see p.19 and p.24.

BOOKABLE WORKSHOPS SCHEDULE

Many of our events are available to drop into during your visit. However, some workshops have a limited capacity and should be booked in advance. You can reserve up to three bookable workshops per child’s day pass purchase. Please use the schedule below to plan your day. We would ask you to keep this schedule and the minimum age recommendation in mind when selecting workshops for your child.

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**BUILD AND BREAK**

**ALL AGES**

**ACTIVITY**

**NATIONAL MUSEUM OF SCOTLAND | GRAND GALLERY**

10AM–5PM | DROP-IN | ON UNTIL SUN 21 APRIL | FREE

Build, break and create in our unique free play session. Visit BUILD IT to unlock your creative spirit and build magical, massive structures with our super-sized construction blocks. Then head over to BREAK IT to be set loose on a huge pile of discarded electronics with a screwdriver and a pair of pliers – rip old pieces of tech apart to discover what they are made of and learn which parts we might be able to reuse. Due to the nature of the activities, adult supervision is required. To provide an accessible environment for families with autistic children and children with complex sensory profiles we are hosting two early doors sessions at the National Museum of Scotland (p.26).

Supported by

ROYAL ACADEMY OF ENGINEERING

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**INTERACTIVE FAMILY DAY**

**ALL AGES**

**SPECIAL EVENT**

**THE SCOTTISH PARLIAMENT**

10AM–4PM | DROP-IN | ALSO ON SAT 13 APRIL | FREE

Join us on an unrivalled adventure in science. Journey through space and discover the marvels of modern science through hands-on activities. Tour the Universe and explore the wonder of the night sky in an inflatable planetarium and enjoy interactive exhibits – from controlling lightning to seeing through a hole in your hand! You can also meet an astronomer, hold a meteorite, learn more about how Earth and space interact and lots more. Visit parliament.scot/science for more information.

Presented by The Scottish Parliament

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**#LITTERCUBES**

**AGES 8+**

**ACTIVITY**

**DYNAMIC EARTH | STRATOSPHERE**

10AM–4PM | DROP-IN | ON UNTIL WED 10 APRIL | FREE WITH ADMISSION

Watch artist Julia Barton as she constructs her thought provoking #LitterCUBES from litter collected on local beaches. Bring along collected plastic bottles or cotton-bud stems and help Julia with her work by washing, sorting and squashing bottles! Join us in asking: how did it get into our seas and on our beaches and what can we do to stop it getting there?

Presented by Dynamic Earth

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**EASTER TRAIL**

**AGES 3+**

**ACTIVITY**

**ROYAL BOTANIC GARDEN EDINBURGH**

JOHN HOPE GATEWAY

10AM–4PM | DROP-IN | ON UNTIL SUN 21 APRIL | £2

TICKETS ON THE DOOR ONLY

Join the Botanics Bunny on a quest to explore new frontiers in our family Easter Trail! Complete the trail and receive your yummy Easter treat.

Presented by Royal Botanic Garden Edinburgh

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**BIO-DISCOVERIES**

**ALL AGES**

**ACTIVITY**

**NATIONAL MUSEUM OF SCOTLAND**

LEARNING CENTRE LEVEL 2

10AM–4.30PM | DROP-IN | ON UNTIL WED 10 APRIL | FREE

Find out from our biologists what new things they've discovered this year about animals, plants and other living things. Get hands-on and make exciting discoveries yourself under the microscope!

Presented by The University of Edinburgh
MATHS: FRONTIERS OF IMAGINATION

NATIONAL MUSEUM OF SCOTLAND
LEARNING CENTRE LEVEL 2
10AM–4.30PM | DROP-IN | ON UNTIL WED 10 APRIL | FREE

Put numbers to the test in this hands-on space exploration and discovery mission! Our mathematicians will help you navigate through the stars using computer simulations. Journey into the 4D world to see how maths predicts the orbit and location of the farthest planets.

Presented by The University of Edinburgh

POP-UP ENGINEERING

NATIONAL MUSEUM OF SCOTLAND
LEARNING CENTRE LEVEL 2
10AM–4.30PM | DROP-IN | ON UNTIL WED 10 APRIL | FREE

Pop by to make your own cardboard pop-up! These ingenious engineering mechanisms can be customised and decorated to suit your personality. Choose your favourite design, transform it from a flat shape to a cool 3D model and then decorate it to take home.

Presented by The University of Edinburgh

CALORIE COUNTDOWN BIKE

NATIONAL MUSEUM OF SCOTLAND
HAWTHORNDEN COURT
10AM–5PM | DROP-IN | ON UNTIL WED 10 APRIL | FREE

Join Food Standards Scotland to discover how long it takes to burn off a jelly baby whilst cycling. Explore the link between food intake and energy in this fun interactive bike activity.

Supported by Food Standards Scotland

STEMS. BEND YOUR BRAIN

NATIONAL MUSEUM OF SCOTLAND
HAWTHORNDEN COURT
10AM–5PM | DROP-IN | ON UNTIL FRI 12 APRIL | FREE

Come and play with our 3D Stems that are made to be incredibly flexible for mind-bending fun. Take the seeds of an idea, add curiosity and watch it grow as we discover what we can make with thousands of Stems. Enjoy the most exciting and puzzling conversation your hands will ever have with your brain and see what creations you can come up with.

STILLS

MOMENTS IN TIME

PLEASANCE | PLEASANCE COURTYARD
10AM–6PM | DROP-IN | SAT 6–SUN 14 APRIL | FREE

Allow yourself to be transported back in time as we take you on a journey through pivotal moments in Scotland’s history. Through a series of immersive snapshots, discover milestones of Scottish scientific achievement from the flowering of philosophy and science during the Enlightenment, through the rapidly mechanising world of the Industrial Revolution, to the data-rich and globally connected Information Age.
ONLINE BOOKING: SCIENCEFESTIVAL.co.uk
BOOKING HOTLINE: 0131 226 0005

FAMILY EVENTS

LIFE UNDER THE LENS

JUPITER ARTLAND
10.30AM | 2 HOURS | £20/£15
Join us on a fun-filled exploration of all things cellular. Become an art explorer and learn about cells on a macro and micro level. Take a tour of Jupiter Artland’s artworks with the experts, then head to the classroom and explore cells through magnifying glasses. Inspired by the shapes, textures and patterns we find under the lens, create your own cellular art to take home. Ticket prices include exclusive entry to the park outside of its open season.
Presented by Jupiter Artland

FUTUREQUEST

PLEASANCE | QUAKER STUDIO
11AM | 1 HOUR | £6 OR £5 EACH FOR 3 OR MORE TICKETS
In a not-too-distant future, transport, schools, museums and everything else in the city of Edinburgh is managed by artificial intelligence. When it stops working one day, a team of volunteers is needed to enter the virtual reality world of The Space and solve the problem. Join science presenter Neil Monteiro for virtual games, interactive challenges and scientific demonstrations. You can save the city and learn about computer science at the same time!

PHYSICS WIZARDDRY

NATIONAL MUSEUM OF SCOTLAND
LEARNING CENTRE LEVEL 4, STUDIO 1
11AM AND 2PM | 1 HOUR | ON UNTIL MON 8 APRIL | £5
With the power of physics at our fingertips, learn how to make obscure potions with spectacular effects. Our Physics Wizards will explain the magic involved so that you too can become a Physics Wizard and impress your muggle friends and family. For ages 7–11. Each ticket also admits one adult if required.
Presented by The University of Edinburgh

ELECTRONIC MUSIC: BEGINNERS

NATIONAL MUSEUM OF SCOTLAND
LEARNING CENTRE LEVEL 4 SEMINAR ROOM
11AM | 90 MINS | £15
Discover how electronic circuits make noise and build one of your own. Learn how to solder components to a small, bagpipe-shaped circuit board and make your gadget play a little tune. No previous soldering experience required. Adults may accompany young children for free but must buy a ticket if they wish to take part.
Presented by MadLab Ltd

ELECTRONIC MUSIC: INTERMEDIATE

NATIONAL MUSEUM OF SCOTLAND
LEARNING CENTRE LEVEL 4, STUDIO 1
11AM AND 2PM | 1 HOUR | ON UNTIL MON 8 APRIL | £15
With the power of physics at our fingertips, learn how to make obscure potions with spectacular effects. Our Physics Wizards will explain the magic involved so that you too can become a Physics Wizard and impress your muggle friends and family. For ages 7–11. Each ticket also admits one adult if required.
Presented by the University of Edinburgh

GAME ON!

NATIONAL MUSEUM OF SCOTLAND
LEARNING CENTRE LEVEL 4 SEMINAR ROOM
12PM AND 3PM | 1 HOUR | ON UNTIL WED 10 APRIL | £5
A hands-on, playful introduction to computer programming. You will explore the exciting world of video games, learn the basics of coding in a visual programming language called Scratch and design and build your very own computer game! For ages 8–14. Each ticket also admits one adult if required.
Presented by The University of Edinburgh

EASY PEASY! REAL COOKING FOR KIDS

NATIONAL MUSEUM OF SCOTLAND
LEARNING CENTRE LEVEL 4, STUDIO 1
11AM AND 2PM | 1 HOUR | ON UNTIL MON 8 APRIL | £5
In a not-too-distant future, transport, schools, museums and everything else in the city of Edinburgh is managed by artificial intelligence. When it stops working one day, a team of volunteers is needed to enter the virtual reality world of The Space and solve the problem. Join science presenter Neil Monteiro for virtual games, interactive challenges and scientific demonstrations. You can save the city and learn about computer science at the same time!

THE BIG LAUNCH

PLEASANCE | QUAKER STUDIO
2PM | 1 HOUR | £6 OR £5 EACH FOR 3 OR MORE TICKETS
Become a Junior Editor and help us track down the most epic science stories. Catch the excitement in this fast-paced, fun presentation, as editors Dan Green and Stevie Derrick take you through the process of selecting stories for a magazine. Along the way, learn about the mysteries of animal sleep, the dangers of plastic pollution and engage in a live debate.
Presented by Dennis Publishing

ELECTRONIC MUSIC: INTERMEDIATE

PLEASANCE | OCHIL ROOM
2PM | 90 MINS | £15
Find out how electronic circuits make noise and build one of your own. Using a soldering iron you’ll construct a Junior Theremin, an early type of synthesiser that you play without touching. Previous soldering experience is required – an introductory workshop is available for soldering newbies at 11am. Adults may accompany children for free but must buy a ticket if they wish to take part.
Presented by MadLab Ltd

Saturdays 6 April

SCIENCEFESTIVAL.co.uk
0131 226 0005
Online Booking

14
ALL AGES
WORKSHOP

TURN YOUR WORLD UPSIDE DOWN! IN THIS HANDS-ON WORKSHOP, ALL AGES CAN DISCOVER THE INSIDIOUS MIND OF A SCIENTIST AND THE SECRETS OF A PHOTOGRAPHER. YOU’LL LEARN HOW TO USE LIGHT AND SHADOW TO CREATE A PICTURE THAT TELLS A STORY.

£6 OR £5 EACH FOR 3 OR MORE TICKETS

11AM AND 2PM | PLEASANCE
1 HOUR

Presented by Same Difference Arts Ltd

THE 1902 GREAT SCOTTISH ANTARCTIC EXPEDITION

THE PATRICK GEDDES CENTRE
10.30AM | 90 MINNS | ALSO ON WED 17 APRIL | £11

ACCOMPANYING ADULTS ARE FREE

In 1902 a team of young explorers set off from Riddle’s Court in Edinburgh to map and better understand the Antarctic. Building their own ship, they docked over a rough winter, conducting numerous revolutionary experiments and set up the first Antarctic Met station. Join us in the very rooms in which they first met as we travel back in time to help address the challenges they faced along the way. Children must be accompanied by an adult to guide between challenges.

Presented by The Patrick Geddes Centre

A MULTI-SENSORY POLAR ADVENTURE

THE PENTLAND ROOM
11AM AND 2PM | 45 MINS

£6 OR £5 EACH FOR 3 OR MORE TICKETS

Come on a multi-sensory polar adventure with storyteller Allie Finlay from Flotsam and Jetsam Puppets and Stories. We will go to the Antarctic, following in the footsteps of Captain Scott and his fellow explorers. This very interactive storytelling session features plenty of props and lots of joining in! These relaxed performances are particularly suitable for children with additional needs and their friends and families.

Presented by Flotsam and Jetsam Puppets and Stories

HOW TO BREAK THE INTERNET

THE OCHIL ROOM
3PM | 2 HOURS | ON UNTIL WED 10 APRIL | £12

Come and create a new app for your Android phone. Discover the principles behind successful software development and put them into practice as you design, code and deploy a smartphone app. You’ll be able to install your app on your phone and save the source code so you can keep on developing after the workshop. No previous experience is needed for this but an interest in coding is recommended.

Presented by Flotsam and Jetsam

FAMILY EVENTS
CREATING AN OPEN FESTIVAL

Each event at the Science Festival is different. We have workshops, discussions, activities, exhibitions and more. In order to make our Festival more accessible, we are offering a range of services and events to make your visit more enjoyable.

SENSORY BACKPACKS

We have partnered with the Edinburgh Festival Fringe Society to offer sensory backpacks. These can be collected from the National Museum of Scotland, Pleasance and City Art Centre using a form of photo ID and a phone number or email. Visit our website’s access page for more information.

RELAXED PERFORMANCES AND EARLY DOORS

There will be four relaxed performances during the Festival this year. Melody and Sam: Record Breakers (p.21) is a spectacular new show about perseverance and record-breaking success, Ugly Animals: Weird Life Underwater (p.24) is an exploratory journey into deep-ocean wildlife and there are two Multi-Sensory Polar Adventures (p.15) with puppets and stories galore!

To provide an accessible environment for families with autistic children and children with complex sensory profiles we are hosting two early doors sessions on Monday 15 and Tuesday 16 April at the National Museum of Scotland for Build and Break (p.26).

CHANGING PLACES MOBILOO AT PLEASANCE

On Monday 8 April and Saturday 13 April we will have a Changing Places Mobiloo at Pleasance. The Mobiloo is a mobile toilet with hoist and changing table. Please bring your own sling if you wish to use the hoist: www.mobiloo.org.uk

ADDITIONAL SERVICES

If you would like to request any of the following services for a specific event, please email us before Friday 8 March at marketing@scifest.co.uk prior to booking. Depending on availability.

- BSL
- Live Captioning
- Hearing Loop (for Pleasance: Quaker Studio, Lomond Room and Upper Hall)

POUNDS AND PENCE: THE SCIENCE IN YOUR POCKET

MUSEUM ON THE MOUND
10AM–4PM | EASTER TRAIL
ROYAL BOTANIC GARDEN EDINBURGH

10AM–4PM | LETTERCUBES
DYNAMIC EARTH

10AM–4.30PM | BIO-DISCOVERIES
NATIONAL MUSEUM OF SCOTLAND

10AM–4.30PM | MATHS: FRONTIERS OF IMAGINATION
NATIONAL MUSEUM OF SCOTLAND

10AM–4.30PM | POP-UP ENGINEERING
NATIONAL MUSEUM OF SCOTLAND

10AM–5PM | BUILD AND BREAK
NATIONAL MUSEUM OF SCOTLAND

10AM–5PM | CALORIE COUNTDOWN BIKE
NATIONAL MUSEUM OF SCOTLAND

SCRAPBOOK: FIGHT OCEAN PLASTICS FROM THE SKIES

DYNAMIC EARTH | STRATOSPHERE
10AM–4PM | DROP-IN | ALSO ON WED 10 APRIL
FREE WITH ADMISSION

Find out about the SCRAPbook project (Scotland’s Coastal Rubbish using Aerial Photography). Meet pilots who are joining the fight against plastic pollution and help classify different amounts of litter. Discover how this will help target beach cleans and hear from the Marine Conservation Society as they share how this information is vital to their work.

Presented by Dynamic Earth

GADGET FACTORY

PLEASANCE | HIGHLAND ROOM
10AM, 11, 10.30AM, 1.30PM AND 3PM | 45 MINS
ALSO ON WED 10 APRIL | £8

Join us in the Gadget Factory to investigate how everyday gadgets work and build your own very own. After grasping the basics of creating an electronic circuit, pick your electronic components and use your new skills to assemble a flashing LED badge. After learning the secrets of soldering there is no end to the gadgets that can be made!

THE SCOTTISH PARLIAMENT DIGITAL ARTS LAB

SUMMERHALL | THE ZOOM CLUB
10.30AM | 5 HOURS | ALSO ON THU 11, TUE 16 AND THU 18 APRIL | £45

Get experimental as we deconstruct ideas through animation, graphic novel, special effects and other dynamic digital storytelling techniques. Developed and delivered by The Zoom Club, this is a drop-in activity and participants must bring a packed lunch. For ages 8–12. Visit the Science Festival website for individual workshop times and details.

Presented by The Zoom Club

TUESDAY 9 APRIL
RECURRING EVENTS

10AM–4PM | EASTER TRAIL
ROYAL BOTANIC GARDEN EDINBURGH

10AM–4PM | LETTERCUBES
DYNAMIC EARTH

10AM–4.30PM | BIO-DISCOVERIES
NATIONAL MUSEUM OF SCOTLAND

10AM–4.30PM | MATHS: FRONTIERS OF IMAGINATION
NATIONAL MUSEUM OF SCOTLAND

10AM–4.30PM | POP-UP ENGINEERING
NATIONAL MUSEUM OF SCOTLAND

10AM–5PM | BUILD AND BREAK
NATIONAL MUSEUM OF SCOTLAND

10AM–5PM | CALORIE COUNTDOWN BIKE
NATIONAL MUSEUM OF SCOTLAND

9.30AM–4.30PM | CITY ART CENTRE
During the Science Festival we transform City Art Centre’s gallery spaces into a sensational science playground, packed full of workshops, shows and interactive events. Day pass required.
DR BUNHEAD’S PUPPET MISSION TO MARS
NATIONAL MUSEUM OF SCOTLAND
EARLY PEOPLE GALLERY, LEVEL -1
11AM, 12PM, 1.30PM, 2.30PM AND 3.30PM | 25 MINS
ALSO ON WED 10 APRIL | FREE
Hold on tight as we blast off for Dr Bunhead’s Rubbish Puppets’ biggest, bravest adventure. Will they survive six months inside a wobbly cardboard spaceship? Are there really Mars Bars on Mars? Come and find out!
Presented by The University of Edinburgh

DIET DESIGN AND DIVERSIFY
ROYAL BOTANIC GARDEN EDINBURGH
JOHN HOPE GATEWAY
12PM–4PM | DROP-IN | FREE
Join scientists from nutrition and health research centre the Rowett Institute and statistical research organisation BioSS as they help you understand healthy diets and give you the opportunity to design your own healthy menu. Use the Number Muncher Diets calculator to work out what a healthy diet looks like and take part in hands-on activities to learn about food and health.
Presented by the Rowett Institute and BioSS

HEALTHCARE FRONTIERS: SCIENCE IN THE NHS
JOHN HOPE GATEWAY
12PM–4PM | DROP-IN | FREE
Meet healthcare scientists working within the NHS and experience a variety of new and exciting healthcare techniques. Get hands-on with some 3D printed organs, watch how they are made and learn how these organs are used to treat patients. Play a card game to learn about cellular therapies, and connect on social media with a fun photo frame accessory.
Presented by NHS National Services Scotland

THE MOON UNDER THE MICROSCOPE
NATIONAL MUSEUM OF SCOTLAND
LEARNING CENTRE LEVEL 4, STUDIO 1
12.30PM | 1 HOUR | ON UNTIL FRI 12 APRIL | £5
Get active and crafty with Denny and the T-Team and enjoy games that explain how your body’s immune cells protect you from disease and keep you healthy. Play the ball pool challenge to discover how future treatments for cancers might work and make your own science sticker stories to take home. For ages 7–13. Each ticket also admits one adult if required.
Presented by The University of Edinburgh

TECHNOLOGY FOR DOGS WITH IMPORTANT JOBS
ALL AGES
ACTIVITY
Join The Open University, mobility assistance dogs from Charity Dogs for Good, and bio-detection dogs from Charity Medical Detection Dogs for a demonstration of cool canine-friendly technologies! Learn the challenges faced by our furry friends in the working world as you take on their role yourself before watching the professionals at work.
Presented by The Open University

HELPING SCOTLAND GROW
ALL AGES
ACTIVITY
Come and see how Scottish Government scientists are helping farmers. Try your hand at extracting strawberry DNA, identify potatoes using CSI (clever spud identifier) technology and get to see inside a beehive with the team from SASA.
Presented by SASA

AMAZING IMMUNOLOGY
NATIONAL MUSEUM OF SCOTLAND
LEARNING CENTRE LEVEL 4, STUDIO 1
12.30PM | 1 HOUR | ON UNTIL FRI 12 APRIL | £5
Get active and crafty with Denny and the T-Team and enjoy games that explain how your body’s immune cells protect you from disease and keep you healthy. Play the ball pool challenge to discover how future treatments for cancers might work and make your own science sticker stories to take home. For ages 7–13. Each ticket also admits one adult if required.
Presented by The University of Edinburgh

ALYX: THE SOCIAL ROBOT
NATIONAL MUSEUM OF SCOTLAND
EARLY PEOPLE GALLERY, LEVEL -1
11AM, 12PM, 1.30PM, 2.30PM AND 3.30PM | 25 MINS
ALSO ON WED 10 APRIL | FREE
Hold on tight as we blast off for Dr Bunhead’s Rubbish Puppets’ biggest, bravest adventure. Will they survive six months inside a wobbly cardboard spaceship? Are there really Mars Bars on Mars? Come and find out!
Presented by The University of Edinburgh

EXPERIMENTARIUM
PLEASANCE, UPPER HALL
11AM–5PM | DROP-IN | ALSO ON WED 10 APRIL | FREE
The Experimentarium returns for Science Festival 2019, with some weird, wonderful and cutting-edge science. Step into our laboratory of hands-on activities and interactive fun for all ages.

THE MOON UNDER THE MICROSCOPE
NATIONAL MUSEUM OF SCOTLAND
LEARNING CENTRE LEVEL 4, STUDIO 1
12.30PM | 1 HOUR | ON UNTIL FRI 12 APRIL | £5
Get active and crafty with Denny and the T-Team and enjoy games that explain how your body’s immune cells protect you from disease and keep you healthy. Play the ball pool challenge to discover how future treatments for cancers might work and make your own science sticker stories to take home. For ages 7–13. Each ticket also admits one adult if required.
Presented by The University of Edinburgh

ALYX: THE SOCIAL ROBOT
NATIONAL MUSEUM OF SCOTLAND
EARLY PEOPLE GALLERY, LEVEL -1
11AM, 12PM, 1.30PM, 2.30PM AND 3.30PM | 25 MINS
ALSO ON WED 10 APRIL | FREE
Hold on tight as we blast off for Dr Bunhead’s Rubbish Puppets’ biggest, bravest adventure. Will they survive six months inside a wobbly cardboard spaceship? Are there really Mars Bars on Mars? Come and find out!
Presented by The University of Edinburgh

EXPERIMENTARIUM
PLEASANCE, UPPER HALL
11AM–5PM | DROP-IN | ALSO ON WED 10 APRIL | FREE
The Experimentarium returns for Science Festival 2019, with some weird, wonderful and cutting-edge science. Step into our laboratory of hands-on activities and interactive fun for all ages.

TECHNOLOGY FOR DOGS WITH IMPORTANT JOBS
ALL AGES
ACTIVITY
Join The Open University, mobility assistance dogs from Charity Dogs for Good, and bio-detection dogs from Charity Medical Detection Dogs for a demonstration of cool canine-friendly technologies! Learn the challenges faced by our furry friends in the working world as you take on their role yourself before watching the professionals at work.
Presented by The Open University

HELPING SCOTLAND GROW
ALL AGES
ACTIVITY
Come and see how Scottish Government scientists are helping farmers. Try your hand at extracting strawberry DNA, identify potatoes using CSI (clever spud identifier) technology and get to see inside a beehive with the team from SASA.
Presented by SASA

HEALTHCARE FRONTIERS: SCIENCE IN THE NHS
JOHN HOPE GATEWAY
12PM–4PM | DROP-IN | FREE
Meet healthcare scientists working within the NHS and experience a variety of new and exciting healthcare techniques. Get hands-on with some 3D printed organs, watch how they are made and learn how these organs are used to treat patients. Play a card game to learn about cellular therapies, and connect on social media with a fun photo frame accessory.
Presented by NHS National Services Scotland

AMAZING IMMUNOLOGY
NATIONAL MUSEUM OF SCOTLAND
LEARNING CENTRE LEVEL 4, STUDIO 1
12.30PM | 1 HOUR | ON UNTIL FRI 12 APRIL | £5
Get active and crafty with Denny and the T-Team and enjoy games that explain how your body’s immune cells protect you from disease and keep you healthy. Play the ball pool challenge to discover how future treatments for cancers might work and make your own science sticker stories to take home. For ages 7–13. Each ticket also admits one adult if required.
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Presented by The University of Edinburgh
WEDNESDAY 10 APRIL

RECURRING EVENTS

#LITTERCUBES WEIGH-IN

DYNAMIC EARTH | EARTHSCAPE/STRATOSPHERE
10AM–4PM | DROP-IN | FREE WITH ADMISSION
Over the past few days, Julia Barton has constructed #LitterCUBES from litter she has collected on local beaches. Now Julia will weigh them and calculate the energy contained in each one in an interactive theatrical art piece. How much oil do the CUBES represent? How many fish suppers? Study the CUBES and join us in asking: how did it get onto our beaches and how can we stop it from getting there?
Presented by Dynamic Earth

CASSIUS THE CRAB

PLEASANCE | PENTLAND ROOM
10.30AM AND 12PM | 1 HOUR | ALSO ON THURS 11 APRIL
£6 OR £5 EACH FOR 3 OR MORE TICKETS
Young ones will enjoy this fun, educational and interactive session sharing animal biology and conservation facts about our rockpool friends. Ever wondered what the inside of your lungs look like? How does air travel through them and where does mucus come from? Answer all these questions and more when you dissect a pig’s lung.
Presented by Surgeons Hall Museums

DISEASE DETECTIVES

ROYAL BOTANIC GARDEN EDINBURGH
JOHN HOPE GATEWAY
12PM–4PM | DROP-IN | FREE
With an increasing number of viruses, bacteria and parasites that cause diseases in both animals and people, it is really important to be able to get a quick diagnosis. This family friendly hands-on activity allows you to be a Disease Detective and to try out some of the different tests that are used in labs to help find out which bugs are making us, and our animals, unwell.
Presented by Moredun Research Institute

LET’S LOOK AT LUNGS

SURGEONS HALL MUSEUMS
11AM AND 1PM | 1 HOUR | ALSO ON WED 17 APRIL
£7
Ever wondered what the inside of your lungs look like? How does air travel through them and where does mucus come from? Answer all these questions and more when you dissect a pig’s lung.
Presented by Surgeons Hall Museums

TENEMENT TOWN

PATTERGEDDES CENTRE
10.30AM | 90 MINS | ALSO ON MON 15 AND TUE 16 APRIL
£10 ACOMPANYING ADULTS ARE FREE
The tenements of Edinburgh’s Old Town emerged through revolutionary engineering and architectural solutions to the unique geographical and urban challenges of the growing city. Survey these amazing structures and build your own tenement model to join our tenement town. Children must be accompanied by an adult to help with the build.
Presented by The Patrick Geddes Centre

ANIMATION LAB @ THE ZOOM CLUB

SUMMERHALL | THE ZOOM CLUB
1.30PM | 2 HOURS | ALSO ON FRI 12, WED 17 AND FRI 19 APRIL | £16
Calling all animation adventurers! Pack your wackiest ideas and delve into your imagination in the awesome Animation Lab! Become a part-time palaeontologist during our Dino Dig; a magician of optical illusions through Magic and Light; and, a master of machines in Human Cyborgs or head off to explore The Red Planet. For ages 6–8.
Presented by the Zoom Club

STONGWOMEN SCIENCE

ROYAL BOTANIC GARDEN EDINBURGH
JOHN HOPE GATEWAY
2PM | 30 MINS FOLLOWED BY 30 MINS ACTIVITY
£6 OR £5 EACH FOR 3 OR MORE TICKETS
StrongWomen circus scientists Aoife and Maria reveal the scientific secrets behind their astounding tricks. In a fun, lively and fast-paced performance, find out how jugglers, fire eaters, acrobats and hula hoop artists use science to create their amazing acts. Then have a go at some of the circus science experiments yourself in hands-on post-show activities (limited availability).
Presented by Circus250

WEDNESDAY 10 APRIL
SCHOOLS AT THE SCIENCE FESTIVAL

Our science playground, covering five floors of activities galore in City Art Centre, opens up two days early this year to enable school groups across Edinburgh to access this family space!

By invitation only, up to 480 pupils will attend supported by our Headline Sponsor, Baillie Gifford along with Edina Trust. The Ogden Trust and Institute of Physics are also supporting this new opportunity, to specifically engage young people with physics through workshops Little Sparks and Robo Constructors.

The pupils attending will experience workshops and shows on Wednesday 3 and Thursday 4 April 2019 and will join an out-of-this-world adventure in Mars Master Constructors, test their goopiest slime on our Splat-o-Meter in Splat-tastic and be the first to explore our six new and refreshed workshops.

Introducing Catalysts
Find out more about how you or your organisation can support our work Beyond the Festival on p.25 and p.37.

COMMUNITY

Making science accessible is at the heart of Edinburgh Science. To further audience engagement and break down barriers to make our annual Festival and other activities more accessible we are creating partnerships with community groups around Edinburgh and working with them to spread science engagement.

In our first year of community engagement we formed partnerships with 18 organisations for complimentary Festival tickets and worked with many groups outwith the Festival to bring science workshops, shows and discussions to their centres. We are also creating a sustainable platform with these partnerships by training youth workers to deliver science workshops and activities across their own programmes.

Community matters to Edinburgh Airport which is why they are the Science Festival’s headline sponsor for community engagement activities in 2019. Edinburgh Airport aims to address issues of local concern and through their engagement team they help to provide a voice for the community and offer a range of opportunities to meet the public face-to-face, across a range of community initiatives. Edinburgh Airport focus on educating the community about their business and operations by hosting work experience placements, running tours and working alongside local charities and businesses. They carry out corporate fundraising activities and have a dedicated Charity Board which distributes funding to support local initiatives focused on health and well-being, environmental, educational or community based projects.

BEYOND THE FESTIVAL

A PLACE FOR SCIENCE

With help from the PLACE (Platforms for Creative Excellence) programme the next three years will see us bring amazing science to more people, in more places, at more times.

As part of this unique three way partnership between the Scottish Government, the City of Edinburgh Council and the Edinburgh Festivals, in collaboration with a range of partners, we will:

Innovate our programming to devise and tour world-class exhibitions and events.

Build upon and expand our community engagement and outreach activities year round, taking workshops and shows to community partners to help embed science in their programmes.

Provide training and skills development opportunities for our staff, partners and peers. This includes the launch of a delegate programme at the 2019 Science Festival.

Creating a PLACE for science, we will encourage excellence in science communication and bring incredible, educational science to wider audiences.

The Programme is funded by the Scottish Government, the City of Edinburgh Council, and the Edinburgh Festivals, and supported and administered by Creative Scotland.

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We’re big believers in taking science out of the laboratory and into exciting new spaces. Science in the Spotlight aims to bring together the wonder of theatre and the explosive world of science communication.

Combining the best of science and theatre, Science in the Spotlight returns with an exciting show recommended for ages 5–8, Melody and Sam: Record Breakers (p.21). The show follows the journey of ambitious friends desperate to break a world record as they swim through challenges, over waves and underwater. Melody and Sam: Record Breakers is a story of determination that will inspire all ages.

Families looking for a day at the theatre will also enjoy a range of shows we have on offer at various venues across Edinburgh. Fix the future in the virtual reality world of The Space in FutureQuest (p.14), experience a multi-sensory polar adventure (p.15), come face to face to the science of circus with StrongWomen Science (p.18), or be shocked by the tales of Dr Megaphone goes Zap (p.22).

There is plenty to explore at the Science Festival this year for families to enjoy and even a Science in the Spotlight event just for grown-ups – Science Theatre Scratch Night – a night of work in progress short performances, poetry readings and comedy (p.44).
AIR POLLUTION: OUR SILENT PROBLEM

ACTIVITY

NATIONAL MUSEUM OF SCOTLAND
HAWTHORNDEN COURT
10AM—5PM | DROP-IN | ON UNTIL MON 15 APRIL | FREE

Join British Heart Foundation Scotland for interactive activities and find out more about the silent problem of air pollution. Walk along Air Street to discover how air pollution affects your body and circulatory system, view real heart cells and discover how gold particles are being used in modern research.

Supported by
British Heart Foundation Scotland

THE CHEMISTRY SHOW

SHOW

NATIONAL MUSEUM OF SCOTLAND | AUDITORIUM
11AM | 1 HOUR | ALSO ON FR 12 APRIL
£5 OR £4 EACH FOR 3 OR MORE TICKETS

Be prepared for bangs, colours, flames, foam and even a song! The vibrant show all about chemistry is back, jam-packed with mostly-educational experiments perfect for quizzical kids who want to know it all. Presented by The University of Edinburgh

MAKE A MONSTER

WORKSHOP

PLEASANCE | OCHIL ROOM
11AM | 90 MINS | ALSO ON FR 12 APRIL | £15

Meet some of the strangest animals that exist on our planet and learn how biodiversity and adaptation help them to survive. Inspired by these weird creatures, you’ll design and make your very own monster from recycled materials. Then capture a photograph of your monster in its natural habitat using our custom Monster Photo Booth!

Presented by Howling Mouse Workshop

MELODY AND SAM: RECORD BREAKERS

SHOW

PLEASANCE | QUAKER STUDIO
11AM AND 1.30PM | 1 HOUR | ON UNTIL SAT 13 APRIL
£6 OR £5 EACH FOR 3 OR MORE TICKETS

Sam and Melody want to break a world record. They train every day. They want to be the best, the fastest, the strongest, the largest, the longest – anything so long as they get their names in the big record book. Their official record attempt is just around the corner, when a message brings news that will possibly break up the team forever and take them on a journey across the seas, through the waves and into the deep. A hilarious and tender story of friendship and record-breaking success.

Please note the 1.30pm showing on Sat 13 April will be a relaxed performance.

Presented by Edinburgh Science Festival, working in partnership with Scottish Theatre Producers and Imaginate
Developed by Caitlin Skinner, Alice Mary Cooper, Ben Winger and Edinburgh Science Festival
Director and Dramaturg: Caitlin Skinner
Designer: Mamoru Iriguchi
Sound Designer: Danny Krass
Lighting Designer: Andrew Gannon

LIGHT UP MONSTERS OF THE DEEP DEEP SEA

SHOW

PLEASANCE | PLEASANCE THEATRE
2PM | 1 HOUR | £6 OR £5 EACH FOR 3 OR MORE TICKETS

What lurks on the dark ocean floor? Investigate how creatures have adapted to these murky depths and make your very own light-up deep-sea monster. Using sewable switches and electrical components, make your creature gleam and glow on the dimly-lit seafloor before capturing its luminous glory in our custom Monster Photo Booth!

Presented by Howling Mouse Workshop

FOSSIL FRONTIERS

SHOW

PLEASANCE | PLEASANCE THEATRE
2PM | 1 HOUR | £6 OR £5 EACH FOR 3 OR MORE TICKETS

Zoologist, presenter and author Jules Howard explores the latest fossil finds in this lively palaeeo-packed show. Expect toilet roll timelines, how-to-fossilise-me guidance and free fossil gifts (plus, of course, fossil poo) as Jules delves into what makes this science such an exciting study area.

Presented by Howling Mouse Workshop

P.12
10AM—5PM | BUILD AND BREAK
NATIONAL MUSEUM OF SCOTLAND

P.13
10AM—5PM | STEMS, BEND YOUR BRAIN
NATIONAL MUSEUM OF SCOTLAND

P.16
10AM—8PM | MOMENTS IN TIME
PLEASANCE

P.18
10.30AM & 12PM | CASSIUS THE CRAB
PLEASANCE

24 HOURS | A HUMAN TOUCH
THE SCOTTISH PARLIAMENT

ONLINE BOOKING: SCIENCEFESTIVAL.co.uk
BOOKING HOTLINE: 0131 226 0005

FAMILY EVENTS
CALL OF NATURE

ROYAL BOTANIC GARDEN EDINBURGH

JOHN HOPE GATEWAY

10.30AM, 12.30PM AND 2.30PM | 1 HOUR | £6/£5

The Institute of Eggsperts needs you and it might get muddy! Join our playful field trip and expert tutors to explore the local landscape in search of a rare egg, finding laughter and wonder in the most unexpected places. A playful performance that puts young explorers in the driving seat using character clowning, improvisation, puppetry and adventure.

Presented by Tenterhooks

DR MEGAPHONE GOES ZAP!

ROYAL BOTANIC GARDEN EDINBURGH

JOHN HOPE GATEWAY

11AM AND 2PM | 2 HOURS | ALSO ON SUN 14 APRIL

Join the search for prehistoric Madagascan insects and spiders! Searching through thousands of pieces of Madagascan copal amber, you'll discover a host of creatures that lived during the Stone Age - you can even take some of your finds away with you! Lively zoologist and author Jules Howard will be on hand to help identify discoveries using a special microscope.

Presented by Dynamic Earth

SHORE: HOW WE SEE THE SEA EXHIBITION

DYNAMIC EARTH | STRATOSPHERE

11AM–7PM | DROP-IN | ALSO ON SAT 13 APRIL

FREE WITH ADMISSION

Shore: How We See The Sea is a touring exhibition of new work from Scotland-based filmmakers Margaret Salmon and Ed Webb-Ingall that aims to inspire, explore and share coastal communities’ responses to Marine Protected Areas. The Shore tour culminates at Dynamic Earth. For these two days you can meet those involved in the project and get their perspective. This exhibition of voices, creative responses and images gathered in participating communities will be on display Tues 9–Sun 21 April. Curated by Invisible Dust and supported by Creative Scotland and the Wellcome Trust.

Presented by Dynamic Earth

FRANKENSTEIN’S PLANTS

ROYAL BOTANIC GARDEN EDINBURGH

JOHN HOPE GATEWAY

12PM–4PM | DROP-IN | ON UNTIL SUN 14 APRIL | FREE

Join the Royal Botanic Garden Edinburgh science team, create a completely unique specimen from the pressed plants provided and upload it to a digital herbarium. You’ll discover why plant specimens and digital images are so important for research and how scientists use the estimated three million plant specimens in the collection.

Presented by Royal Botanic Garden Edinburgh

THE VOLCANOES THAT ROCKED EDINBURGH

DYNAMIC EARTH | HOLYROOD PARK

2PM | 2 HOURS | ALSO ON SUN 14 APRIL | £8/£5

Explore the volcanic eruptions that rocked Edinburgh and helped shape the landscape we see today. Be guided through the undulating past of Holyrood Park through the eyes of expert geologist Angus Miller. Hear stories of these different volcanoes, comparing them to modern eruptions to help us understand what happened in Edinburgh in the past and then head out into Holyrood Park to track down the evidence. Please dress appropriately for this outdoor event including sensible footwear and waterproof clothing.

Presented by Dynamic Earth
SATURDAY 13 APRIL

RECURRING EVENTS

10AM–4PM | EASTER TRAIL
ROYAL BOTANIC GARDEN EDINBURGH

10AM–4.30PM | COMPUTER-POWERED CHEMISTRY
NATIONAL MUSEUM OF SCOTLAND

10AM–4.30PM | THE ROBOTARIUM
NATIONAL MUSEUM OF SCOTLAND

10AM–5PM | BUILD AND BREAK
NATIONAL MUSEUM OF SCOTLAND

10AM–5PM | AIR-POLLUTION: OUR SILENT PROBLEM
NATIONAL MUSEUM OF SCOTLAND

10AM–8PM | MOMENTS IN TIME
PLEASANCE

9.30AM–4.30PM | CITY ART CENTRE

During the Science Festival we transform City Art Centre’s gallery spaces into a sensational science playground, packed full of workshops, shows and interactive events. Day pass required.

INTERACTIVE FAMILY DAY

THE SCOTTISH PARLIAMENT
10AM–4PM | DROP-IN | ALSO ON SAT 6 APRIL | FREE

Join us on an unrivalled adventure in science. Journey through space and discover the marvels of modern science through hands-on activities. Tour the Universe and explore the wonder of the night sky in an inflatable planetarium and enjoy interactive exhibits – from controlling lightning to seeing through a hole in your hand! You can also meet an astronomer, hold a meteorite, learn more about how Earth and space interact and lots more. Visit parliament.scot/science for more information.

Presented by The Scottish Parliament

HERIOT-WATT FAMILY DAY

ORIAM
10AM–4PM | DROP-IN | FREE

Discover the wonders of science and sport, and get hands-on with cutting edge research, spanning robots and virtual reality to bacteria and body parts. As part of Heriot-Watt’s Year of Health, Oriam, Scotland’s National Performance Centre for Sport, transforms into a marathon of discovery. The day will be packed with workshops and interactive activities, exploring healthy homes, bodies and minds.

Supported by

WILD DAY OUT

HOLYROOD PARK | EDUCATION CENTRE
10AM–4PM | DROP-IN | FREE

Wild adventures await you at Holyrood Park! Explore dramatic landscapes and discover more about the birds and wildlife living in Edinburgh. With face painting, a nature science lab and lots of wildlife themed activities, don’t miss the opportunity to discover your wild side in the heart of the city! Please dress appropriately for this outdoor event including sensible footwear and waterproof clothing.

Presented by Historic Environment Scotland and RSPB Scotland

Image: Helen Pugh Photography

INSIDE A NUCLEAR REACTOR

NATIONAL MUSEUM OF SCOTLAND
HAWTHORNDEN COURT
10AM–5PM | DROP-IN | ON UNTIL SUN 21 APRIL | FREE

Come to the planetarium where you can shrink to the size of an atom, journey with EDF Energy to the core of a nuclear reactor and travel where no one has gone before. Watch how nuclear fission happens inside our power stations and how the energy is used as steam to turn turbines producing electricity for your home.

Supported by

DIRECT ANIMATION WORKSHOP

COLLECTIVE | CALTON HILL
10.30AM | 3 HOURS | £6/£4

Join us at Collective’s new home on Calton Hill to investigate lenses; instruments that correct and expand the frontiers of vision. Artist and curator Lydia Beilby leads this hands-on workshop making abstract animations on celluloid film. Draw, paint, etch and collage directly onto film to create your own mesmerising moving image.

Presented by Collective

ONLINE BOOKING: SCIENCEFESTIVAL.co.uk
BOOKING HOTLINE: 0131 226 0005
UGLY ANIMALS: WEIRD LIFE UNDERWATER

MEET EDISON: OUR PROGRAMMABLE BOT

Pleasance | Pleasance Theatre
11am and 2pm | 1 hour | £5 or £5 each for 3 or more tickets

Meet Edison - our LEGO® compatible, programmable bot! Discover basic robotics as you begin by using barcodes to program Edison before moving on to more advanced processes. You can program Edison to move when clapping, communicate with light and music and navigate through a series of maps, obstacles and local landmarks.

Presented by ComputerXplorers

THE GREENROOM

Stills Centre for Photography

11am—4pm | Drop-in | On until Sun 21 April | Free

From fish that use sickening slime as defence to sea cucumbers that fight with their bum, our seas are full of some of the strangest animals in the world. Join biologist and presenter Simon Watt to hear how to help these creatures and our planet survive. Please note the 11am showing will be a relaxed performance.

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UNCERTAIN FRONTIERS PHOTOGRAPHY WORKSHOP

National Museum of Scotland

Learning Centre Level 4, Studio 2
1pm | 3 hours | £5

Create a stunning photographic image using recycled materials! Explore and create, through the use of recycled materials, a world view of topics that science does not always get right. International photographic artist Ron O'Donnell will inspire and energise you to create an alternative view of our world, highlighting issues such as plastic pollution and nuclear weapons.

Presented by Edinburgh Napier University

TRACKS AND SIGNS

Pleasance | Meet in Ochil Room
2pm | 2 hours
£6 or £5 each for 3 or more tickets

In the spirit of exploration we are bringing wild bushcraft to urban Edinburgh. Join our tracking expert for a fascinating workshop discovering how you can make sense of the signs all around you. Explore the hidden world of elusive animals, learn how to use all your senses, and practice tracking in the city’s green spaces. Please dress appropriately for this outdoor event including sensible footwear and waterproof clothing.

Presented by Stills Centre for Photography

LIGHT DRAWING

Pleasance | Quaker Studio
11am | 1 hour | £10

Scientifically creative and creatively scientific, Light Drawing is an illuminating workshop on the science of light and photography led by science communicator Dr Kathryn Harkup. With a bit of help from science you can sketch and doodle with a light bulb. Using long exposure photography and a little imagination we will be making brilliant, bright and bold images.

ANALOGUE EXPLORERS WORKSHOP

Collective | Calton Hill
10.30am | 3 hours | £6/£5

Join us at Collective’s new home on Calton Hill to investigate lenses; instruments that correct and expand the frontiers of vision. Artist and curator Lydia Beilby leads this hands-on workshop to discover the wonder of analogue film technology, explore the nature of ‘seeing’ and use found film to create your own imaginative stories.

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Presented by Collective

LIGHT DRAWING

Pleasance | Quaker Studio
11am | 1 hour | £10

Scientifically creative and creatively scientific, Light Drawing is an illuminating workshop on the science of light and photography led by science communicator Dr Kathryn Harkup. With a bit of help from science you can sketch and doodle with a light bulb. Using long exposure photography and a little imagination we will be making brilliant, bright and bold images.
GAME DESIGN USING XBOX CONTROLLERS

AGES 8+

WORKSHOP

PLEASANCE | HIGHLAND ROOM
11AM AND 2PM | 2 HOURS | £15

Time to take control of the game. Using an Xbox controller, learn how to create a range of terrains, worlds and characters, controlling movement, sound and vision using an intuitive icon-based programming language. At the end of the workshop you will have your own video game to take home and play!

Presented by ComputerXplorers

SING AND DANCE IN SPACE AND TIME WITH MR BOOM

AGES 3+

SHOW

PLEASANCE | CABARET BAR
2PM | 1 HOUR | £6 OR £5 EACH FOR 3 OR MORE TICKETS

Mr Boom – the children’s one-man band – arrives from the Moon in the spaceship Imagination. Travel with him on an amazing musical adventure through time and space in an exciting, animated show that features song, dance and audience participation.

Science and technology are central to your life and they can change the world. What advancements or discoveries have you witnessed in your lifetime?

Polio vaccine 1955
Organ transplants 1960
Moon landings 1969
PCs 1977
World Wide Web 1989
Dolly the sheep 1996
Iphone 2007
Dark matter 2009
Gravitational waves 2016

Could the next one be a cure for cancer? An answer to climate change or holidays on Mars?

Advancements in science and technology is dependent on inspiring young people of today to explore the world and help secure a successful and sustainable future.

Edinburgh Science is Scotland’s largest science engagement charity and we cannot continue our work without support.

MAKE A DIFFERENCE

Please look out for our Donation Stations at Science Festival venues and help us to deliver our world-leading Science Festival; community activities; education workshops in schools across Scotland, reaching 60,000 children each year; and an inspiring careers event to show young people the breadth of options for their future.

For more information on donating as an individual or organisation, please contact Hannah

hannah.schlesinger@scifest.co.uk

Registered Charity no. SC003790
MONDAY 15 APRIL

RECURRING EVENTS

EARLY DOORS: BUILD AND BREAK

NATIONAL MUSEUM OF SCOTLAND | GRAND GALLERY
9AM | HOUR | ALSO ON TUE 16 APRIL
FREE BOOKING REQUIRED | ££

To provide an accessible environment for families with autistic children and children with complex sensory profiles we are hosting two early doors sessions at the National Museum of Scotland for Build and Break (p.12).

FURTHER, FASTER, HIGHER

NATIONAL MUSEUM OF FLIGHT
11AM–4PM | DROP-IN | ON UNTIL MON 22 APRIL
FREE WITH ADMISSION

From Concorde to the R.34 airship, discover the science behind the pioneering aircraft in the museum through a technical challenge, family trail and craft activities.

Presented by National Museum of Flight

TUESDAY 16 APRIL

RECURRING EVENTS

DELVING INTO DEEP EARTH. EXPLORING OUR FINAL FRONTIER

DYNAMIC EARTH | STRATOSPHERE
10AM–4PM | DROP-IN | FREE WITH ADMISSION

The UK Geoenergy Observatories project invites you to explore the fascinating secrets of the geological underworld and talk to experts from the British Geological Survey and Professor of Geoscience Communication, Prof Iain Stewart. The project is developing two unique Earth observatories to research energy solutions for a cleaner, greener future. Discover the uses of different types of rocks and minerals, how the Earth is constantly moving and even make your own earthquakes!

Presented by Dynamic Earth

SECRETS OF ANIMAL DNA

NATIONAL MUSEUM OF SCOTLAND
LEARNING CENTRE LEVEL 2
10AM–4PM | DROP-IN | ON UNTIL THU 18 APRIL | FREE

Scientists in Edinburgh have been studying the DNA of animals for 100 years. Find out how researchers at The Roslin Institute are exploring the genomes of all creatures great and small, to improve the health and welfare of animals and people.

Presented by The University of Edinburgh

HANDS-ON ROBOTS

NATIONAL MUSEUM OF SCOTLAND
HAWTHORNDE COURT
10AM–5PM | DROP-IN | ON UNTIL THU 18 APRIL | FREE

Enjoy fun activities with mobile robots designed by students from Edinburgh Napier University. See how they work and what they can do and do some programming of your own. Parents welcome and encouraged to help.

ALYX: THE SOCIAL ROBOT

NATIONAL MUSEUM OF SCOTLAND
HAWTHORNDE COURT
10AM–5PM | DROP-IN | ALSO ON WED 17 APRIL | FREE

Learn about modern robot capabilities from a technical perspective and hear about the work conducted at Heriot-Watt University in this interactive activity. See a robot’s ability to estimate a person’s emotion from their face and body posture, as well as its ability to generate different facial expressions, gesture, talk and self-balance. Discover more about the work being done towards further advancements and the possible applications of such technology. Also on Tuesday 9 and Wednesday 10 April in Pleasance as part of Experimentarium.

Presented by Heriot-Watt University
IT’S MY TURN!

AGES 5+
SHOW
NATIONAL MUSEUM OF SCOTLAND | AUDITORIUM
11AM AND 2PM | 45 MINS
£6 OR £5 EACH FOR 3 OR MORE TICKETS

Ellie struggles to talk to her parents because she just can’t get her timing right; either she interrupts them or they’ve moved on. With help from friendly musicians, an annoying older sibling and you, Ellie learns when it is her turn to talk and finally tells her parents about the fairy she discovered in the cupboard – but how will her family respond? For ages 5–8.

Presented by The University of Edinburgh

BUILD A COMPUTER

AGES 8+
WORKSHOP
NATIONAL MUSEUM OF SCOTLAND | LEARNING CENTRE LEVEL 4 SEMINAR ROOM
11AM AND 2PM | 1 HOUR | ON UNTIL SAT 20 APRIL | £6

Have you ever built a computer? Grab a screwdriver and have a go. Learn how the components fit together and see if you can start it up. For ages 8-12. Each ticket also admits one adult who is required to participate.

Presented by The University of Edinburgh

REVEALING SCOTLAND’S COLD-WATER CORAL REEF

AGES 8+
ACTIVITY
DYNAMIC EARTH | STRATOSPHERE
10AM–4PM | DROP-IN | ALSO ON FRI 19 APRIL
FREE WITH ADMISSION

Did you know that Scotland has its own coral reefs? Scientists from the University of Edinburgh will help you learn more about these amazing reefs with a selection of interactive, sensory activities. Touch real specimens and find out just what these reefs can do for us and why we should care about them. Bring along a clean glass jar to make a crafty coral creation to take away!

Presented by Dynamic Earth

100 THINGS TO KNOW ABOUT SPACE

AGES 9+
SHOW
NATIONAL MUSEUM OF SCOTLAND | AUDITORIUM
11AM | 1 HOUR | £6 OR £5 EACH FOR 3 OR MORE TICKETS

Join the Usborne Fact Force as they take you on a fascinating journey to outer space, followed by a big space quiz at the end. Did you know the snow on Mars is square? That there’s a cloud in outer space that tastes like raspberries? Do you know how to escape a black hole? Or why astronauts learn wilderness survival skills? Come along to find out!

Presented by Usborne Publishing
WILDLIFE AND SOILS THAT CALL SCOTLAND HOME

ST KILDA’S SECRETS: A MINECRAFT ADVENTURE

MEDICAL FRONTIERS: FROM SCIENCE TO FUTURE MEDICINE

IVO KOHLER EXPERIENCE
Don’t miss the special 30th anniversary edition of the Edinburgh International Children’s Festival!

Discover the world’s best theatre and dance for children and young people.

Full programme revealed and booking opens on 20 March 2019.

www.imaginate.org.uk

“I love this festival. The shows we saw were utterly brilliant. They brought us pure joy and uplifted our spirits.”

Parent, Festival 2018

NEWS!

Programme includes a special 3-week run of Punchdrunk’s immersive show Small Wonders
EDINBURGH SCIENCE FESTIVAL EVENTS

In 2019, Edinburgh Science Festival’s events programme takes inspiration from the 50th anniversary of the Moon landings to present: Frontiers.

Jumping in to the unknown and expanding our horizons, our 2019 events represent the cutting-edge knowledge and passion at the forefront of science and technology. We are welcoming new ideas, new possibilities and new venues too.

Join us at the frontier at our Festival hub, The Pleasance, where you’ll find debates, discussions, comedy and special events plus our ever-popular GastroFest series (p. 54). A special pop-up bookshop from Blackwells will also be open daily.

EARLY BIRD OFFER

Buy four tickets for events across our festival programme and receive your fifth ticket free.

Cheapest ticket free, valid for five separate events only. Early Bird Tickets can be booked by phone or in person only. The Early Bird Offer closes on Monday 25 March.

AGE RESTRICTIONS

The following programme is designed for visitors aged 14+. This is a recommendation only and younger visitors are very welcome. Please note that a small number of events have an enforced age limit of 18+ and these will be marked with ‘AGES 18+’. This restriction is in place due to event content and/or venue licensing laws. For these events, identification will be required and under 18s will not be admitted under any circumstances.

#SCIFIVE

Are you sci-curious? Students and teachers can explore our Frontiers with tickets for just £5 – everything from engaging workshops and discussions to a great night out!

Look out for the #scifive tag as you browse event listings and follow us on Twitter, Facebook and Instagram for more news and special offers.

EdSciFest EdinburghScienceFestival EdSciFest
CHANGING PLACES MOBILOO AT PLEASANCE

On Monday 8 April and Saturday 13 April we will have a Changing Places Mobiloo at Pleasance. The Mobiloo is a mobile toilet with hoist and changing table. Please bring your own sling if you wish to use the hoist. www.mobiloo.org.uk

ADDITIONAL SERVICES

If you would like to request any of the following services for a specific event, please email us before Friday 8 March at marketing@scifest.co.uk prior to booking. Depending on availability.

- BSL
- Live Captioning
- Hearing Loop (for Pleasance: Quaker Studio, Lomond Room and Upper Hall)
THROUGHOUT THE FESTIVAL

ROBOTS EXHIBITION

NATIONAL MUSEUM OF SCOTLAND
10AM–5PM | FRI 18 JANUARY–SUN 5 MAY
£10/£8 | UNDER 16S ARE FREE

From early mechanised human forms to today’s cutting-edge technology, this major exhibition reveals our 500-year quest to make machines human. Featuring more than 100 objects – from automata to science fiction film stars and the creations of modern research labs – this is your chance to see the most significant collection of humanoid robots ever assembled. Supported by players of People’s Postcode Lottery.

Developed by the Science Museum, London
Image: The Board of Trustees of the Science Museum

MICROSCOPES: NATURE REVEALED

NATIONAL MUSEUM OF SCOTLAND
10AM–5PM | FRI 29 MARCH–SUN 15 SEPTEMBER | FREE

From the simple pocket microscopes of the 18th century to the precision instruments of today, the microscope has been fundamental in improving our understanding and revealing the wonders of the natural world. Using examples from the National Museum of Scotland’s significant collection, see how optical improvements sparked a change in the public perception of the microscope from being a simple optical toy to a reliable instrument of science.

Presented by National Museums Scotland

CHARLES PIAZZI SMYTH 200

CALTON HILL | NELSON MONUMENT
10AM–4PM | DROP-IN | MON 1 APRIL–TUE 31 DECEMBER | FREE

Marking the bicentenary of Scottish Astronomer Royal and polymath Charles Piazzi Smyth’s birth, this special exhibition presents the story of this extraordinary man whose pioneering work at Calton Hill has changed the practice of astronomy across the world. Supported by The Royal Society of Edinburgh and The Astronomical Society of Edinburgh.

Presented by Royal Observatory Edinburgh and City Art Centre

THE SCOTTISH PARLIAMENT
WED 20 MARCH–WED 8 MAY | DROP-IN | FREE

This stunning large-scale, open-air photography exhibition will take you on a fascinating journey exploring the effect of human activity on our planet, how modern practices are changing our landscapes and impacting on the environment, and looking at some of the steps taken to cope with a rapidly changing world and dwindling resources. Learn about the urgency of rapid environmental degradation and ways to make a difference.

In association with The Scottish Parliament
Images: Jassen Todorov
Supported by OCEANA Protecting the World’s Oceans

ONLINE BOOKING: SCIENCEFESTIVAL.CO.UK
BOOKING HOTLINE: 0131 226 0005
FESTIVAL EVENTS
The Royal Society of Edinburgh is proud to present Celebrating Women in Science in Scotland, a new multimedia exhibition for 2019, featuring some of the country’s leading scientists. These incredible women are changing the way we see and understand the world every day with their work and we want to celebrate them! Come along and find out more about what inspired them to follow this career path and the various challenges as well as achievements they have had along the way. For dates and times please visit rse.org.uk.

Presented by Royal Society of Edinburgh

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**METAMORPHOSIS**

**SUMMERHALL**

LAUNCH: FRI 5 APRIL | 6.30PM – 8.30PM
EXHIBITION: SAT 6 – SUN 21 APRIL | WED 24 APRIL–SUN 19 MAY (NOT MON & TUES) | 10AM–6PM | DROP-IN | FREE

Metamorphosis is a contemporary art exhibition co-curated by Summerhall and ASCUS Art & Science, showcasing new work of local and international artists Louise Mackenzie, Russell Beard, Stephen Kavanagh and Aurélie Fontan. Working across the fields of art, design and science, these works explore where we are today after centuries of engineering the world and environment around us, begging the question what impact has this had and where should we, as humans, go from here?

See p.35, p.36, p.38 and p.40 for the corresponding artist talks and workshops.

Presented by Summerhall, ASCUS Art & Science and Lateral Lab
Image: Jason Revell

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**TENSEGRITY**

What is the fashion of the future? Upcoming designer Aurélie Fontan created her own 100% degradable fabric from speciality tea, Kombucha. Her Edinburgh College of Art graduate collection Tensegrity demonstrates the combination of craft and technology based on science imagery and disciplines.

Presented by Summerhall and ASCUS Art & Science

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**FRAG'MENT (TERRA NON-FIRMA)**

Emerging from the social, geopolitical and environmental uncertainty of the ‘Anthropocene’ time period – Frag‘ment (Terra Non-Firma) brings together two recent recipients of Lateral Lab’s Robert Callender International Residency for Young Artists, Russell Beard and Stephen Kavanagh. In this joint exhibition, they explore the space between order and chaos, growth and disintegration.

The series of sculptural works charts the artists’ ongoing experimentation with raw materiality.

Presented by Summerhall, ASCUS Art & Science and Lateral Lab
Image: Stephen Kavanagh

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**PITHOS: ONE POSSIBLE STORY OF OUR LIVELY MATERIAL**

Visual artist Louise Mackenzie reimagines the myth of Pandora for a biotechnical era in this exhibition of her works. Following three years of research with the Institute of Genetic Medicine at Newcastle University and ASCUS Lab at Summerhall, Mackenzie delves into film and participatory performance and uses her experience of genetically modifying E. coli bacteria to confront issues of care and control.

Presented by Summerhall and ASCUS Art & Science
Image: Louise Mackenzie
EDINBURGH MEDAL ADDRESS
CLIMATE CHANGE: WHERE ARE WE?

THE SIGNET LIBRARY | UPPER LIBRARY
7PM | 1 HOUR | £12/10

The Edinburgh Medal is a prestigious award given each year to men and women of science and technology who are judged to have made a significant contribution to the understanding and wellbeing of humanity. The 2019 Edinburgh Medal is awarded to Christiana Figueres, for her work as a recognised world leader on global climate change and her efforts in bringing nations together to jointly deliver an unprecedented climate change agreement.

Christiana Figueres, Executive Secretary of the UN Framework Convention on Climate Change (UNFCCC), was instrumental in the successful conclusion of the Paris talks. The Summit saw all of the world’s nations agree for the first time to a binding commitment to avoid dangerous levels of global warming. Figueres served as the UN’s Climate Chief from 2010 until July 2016.

Join Figueres as she discusses the international picture in respect of action to halt climate change. The 2015 Paris Agreement was a historic achievement of international cooperation that charted a course toward addressing global climate change. Since then, some political events have called that international cooperation into question.

Supported by

PREVIOUS RECIPIENTS
2018 Prof Cordelia Fine
2017 Prof Peter Piot
2016 Kevin Govender and the IAU
2015 Mary Midgley
2014 Prof Mary Abukutsa-Onyango
2013 Prof Peter Higgs and CERN
2012 Dr James Hansen
2011 Prof Carl Djerassi
2010 Sir Alex Jefferies
2009 Prof Jonathan Beckwith
2008 Prof Chris Rapley
2007 Dr Richard Horton
2006 Prof James Lovelock
2005 Prof Colin Blakemore
2004 Prof Steven Rose
2003 Prof Wang Sun
2002 Dr Lise Kingo
2001 Sir John Sulston
2000 Prof Lynn Margulis
1999 Prof Jocelyn Bell Burnell
1998 Sir David Attenborough
1997 Prof Amartya Sen
1996 Prof Richard Levin
1995 Sir John Crofton
1994 Prof Manuel Patarroyo
1993 Prof Wangaari Maathai
1992 Prof Heinz Wolff
1991 Prof Jane Goodall
1990 Prof Stephen J Gould
1989 Prof Abdus Salam

BUILD AND BREAK

ACTIVITY

NATIONAL MUSEUM OF SCOTLAND
10AM–5PM | SAT 6–SUN 21 APRIL | DROP-IN | FREE

Build, break and create in our unique free play session. Visit BUILD IT to unlock your creative spirit and build magical, massive structures with our super-sized construction blocks then head over to BREAK IT to be set loose on a huge pile of discarded electronics with a screwdriver and a pair of pliers – rip old pieces of tech apart to discover what they are made of and learn which parts we might be able to reuse.

Due to the nature of the activities, adult supervision is required. To provide an accessible environment for families with autistic children and children with complex sensory profiles we are hosting two early doors sessions at the National Museum of Scotland (p.26).

Supported by

MOMENTS IN TIME

EXHIBITION

PLEASANCE | PLEASANCE COURTYARD
10AM–8PM | DROP-IN | SAT 6–SUN 14 APRIL | FREE

Allow yourself to be transported back in time as we take you on a journey through pivotal moments in Scotland’s history. Through a series of immersive snapshots, discover milestones of Scottish scientific achievement from the flowering of philosophy and science during the Enlightenment, through the rapidly mechanising world of the Industrial Revolution, to the data-rich and globally connected Information Age.

Supported by

ONLINE BOOKING: SCIENCEFESTIVAL.co.uk
BOOKING HOTLINE: 0131 226 0005
FRIDAY 5 APRIL CONTINUED
The global spread of crops has linked continents and cultures as we have taken edible plants with us on our travels. The Food Forever exhibition uses large photographic images to explore the importance of diversity in crops and their wild relatives, for resilience and food security.

Presented by Royal Botanic Garden Edinburgh

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**Cyanotype Workshop**

**Pleasance | Highland Room**

11am and 2pm | 2 hours | £12/£10

Enjoy one of the first photographic printing processes and create your own beautiful design to take away. Sheila Noble Woodward of wREN Fine Art Photography joins us to make amazing cobalt blue images using the historic cyanotype printing process. Hand-coat watercolour paper, design a collage of plant material or other objects of your choice and expose it to the sun (or an alternative UV light source if the sun doesn’t come out) to see the beautiful reaction at work.

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**The Mirror Trap**

**Pleasance**

10am–6pm | Drop-in | On until Sun 14 April | Free

A short headphone horror story about psychology and quantum physics. Paul Gato locked himself in his room. When police finally battered down the door, they found a gun, two mirrors, a vial of LSD and a diary full of ramblings and Feynman diagrams, but Gato had disappeared. His diary proves that he had lost his mind but perhaps he found something else. Dare you re-enact his final experiment?

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**Exploring the Deep**

**National Museum of Scotland | Auditorium**

12pm | 90 MINS | £8.50/£6.50

Despite over 50 years of deep-sea exploration, less than 1% of the global deep ocean has ever been visited. However, that very small fraction has yielded new ecosystems, abundant resources and the possible birthplace of life on Earth. Trinidadian marine biologist specialising in deep-sea biology Dr Diva Amon hosts a panel of experts including Amber Cobley and Dr Allison Perry who recall their own adventures into the unknown and discuss what the future holds for the deep.

Supported by Oceana: Planting the World’s Oceans

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**From Biohazard to Biofuel**

**Pleasance | Lomond Room**

2pm | 90 MINS | £8.50/£6.50/£5

As traditional fossil fuels continue to fall out of favour, scientists are instead turning to new and unusual energy sources such as fats, algae and even bacteria that eat human waste. In a discussion chaired by director of Creative Carbon Scotland Dr Ben Twist, join Argent Energy’s Dickon Posnett and and Prof Yannis Ieropoulos of the Bristol BioEnergy Centre, to measure the power generated from weird and wonderful materials.

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**Cabaret of Dangerous Ideas: Provisions for a Sustainable Future**

**Summerhall | Red Lecture Theatre**

2pm | 90 mins | £5

Join us as some of our brightest and bravest thinkers let their most challenging sustainability ideas loose on the public! Questions and challenges are actively encouraged and there’ll be a liberal sprinkle of entertainment from MC and comedian Susan Morrison. You’ll also have a chance to view a series of short environmental films created by students from Edinburgh College of Art.

**Russell Beard: Artist Talk**

**Summerhall | Red Lecture Theatre**

2.30pm | 1 hour | £5

Join artist Russell Beard as he discusses his joint exhibition with Stephen Kavanagh presenting new sculptural works and the challenges emerging from the social geo-political and environmental uncertainty of the Anthropocene – an era of the dominant influence of human activity on the environment. This venue is undergoing access improvements, contact the venue for up-to-date information.

Presented by Summerhall, ASCUS Art & Science and Lateral Lab

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**Cracking the Cancer Code**

**Pleasance | Upper Hall**

3pm | 1 hour | £6/£5/£5

As scientists turn to big data and Artificial Intelligence to crack the cancer code, we find ourselves on the brink of personalised medicine and targeted treatments. Test Cancer Research UK’s escape game and hear about the latest advances from cancer scientists as you race against the clock to solve a series of puzzles using the tools and techniques of research.

Presented by Cancer Research UK
MAXWELL IN SIX OBJECTS
NATIONAL MUSEUM OF SCOTLAND | AUDITORIUM
3PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5
James Clerk Maxwell is up there with the likes of Newton and Einstein but his achievements and life are little known, even in his native Scotland. Focused around six objects associated with Maxwell, Dr Isobel Falconer presents key aspects of his life and scientific work. These objects, on loan from the Cavendish Laboratory and the James Clerk Maxwell Foundation, provide insights into the personality and modes of thought of this great physicist.
Supported by JAMES CLERK MAXWELL FOUNDATION

PUTTING INTELLIGENCE TO THE TEST
PELEASANCE | QUAKER STUDIO
5.30PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5
Are you as smart as you think you are or are there ways to increase your intelligence? How did humans become so brainy and how accurately can we really test intelligence anyway? Join our panel of experts including Dr Adam Hampshire to hear how Artificial Intelligence can help to define intelligence from a mechanistic perspective, while Dr Amanda Seed will explore the evolution of human intelligence compared to other animals, and author of The Intelligence Trap, David Robson, will talk about the stupid things smart people do.

ANIMALS IN RESEARCH: ANY ALTERNATIVES?
PELEASANCE | CABARET BAR
3PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5
Animal research has played a vital part in nearly every medical and veterinary breakthrough, but what alternatives exist? Quiz our panel of experts to find out about ways of reducing the use of animals in research, how to maximise welfare and explore the possibilities of alternatives. Speakers include Dr Lesley Penny, Director of Bioresearch and Veterinary Services at the University of Edinburgh, Hazel Lambert from the College of Medicine and Veterinary Medicine at the University of Edinburgh and critical care medicine consultant Dr Kenneth Baillie. Supported by the Medical Research Council.
Presented by The University of Edinburgh

BENEDICT ALLEN: ULTIMATE EXPLORER
PELEASANCE | PLEASANCE THEATRE
5.30PM | 90 MINS | £12/£10
Benedict Allen, famously the subject of mass media speculation when he was ‘lost’ in Papua New Guinea some 18 months ago, tells the gripping story of that harrowing journey and the extraordinary discoveries he made there with his usual good humour. He talks about what first motivated him to become an explorer, the physical and mental endurance that his numerous challenges have required and his work documenting some of the most remote people and environments on the planet.

THE SCIENCE OF THE SESH
SUMMERHALL | DISSECTION ROOM
7.30PM | 2 HOURS | £28 INCLUDES WELCOME COCKTAIL
Join us for an evening of delicious drinks, boozey (but responsible) experiments and cocktail history as we explore The Science of the Sesh! Discover what factors and senses affect how we taste, how to make perfect cocktails at home and sip on some beautiful drinks made with the best Scottish spirits as you learn. Over 18s only. This venue is undergoing access improvements, contact the venue for up-to-date information.
Hosted by Summerhall Drinks Lab

IS THAT A BIG NUMBER?
PELEASANCE | LOMOND ROOM
8PM | 1 HOUR | £8.50/£6.50/#SCIFIVE £5
Impressive statistics are thrown at us every day from the cost of healthcare, the size of an earthquake to the distance to the nearest star. Financial technology entrepreneur Andrew Elliott gives the tips and tools to make sense of these numbers. Join us to learn how number skills help us to understand the everyday world and how the same skills can be stretched to solve mysteries of science, politics and the Universe.
Presented by Oxford University Press

OCEANS IN CRISIS: A PUBLIC DEBATE
PELEASANCE | QUAKER STUDIO
8PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5
We all rely on the seas for their abundant food, mineral and energy resources and yet more than 90% of the deep oceans remain totally unexplored. From microplastics to rising sea levels, human activity is changing our oceans before we have the chance to explore its full potential. Join our panel of ocean experts to discuss the challenges we face and better understand our ocean world.
Presented by Heriot-Watt University

ANIMALS IN RESEARCH: ANY ALTERNATIVES?
PELEASANCE | CABARET BAR
3PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5
Animal research has played a vital part in nearly every medical and veterinary breakthrough, but what alternatives exist? Quiz our panel of experts to find out about ways of reducing the use of animals in research, how to maximise welfare and explore the possibilities of alternatives. Speakers include Dr Lesley Penny, Director of Bioresearch and Veterinary Services at the University of Edinburgh, Hazel Lambert from the College of Medicine and Veterinary Medicine at the University of Edinburgh and critical care medicine consultant Dr Kenneth Baillie. Supported by the Medical Research Council.
Presented by The University of Edinburgh

LOUISE MACKENZIE: ARTIST TALK
SUMMERHALL | RED LECTURE THEATRE
4PM | 1 HOUR | £5
With a background in psychology and an interest in philosophy, Louise Mackenzie explores human behaviour and the evolution of society through art practice. Taking human-made objects as a starting point for exploration, we discuss Mackenzie’s recent work focusing on aspects of biological matter that she describes as ‘lively material’. This venue is undergoing access improvements, contact the venue for up-to-date information.
Presented by Summerhall and ASCUS Art & Science

CAN SCIENCE EXPLAIN MUSIC?
PELEASANCE | CABARET BAR
5.30PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5
Physicists study vibrations and the physical mechanisms of making music and neuroscientists visualise our brain activity when listening to it. But is music ever going to be something that can be understood or explained using science? Arguing yes is physicist and musician Mark Lewney against an emphatic no from neuroscientist, doctor and philosopher Raymond Tallis.
12 YEARS TO SAVE THE PLANET

In 2018, top environmental scientists issued a final call to save the world from catastrophic climate change. They argue ‘rapid, far-reaching and unprecedented changes in all aspects of society’ are necessary to prevent global temperatures from rising more than 1.5°C above pre-industrial levels. We present a panel of climate experts and figures from the worlds of energy and industry who propose their plans for combating this complex issue.

CHEESEOLOGY 4.0

CheeSEOLOGY returns to the Science Festival for a fourth year to explore the science behind the production of this fascinating food. Hosted by dairy technologist Paul Thomas and journalist and cheese expert Patrick McGuigan, CheeSEOLOGY combines a tutored tasting of some of Europe’s finest cheeses with an explanation of the factors influencing texture and flavour development in each variety.

LIFE ON MARS

Join science presenter Neil Monteiro to build a new life on Mars in this pub quiz, board game and sci-fi mashup! Divide up resources, develop structures and prepare to live on the edge whilst dealing with on-screen random events. You’ll need to bring your best space and sci-fi brains for the knowledge and dexterity challenges. Come prepared with a team of four to eight people or simply bring a willingness to join in and submit your name to the team creator on the night. Over 18s only.

SCIENCE NEEDS YOU!

Our vision is of a world where science, technology, engineering and mathematics are recognised and celebrated as central to our lives and where we all work together to create a sustainable future.

You can be part of delivering Edinburgh Science Festival as well as community outreach and learning projects across Scotland. You can help to inspire the next generation to become the problem solvers of tomorrow.

We are Scotland’s largest science engagement charity but we cannot continue our work without support.

Please look out for our Donation Stations at Science Festival venues to help us to deliver a world-leading Festival and our education projects across Scotland.

Get in touch for more information and to discuss the benefits of partnering with Edinburgh Science by contacting Hannah at hannah.schlesinger@scifest.co.uk

Registered Charity no. SC003790

Are you sci-curious? Students and teachers can explore everything - from engaging workshops and discussions to a great night out - for just £5 at most events.

Look out for the #scifive tag as you browse event listings.

Follow us on Twitter, Facebook and Instagram for more news and special offers.

#scifive

FIG 1. SCIPALS ROSALYN YALOW AND JAMES DEWAR DEMONSTRATE A SUCCESSFUL #SCIFIVE!

TEACHERS AND STUDENTS £5 TICKETS!

Are you sci-curious? Students and teachers can explore everything - from engaging workshops and discussions to a great night out - for just £5 at most events.

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Follow us on Twitter, Facebook and Instagram for more news and special offers.

#scifive
SUNDAY 7 APRIL

ONGOING EXHIBITIONS

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<td>9AM–5PM</td>
<td>CELEBRATING WOMEN IN SCIENCE</td>
<td>ROYAL SOCIETY OF EDINBURGH</td>
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<tr>
<td>10AM–5PM</td>
<td>BUILD AND BREAK</td>
<td>NATIONAL MUSEUM OF SCOTLAND</td>
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<td>10AM–5PM</td>
<td>CHARLES PIAZZI SMYTH 200</td>
<td>CALTON HILL</td>
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<td>ROBOTS EXHIBITION</td>
<td>NATIONAL MUSEUM OF SCOTLAND</td>
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<tr>
<td>10AM–5PM</td>
<td>MICROSCOPES: NATURE REVEALED</td>
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RECURRING EVENTS

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>10AM–5PM</td>
<td>ROYAL BOTANIC GARDEN EDINBURGH</td>
<td>PLEASANCE</td>
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<tr>
<td>10AM–5PM</td>
<td>FOOD FOREVER</td>
<td>NATIONAL MUSEUM OF SCOTLAND</td>
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<tr>
<td>11AM–6PM</td>
<td>THE MIRROR TRAP</td>
<td>PLEASANCE</td>
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<td>2PM</td>
<td>CHEESEOLOGY 4.0</td>
<td>PLEASANCE</td>
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</table>

SCIENCE FESTIVAL

CHURCH SERVICE

ST GILES CATHEDRAL
11.30AM | 1 HOUR | FREE
The Lord Provost of Edinburgh and the Minister of St Giles’ Cathedral invite you to the annual church service celebrating the Edinburgh Science Festival.

EVERY BREATH YOU TAKE

NATIONAL MUSEUM OF SCOTLAND | AUDITORIUM
12PM | 2 HOURS | £8.50/£6.50/#SCIFIVE £5
Air pollution is in the news daily and in the UK, 40,000 deaths each year are linked to this growing problem. Join Prof D K Arvind to learn about the exciting new development of wearable sensors to measure air pollution and its effects on vulnerable groups, such as young asthmatics, pregnant mothers and patients with chronic obstructive respiratory disease. After the discussion, have a go at wearing the devices on a walk around the museum to visualise your personal dosage of air pollutants.
Presented by The University of Edinburgh

SCIENCE IS BEAUTIFUL

ROYAL BOTANIC GARDEN EDINBURGH
LECTURE THEATRE
2PM | 1 HOUR | £5
Through the ages plants have been associated with beauty. Microscopes reveal that what’s true of plants in our everyday experience is also true of their micro-structure. Things that are invisible to the naked eye turn out to be stunningly beautiful. Join Colin Salter, author of Science is Beautiful: Botanical Life and botanist Dr Louis Ronse De Craene for a journey into the inner workings of plants.
Presented by Royal Botanic Garden Edinburgh

THE SCIENCE OF COLD WATER SWIMMING

PLEASANCE | LOMOND ROOM
2PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5
Taking a dive into chilly waters has become increasingly popular across the UK. Intrepid Scottish wild swimmer Calum Maclean hosts a panel including anaesthetist and researcher into the therapeutic benefits of cold water swimming Dr Mark Harper, thermal physiology expert Dr Clare Eglinton and Adrian Mayhew of Surf Life Saving GB to discover the science behind claims that an icy dip can help improve your physical and mental health, what happens to your body in cold water and how to assess conditions for a safe outdoor swim.

TENTACULAR RESONANCES

SUMMERHALL | ASCUS LAB
2PM AND 6PM | 5 HOURS | £15
Artist Louise Mackenzie uses sound and new media to explore our entangled relationship with landscape and the natural world. Work with Louise and her team to create and record DNA poems that will be used to generate soundscapes for an interactive installation. This venue is accessible by 29 steps.
Presented by Summerhall and ASCUS Lab
Image: Louise Mackenzie

THE NAKED SCIENTISTS LIVE PODCAST

PLEASANCE | PLEASANCE THEATRE
3PM | 1 HOUR | £8.50/£6.50/#SCIFIVE £5
The Naked Scientists, one of the world’s most popular science podcasts, is exploring science, technology and medicine. Come along for your fix of science stories and have your most puzzling questions answered by the (fully clothed!) Naked Scientists live radio show.

COSMIC BEAUTY, POETRY & SCIENCE

ROYAL SOCIETY OF EDINBURGH
10AM–8PM | MOMENTS IN TIME
Celebrating the publication of their book Our Big Braw Cosmos, join Astronomer Royal for Scotland Prof John C Brown and eminent Lallans poet Rab Wilson for a session of poetry and an exploration of astronomy, cosmic beauty and science to a backdrop of superb cosmic imagery.
DISCUSSION

THE BUZZ ABOUT GM INSECTS

In Scotland the discussion around genetic modification (GM) has come to a head for crops, but what about other living things? GM insects are changing the way we look at public health and could contribute to large-scale changes to our world. Find out more about these modified insects and how, over time, they may wipe out infectious diseases altogether with Grey Frandsen, CEO of Oxitec, creators of the Friendly™ Mosquitoes, Prof Luke Alphey of the Pirbright Institute and Prof Helen Sang of the Roslin Institute.

Supported by

BRITISH ECOLOGICAL SOCIETY

GENE MACHINE

DISCUSSION

WELCOME TO TECH TOWN

IDEAS ON THE EDGE

Plea...
A VAST AND MAJESTIC, GLACIERS LOCK UP 10% OF THE WORLD’S FRESHWATER. THESE GREAT BODIES OF ICE PLAY AN IMPORTANT PART IN THE EARTH’S DEVELOPMENT, CARVING LANDSCAPES, INFLUENCING CLIMATE AND AFFECTING GLOBAL SEA LEVEL.

Glacial geomorphologist Prof David Evans considers how glaciers and ice sheets have shaped our planet and the role they play today.

Presented by Oxford University Press

**WHERE IT CAME FROM**

The world wide web: where it came from

**PLEASANCE | CABARET BAR**

1PM | HOUR | £6/#SCIFIVE £5

Generally accepted as the greatest innovation in human communication, the world wide web’s original concepts were developed by pioneers in the 1960s and brought to market in 1980s at the same time the internet became publicly available. Join Ian Ritchie, founder of OWL, who helped pioneer the world’s first Hypertext product for the delivery of documents intended for the computer screen, to hear about his journey on the web.

Presented by Summerhall and ASCUS Lab

Image: Aurelie Fontan

**THE CONSOLATIONS OF PHYSICS**

Where the hell is my hoverboard?

**PLEASANCE | PLEASANCE THEATRE**

5.30PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5

If you’ve seen films like Back to the Future or Blade Runner you might be wondering why we aren’t all zipping around on hoverboards or getting stuck in flying traffic jams. We’ve invited a panel of experts and enthusiasts, including robotics researcher James Garforth, future-tech enthusiast and journalist Dave Hall and engineering researcher Dr Adam Stokes, to discuss where technology is at and what hurdles we still have to overcome before we can live out our sci-fi dreams. There will also be the opportunity to taste some 3D printed food, courtesy of Cambridge company Nu Food.

Presented by Hodder and Stoughton

Image: Julie Mcintyre

**SONGS FOR SCIENCE EDUCATION**

Songs for science education

**PLEASANCE | LOMOND ROOM**

5.30PM | 1 HOUR | £8.50/£6.50/#SCIFIVE £5

In a humorous and song-studded talk, science troubadour Jonny Berliner explains how he uses the art of songwriting to make science accessible and entertaining for all. His unique brand of science comedy has helped Berliner appear alongside some of the world’s leading science communicators, become a science teacher, education researcher and a TEDx presenting advocate for using songs to educate.

Presented by Hodder and Stoughton

Image: Julie Mcintyre

**MICROFIBRES, MICROORGANISMS AND DESIGN**

Microfibres, microorganisms and design

**SUMMERHALL | ASCUS LAB**

2PM AND 6PM | 3 HOURS | £15

Designer Aurelie Fontan uses microbiology and scientific imagery to inform her design process, sometimes using living organisms to create textiles. Join the conversation about fashion and sustainability, capture your own scientific imagery and explore how Kombucha, often more well known as a fermented drink, can be transformed into wearable fashion.

Presented by Summerhall and ASCUS Lab

Image: Aurelie Fontan

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Image: Aurelie Fontan

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Songs for science education

**PLEASANCE | PLEASANCE THEATRE**

5.30PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5

In an age where uncertainty and division is rife, Tim Radford, former science editor of The Guardian, turns to the wonders of the Universe for consolation. Guiding us through the vast unknown from a tiny particle to the grand marvels of space, this event is perfect for space fanatics and meaning of life explorers.

Chaired by writer and science communicator, Hazel Lambert.

Presented by Hodder and Stoughton

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Chaired by writer and science communicator, Hazel Lambert.

Presented by Hodder and Stoughton

Image: Julie Mcintyre
**DIAGNOSING WITH DATA**

Every time you visit the doctor or hospital you generate medical data. For Edinburgh BioQuarter, a leading health and science campus focusing on modern health care, ‘big data’ is essential in exploring modern health care. Join Chair of Cardiology and Consultant Cardiologist Prof Nicholas Mills, ethics of medical research expert Dr Sarah Chan and Dr Angus Ferguson from the Public Benefit and Privacy Panel for Health and Social Care, as we discuss digital healthcare data and its future.

**THE SCIENCE OF SIN**

It’s a hard battle to fight our temptations. But where do these urges come from? Exploring the themes in his new book, *The Science of Sin*, neurobiologist, TV presenter and podcaster Dr Jack Lewis combines the latest neuroscience research and the seven deadly sins to look at the science behind why we are constantly tempted to do the things we know aren’t good for us. Lewis suggests strategies to help us better manage our impulses in order to improve our health, our happiness and our productivity.

**OCEAN POWER**

What’s the deal with ocean power? With the UK poised to be a world leader in the field, industry experts Beth Dickens, Taylor McKenzie, Cameron McNatt and Neil Kermode, discuss tidal, wave and offshore wind power. Hosted by comedian Cerys Bradley.

**HERE COMES THE SUN**

Edinburgh and Glasgow have been dubbed the least sunny large cities in the world. Join leading geneticist and author Prof Steve Jones (who spent almost a decade in Edinburgh) to hear about the good, the bad and the possibly deadly results of our grey weather and why we should increase our exposure to sunlight when we can. Does our lack of sunshine impact our liability to rickets, multiple sclerosis or even cancer?

**THE SCIENCE OF SIN**

Presented by Bloomsbury Publishing

**WOMEN IN**

We are proud to champion the achievements of women in science and science communication, and strive for a balanced representation of gender in our programming.

Often considered male dominated industries, women are working, growing and thriving in STEM roles. From celebrating the actions of the Edinburgh Seven (p.44), an inspiring group of women who broke through barriers to become the first to study medicine in the UK, to investigating world issues with female industry-leaders like Christiana Figueres (p.34), our programme strives to inspire, encourage and educate women and girls of all ages about the opportunities available to them within STEM industries.

So if you’re looking for inspiration, look no further than this hand-picked selection of events. The *Gendered Brain* (p.44) gives us insight into the biological differences and similarities between the sexes; discover the pioneers who inspired *The Untold Stories of Women in Engineering* (p.45); and learn of the trials, tribulations and successes of *Being a Woman in Science* (p.53).

Make sure you visit Pleasance Courtyard to explore *Moments in Time* (p.13) and learn of the Scottish scientific milestones through history including landmark contributions from women. And to top off a female-led journey, the Royal Society of Edinburgh is *Celebrating Women in Science* all Festival long (p.33).
**The Happy Brain**

Dr Dean Burnett investigates the science of happiness, or whether such a thing even exists. What causes happiness? Is it your brain—a mere concoction of chemicals, or network of neurons? Is it in fact your gut? (Spoiler alert: yes. Sort of.) Burnett offers up a uniquely entertaining insight into what it means to be human.

Presented by Faber and Faber

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**When the Dogs Don’t Bark: Forensic Science at Work**

Neuroscientist and comic Dr Dean Burnett investigates the science of happiness, or whether such a thing even exists. What causes happiness? Is it your brain—a mere concoction of chemicals, or network of neurons? Is it in fact your gut? (Spoiler alert: yes. Sort of.) Burnett offers up a uniquely entertaining insight into what it means to be human.

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**The Festival City**

Edinburgh is known as ‘the world’s leading festival city’ and many cities around the globe are designated or branded as festival cities through their significant provision of cultural events. This panel discussion attempts to unpack the meaning of the festival city, beyond the brand; and in doing so asks what are the physical and symbolic frontiers of a festival city in the 21st century?

Presented by Edinburgh Napier University

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**The Future of Fertility**

It is becoming more common to have children later in life, so the need to understand human fertility is more and more important. Join experts Dr Berna Sozen, University of Cambridge researcher whose team published a paper on the development of artificial mouse embryos, reproductive biologist Prof Evelyn Telfer and Prof Alison Murdoch, former chair of the British Fertility Society, as they examine the challenges and breakthroughs of fertility research.

Supported by Marks & Clerk

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**Accept/Decline: Keeping Children Safe Online**

Twenty years ago we couldn’t use a landline phone and the internet at the same time. Now we have endless internet access and with the tap of a touch screen children are exposed to it all. Join Prof Sonia Livingstone, children’s digital rights expert and leader of the Global Kids Online project, as she discusses online safety; and head of the Developing Resilience against Online Grooming Project Prof Nuria Lorenzo-Dus as she and her team reveal some of the regular phrases used by online predators and demonstrate new software being developed to identify them. Hosted by Children in Scotland’s Emma Rogan.

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**Synthetic Biology**

Synthetic biology affects fields of science as diverse as drug manufacture, biofuel production, tackling pollution and medical diagnostics. It may even make it possible for us to create new life from non-living materials. Experimental anatomist Prof Jamie Davies discusses the considerable controversies the opportunities that this fast growing field of research brings.

Presented by Oxford University Press

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**The Science of Gin and Tonic**

Join Pickering’s Gin co-founder Matt Gammell to learn the science behind creating the perfect gin and tonic! Experience an in-depth, fast-paced distillery tour with practical demonstrations along the way. Explore the complex science of distilling and learn about alcohol properties and the different flavour-enhancing and even colour-changing components of tonic. Begin with a Pickering’s gin and tonic in the Royal Dick Pub, as well as sampling the Pickering’s Gin range throughout... all in the name of science, naturally!

Over 18s only.

Presented by Summerhall Distillery

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**NoFilter: Urine Trouble!**

How does the kidney filter our blood? What role do salts and sugars in our blood play as they travel through the kidney? Chat to researchers from the University of Edinburgh about kidney health and how factors such as diet, lifestyle and age can affect kidney function, then get hands on with interactive experiments exploring this complex filtration system.

This venue is accessible by 29 steps.

Presented by Summerhall and ASCUSLab

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HYPOnosis, psychosis and the consciousness conundrum

DYNAMIC EARTH
6.30Pm | 1 HOUR | ALSO ON WED 15, THURS 16, WED 17 AND THURS 18 APRIL | £10
Sit back and relax for a 360° immersive extravaganza. The Planets 360° is a re-imagining of British composer Gustav Holst’s The Planets orchestral suite. It uses the awe-inspiring Fulldome format to create a sonically driven and immersive experience. The show aims to bring new audiences to the dome by fusing art, music and science into a 360° spectacle. Pre-recorded new music by Philharmonia Orchestra.

IN OUR HANDS:
SEEDING CHANGE

SUMMERHALL | RED LECTURE THEATRE
7PM | 3 HOURS | £3
In Our Hands is the story of the farmers who, through hope, hard graft and sheer bloody-mindedness are refusing to be victims of history. This one-hour documentary takes you on a journey across the fields of Britain, past orchards of forgotten fruit and through fields of ancient grains. We explore innovations bringing back the ‘culture’ to ‘agriculture’ and the flavour to the tomato. Followed by a Q and A session and locally sourced food offerings. This venue is undergoing access improvements, contact the venue for up-to-date information.

DESIGN: THE FRONTIERS OF ART AND SCIENCE

THE PATRICK GEDDES CENTRE
7PM | 90 MINS | £8.50/£6.50
From the innovation of early man to cutting-edge design solutions, we present a swift series of short, punchy talks from a panel of academics, curators and industry experts that will guide us through the frontiers of art and science.

ROBIN INCE: I’M A JOKE AND SO ARE YOU

PLEASANCE | PLEASANCE THEATRE
8PM | 60 MINS | £12/£10/#SCIFIVE £5
Robin Ince, comedian and host of BBC Radio 4’s The Infinite Monkey Cage, explores what the birth, behaviour, anxiety and storytelling of comedians may tell us about all humans. Through journeys with geneticists, neuroscientists and therapists and via brain scans, ECGs and IQ tests, Ince discusses what showing off for a living has helped him learn about what it is to be human and how best to cope with that situation.

LAB OF THE LUDICROUS

PLEASANCE | CABARET BAR
8PM | 90MINS | £8.50/£6.50/#SCIFIVE £5
Stand-up scientist Dr Rob Pyatt returns with an all new tour of the strangest science studies ever conducted! This interactive discussion of bizarre studies will demystify scientific methods and put you at the heart of a research experiment. Expect laughter, conversation, hands-on experiments and Weird Science!
**ONLINE BOOKING:** SCIENCEFESTIVAL.co.uk  
**BOOKING HOTLINE:** 0131 226 0005

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**Festival Events**

**ONGOING EXHIBITIONS**

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<th>Time</th>
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<td>9AM–5PM</td>
<td>CELEBRATING WOMEN IN SCIENCE NATIONAL MUSEUM OF SCOTLAND</td>
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<td>10AM–5PM</td>
<td>MICROSCOPES: NATURE REVEALED NATIONAL MUSEUM OF SCOTLAND</td>
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<td>11AM–6PM</td>
<td>METAMORPHOSIS SUMMERHALL</td>
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<td>10AM–5PM</td>
<td>BUILD AND BREAK NATIONAL MUSEUM OF SCOTLAND</td>
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<tr>
<td>10AM–5PM</td>
<td>SCIENCE OF MOUNTAINEERING NATIONAL MUSEUM OF SCOTLAND</td>
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**DISCUSSION**

**A VERY SHORT INTRODUCTION TO... DEPRESSION**

**PEASEANCE | CABARET BAR**

1PM | 1 HOUR | £6/£5/SCIFIVE £5

Consultant psychiatrist Dr Mary Jane Tacchi and professor of psychological medicine Jan Scott present a history of depression and bipolar disorder and explain how they are experienced and understood today. They examine the controversies of diagnosis and treatment and discuss how mood disorders can influence creativity.

Presented by Oxford University Press

**GENETICS AND THE MOVIES**

**PEASEANCE | CABARET BAR**

5.30PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5

What can Harry Potter teach us about inheritance? Would a clone of Arnold Schwarzenegger look, act and beat up bad guys exactly like the original? Can genetics explain how a Jedi uses the Force? Clinical molecular geneticist Dr Rob Pyatt explores the frontiers of genetic technology through our favourite movie trailers.

**INSIDE GOOGLE TRANSLATE**

**PEASEANCE | LOMOND ROOM**

5.30PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5

Google Translate can interpret over one hundred human languages, but not always very well. Will it ever be able to translate poetry? Computer language expert Adam Lopez takes us inside the multilingual site to see how it works, with activity and discussion spanning language, creativity, and silicon brains.

Presented by The University of Edinburgh

**THE EDINBURGH SEVEN**

**NATIONAL MUSEUM OF SCOTLAND | AUDITORIUM**

5.30PM | 90 MINS | FREE

The Edinburgh Seven were an inspiring group of women who broke through barriers to become the first to study medicine in the UK. For the first annual Dr Elsie Inglis lecture by Edinburgh and the Lothians Health Foundation, we welcome inspirational women who are smashing through barriers. Hear tales of doctoring in the Antarctic, front-line medical treatment and surgical adventures from women pushing to the front of science history.

Supported by Edinburgh & Lothians Health Foundation

**THE SCIENCE OF MOUNTAINEERING**

**PEASEANCE | PEASEANCE THEATRE**

5.30PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5

A century ago, extreme weather conditions made mountaineering a dangerous game for the most ambitious thrill seekers. Thanks to advances in technology and medicine, even Everest has been conquered thousands of times. Alongside the Search and Rescue Aerial Association, which uses drones to aid in mountain rescue, we take a look at the modern mountaineering landscape and ask: has the edge been taken off exploration?

**SCIENCE THEATRE**

**SCRATCH NIGHT**

**SCOTTISH STORYTELLING CENTRE**

NETHEROB THEATRE

6.30PM | 3 HOURS | £5

Join us for a science theatre scratch night! This unique event is part of Science in the Spotlight, a project which brings together the wonder of theatre with the explosive world of science communication. Experience an exciting programme of short scratch performances, showcasing short excerpts of new works which explore a range of themes. A special evening of theatre in the making where you’ll be inspired and intrigued by how science and theatre unite.

**THE GENDERED BRAIN**

**NATIONAL MUSEUM OF SCOTLAND | AUDITORIUM**

8PM | 1 HOUR | £8.50/£6.50/#SCIFIVE £5

Do you have a female or a male brain? Or is that the wrong question? Exploring centuries of sexism, neuroscientist Prof Gina Rippon shows how we arrived at the idea of an inferior, female brain and how cutting-edge breakthroughs in neuroscience can liberate us from this outdated understanding.

Presented by Penguin Random House

---

**ADVANTAGE PLAY**

**SUMMERHALL | ASCUS LAB**

2PM AND 6PM | 3 HOURS | £15

Explore what makes your ticker tick with this unique sensory and hands-on workshop. Join researchers from the University of Edinburgh to peer inside your own heart as it contracts, visualise the electrical impulses that rush through with every beat and see your own cells glow down a microscope using a fluorescence microscopy technique. Play with our science tools including ECG, ultrasound and stethoscopes and learn more about this tireless workhorse in all of us! This venue is accessible by 29 steps.

Presented by Summerhall and ASCUS Lab

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**WHAT MAKES YOUR Ticker Ticker?**

**WINNERS FROM THE LOSERS IS NEW TECHNOLOGY.**

Data, the one thing that might distinguish the sport throughout history. From novel materials and discuss how mood disorders can influence the controversies of diagnosis and treatment experienced and understood today. They examine bipolar disorder and explain how they are.

**INTRODUCTION TO...**

**BIOPHYSICS:**

- **ELECTROCARDIOGRAPHY (ECG)**
- **ULTRASOUND**
- **STETHOSCOPE**

**SCIENCE TOY STUDY**

- **MAGNETISATION**
- **FLUORESCENCE MICROSCOPY**

**SHRINK YOUR HEART AND SENSE:**

- **BIOPHYSICS**
- **MOLECULAR BIOLOGY**

**EXPLORE WHAT MAKES YOUR Ticker Ticker?**

Presented by Birlinn

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**WORKSHOP**

**INSIDE GOOGLE TRANSLATE**

**Google Translate can interpret over one hundred human languages, but not always very well. Will it ever be able to translate poetry? Computer language expert Adam Lopez takes us inside the multilingual site to see how it works, with activity and discussion spanning language, creativity, and silicon brains.**

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Presented by Summerhall and ASCUS Lab

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**WHAT MAKES YOUR Ticker Ticker?**

**WINNERS FROM THE LOSERS IS NEW TECHNOLOGY.**

Data, the one thing that might distinguish the sport throughout history. From novel materials and discuss how mood disorders can influence the controversies of diagnosis and treatment experienced and understood today. They examine bipolar disorder and explain how they are.

**INTRODUCTION TO...**

**BIOPHYSICS:**

- **ELECTROCARDIOGRAPHY (ECG)**
- **ULTRASOUND**
- **STETHOSCOPE**

**SCIENCE TOY STUDY**

- **MAGNETISATION**
- **FLUORESCENCE MICROSCOPY**

**SHRINK YOUR HEART AND SENSE:**

- **BIOPHYSICS**
- **MOLECULAR BIOLOGY**

**EXPLORE WHAT MAKES YOUR Ticker Ticker?**

Presented by Birlinn

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**WORKSHOP**

**INSIDE GOOGLE TRANSLATE**

**Google Translate can interpret over one hundred human languages, but not always very well. Will it ever be able to translate poetry? Computer language expert Adam Lopez takes us inside the multilingual site to see how it works, with activity and discussion spanning language, creativity, and silicon brains.**

Presented by The University of Edinburgh

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**SCIENCE THEATRE SCRATCH NIGHT**

**SCOTTISH STORYTELLING CENTRE**

**NETHEROB THEATRE**

**6.30PM | 3 HOURS | £5**

Join us for a science theatre scratch night! This unique event is part of Science in the Spotlight, a project which brings together the wonder of theatre with the explosive world of science communication. Experience an exciting programme of short scratch performances, showcasing short excerpts of new works which explore a range of themes. A special evening of theatre in the making where you’ll be inspired and intrigued by how science and theatre unite.

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**THE GENDERED BRAIN**

**NATIONAL MUSEUM OF SCOTLAND | AUDITORIUM**

**8PM | 1 HOUR | £8.50/£6.50/#SCIFIVE £5**

Do you have a female or a male brain? Or is that the wrong question? Exploring centuries of sexism, neuroscientist Prof Gina Rippon shows how we arrived at the idea of an inferior, female brain and how cutting-edge breakthroughs in neuroscience can liberate us from this outdated understanding.

Presented by Penguin Random House
Sacha Dench talks to Dr Jon Copley, expert to become vegetarians? Should we frack? Or stop using air travel? Renowned sustainability expert Prof Mike Berners-Lee has crunched the numbers and plots a course of action to help humanity thrive on this – our only – planet. After all, There Is No Planet B.

Presented by Cambridge University Press

There Is No Planet B

**DISCUSSION**

**DISCUSSION**

**DISCUSSION**

**P.43**

**P.42**

**P.35**

Twitter currently has around 335 million active users. And with each user comes data. Twitter user data has been used to map public health, watch responses to natural disasters and even pre-emptively spot depressive behaviour. Our panel, including Twitter research expert Dr Wasim Amhed and Deputy Director of The Social Data Science Lab Dr Luke Sloan, takes a long hard look at social media, analysing sites live to show how much metadata is available and what it can be used for.

Presented by Edinburgh Geological Society

**SPOTLIGHT ON:**

**MICROSCOPES**

**DISCUSSION**

**DISCUSSION**

**DISCUSSION**

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**P.42**

**P.35**

A very short introduction to... infinity.

Infinity is an intriguing topic, with connections to religion, philosophy, metaphysics, logic and physics as well as mathematics. Cosmologists consider sweeping questions about whether space and time are infinite. Philosophers and mathematicians have posed numerous paradoxes about infinity and infinitesimals. Prof Ian Stewart discusses some of the major problems and insights arising from the concept of infinity.

Presented by Oxford University Press

**OUT OF REACH**

**DISCUSSION**

**DISCUSSION**

**DISCUSSION**

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**P.42**

**P.35**

While scientists, adventurers and indigenous people have explored much of our planet, there are still places that remain difficult to reach and study. Our panel, including deep-sea biologist and author of Ask An Ocean Explorer Dr Jon Copley and ‘the human swan’ Sacha Dench, discusses some of these places that were formerly ‘out of reach’, what drives them to go there and what we can learn from them.

Presented by Canongate Books

**THE SCIENCE BEHIND HUMANITY’S DARK SIDE**

**DISCUSSION**

**DISCUSSION**

**DISCUSSION**

**P.43**

**P.42**

**P.35**

Why do we think and do evil? Psychologist Dr Julia Shaw unlocks the intricacies of criminal psychology, drawing together science, psychology and philosophy. How similar is your brain to a psychopath’s? How many people have murder fantasies? Shaw gives us insight into the evils of the world, ourselves and our Google search history.

Presented by Canongate Books

**THE UNTOLD STORIES OF WOMEN IN ENGINEERING**

**DISCUSSION**

**DISCUSSION**

**DISCUSSION**

**P.43**

**P.42**

**P.35**

How has the microscope changed from the 18th century to the present day? Join curator Julie Gibb to examine the makers and users of an instrument that has been fundamental in improving our understanding of the natural world. Presented by National Museums Scotland

Presented by The Women’s Engineering Society

**DEEP TIME WALK**

**ACTIVITY**

**ACTIVITY**

**ACTIVITY**

**P.43**

**P.42**

**P.35**

Join the 4.6km Deep Time Walk to travel across Earth’s 4.6 billion year timeline at a rate of one million years per metre. Starting at the creation of Earth, Deep Time Walk covers significant events in history, including the formation of the Moon, plate tectonics, the early evolution of life, dinosaurs and much more. Please dress appropriately for this outdoor event including sensible footwear and waterproof clothing. Download the award-winning Deep Time Walk app at deeptimewalk.org.

Presented by Edinburgh Geological Society

**ONGOING EXHIBITIONS**

**ROYAL BOTANIC GARDEN EDINBURGH**

**10AM–5PM | BUILD AND BREAK**

**10AM–5PM | ROBOTS EXHIBITION**

**10AM–5PM | MICROSCOPES: NATURE REVEALED NATIONAL MUSEUM OF SCOTLAND**

**10AM–5PM | FOOD FOREVER ROYAL BOTANIC GARDEN EDINBURGH**

**10AM–5PM | CHARLES PIAZZI SMYTH 200 CAITTON HILL**

**10AM–5PM | BOTS EXHIBITION NATIONAL MUSEUM OF SCOTLAND**

**10AM–5PM | MEMORIES OF SCOTLAND NATIONAL MUSEUM OF SCOTLAND**

**10AM–5PM | BUILD AND BREAK NATIONAL MUSEUM OF SCOTLAND**

**10AM–5PM | METAMORPHOSIS SUMMERHALL**

**BOOKING HOTLINE: 0131 226 0005**

**ONLINE BOOKING:**

**SCIENCEFESTIVAL.co.uk**
**THROUGH ANIMALS**

**DESIGNING THE DEVELOPING WORLD**

**SUGAR AND SPIKES: CHANGING APPROACHES TO DIABETES CARE**

**WILD FRONTIER**

**THE CITIES OF THE FUTURE**

**GOOD FOR YOUR GUTS**

**TIME FOR A NEW ECONOMIC MODEL?**

**STAR WARS? THE LAW OF ARMED CONFLICT IN SPACE**

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**THROUGH ANIMALS**

**ONLINE BOOKING:** SCIENCEFESTIVAL.co.uk  
**BOOKING HOTLINE:** 0131 226 0005  
**Festival Events**

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**ONLINE BOOKING:** SCIENCEFESTIVAL.co.uk  
**BOOKING HOTLINE:** 0131 226 0005  
**Festival Events**

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**THROUGH ANIMALS**

**DISCUSSION**

**PLEASANCE | QUAKER STUDIO**

5.30PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5

What do we know about how animals think and about ways of explaining their behaviour? Over the last century, cognition research has revealed a variety of advanced mental abilities in animals. In this panel, experts in philosophy, genetics and anthropology discuss the frontiers of animal research in relation to human self-understanding. Could we be close to a new agreement on the relationship between us and our furred or feathered friends?

Presented by The University of Edinburgh

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**DESIGNING THE DEVELOPING WORLD**

**DISCUSSION**

**NATIONAL MUSEUM OF SCOTLAND | AUDITORIUM**

5.30PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5

From rural sanitation to flood defence, scientists and engineers are still finding innovative solutions for the developing world. Join experts including researcher in earthquake-resistant foundations Dr John McDougall, technology entrepreneur Tim Harper and Chief Executive of Engineers Without Borders Katie Cresswell-Maynard, to follow the journey of new designs from scientific concept to implementation and helping the people who need it most.

Presented by The Royal Botanic Garden Edinburgh

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**SUGAR AND SPIKES: CHANGING APPROACHES TO DIABETES CARE**

**DISCUSSION**

**ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH**

6PM | 90 MINS | £5

During the last 100 years, the treatment of diabetes has undergone radical transformation, with an increasing amount of self-management of the disease. Medical historian Dr Martin Moore explores how medical thought, patient experience and everyday practice of self-management were influenced by broader structures in British politics, culture and society. Diabetes expert Prof Mark Strachan continues the discussion with the latest cutting-edge research in Edinburgh.

Presented by Royal College of Physicians of Edinburgh

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**WILD FRONTIER**

**DISCUSSION**

**ROYAL BOTANIC GARDEN EDINBURGH**

LECTURE THEATRE

6PM | 1 HOUR | £5

The wild plants related to food crops are arguably the most important on the planet. They hold the genetic key to tackling the growing number of threats to our food supply and can do so in a much more environmentally friendly way. Join botanist Dr Tiina Sarkinen on the wild frontier of food that is bringing botanists and crop scientists together in pursuit of sustainable farming solutions based on biology rather than chemistry.

Presented by The Royal Botanic Garden Edinburgh

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**THE CITIES OF THE FUTURE**

**DISCUSSION**

**THE PATRICK GEDDES CENTRE**

7PM | 90 MINS | £8.50/£6.50

The continued growth of urban populations and added pressures present sustainability challenges for our future cities. Join a panel of experts, including Planning Aid Scotland (PAS), academics, engineers and technology experts to explore what lies ahead for humanity.

Presented by The Patrick Geddes Centre

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**GOOD FOR YOUR GUTS**

**DISCUSSION**

**SUMMERHALL | RED LECTURE THEATRE**

7.30PM | 90 MINS | £5

A nature film with a difference, Becoming Animal traces how we sense the ‘more than human’ world. An inspired collaboration between filmmakers Emma Davie and Peter Mettler, environmental philosopher David Abram journeys to Grand Teton National Park in North America to explore how the written word and technology has affected how we see. Preceded by the short film Plastic Man by Yulia Kovanova. This venue is undergoing access improvements, contact the venue for up-to-date information.

Presented by Summerhall

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**TIME FOR A NEW ECONOMIC MODEL?**

**DISCUSSION**

**PLEASANCE | PLEASANCE THEATRE**

8PM | 1 HOUR | £8.50/£6.50/#SCIFIVE £5

Imagine if we redesigned the economy so that it took insights from living systems. This economic model would concentrate on creating effective flows of resources and information, on regenerating the biosphere, of turning waste into food. This is the promise of a circular economy: an economic model that’s restorative and regenerative by design. Discover why governments, major corporates, universities and citizen groups are all excited about a circular economy.

Presented by the Ellen McArthur Foundation

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**STAR WARS? THE LAW OF ARMED CONFLICT IN SPACE**

**DISCUSSION**

**PLEASANCE | LOMOND ROOM**

8PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5

Wars and conflict have been the cause of many dark years on Earth – but how would they affect space? Detonating bombs and using force on Earth is regulated by the law of armed conflict, but the use of weapons in space is supposedly forbidden. Get yourself into the legal mindset in this interactive event and argue the best way to regulate war in space – if at all!

Presented by Edinburgh Napier University

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**THURSDAY 11 APRIL CONTINUED**

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DISCUSSION

SPECIAL EVENT

V&A Dundee is a building like no other. The science behind medical cannabis and its applications in treating exceptional needs will be discussed in a panel including pharmacologist and co-founder of the International Cannabinoid Research Society Prof Roger Pertwee and specialist clinicians who have been able to legally prescribe cannabis-derived products to patients with an exceptional clinical need.

Presented by Oxford University Press

A SCOTTISH ICON

ARUP LECTURE DESIGNING A SCOTTISH ICON

V&A Dundee is a building like no other. The realisation of Kengo Kuma’s bold vision was achieved through the creativity and dedication of a diversely skilled team of designers, engineers and specialists. Dan Clipsom, project structural engineer, and Maurizio Mucciola, project architect, explore how our engineers and designers overcame the challenges presented by this building and to understand what makes it so special as a ‘living room for the city’ of Dundee.

Supported by

TO BOLDLY GO... SHORELINE OF INFINITY’S EVENT HORIZON

Shoreline of Infinity’s Event Horizon returns with a new mix of music, prose, drama, poetry and discussion. We ask whether science fiction can help us respond to the advances in science and technology and guide us to a glorious future or will it lead us to disaster and dystopia? Join in the discussion with a panel including science fiction writer Ken MacLeod and astrophysicist Dr Jarita Holbrook.

Presented by The University of Edinburgh

ARE WE TOO CLEAN?

ARUP LECTURE DESIGNING A SCOTTISH ICON

How clean is too clean? Host Hana Ayoob of The Cloaca Monologues joins immunologist Dr Charu Chopra and the rest of our panel to discuss how obsessive cleanliness might be harmful. Today they talk about the emergence of the compulsion to clean and whether we can, or should, be doing something to stop it.

Supported by

FROM HANDWARMERS TO HEATING HOMES: COMBATING FUEL POVERTY

Highly successful academic-industrial collaboration has resulted in the development of heat batteries that reduce emissions of carbon dioxide and the levels of fuel poverty in social housing. Chaired by Dr Siobhán Jordan from Interface, Prof Colin Pulham, Head of the School of Chemistry at the University of Edinburgh and Andrew Bissell, CEO of Sunamp, will present their work.

Presented by The University of Edinburgh

A VERY SHORT INTRODUCTION TO CONSCIOUSNESS

Consciousness remains a hot topic. What creates our identity? Do we really have free will? Could consciousness itself be an illusion? From the construction of self in the brain to mechanisms of attention, Dr Susan Blackmore clarifies the potentially confusing arguments and outlines the amazing pace of discoveries in neuroscience.

Presented by Oxford University Press

THE MAGICIANS

In 1965, Edinburgh resident Peter Higgs predicted a new fundamental particle and almost 40 years later the Higgs particle was found at the Large Hadron Collider. This magic of science – that things predicted by mathematical formulae actually exist – is so miraculous that even scientists themselves scarcely believe it. Today, best-selling science writer Marcus Chown discusses the ‘magicians’ who have predicted the existence of invisible waves that course through the air, antimatter, black holes and more.

Supported by

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ONLINE BOOKING: SCIENCEFESTIVAL.co.uk             BOOKING HOTLINE: 0131 226 0005
CONTINUES...
SOUNDS OF SPACE

**DISCUSSION**

**PLEASANCE | CABARET BAR**

**5.30PM | 90 MINS | £12/£10/#SCIFIVE £5**

Chaired by science fiction sound nerd and Radio 4 space show writer and presenter Helen Keen, this panel explores how distant worlds and undiscovered life forms sound in the movies and in reality. Take a look at the huge contribution made by soundscapes to the science fiction genre – from classic 1950’s B movies to modern day masterpieces like Close Encounters of the Third Kind, Arrival and Under the Skin. We’ll demonstrate how uncanny sounds and unnerving music is created.

**SHORE: HOW WE SEE THE SEA DISCUSSION**

**DISCUSSION**

**DYNAMIC EARTH | SHOWDOME**

**6PM | 2 HOURS | £5/£3**

Join us to watch two films by Scotland-based filmmakers Margaret Salmon and Ed Webb-Ingall that inspire, explore and share coastal communities’ responses to Marine Protected Areas, as part of the Shore: How We See the Sea tour. There will be an audience discussion after the films with the filmmakers and scientists from project partner SAMS, the Scottish Association for Marine Science, followed by a celebratory reception. Shore: How We See the Sea is curated by Invisible Dust and supported by Creative Scotland and the Wellcome Trust.

Presented by Dynamic Earth

**EGG BY PAPER DOLL MILITIA**

**SHOW**

**SUMMERHALL | DEMONSTRATION ROOM**

**7.30PM | ON UNTIL SUN 14 APRIL | 65 MINS | £14/£12**

Weaving together personal testimony, live original music and stunning aerial artistry, EGG takes you on a highly visual exploration of female fertility, sexuality and choice, following the true story of a woman who gave her eggs to her friend to have a child. After a sell-out Fringe run in 2018, EGG returns for a limited Science Festival run.

Presented by Summerhall

THE CLOACA MONOLOGUES

**DISCUSSION**

**PLEASANCE | PLEASANCE THEATRE**

**8PM | 1 HOUR | £8.50/£6.50/#SCIFIVE £5**

Science communicator Hana Ayoob, zoologist Adriana Lowe, world fly expert Erica McAlister and science writer Jules Howard discuss one of the latest frontiers in sex – the science of vaginas. Discuss how this crucial piece of female anatomy shapes and moulds the evolution of animal mating strategies, all topped off with a 3D virtual reality tour through a duck’s vagina. This Science Festival world first is not to be missed!

**DANGER OF OBSOLETION**

**DISCUSSION**

**PLEASANCE | LOMOND ROOM**

**8PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5**

VHS, Blu-ray and your beloved flip phone have all had their moment in the spotlight and become obsolete since. As technology advances at faster rates than ever before, experts are looking at ways to counteract the digital die-out. Join our panel of experts including specialist Paul Capel to explore the ideas of Cradle to Cradle design, where the end of a product’s life is considered at the design stage, and other ideas to try and reduce the estimated 1.2 million tonnes of electronic waste produced each year in the UK.

**SPICE OF LIFE**

**DISCUSSION**

**PLEASANCE | LEITH DEPOT**

**AGE 18+**

**8PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5**

Could a turmeric latte be the cure for cancer? Does red wine really prevent dementia? Cancer researcher Prof Karen Brown and host Dr Stuart Farrimond will help you sort the fake claims from the real ones. Put your questions directly to those at the frontline of food science and eat and drink your way through the so-called superfoods. Over 18s only.

**TABOOS TO BE BROKEN**

**DISCUSSION**

**PLEASANCE | CABARET BAR**

**8PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5**

Get under the skin and confront some of the social taboos still affecting the health and wellbeing of many. Comedian Dave Chawner talks about the particular challenges faced by men with eating disorders, Dr Sharron Hinchliff looks at sexual relationships among older generations, Dr Kate Lister ponders our obsession with pubic hair and Chella Quint busts some myths around menstruation.

**PLASTIC ALPHABET**

**DISCUSSION**

**PLEASANCE | QUAKER STUDIO**

**8PM | 90 MINS | £8.50/£6.50/#SCIFIVE £5**

PP, PVC, PET: time to unwrap the language of plastics. Join us for an evening where we shed some light on the plastic mystery with the ‘queen of recycling’ Prof Margaret Bates, and polymer chemistry researcher Prof Michael Shaver. Led by Colin Webster of the Ellen MacArthur Foundation, our panel will take you on a fascinating journey from chemical processing and manufacture through to disposal, talking about how and why this material is designed, used and recycled.
THE MUSICAL BRAIN: HOW MUSIC HELPS DEMENTIA

Presented by The University of Edinburgh

GENERATION SPACE

SPECIAL EVENT

PLEASANCE | UPPER HALL

2PM | 90 MINS | FREE BOOKING REQUIRED

Join the Festival’s Youth Consultation Group as we look to the frontiers we will cross in our lifetimes. We will be coming up with the science that we want to see in the world and the future that we could create through ideas and innovation in science. Get involved in finding the science of the future for Earth, space and the human race. Recommended for ages 12-18 but all ages welcome.

EVERYBODY HURTS

DISCUSSION

NaTionaL Museum of scOTaNd | aUdItorium

12PM | HOUR | £8.50/£6.50/#SCIFIVE £5

Join Playlist for Life and the University of Edinburgh’s Prevent Dementia project to explore how the power of music can help those with dementia. Learn how personally meaningful music - the soundtrack of your life - can restore memory, communication and the ability to recognize songs.

TrackS and SighS

Pleasance | och Hil room

2PM | 2 HOURS | £8.50/£6.50/#SCIFIVE £5

In the spirit of exploration we are bringing wild bushcraft to urban Edinburgh. Join our tracking expert for a fascinating workshop discovering how you can make sense of the signs all around you. Explore the hidden world of elusive animals, learn how to use all your senses and practice tracking in the city’s green spaces. Please dress appropriately for this outdoor event including sensible footwear and waterproof clothing.

uNLOckINg the SECRETS of ouR past

Pleasance | PentaLand room

2PM | 2 HOURS | £8.50/£6.50/#SCIFIVE £5

Presented by The University of Edinburgh

MUSIC HELPS DEMENTIA

Presented by Edinburgh’s Prevent Dementia project to explore how the power of music can help those with dementia. Learn how personally meaningful music - the soundtrack of your life - can restore memory, communication and the ability to recognize songs.

THE MUSICAL BRAIN: HOW MUSIC HELPS DEMENTIA

Presented by The University of Edinburgh

THE EVOLUTION MOTOR SHOW

CASTLE STREET

10AM–4PM | DROP-IN | FREE

Wondering how your next car will sound? Have you heard about electric cars but have no idea for free at the EVOLUTION Motor Show on Castle Street. We will have the very latest in innovative plug-in and electric cars from the likes of BMW, Tesla and more. If two wheels are more your thing, we have electric scooters and even electric push-bikes. Come on down and take a ride!

Presented by PSi ltd

SummerhALL TOURS

TOUR

SUMMERHALL | Meet at Reception

2PM | 1 HOUR | ALSO ON SUN 14, FRI 19 AND SUN 21

APRIL | £5

Take a tour of Summerhall and discover its fascinating history. Did you know that one of the first known occupants of the site was a family run brewery established in the 18th century? The main iconic building we know today housed The Royal Dick School of Veterinary Studies for nearly 100 years. Visit Summerhall’s labs and lecture theatres and learn about the notable alumni who contributed to science around the world. Please note that some rooms within Summerhall are only accessible via stairs so tours will be adapted to the needs of each group.

Presented by Summerhall

UnloCkinG the SECRETS of ouR past

NATIONAL Museum of scOTaNd | aUdItorium

3PM | 1 HOUR | FREE BOOKING REQUIRED

Discuss and explore how science, technology and innovation in archaeology are used to unlock secrets of the past, with the Society of Antiquaries of Scotland’s Fellows Dr Lisa Brown and Dr Alison Sheridan, chaired by science author and broadcaster Prof Jim Al Khalili. Presented by The Society of Antiquaries Scotland

Image: Historic Environment Scotland
The natural world has influenced technology for cyber security. Hosted by fitness writer Dr Paul Patras

Sunfall with Jim Al-Khalili

The natural world has influenced technology for cyber security. Hosted by fitness writer Dr Paul Patras

Health Trackers: Help or Hindrance?

As we settle into the digital age, increasing numbers of people are turning to fitness trackers to tell them about their activity and give nudges to help improve their health. Trackers collect a huge amount of data on us, from our date of birth to our daily movements. Today we ask: could the data be used to improve human health, or is it just a privacy and security risk? Panelists include Beverley Bryant, former director of digital technology for NHS England, Dr Lukasz Piwek, researcher in smart wearables' data, and Dr Paul Patras, lecturer in cyber security. Hosted by fitness writer Nick Harris-Fry.

Designed by Nature

The natural world has influenced technology for cyber security. Hosted by fitness writer Dr Paul Patras

A Science Skeptacular!

Join the Edinburgh Skeptics Society for an evening of science, music, magic, skepticism and comedy to entertain and make you think. Marvel at magician Dave Alnwick, and guffaw with laughter with stand-up comedian and archaeologist, Paul Duncan McGarrity. Add to the mix comedian and skeptic, Carmen D’Cruz alongside research scientist, Dr Alice Howarth and you’ve got an entertaining and informative Saturday-Night Science Skeptacular! Over 18s only.

Unnatural Selection

Fusing together art, science and history, author and illustrator Katrina van Grouw explores selective breeding – the ongoing transformation of animals at the hand of man. Accompanied by her stunning illustrations, van Grouw discusses the evolutionary forces that have shaped wild and domesticated animals alike, paying tribute to the 150th anniversary of Charles Darwin’s The Variation of Animals and Plants under Domestication.

An Evening with the Moon

Discuss your favourite Moon moments to the backdrop of a lunar landscape. Be enchanted by our wondrous Moon in an evening of laid-back lunar activities and celestial cocktails whilst listening to experts in anthropology and popular culture, including popular science writer Philip Ball, and cultural astronomer Daniel Brown, hosted by comedian Susan Morrison. Over 18s only.
why do we now cook our food? Evolutionary ecologist Dr Beth Biller from the Institute for Astronomy, investigates the clouds and chemical compositions of exoplanets and will discuss the possibility of eventually finding signs of life on planets outside of our own solar system.

The discovery of exoplanets outside our solar system has sparked discussion regarding what we know about planetary systems. In this event Dr Beth Biller of the University of Edinburgh’s Institute for Astronomy, investigates the clouds and chemical compositions of exoplanets and will discuss the possibility of eventually finding signs of life on planets outside of our own solar system.

How can we survive the risks inherent to advances in science and technology and thrive? Is human overpopulation the biggest threat to the planet? According to Global Footprint Network, a sustainable population for our planet is between 1.5 and 3 billion by 2050. Our experts, including Director of Population Matters Robin Maynard, human rights researcher and population ethicist Karin Kuhlemann and population statistician Dr Alan Marshall discuss what the future might look like.

Our primate ancestors were vegans and our closest relatives, the great apes, have a largely vegetarian diet. So why have humans moved away from living on a diet of plants alone? How did evolution change our eating habits and why do we now cook our food? Evolutionary ecologist Prof Jonathan Silvertown provides the answers to these and other digestive puzzles.

What will the world look like in 2050? Does science still do more good than harm? Will we build new worlds in space? Astronomer Royal Lord Martin Rees explores some of the themes of his recent book, On the Future: Prospects for Humanity. How can we survive the risks inherent to advances in science and technology and thrive? Lord Rees calls on all of us to join the debate on how to determine a positive vision for humanity, on Earth and beyond.

Presented by Royal Botanic Garden Edinburgh
TREATING PATIENTS AS PEOPLE IN THE NHS

**Discussion**

**Pleasance | Lomond Room**

5.30PM | 90 mins | £8.50/£6.50/#SCIFIVE £5

Whether you’ve experienced the service first hand or you know a loved one who has, the NHS has touched the lives of millions. Yet a flurry of conversation continues to surround the healthcare service with some questioning whether it is fit for purpose. Does the NHS place enough focus on the individual? Throughout this lively debate you will use an electronic voting system to contribute your own views to the discussion.

Presented by Edinburgh Napier University

ENDOMETRIOSIS: THE BLOODY TRUTH

**Discussion**

**Pleasance | Cabaret Bar**

5.30PM | 90 mins | £8.50/£6.50/#SCIFIVE £5

Endometriosis is an incurable disorder that can take years to diagnose and can cause distressing symptoms like chronic pain and infertility. Join this roundtable discussion and extensive Q&A to raise awareness of the condition and the work being done to support patients, improve treatment within the NHS and find new, innovative ways of treating symptoms without multiple surgeries or drugs.

Presented by The University of Edinburgh and Endometriosis UK

TAM DALYELL PRIZE LECTURE

**Discussion**

**Playfair Library**

6PM | 90 mins | FREE BOOKING REQUIRED

The Tam Dalyell Prize for Excellence in Engaging the Public with Science recognises and rewards the University of Edinburgh’s outstanding science communicators. This year’s prize is awarded to Dr Steve Brusatte. Reader in Vertebrate Palaeontology, his research is often profiled in popular press and he is a resident palaeontologist and consultant for the BBC’s Walking With Dinosaurs. Today, Dr Brusatte and his team will share highlights of their dinosaur research.

Presented by The University of Edinburgh

SHOOT FOR THE MOON

**Discussion**

**Pleasance | Pleasance Theatre**

8PM | 1 hour | £12/£10

In celebration of the 50th anniversary of the Apollo 11 Moon landing, join psychologist and author Prof Richard Wiseman in conversation with comedian and broadcaster Helen Keen to investigate the powerful life lessons behind humanity’s greatest achievement. The result of intensive research including interviews with surviving members of the Apollo mission control, today Wiseman uncovers key lessons on teamwork, leadership, persistence, creativity and more, each one a vital part of the mindset for success.

Digital Therapist

**Discussion**

**Pleasance | Lomond Room**

8PM | 90 mins | £8.50/£6.50/#SCIFIVE £5

Could virtual reality treat depression or could a robot companion make you feel better? Our panel, including leading clinical psychologist Prof Daniel Freeman, robotics expert Prof Ruth Aylett and co-developer of the NHS Digital approved Feeling Good: positive mindset app Dr Sheila Ross, explores some of the beneficial effects of technology and how it could be used to help improve our mental health.

BORROWED TIME

**Discussion**

**Pleasance | Cabaret Bar**

8PM | 1 hour | £8.50/£6.50/#SCIFIVE £5

The biggest single risk factor for the diseases of old age is the ageing process itself. Now geroscience (the science of aging) is uncovering common mechanisms that can be manipulated to prevent or delay a host of these crippling conditions to allow us to remain healthy, active and independent deep into old age. Join us in exploring the prospects with Richard Faragher, professor of biogerontology and Sue Armstrong, author of Borrowed Time.

Presented by Bloomsbury Publishing

PLANETS AND PULSATIONS: THE KEPLER AND TESS SPACE MISSIONS

**Discussion**

**Pleasance | Quaker Studio**

8PM | 1 hour | £8.50/£6.50/#SCIFIVE £5

One of the biggest questions humans can ask is, ‘are we alone?’ While we can’t answer that just yet, we are closer than ever before thanks to technological advances. In this discussion about the new research field of Asteroseismology, learn how the Kepler Space Mission found more than 4,000 planets orbiting stars and how the Transiting Exoplanet Survey Satellite (TESS) explores exoplanets close to Earth.

DINE AND DEBATE

**Discussion**

**Pleasance | Upper Hall**

8PM | 2 hours | £30 INCLUDES THREE-COURSE MEAL

In the spirit of the original Oyster Club founded by Adam Smith, Joseph Black and James Hutton, we invite you to discuss some of our most pressing scientific quandaries over supper. Hosted by comedian Susan Morrison with short presentations from experts and a delicious three course meal, you’ll be encouraged to chat about the topics raised around your table – with a little help from our facilitators. No knowledge required – just an appetite for discussion and appreciation of good food and drink. Over 18s only.
BEING A WOMAN IN SCIENCE: CHANGED TIMES?

THE ROYAL SOCIETY OF EDINBURGH
WOLFSN LECTURE THEATRE
6PM | 90 MINS | FREE BOOKING REQUIRED

When so many female scientists have changed our understanding of the world and yet around half the UK population struggles to name a woman in science, questions need to be asked! What attracts women to science, what are their experiences and why are they not more visible?

Join us for a fascinating discussion with current and former Royal Society of Edinburgh (RSE) Presidents, Prof Dame Anne Glover and Prof Dame Jocelyn Bell Burnell and RSE Young Academy of Scotland member Dr Silvia Paracchini as they discuss their personal experiences of being women in science.

Presented by The Royal Society of Edinburgh

COMMUNICATING THE HIDDEN COMMONS

DYNAMIC EARTH | BIOSPHERE
6.30PM | 90 MINS | £8/£5

BBC’s The Power of the Planet presenter Prof Iain Stewart explores the challenges of understanding the underground. The geological subsurface represents one of Earth’s major commons and is a natural resource base for much of the human economy. Hear about the challenges we face in understanding the realm below our feet and managing it more sustainably.

Presented by Dynamic Earth and British Geological Survey

THE FUTURE IS ROBOT

NATIONAL MUSEUM OF SCOTLAND | AUDITORIUM
8PM | 90 MINS | £8.50/£6.50/SCIFIVE £5

What role will robots play in our lives? Join writer, broadcaster and comedian Timandra Harkness to examine how design and programming decisions made today will affect our relationships with robots in the future.

Presented by National Museums Scotland

YOUTH CONSULTATION GROUP

We are back for another year. Building on the success of our involvement with the Edinburgh Science Festival in 2018, we are going above and beyond for our 2019 theme: Frontiers.

We’ve been working on ideas and making decisions that will help the Festival connect with people our age, and assisting in the creative development of future Edinburgh Science Festival activities.

We love coming up with new ideas and fresh perspectives to produce an inclusive and diverse programme of events that can inspire audiences of 12-18 years old.

Check out our special event Generation Space (p.49) to hear the changes we want to see in the world and the science, technology, engineering and mathematics that we think will get us there.

Look out for more information and recommended events at sciencefestival.co.uk/youth-consultation-group and on social media.
A smorgasbord of insightful discussions, delicious dining experiences and special science themed presentations, GastroFest is the treat to suit all tastes.

A mini festival of the science of food and drink, GastroFest showcases the importance of science in our lives in the most delicious way possible: through a series of innovative events exploring the centrality of science to our culinary experience with snacks included!

Cheese lovers unite for the return of Cheeseology 4.0 (p.37), a tutored tasting and flavour explosion; indulge your tastebuds and learn of some spectacular superfoods in Spice of Life (p.48); or create the perfect pastry and light sponge with our The Science of Baking (p.51) special event.

If you’re still hungry it may be time to discover the Secrets of Seafood (p.39) or find some answers while you fill your belly at Dine and Debate (p.52).

And once you’re feeling full and that tummy starts to grumble, find out what’s actually Good for your Guts (p.46) before you eat anything else!

How much of what we do is really governed by reason? Renowned neuroscientist Prof Gareth Leng considers the extent to which one small structure of the neuroendocrine brain, the hypothalamus, influences what we do, how we love and who we are. Discover how the brain is very much at the heart of what makes us human.

Presented by MIT Press
**ST KILDA’S SECRETS COLLECTION TOUR**

**NATIONAL MUSEUMS COLLECTION CENTRE**
10.30AM | 75 mins | £7/£6/£5

From minuscule insects to mighty whales, the National Museums’ Natural Sciences collection documents the incredible diversity of life on Earth. Join curators and conservators to tour selected highlights of this remarkable collection.

Presented by National Museums Scotland

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**THE MOTOR NEURONE DISEASE RESEARCH REVOLUTION**

**NATIONAL MUSEUM OF SCOTLAND | AUDITORIUM**
5.30PM | 90 mins | £8.50/£6.50/£5 SCIFIVE £5

Motor Neurone Disease (MND) is a rapidly progressing terminal neurological illness with an average life expectancy of 20 months from diagnosis. MND has no cure and it can affect anyone at any time. Scotland is leading a research revolution and today charity MND Scotland and researchers at The University of Edinburgh join us to discuss research into MND and showcase how an innovative digital platform allows for collaboration between scientists and patients.

Presented by MND Scotland

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**SOURCING HEALTHY FOOD AS THE WORLD CHANGES**

**ROYAL BOTANIC GARDEN EDINBURGH | LECTURE THEATRE**
6PM | 1 hour | FREE BOOKING REQUIRED

Global demand for food continues to grow and we are more concerned than ever that food should be safe and nutritious. Climate change predictions highlight serious challenges for future food production, but in the meantime agriculture makes a significant contribution to greenhouse gas emissions. Lancaster University’s Prof Bill Davies explores the hard decisions we need to make and how plant science provides opportunities to create the kind of world we want to live in.

Presented by Royal Botanic Garden Edinburgh

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**ARE YOU PASSIONATE ABOUT SCIENCE COMMUNICATION?**

Edinburgh Science Festival is launching a brand new delegate programme for science engagement professionals, teachers, youth workers, academics and creatives.

Meet with Festival staff, speakers and experts to learn more about the ways in which – through hands-on science, exhibitions, theatre, comedy, song and art – we collectively create and deliver the original, and one of the world’s largest, Science Festivals.

The delegate programme runs from **Monday 8–Thursday 11 April**
Find out more: sciencefestival.co.uk/delegates
THE SCIENCE OF EGYPTIAN MUMMIFICATION: A NO-BRAINER?

Dr Stephen Buckley of York University’s Mummy Research Group explores the latest ground-breaking research on how the ancient Egyptians dealt with death by challenging the misunderstandings which have clouded much of our knowledge and understanding of Egyptian mummification.

THE STORY OF HOW WE BECAME US

Things that were once thought to be unique human behaviour are being discovered in the animal kingdom. From tools and fashions to fire and art – what does it mean to be human when animals can do it too? How special are we really? This conundrum – that our biology is indistinct from all other life, yet we consider ourselves unique – is the central question of the human condition. Join geneticist, author and BBC Radio 4 Inside Science broadcaster Dr Adam Rutherford to explore this quandary.

A LAKESIDE VIEW ON MARS

On Earth, wherever we find water we find life. But is this true on other planets? Tiny blips in scanning the surface of Mars have led to the discovery of a liquid lake under the ice cap. Delve under the surface to discover what water on Mars really means with planetary science expert Dr Lydia Hallis and Dr Jon Wade, the University of Oxford’s planetary formation researcher.

AN AFTERNOON OF MUSIC AND MATHEMATICS

Hear a tuba playing music inspired by maths and find out how three amazing collaborators work together to create a mathematical auditory sensation. Lasse Rempe-Gillen works in the area of dynamical systems and Jack Adler-McKean works primarily as a tubist, promoting his instrument to the contemporary musical world. Emily Howard’s music is known for its particular connection with science and mathematics and she discusses her compositions via a film contribution.

Presented by International Centre for Mathematical Sciences
APPLE OF MY EYE

ROYAL BOTANIC GARDEN EDINBURGH

LECTURE THEATRE

2PM | 1 HOUR | £5

Sometimes loving something can have unintended consequences. Threats to the Scottish wildcat through crossbreeding with domestic moggies have been a concern for years, but wild plants face the same problems. Our love of apples could be pushing one of Scotland’s rarest native trees towards extinction. Geneticist Dr Markus Ruhsam explores the genetics of one of our most popular healthy snacks – the apple – and shares evidence that it poses a threat to the native crab apple.

Presented by Royal Botanic Garden Edinburgh

HOW SMART ARE SMART DEVICES?

NATIONAL MUSEUM OF SCOTLAND | AUDITORIUM

3PM | 90 MINS | £8.50/£6.50/DESCRIBE £5

Each day we add more smart devices to our lives from doorbell cameras linked to apps, online fridges ordering food and smart watches telling us when to exercise. Join panellists including Dr Nick Taylor, specialist in human-computer interactions, to explore what a smart device is, what data they are collecting and how your devices could be used against you, with a simulated attack included.
ACCESSIBILITY

If you would like a copy of this brochure in a different format, please contact marketing@scifest.co.uk or call 0131 553 0320. Access information is available at the front of this brochure (p.6–7) and at sciencefestival.co.uk/venues. We have a selection of accessible events and services too (p.16).

If you have specific access requirements or need to book wheelchair space, please call the Box Office on 0131 226 0005.

STAFF

Edinburgh Science Foundation is a pioneering educational charity dedicated to providing inspirational, innovative and thought provoking formal and informal science, technology, engineering and maths (STEM) engagement experiences for people of all ages and all backgrounds across the world. Registered Charity No. SC003790.

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EDINBURGH SCIENCE LEARNING

In addition to our Festival we deliver an extensive education programme, inspiring Scotland’s young learners with the wonder of science and technology and helping teachers deliver the Curriculum for Excellence. Generation Science brings interactive science shows and workshops to primary schools all over the country and Careers Hive gives thousands of secondary pupils a unique immersive STEM focused careers experience. Find out more at sciencefestival.co.uk/education.

**HEADLINE SPONSOR**

![EDF Energy](image)

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To find out more please contact our Development team on 0131 553 0324 or development@scifest.co.uk.

Further information is available online at sciencefestival.co.uk/support-us.
EDINBURGH SCIENCE FESTIVAL
AT CITY ART CENTRE

6-21 April [not Sundays]
Open daily 9.30am-4.30pm

Explore five-floors packed with shows, workshops and interactive events perfect for children aged 3 years and over. Full details on page 9.

Venue sponsor