

UNIVERSITY OF
BIRMINGHAM

School of Physics and Astronomy Community

Part of
THE EPS COMMUNITY



Spring 2018

Greetings from the School of Physics and Astronomy.

Welcome to this newsletter which we hope will give you a glimpse of the things which we are excited about. They range from new discoveries to emerging areas such as the application of quantum science to applications which perhaps none of us would have anticipated. These are really great moments to be Head of the School of Physics and Astronomy. It is a time when we have witnessed the discovery of [gravitational waves](#), seen for the first time the [collision and merger of black holes](#), and similarly the observation of the [merging of two neutron stars](#). The latter event being spectacular as it was observed via optical, x-ray, gamma-ray emission providing a complete picture of the event which can itself be merged with that from the gravitational waves. It has been speculated that such events are in fact the originators of the synthesis of most of the heavy-elements in the Universe, including gold, which may have turned our understanding of elemental synthesis on its head.

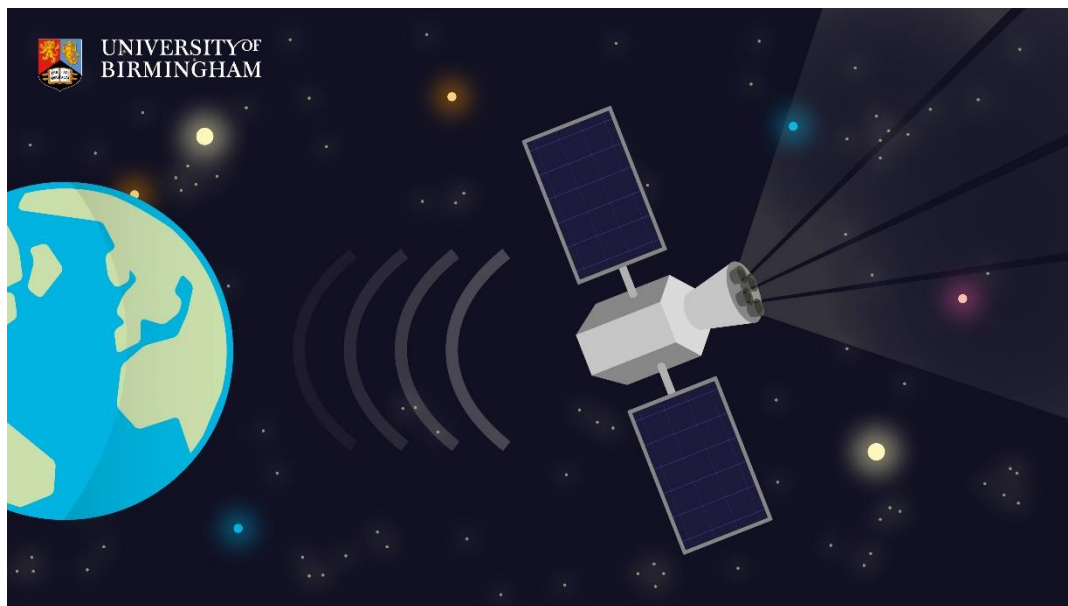
The award of the [2016 Physics Nobel Prize to Mike Kosterlitz and David Thouless](#) was a very proud moment for the School and University alike, which has been captured in the refurbishment of the University train station. Their work related to what happens in two-dimensional systems at low temperatures. Here the electrons can move in a way which is equivalent to mini-vortices, and these vortices pair up. The discovery made was a theoretical one, but has gone on to underpin the way we understand a variety of systems from superconductors to elements of particle physics. This is a branch of physics called [topology](#) which is strongly influenced by mathematics. Topology may be thought about in terms of properties of closed surfaces and the number of holes they contain; for example a sphere has no holes, whereas a doughnut has one. These are

three-dimensional objects, but what happens in higher dimensions. An answer to that question might be mathematically possible but designing a theory which can be tested experimentally is another matter.

I hope to see you at our Alumni Reunion in September and share further details on these exciting projects.

With best wishes

Professor Martin Freer
Head of School



Birmingham asteroseismologists to observe the brightest stars in the sky: NASA launches new observatory into space

NASA's Transiting Exoplanet Survey Satellite (TESS) launched from Cape Canaveral in Florida on Tuesday 18 April, 2018. TESS will survey the brightest stars in the sky to search for planets orbiting stars and to also study the stars themselves. Birmingham physicists are playing a leading role internationally in the asteroseismology programme of TESS; the study of stars by observing their resonant oscillations, which are caused by sound trapped inside the stars. By measuring the tones of this 'stellar music', it is possible to determine the properties of individual stars in exquisite detail.

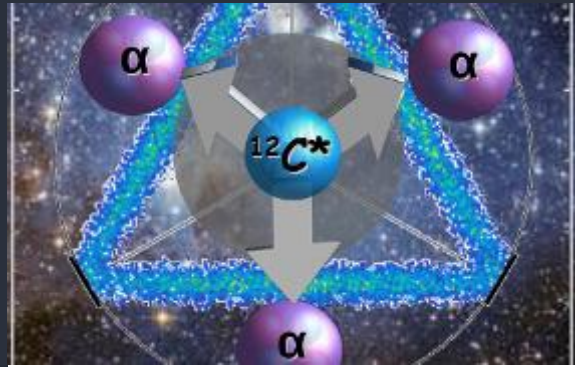
[FIND OUT MORE >](#)



Topology: taking a look into a fourth dimension

Dr Hannah Price shows how a physical phenomenon, first predicted to occur in systems with four spatial dimensions, can be explored in the laboratory.

[FIND OUT MORE >](#)



New insight into how the universe was put together

Nuclear physicists have painted the most precise picture yet of the somewhat perplexing 'Hoyle state', which affects the nucleosynthesis of carbon in stars and life itself.

[FIND OUT MORE >](#)



Look up to the stars

New constellations based on modern day inspirational figures created in a bid to get more children across the UK looking up to the stars and interested in the universe. In a campaign

to get more young people interested in the universe, The Big Bang Fair has partnered with astronomers at from the University of Birmingham Astronomical Society, AstroSoc, to create 'Look Up To The Stars': a new set of constellations representing icons from sport, entertainment, science and activism that children are inspired by today.

[DISCOVER MORE >](#)

WE ARE BIRMINGHAM ALUMNI

Share your story

You, our alumni, all share one thing in common: Birmingham. From recent graduates to industry leaders, you are making important things happen. Join the "We Are Birmingham" project to inspire our students and offer an insight into the vast array of opportunities waiting for them. Share your Birmingham story and help shape their future.

[GET INVOLVED >](#)

GIVE. VOLUNTEER. CHANGE 10,000 LIVES.

Get involved

Since the 10,000 Lives campaign launched in September, alumni and friends of the University have changed the lives of 1,062 young people. 200 of these are students in the College of Engineering and Physical Sciences!

Will you step forward and change a life?

[FIND OUT MORE >](#)

University Reunion 2018

The Alumni Reunion 2018 is a great opportunity to rediscover what made Birmingham "home" for you and renew your lifelong connection to this special place. Reconnect with friends and classmates and see how Birmingham has grown into the university it is today. Join us for a day of celebrations including campus tours, stress-free lectures, a chance to visit some of the latest additions to campus such as the new Library, Sports Centre and Collaborative Teaching Laboratories, and plenty of time to reminisce. In the morning you will visit us in Physics & Astronomy and hear how we have changed since you were last with us. You never know there may be some familiar faces there with you!



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Society news: a great year for physics!

There are now eight student groups in Physics & Astronomy: [AstroSoc](#), [PPS](#), [NucSoc](#), [GUTS](#), [Mozilla Club](#), [oSTEM](#), [WISE](#) and [SATNAV](#). Each does great work for our students.

The College of Engineering and Physics Sciences is home to 29 societies. It's been an amazing year of careers activities, volunteering,



EPS Societies' Awards 2018

Were you a member of a society? Wish you had been? Or have you been impressed reading about our [student groups](#)? Why not nominate them for an EPS Societies' Award.

These Awards celebrate the lengths our students go to make the University a better place. Join our celebrations by nominating your

competitions and, of course, social events so there's plenty to tell you.

[FIND OUT MORE >](#)

society; maybe they'll win the much coveted *Society of the Year* trophy.

[NOMINATE >](#)

News Round-Up

Professor David Phillips, alumnus and Past President of the Royal Society of Chemistry, delivered the latest [EPS Distinguished Lecture entitled "Light Up Your Life"](#).

[Two Nobel Prize-winning physicists have received honorary degrees](#) from the University of Birmingham.

A series of four studies have [shed new light on the properties of the TRAPPIST-1 planetary system](#), currently our most optimal hope for evidence of biological life beyond the Solar system.

[CERN experiment sees hints of rare kaon decay](#): Birmingham physicists play leading role in design and build of the detector, and in data analysis.

[Quantum vortex matter: insights from computer algebra](#). Working with computer algebra in a research environment has led Professor of Physics Nicola Wilkin to make breakthroughs in areas 'where neither pen and paper nor numerical solutions could shed light on the problem'.

The Institute of Physics has awarded [Professor David Charlton the Richard Glazebrook Medal and Prize](#) for his leadership in particle physics.

[Einstein's 'spooky' entanglement theory](#) takes us one step closer to 'hearing' the Big Bang.

New research reveals the [origins of fundamental structures](#) in the wind on a supergiant star.

How a Physics and Astronomy student [contributed to solving the global energy crisis](#).

Scientists celebrate first [direct observation of colliding neutron stars](#).

University of Birmingham to benefit from new [£65m investment in science partnership](#) agreement with US.

The UK's world-class expertise in the research of biofilms has been recognised through the [launch of a new National Biofilms Innovation Centre](#).

Broadcaster, journalist and University honorary graduate [Simon Singh delivered the 2017 EPS Christmas Lecture](#). Our scientific journalistic society SATNAV interviewed him during his visit.

From the many inspiring research projects across the University, we've selected three that have the potential to change lives. Which one is your favourite? [Vote for the project you're passionate about](#) and the University will fundraise for the winner over the next year.

Events

A full list of alumni events, including Reunions and Global Gatherings, is available [online](#). Here are just a few events coming up in Physics & Astronomy and the College of Engineering and Physical Sciences:

Wednesday 6 June

[EPS Societies' Awards](#)

Celebrate with your student society as we recognise their extraordinary achievements with a gala, black-tie evening.

Time: 7pm-11pm

Venue: Great Hall, University of Birmingham

Wednesday 19 September

[London Mathematical Society Popular Lectures](#)

We are proud to begin the 2018/19 Birmingham Popular Mathematics Lecture series with the London Mathematical Society Popular Lectures, which are suitable for all who have an interest in Mathematics, presenting exciting topics in mathematics and its applications.

This year Katie Steckles (Maths's Greatest Unsolved Puzzles) and Jennifer Rogers (Risky Business) will be speaking

Time: 6:30-9pm

Venue: Bramall Music Building, University of Birmingham

Saturday 29 September

[University of Birmingham Alumni Reunion](#)

Join us for the big Anniversary Reunion on Saturday 29 September 2018. Whether you're celebrating your 50th anniversary or your 5th anniversary, come back to the Edgbaston campus and celebrate your University with staff, students and fellow alumni.

Time: 10am-5pm

Venue: University of Birmingham, Edgbaston Campus

Monday 29 July - Friday 2 August 2019

British Combinatorial Conference

The University will host the British Combinatorial Conference. More information about the conference will be published soon.



You are in control of your data. We want to stay in touch with you and keep your information in accordance with your wishes. You will be kept updated with news from our campus, including research, educational activities and courses, events, alumni activities, and opportunities to support our fundraising and volunteering programmes. Depending on [your preferences](#), you will receive communications via post, email, telephone, SMS text messages, and social media. We would like to ensure that our interactions with you are appropriate and cost-effective. We will pay attention to your responses (including e-tracking) and, from time to time, may use your data for profiling, wealth screening, targeting, and research purposes. Your information will be [held securely](#) by the University of Birmingham and will only be made available to our academic & administrative departments, recognised alumni groups, and trusted agents acting on behalf of the University. We will never sell your personal data or share it for non-University of Birmingham programmes. If you decide to donate to the University, you can choose whether to give anonymously or be recognised on our Donor Rolle of Honour. Information on how your data is held and used is set out in our Data Protection Statement at www.birmingham.ac.uk/dataprotection. If you wish to opt-out of any contact or have any questions about your personal data, please contact Luke McGarrity on L.McGarrity@bham.ac.uk. Our Inland Revenue Charities reference number is X7237.