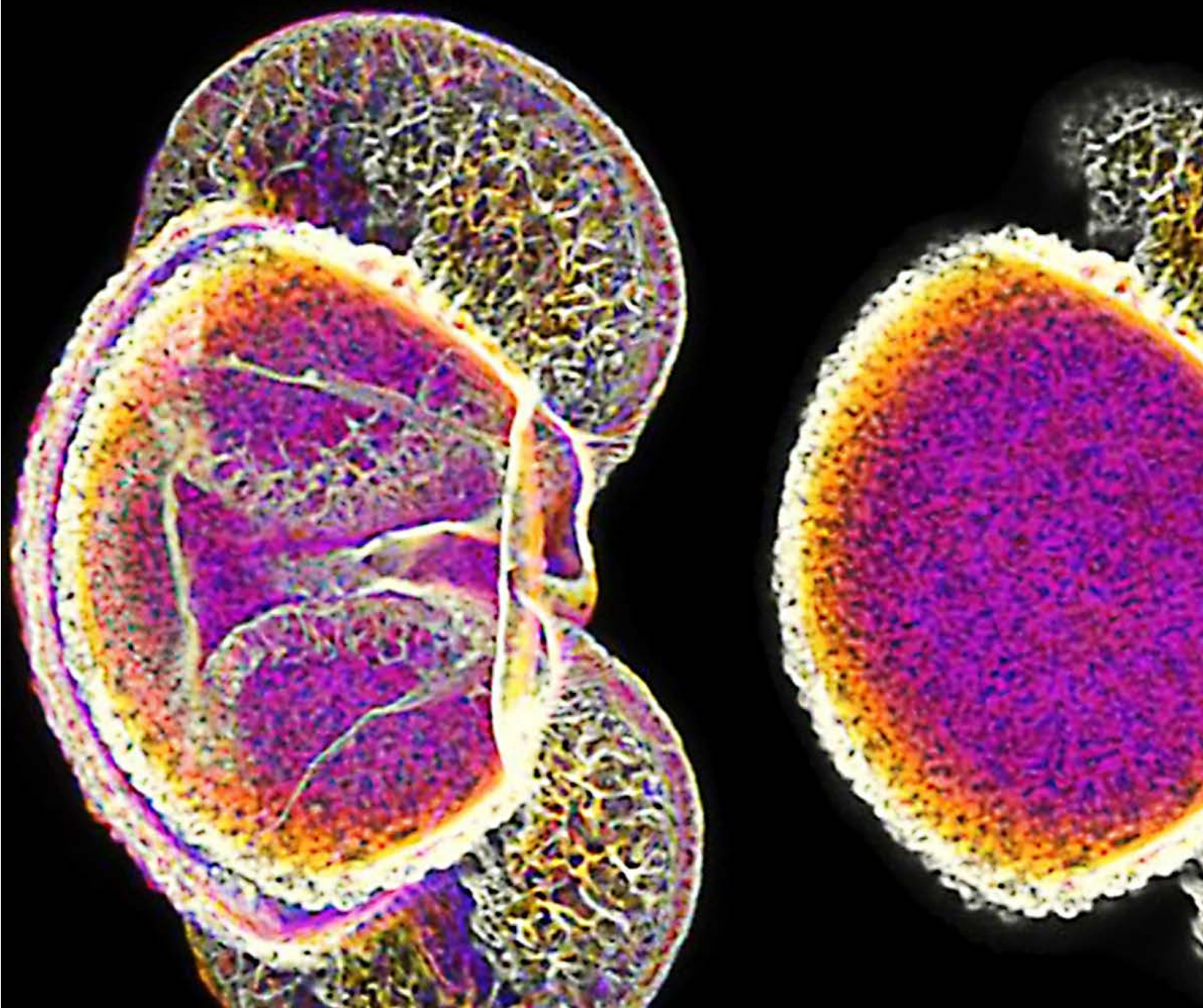


# GRADUATE SCHOOL

Doctoral Research Highlights 2019



# WELCOME

## Welcome to the doctoral research highlights of 2019



**PROFESSOR  
DIANNE BERRY**  
DEAN OF  
POSTGRADUATE  
RESEARCH STUDIES

The pages that follow enable you to see what some of our research students have been up to. We have around 1,800 postgraduate research students from a wide range of countries and backgrounds, who are all on the journey to becoming independent researchers. Here you can see at a glance some of their ingenious projects, such as a weed-killing robot and new approaches to designing and building houses. You can also read about their research to tackle issues such as the decline in the African elephant population and food poverty.

This issue also showcases some of the prize-winning research that was featured during our 2019 Doctoral Research Conference, including the winner of the 2019 PhD Researcher of the Year competition. It also tells you more about our latest annual Fairbrother public lecture, which draws comparisons between the recent #MeToo movement and sexual violence in the American South.

I very much hope that you enjoy it.



**1,840\***  
POSTGRADUATE  
RESEARCH  
STUDENTS FROM  
COUNTRIES STUDIED HERE

**111**

Highlights from the  
academic year 2018/19



WE AWARDED

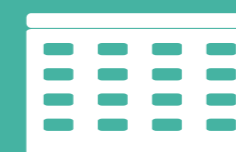
**306**  
DOCTORATES

THE AGE\*  
RANGE  
OF STUDENTS STUDYING  
FOR A DOCTORATE AT  
READING WAS

**21  
to  
84**

**30%**  
OF ALL DOCTORAL RESEARCHERS  
UNDERTOOK THEIR STUDIES  
PART TIME\*

Highlights from the  
calendar year 2019



**THE DOCTORAL THESIS**  
*"DEFINING THE ROLE OF BUSINESS ANALYSTS"*  
BY DEBRA PAUL, HENLEY BUSINESS SCHOOL:  
**DOWNLOADED**  
**1,037** TIMES  
FROM CENTAUR\*\*

PUBLISHED IN NATURE  
**MOST  
DOWNLOADED  
RESEARCH PAPER**

BY A CURRENT DOCTORAL RESEARCHER FROM CENTAUR\*\*  
SIMON LEE'S PAPER *"INCREASED SHEAR  
IN THE NORTH ATLANTIC UPPER-LEVEL JET  
STREAM OVER THE PAST FOUR DECADES"*

**THE GRADUATE SCHOOL'S  
READING RESEARCH  
DEVELOPMENT PROGRAMME**

**DELIVERED**  
**194**  
COURSES

\* Higher Education Statistics Agency (HESA) student returns, 2018/19.  
\*\* CentAUR is the University of Reading's institutional repository.

# 2019 AT A GLANCE

## Henley Business School celebrates 200th DBA graduate



The Henley Business School celebrated **Andy Stevens** becoming the 200th graduate of its Doctor of Business Administration (DBA) programme at the September 2019 graduation ceremonies on Greenlands campus. Andy's research explored the sporting and financial performance of Premier League football clubs.

The part-time professional doctoral programme is designed to enhance executive and professional practice, through the application of theory and research to real issues in business and management. Henley has one of the longest-running DBA programmes in the UK and Andy's graduation marked a significant milestone.

## Promoting women in science with Soapbox Science



Soapbox Science is a novel public outreach platform that promotes women in science and their work. On 8 June 2019, Reading's Broad Street was transformed into a hub of scientific learning and discussion when 12 women working on PhDs in science, technology, engineering and maths (STEM) showcased their research to the public. Members of the public had the opportunity to learn from and question the scientists taking part.

Two doctoral researchers from the School of Biological Sciences, **Rachael Chandler** and **Chanida Fung**, presented talks entitled "*Parkinson's, DNA and...microscopic worms?!*" and "*Insects and individuals: Why should we care?!*" respectively.

## Doctoral researcher selected for television industry training programme



**Anna Varadi**, a doctoral researcher in the Department of Film, Theatre & Television, was selected for a place on the Edinburgh Television Festival's (ETF) TV PhD programme, which ran from 19–23 August 2019. The Festival is unique as it is a gathering place for all the UK's channel controllers and senior commissioners to outline their highlights from the past year and, crucially, their commissioning wish lists for the year ahead.

The TV PhD scheme helps early-career academics to work with the television industry. Anna participated in a programme of sessions and received training to help her develop skills, make contacts and increase her knowledge of the television industry. She also had many opportunities to network with TV professionals.

## Making architecture – making communities



Award-winning architect and TV presenter **Piers Taylor** won an Anniversary PhD Scholarship in 2017 to undertake a doctorate in the School of Architecture. Piers has co-presented television programmes such as *The World's Most Extraordinary Homes* and *The House That £100k Built*. His PhD, entitled "*Contingent Negotiation*", fits into the University's Environment research theme. He is exploring the consequences of using "making" (the exploration of alternative design through the process of creating) to explore design processes.

Piers was invited to give the annual Alumni Lecture on 19 November 2019. In his lecture he discussed how architecture can bring about transformations in people and places, and how making can be a vehicle for participation.

## Weed-killing robot that could transform weed control technology



**Nikolaos Koukiasas**, a doctoral researcher in the School of Agriculture, Policy and Development, has worked on a project developing a prototype of an automated weed-killing robot that targets individual plants with small amounts of chemical treatments. The eyeSpot uses cameras to identify weeds, and a novel applicator shoots herbicide droplets onto their individual leaves. This engineering solution achieves a paradigm shift in weed control technology, moving away from spraying whole fields and relying on selective herbicides.

The robot, developed by Concurrent Solutions LLC in the USA, was demonstrated to sponsors, academics, industry experts and growers at Sonning Farm on 25 July 2019. Commercialisation of the robot is currently being explored. Nikolaos graduated in December.

ABOVE PHOTO: SHANE SANFORD FROM CONCURRENT SOLUTIONS LLC AND NIKOLAOS KOUKIASAS.

# SPREADING THE WORD

Communicating your research with non-academic audiences can be a great way to share your enthusiasm and use people's reactions to expand your own ideas and thinking. In the pages that follow, learn how our doctoral researchers showcased their research in 2019.

## GETTING STARTED IN PUBLIC ENGAGEMENT

HERE ARE SOME SIMPLE THINGS DOCTORAL RESEARCHERS CAN DO:

- 1) Talk to your supervisor.** Many organise engagement and outreach activities themselves and would be pleased for you to get involved (or will point you in the direction of a colleague who can help).
- 2) Register to attend** the Introduction to Public Engagement workshop that is part of the Reading Researcher Development Programme.
- 3) Talk to the University's outreach team.** They have partnerships with some of the national organisations that support doctoral students working in schools.
- 4) Get involved** with student-led engagement activities, such as Pint of Science.

FIND OUT MORE AT [RDG.AC/PUBLIC-ENGAGEMENT](http://RDG.AC/PUBLIC-ENGAGEMENT)

# Research Engagement AWARD

In June 2019, we celebrated our inaugural Doctoral Research Engagement Award at the annual Doctoral Research Conference.

This award aims to recognise and reward doctoral researchers who undertake public engagement activities to share their enthusiasm about their research and increase the reach and impact of their work. The judging panel, chaired by Professor Parveen Yaqoob, Pro-Vice-Chancellor (Research and Innovation), were particularly impressed by the creativity demonstrated by the four finalists, and the fact that each researcher had achieved good engagement and benefits for their research, albeit in very different ways.

*The judges said: "This was an outstanding application – beautifully written and demonstrating remarkable initiative and creativity."*



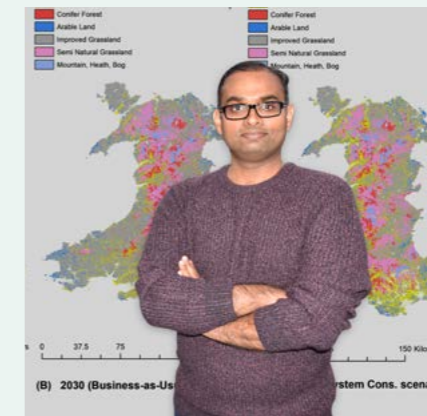
## 3D POLLEN – WINNER

**Oliver Wilson**, School of Archaeology, Geography and Environmental Science, used cutting-edge technology to create an open-source database of 3D images of pollen. This database helps people to understand pollen composition and its many uses, without having to peer down a microscope. These 3D images are freely available online and have been downloaded and used by organisations around the world: for teaching undergraduates and high school students; as part of a display in the Naturalis Biodiversity Center in Leiden, Netherlands, the Georgia Museum of Natural History, USA, the Chicago Botanic Garden, USA, the University of Dundee Botanic Garden, UK; and at a British Science Week event here in Reading.



## ORNAMENTAL INVADERS

As part of his PhD, **Tomos Jones**, School of Biological Sciences, ran a citizen science project asking gardeners to report plants that are invading or taking over their gardens to help him gather evidence about how to prevent future plant invasions. The project culminated in an exhibit at the RHS Chelsea Flower Show. Find out more about Tomos' engagement project on page 9.



## LAND-USE CHANGE MODELLING

As part of his research into the drivers of land-use change in different environments, **Syed Manzoor**, School of Agriculture, Policy and Development, developed spatially explicit maps as an aid for discussion and policy decisions.



## SUPER INSECTS

**Chanida Fung**, School of Biological Sciences, created a hands-on game for children that allows them to design and create an insect with the most suitable adaptive traits for a given environment.

Floods are among the most damaging natural hazards on Earth.

# Gambling with FLOODS?

**As part of her PhD, "The art of streamflow forecasting over Europe", Louise Arnal, School of Archaeology, Geography and Environmental Science, has used games and art to communicate the ins and outs of flood forecasting to a wide audience.**

Louise collaborated with partners from the IMPREX H2020 project to create a serious online game about flood forecasting. In this game, the player is the head of a flood forecasting institute. They explore the world of flood forecasting, from producing flood forecasts to making decisions based on them to protect the inhabitants of a city from flooding. This game was released in April 2019 and can be played on the IMPREX H2020 website: [imprex.arctik.tech/](http://imprex.arctik.tech/)

Louise has also collaborated with Stuart Mitchell, IT/audiovisual professional at the European Centre for Medium-Range Weather Forecasts (ECMWF), to create a multi-sensory science and art installation called "Gambling with floods? An exploration of the science and art of flood forecasting". The installation was exhibited at the Museum of English Rural Life, from 1–17 November 2019. Exhibition visitors were placed at the heart of a metaphorical forecasting system and prompted to create a flood forecast by pulling the lever of a fruit machine.

This installation was based on actual forecast data from the Global Flood Awareness System (GloFAS) for Reading. Creating a contrast between the scientific data and the fruit machine, this art installation allowed people to explore how technology can be used to predict floods in the noisy chaos of nature.

Louise commented: "Floods are expected to become more frequent in the future, and with an increasing population at risk, it is vital that we can predict these events well in advance and that we open up discussions about flood forecasting to everyone."

Louise graduated in December 2019 and has taken up a position as a hydrological forecast product designer at ECMWF.



A small number of ornamental plants have escaped gardens and become invasive.



# Ornamental plants: OUR FUTURE INVADERS?

**Plant hunters have for centuries been introducing plants to Britain and Ireland from all over the world. Most of these were introduced as ornamental plants, which means that our gardens are now home to a staggering 17,000 non-native plant species.**

A small number of ornamental plants have escaped gardens and become invasive, meaning that they are having a detrimental impact on native biodiversity. Notorious examples include Himalayan balsam (*Impatiens glandulifera*) and common rhododendron (*Rhododendron ponticum*).

Climate change could provide opportunities for more plants to become invasive. Are the future invaders already growing in our gardens?

The destructive potential of ornamental plants found in gardens across Britain and Ireland is the topic of Tomos Jones' PhD project in the School of Biological Sciences. Tomos created an ambitious structure entitled "Ornamental plants: our future invaders?" for the RHS Chelsea Flower Show, the world's most famous flower show. Designed in collaboration with the School of Architecture, a 2.4m tall wooden representation of an invasive plant called giant rhubarb (*Gunnera tinctoria*) was constructed to tower over a display of invasive and potentially invasive ornamental

plants. These plants were specifically selected to reflect the results of a survey Tomos conducted as part of his PhD research, which asked gardeners to report any plants invading or taking over their gardens.

The exhibit was an opportunity for Tomos to explain the issue of invasive plants to gardeners, but crucially also demonstrated how gardeners can help reduce the impact of invasive species by identifying ornamental plants showing "invasive behaviour".

Tomos' exhibit was awarded a gold medal from RHS Chelsea. This resulted in considerable media interest, including a TV interview for BBC South at Chelsea and an article in the *Financial Times*.

# Stimulating SENSES

Visitors to the 2019 Royal County of Berkshire Show were treated to a sensory experience on the University's stand based around the theme of the five senses. A team of academics and doctoral researchers from across the University entertained and informed 3,500 visitors across the weekend.

Doctoral researchers from the School of Psychology and Clinical Language Sciences were on hand to explain "earworms" (those annoying tunes that get stuck in your head) and demonstrate how they research musicality and sound perceptions.

The noses of thousands of passers-by were commandeered by doctoral researchers from the School of Archaeology, Geography and Environmental Science and the School of Biological Sciences. Using an array of plants and 3D-printed pollen models, their exhibit explored how plants' scents can repel attackers and attract pollinators, and how a plant's pollination strategy is written on the features of its pollen grains.

The noses of thousands of passers-by were engaged by doctoral researchers from the School of Archaeology, Geography and Environmental Science and the School of Biological Sciences.



Keren MacLennan, a doctoral researcher in the School of Psychology and Clinical Language Sciences, helped to create a large interactive touch-board exhibit so that visitors could feel different textures and rate how much they liked each one. This exhibit informed the public about their sensory preferences and differences.

The Sensory Experience exhibit, manned by doctoral researchers from the Department of Food and Nutritional Sciences, explored differences in individuals' aroma, taste and texture perception and how these influence the foods we choose to eat and enjoy.

Oliver Wilson, doctoral researcher from the School of Archaeology, Geography and Environmental Science said, "It was great to talk to a wide range of people about my doctoral research. One minute I could be talking to children about lemon-scented plants, and the next minute I was comparing notes on pollen with a professional beekeeper. The rapid gear-shifting this required was a real workout for my engagement skills!"

Rafael Pompa, a doctoral researcher from the School of Agriculture, Policy and Development, exhibited activities that demonstrated our sensory connection to agroforestry. In particular, how the cultivation of trees can change the visual appearance of the landscape and provide habitats for animals that bring sounds, smells and textures.

# THE TWO POPES

## Screening and masterclasses

An audience of over 200 had a special opportunity to attend a screening and masterclass with renowned Brazilian film director, producer and screenwriter Fernando Meirelles.

The event, which included a screening of Meirelles' film *The Two Popes*, was organised by Professor Lúcia Nagib, Director of the Centre for Film Aesthetics and Cultures (CFAC), and Silvia Macedo, Assistant Director of CFAC and PhD researcher in the Department of Film, Theatre & Television.



© CITY OF GOD, 2002. DIRECTED BY FERNANDO MEIRELLES AND KÁTIA LUND.

Meirelles is best known for co-directing the acclaimed film *City of God* (2002), an account of gang warfare in a Brazilian favela told entirely from the viewpoint of children, and for directing *The Constant Gardener* (2005), an adaptation of the John le Carré novel of the same name.

The visit was something of a coup for CFAC. "We took advantage of the fact that Meirelles was in the UK for the London Film Festival and on tour with Netflix to promote *The Two Popes*. We invited him to the University of Reading," explains Macedo. "He was not in the UK for long and came directly from the airport." Macedo describes the event as a great success, with a highly engaged audience and a Q&A that was "hugely thought-provoking. Both Fernando and Netflix were extraordinarily considerate and

generous to accept our invitation to screen at Reading and deliver a masterclass."

Macedo started her role at CFAC in August. Her doctoral research explores the relationship between cultural and visual identity and art direction in the cinema of north-eastern Brazil. She is enthusiastic about combining her work for CFAC with her PhD research.

"My thesis relates quite directly to the issues of politics and aesthetics explored by CFAC's work; I look at the visual identity of film and how that can reflect a country's culture. My work with CFAC is strengthening my relationship with research on aesthetics and culture and opening up film-related, cultural and artistic networks to me."

A VIDEO OF THE MASTERCLASS WILL SOON BE AVAILABLE AT [RESEARCH.READING.AC.UK/CFAC/](https://RESEARCH.READING.AC.UK/CFAC/)

# FAIRBROTHER LECTURE

Elizabeth Barnes reflects on presenting the 2019 Fairbrother Lecture and the voices of the women behind her research.



Women in the past, much like today, faced many barriers when they tried to speak out about rape.

In October 2017, the Twitter hashtag #MeToo raised unprecedented awareness of the scale of sexual violence and harassment in modern societies across the globe. The movement, originally founded by African American activist Tarana Burke in 2006, highlighted the importance of women's testimonies in the battle against sexual injustice.

Although nothing quite like the #MeToo movement had happened before, comparisons can be drawn between the modern campaign and efforts to resist widespread sexual violence in the past. My PhD research focuses on one such effort: the mass testimony of black women in the Reconstruction-Era American South, who were newly freed

from enslavement. In May, I delivered the annual Fairbrother Lecture and explored some of this historical connection.

Women in the past, much like today, faced many barriers when they tried to speak out about rape. Problems such as a lack of witnesses and corroborating evidence, coupled with social attitudes that shame and doubt women, are as harmful today as they were centuries ago.

The problems faced by formerly enslaved women were further compounded. The American legal system (based on English common law) entirely excluded enslaved women from legal protections against sexual

violence. Quite simply, before slavery was abolished in 1865, most black women in the United States could not legally be raped. This exclusion was justified by racist stereotyping that painted all black women as promiscuous "Jezebels", so naturally sexual that they were essentially incapable of saying no to sex. Without access to the law, enslaved women struggled to leave any trace of their suffering; most were illiterate and confined in remote areas away from potential allies.

When slavery was abolished after the Civil War of 1861-65, for the first time black women could appeal to the law when they were sexually violated. In the post-war period there was, therefore, a mass outpouring of

testimony about sexual violence, not dissimilar to the current #MeToo movement. Black women across the South came forward in an attempt to combat violence, advance racial equality, and improve their own lives.

There were notable successes and numerous white men were convicted of raping black women in this period. The success was short-lived, however, as white supremacists gradually regained control of the Southern states in the 1880s. The short period of advancing justice for black Americans was followed by a period of retrenched inequality, the most startling feature of which was the rise of lynching across the United States.

The Fairbrother Lecture was a wonderful opportunity to shine a light on the stories of these women and to talk to people from a variety of backgrounds, both from within the University and beyond, about the modern day relevance of this chapter of history. After the lecture there was stimulating discussion about the #MeToo movement, histories of anti-rape activism, and anti-harassment actions that can be taken at Reading.

I hope that, going forward, we can all take a more critical approach to the problem of sexual violence in our society and remember the power that women's voices can have in an evolving world.

THE FAIRBROTHER LECTURE IS AN ANNUAL EVENT AT WHICH ONE UNIVERSITY OF READING DOCTORAL RESEARCHER PRESENTS THEIR RESEARCH TO A WIDER AUDIENCE.



Sabine describes community kitchens as places that provide food for anyone who turns up.

# UNCOVERING the UK's food poverty issue

**An estimated 8.4 million people in the UK struggle to get enough to eat and rely on food handouts, according to the UN. Volunteering at a community kitchen inspired PhD student Sabine Mayeux to investigate how these kitchens address food poverty in the UK.**

During her postgraduate studies, Sabine found herself struggling to make ends meet while balancing university with minimum-wage jobs and high rent. She discovered a community kitchen called FoodCycle.

"I had to rely on community kitchens to eat during some of my studies – they are actually very popular among students and other low-income groups," she explains.

"Although unlike homeless and other vulnerable people I never entirely relied on handouts, I could not believe how many seemingly deprived people came for free food outside the London School of

Economics or outside Charing Cross tube station, next to the affluent West End. I had to act, somehow."

Having visited FoodCycle for meals during straitened times, Sabine quickly became part of the kitchen's close-knit community and later turned from visitor to volunteer – and then to researcher.

Sabine describes community kitchens as places that provide food for anyone who turns up, with no questions asked – unlike food banks, which require people to be referred and registered before they can use them. The kitchens remove that barrier.



"They provide vital support to anyone living with food poverty, or any other form of insecurity – it might be the homeless, the 'working poor', people who are ill or in temporary shelter, or somewhere in between," explains Sabine.

Sabine's Economic and Social Research Council funded research looks at how community kitchens across the UK address food poverty. She has been volunteering at Sadaka Community Kitchen in Reading since 2017; this gives her insights that she applies to her research.

Findings from a Reading Borough Council report showed that Reading is one of the most unequal towns in the UK, where people with the highest incomes and those living in the most

extreme poverty live side by side. "Food poverty is just one aspect of poverty – but once you're in it, it's a spiral that is hard to get out of," says Sabine.

Sabine was nominated for a Pride of Reading award for her volunteering work, and while she didn't win, she is pleased that it has raised the profile of the food poverty issue. "I find the research highly rewarding – it takes time, but it's on the ground and applicable to urgent, global problems."

THE ARTICLE ABOVE IS AN EDITED EXTRACT OF "UNCOVERING THE FULL PICTURE OF THE UK'S FOOD POVERTY ISSUE" BY SARAH HARROP, PUBLISHED ONLINE IN THE COMMUNICATING RESEARCH BLOG IN DECEMBER 2019. VISIT [RESEARCH.READING.AC.UK/RESEARCH-BLOG/UNCOVERING-THE-FULL-PICTURE-OF-THE-UKS-FOOD-POVERTY-ISSUE/](https://RESEARCH.READING.AC.UK/RESEARCH-BLOG/UNCOVERING-THE-FULL-PICTURE-OF-THE-UKS-FOOD-POVERTY-ISSUE/)

## Doctoral Training Partnership FOODBIOSYSTEMS

A new interdisciplinary doctoral training partnership (DTP) led by the University of Reading has received funding from the Biotechnology and Biological Sciences Research Council (BBSRC). The funding is for five years from 2020.

The FoodBioSystems DTP brings together six university partners including Cranfield University, the University of Surrey, Queen's University Belfast, Aberystwyth University and Brunel University. Associate partners include EIT Food, the British Nutrition Foundation, the Science and Technology Facilities Council Food Network+ and Diamond Light Source.

This unique DTP will train and develop highly skilled UK agri-food bioscientists, with expertise spanning the

Expertise spanning the entire food value chain from farm to table.

entire food value chain (the network of stakeholders involved in growing, processing and selling food that consumers eat) from farm to table. It will fund more than 125 PhD students over five years across the six partner universities. Of these, a minimum of 30 will be earmarked as industrial collaboration "CASE" studentships. The DTP will offer four-year PhD studentships, during

which each student will also undertake a three-month professional placement to further develop their skills and to explore future career pathways.



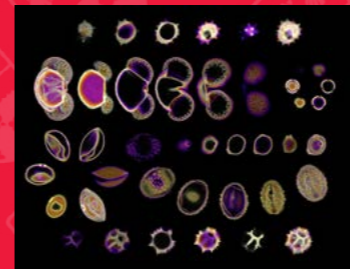


# Doctoral Research CONFERENCE 2019

The Doctoral Research Conference took place on the afternoon of 19 June 2019. 350 doctoral researchers and academic staff from across the University enjoyed presentations from the competition finalists. The conference also included eight research images, 35 research posters, four research engagement displays, two highly enjoyable research films and an entertaining poetry, rhyme and rap competition.

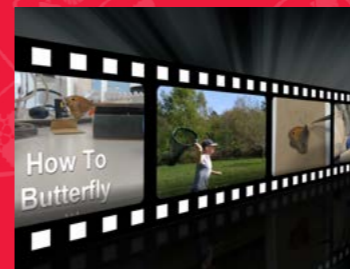


"The conference is very entertaining and engaging. I love the variety of competitions."



## RESEARCH IMAGE COMPETITION

The Research Image Competition was won by Oliver Wilson, School of Archaeology, Geography and Environmental Science. His entry "Not to be sneezed at" won both the Judges' and People's Choice awards.



## RESEARCH FILM COMPETITION

Matthew Greenwell, School of Biological Sciences, won the Research Film Competition with his film "How to: Butterfly".



## POETRY, RHYME AND RAP COMPETITION

Shweta Kalmegh Band, School of Law, won both the Judges' and People's Choice awards in the Poetry, Rhyme and Rap Competition for her entry "Leavers or Remainers: Destination Unknown", which took the audience through the PhD journey from the perspective of an aircraft flight attendant.



## THREE MINUTE THESIS COMPETITION

Matthew Greenwell, School of Biological Sciences, won the Judges' and People's Choice Award for his Three Minute Thesis talk, entitled "How to measure what we can't see – a conservation conundrum".



## RESEARCH POSTER COMPETITION

"Communicating health in food labels in Britain 1850-1970", submitted by Bodil Mostad Olsen, School of Arts and Communication Design, won first prize in the Research Poster Competition. The People's Choice Award was won by Riyadh Aeban, School of Biological Sciences, for his poster entitled "Characterisation of microsatellite loci for *Dermatophagoides farinae* (Acari) and novel identification of Saudi house dust mites of forensic importance".



## DOCTORAL RESEARCH ENGAGEMENT COMPETITION

The Doctoral Research Engagement Competition was won by Oliver Wilson, School of Archaeology, Geography and Environmental Science with "The 3D Pollen Project". You can read more about Oliver and the other finalists' engagement activities on page 6.



## PHD RESEARCHER OF THE YEAR

The winner of the PhD Researcher of the Year 2019 Award was Jamie Draper, School of Politics, Economics and International Relations. You can learn more about Jamie and the other finalists' doctoral research by watching their films.

# BEATING BAD MICROBES

through better communication



The aim of the "Information Design and Architecture in Persuasive Pharmacy Space" project is to draw attention to the role of design.

A collaborative project led by a team at Reading has recently developed new print materials for use in pharmacies in Rwanda. The "Beat Bad Microbes" materials are being trialled in a second pilot study in Kigali pharmacies.

Rachel Warner, PhD researcher in the Department of Typography & Graphic Communication, worked with Professor Sue Walker and members of the project team in collaboration with colleagues in Rwanda to develop the design of "Beat Bad Microbes" print materials. The development of the materials is based on feedback from the pharmacists and pharmacy users who took part in the first pilot study, extends the use of a visual identity made by project partner Design Science and incorporates illustrations by Nikoletta Karastathi.

The development of the materials included: re-formatting an antibiotic record card so it better met user needs; making a set of posters that incorporated new illustrations to represent Rwandan people; designing a set of instructions to explain to pharmacists how the materials should be used; and working with the University production team

to develop a compact and usable package of printed multilingual materials. The team are continuing to work with the Rwandan Community Pharmacists Association and the University of Rwanda, and the materials were used in a second pilot study in Kigali.

The work to develop the "Beat Bad Microbes" materials is part of the project, "Information Design and Architecture in Persuasive Pharmacy Space: combating AMR (IDAPPS)" – a project at the University of Reading and Loughborough University. The intention in the IDAPPS project, and work emerging from it, was to draw attention to the role of design – particularly information design, user-centred design, architecture and interior design – in communicating information about Antimicrobial Resistance (AMR). The team realised that for many people involved in public health communication, design is something that is considered at the end of a project to make materials or products "look good", or to align with particular brand guidelines. Yet design is much more than this. As the IDAPPS project has demonstrated, it is a catalyst for innovative thinking. This is what we need if we are to help people understand the threat of AMR.



## Africa: TOO MANY ELEPHANTS?

Africa's elephant population has plummeted, from one million in 1970 to around 400,000 today.

**While poaching accounts for some of this, Africa's booming human population is arguably a greater threat. The number of people living in Africa has doubled since 1982, reaching one billion in 2009, and is expected to double again by 2050. To feed and house this growing population, natural habitats have been fragmented by roads and railways, and entire swathes have been converted to farmland and settlements.**

As a result, Africa's elephants are increasingly confined to small reserves separated by vast, human-dominated landscapes. Here, elephant dispersal is limited, but their relative protection has seen numbers increase to the extent that some consider reserves overpopulated.

While elephants play a crucial role in Africa's savanna ecosystems, over prolonged periods high elephant densities can shrink woodland habitats, threatening species for which trees provide food and shelter.

A fundamental question in deciding the future of Africa's elephants is whether we are happy for them to exist only in small reserves where they are heavily

managed. If so, we need more research on the most effective and ethical ways of managing elephants. If not, then securing space for elephants to live alongside human communities may be the answer.

This boils down to an old debate – to spare land, or share it?

Land sparing means separating pristine wildlife habitats from areas of human activity, while land sharing involves maintaining biodiversity within landscapes that are shared with humans. South Africa shows us what land sparing means for elephants – expensive, ongoing management. The alternative land sharing approach gives elephants greater access to Africa's landscapes, but relies on coexistence between people and elephants.

VICKY BOULT COMPLETED HER PHD IN MARCH 2019 IN THE SCHOOL OF BIOLOGICAL SCIENCES. THE ARTICLE ABOVE IS AN EDITED EXTRACT OF "TOO MANY ELEPHANTS IN AFRICA? HERE'S HOW PEACEFUL COEXISTENCE WITH HUMAN COMMUNITIES CAN HELP". PUBLISHED ONLINE IN MARCH 2019. [THECONVERSATION.COM/TOO-MANY-ELEPHANTS-IN-AFRICA-HERES-HOW-PEACEFUL-COEXISTENCE-WITH-HUMAN-COMMUNITIES-CAN-HELP-112645](http://THECONVERSATION.COM/TOO-MANY-ELEPHANTS-IN-AFRICA-HERES-HOW-PEACEFUL-COEXISTENCE-WITH-HUMAN-COMMUNITIES-CAN-HELP-112645)

# 28 DAYS AT SEA

## Fishing for facts about environmental change

In October 2019, Roweena Patel, PhD researcher in Environmental Sciences, embarked on a 28-day voyage aboard the research vessel Cefas Endeavour to study the diets of fish.



Roweena's PhD aims to improve understanding of how food size influences the diets of five commercially important fish – mackerel, horse mackerel, sprat, sardine and anchovy. To do this, she is mapping phytoplankton (marine algae) – a potential prey of the fish species – by satellite, investigating the diets of the individual species of fish and then collating the data to create a combined food web model.

The Cefas Endeavour sailed to a number of locations off the south-west of the UK and Ireland, and used acoustic beam technology to identify schools of target species of fish. A short trawl then resulted in a small number of sample fish being brought aboard for examination. Roweena had access to on-board laboratories and microscopes where she could work alongside other scientists working on a range of marine experiments.

After carefully checking she had the right fish species – which wasn't always easy – she measured and recorded each fish before she dissected it, removed the stomach and then studied the contents under a microscope.

### ROWEENA ANSWERED A FEW QUESTIONS:

#### Did you get seasick?

Thankfully, I didn't really feel seasick and, for some reason, I found eating lots of salt helpful with that. I always put extra soy sauce on my noodles!



#### Did you catch the fish yourself?

No, we had experienced fishermen on board who dealt with the short trawls, but I did get to see how it all worked.

#### How are you at dissecting fish?

Having a background in biology, I've done other dissections so I didn't feel too squeamish. Before I went on the voyage I did get some help to make sure I could correctly identify the stomach.

#### What did you find in the stomachs of the fish?

Initially the stomach contents of the 132 fish I studied were all jumbled up, but I learned to identify the different components under the microscope. The fish I'm studying all eat plankton, which includes marine algae (phytoplankton) and microscopic crustaceans (zooplankton). I learned to recognise the different types and recorded the volumes and sizes found in each fish stomach.

#### Was there any plastic in there?

I didn't find much, but other researchers on the ship found plastic in trawls.



#### Did you get interrupted by any bad weather?

Yes, we did! We got the tail end of Storm Lorenzo. As you can imagine, weighing samples and doing anything useful is impossible when the sea is choppy! We were forced to stop everything and shelter in the lee of Lundy Island.

#### Did you miss dry land?

I did miss solid ground as the ship was constantly moving around and the daily 12-hour-long shifts were tough.

#### What were the highlights of your 28 days at sea?

I particularly enjoyed seeing dolphins, the beautiful sunsets and being among a range of marine experts.



#### What comes next in your research?

I still have a few samples to analyse in the Department. Then I will be working on integrating the fish data with the phytoplankton satellite data to produce food webs, which will show which species of fish eat which types of plankton and in what quantities. If environmental changes affect phytoplankton location, availability or size then it will be possible to project the impact on fish locations and populations who are dependent on those types of phytoplankton.



ROWEENA'S RESEARCH IS FUNDED BY THE NATURAL ENVIRONMENT RESEARCH COUNCIL SCENARIO DOCTORAL TRAINING PARTNERSHIP.

## Climate change and future air travel –

# ROUGH OR SMOOTH?



Many of us have experienced turbulence on a flight – the seatbelt sign flashes on, the aircraft starts to lurch unpredictably, and we cling on to the armrests while trying to act like we aren't perturbed in the slightest.

No one enjoys even mild turbulence, but what does climate change mean for turbulence levels in the future?

Simon Lee studied this very area during his integrated master's degree in Meteorology and Climate (MMet). His research resulted in a paper being published in *Nature* in August 2019. Simon has discovered that since 1979, the vertical west-to-east wind shear (the change in wind speed with height) of the jet stream has increased by around 15% as a result of climate change. Simon explains: "This is an important result because vertical wind shear is a key driver of clear-air turbulence, a major aviation

hazard. Our findings support climate model projections of increased turbulence." The study provides the first observation-based evidence to support previous University of Reading research that human-induced climate change will make severe turbulence up to three times more common by 2050–80.

Simon's research indicates that airline passengers can expect a much bumpier ride in future if climate change continues at the current rate. His study shows for the first time that, while the temperature difference between the Earth's poles and the equator is narrowing at ground level because of climate change, the opposite is happening at around 34,000 feet – a typical aeroplane cruising altitude.

### What does this mean for the aviation industry?

Tens of thousands of planes encounter severe turbulence every year, with an estimated cost to the global aviation sector of

up to one billion dollars annually, through flight delays, injuries to cabin crew and passengers, and structural damage to aircraft. Simon's findings have serious implications for airlines, as passengers and crew would face a bigger risk of injury. "Indications of a stronger jet stream in the future would also affect airlines by increasing flight times from Europe towards the US and speeding up flights the other way."

In August 2019, Simon published an article entitled "*Increased shear in the North Atlantic upper-level jet stream over the past four decades*" in the journal *Nature*, co-authored by Professor Paul Williams and Dr Thomas Frame from the Department of Meteorology.

SIMON LEE IS CONTINUING HIS METEOROLOGICAL RESEARCH AT READING AT PHD LEVEL, AND HAS PUBLISHED SEVERAL PAPERS ON HOW THE STRATOSPHERE INFLUENCES THE WEATHER WE EXPERIENCE AND OUR ABILITY TO FORECAST IT.



## ASTOR100 Celebrating 100 years of women in Parliament

**When American-born English socialite Nancy Astor entered the House of Commons on 1 December 1919, she became the first female MP in British history to take a seat in Parliament.**

For the first time a woman was able to directly influence the parliamentary debate, the writing of laws of her own land and facilitate the demands for progress towards political equality. Her courage and resilience in standing alone for almost two years in a hostile House established a platform on which women continue to build. In 1923, Astor introduced the Intoxicating Liquor Bill, the first Bill by a woman to be passed into a law in the UK, which is fundamentally still in practice today.

Astor100 was a major series of academic and public engagements that took place during 2019 (and into spring 2020) to celebrate the life and legacy of Nancy Astor. The project was managed by Dr Jacqui Turner and aimed to address issues of gender

Melanie Khuddro, doctoral researcher in the Department of History, reflects on the legacy of Nancy Astor.

balance and the contributions of women to politics and power. I worked closely with Dr Turner on the project, which involved recording oral testimonies with the Astor grandchildren to be deposited in the British Library for the National Trust. My thesis focuses on the theological undertones of Astor's politics, which has helped facilitate an increased awareness of Astor in the US, especially in the run-up to the centenary of the federal vote for women in the US in 2020. My research positions Astor as an American woman as well as a British politician.

Throughout the centenary year, I curated a digital exhibition on several public platforms based on the Astor Papers held at the University of Reading Special Collections. My role in the research project has also been largely media-focused and involved several television and radio interviews.

Perhaps the most significant event during Astor100 was the unveiling of a permanent memorial of Nancy Astor on 28 November 2019 in her constituency home on the 100-year anniversary of her successful election. This is England's first public statue of a female politician.

Astor's legacy is complex and her views have been widely criticised as anti-semitic. However, when she took her seat in the House of Commons, British democracy changed forever.

For more information, please contact:

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