



THE Darwinian



Genetics

On the 70th anniversary of the discovery of the structure of DNA, Darwinians uncover the secrets of genes

Also inside:



Professor Olha Kushniruk describes her flight from Ukraine



After 30 years, the College gardens turn over a new leaf



Recalling the life of Dr Olga Kennard

A Message from the Master

Dr Mike Rands

Genetics, green impact and a global community



It seems both timely and appropriate that this issue of the Darwinian should have a special focus on genetics. As the College prepares itself for its 60th anniversary in 2024, and the University of Cambridge celebrates 70 years since the unravelling of the structure of deoxyribonucleic acid (DNA) by James Watson and Francis Crick, the articles that follow demonstrate the continued contribution this College, bearing the Darwin family's name, plays in understanding the role of genes in our lives and that of all other life on Earth.

Charles Darwin's contributions to evolutionary biology are well known, but his contributions to genetics are much less so. He collected a tremendous amount of genetic data, and attempted to provide a theoretical framework for its interpretation; he described many genetic phenomena of fundamental importance and formulated a developmental theory of heredity. Interestingly, his grandfather, Erasmus Darwin - a respected physician, poet, philosopher, botanist, and naturalist - was also very enlightened in his theories around the origins of inherited characteristics, an interest sustained by subsequent generations of the Darwin family up to the present day.

In a similar vein, but over a much shorter time span, Darwin Fellows and students have engaged in ground-breaking research in many areas of genetics. These include Emeritus Fellow and Nobel Laureate, the late César Milstein, who

made such an extraordinary contribution to developments in monoclonal antibody technology; our 1970s alumnus, Sir Ian Wilmut, who went on to create Dolly the sheep at the Roslin Institute here in the UK; alumna, Honorary Fellow and Nobel Laureate Elizabeth Blackburn, whose discovery that chromosomes are protected by telomeres advanced the understanding of the field; and all those who have contributed to the pieces that follow.

As this academic year draws to a close I would like to extend an enormous thank you to the global community of Darwin alumni, Fellows, students and staff who have contributed so much to the life and productivity of the College this year. This has been my first 'near-normal' year as Master, with a rich mix of graduation ceremonies, formal and informal halls, full lecture theatres for the Darwin Lectures, garden parties, lively in-person research seminars and workshops, plus many other delightful informal College-based events.

Darwin has witnessed some exciting developments this year: the adoption of our Ten-Year Strategic Plan; the launch of the Erasmus Seminar Series; the purchase of 44 flats that form Causewayside for student accommodation; the opening of a new fully equipped College Gym; and the continued focus on sustainability with staff, students and our catering team winning yet more Green Impact Awards.

We have begun the degasification of our estate with air-source heat pumps being fitted to Frank Young House this autumn and a feasibility study for water-source heat pumps for the core properties underway. This year's students have been, as always, very active and innovative in their approach to sustainability – our May Ball was, I believe, the first Oxbridge May Ball to have entirely plant-based catering.

Darwin is first and foremost here for its students, so let me conclude by congratulating all of them. It has been, and remains, a difficult time to be a student for many reasons, some internal to the University setting, others thanks to global challenges largely beyond our immediate control. Many of our students this year have been recognised for their outstanding academic achievements and I do not have space to celebrate them all. But I would like to congratulate Chelsea Edmonds, a PhD student in Computer Science, on receiving the prestigious Mary Bradburn Award from the British Federation of Women Graduates in recognition of her outstanding research in mathematics, and thank her for her support for all of us in the College as DCSA President.

The Darwin College Lecture Series

Interrogating isolation



The Darwin College Lecture Series returned in 2023 to its original form as a live, in-person event only. While recordings were made available in the week following each lecture, on the night participants could only attend by scrambling for a seat in the Lady Mitchell Hall.

In the post-Covid era, with audiences accustomed to accessing content at home, this felt a slightly risky approach. With reservations not required, the organisers had no way of knowing ahead of time whether anyone would turn up at all, particularly as the series takes place in the cold, dark, evenings of January, February and March. But the emphasis on the shared, real-life experience paid off, with the audiences packing into the hall week after week providing a fitting counterbalance to the theme of isolation.

This theme was interrogated from angles ranging from the solitude of characters in medieval Persian poetry to the isolation of molecules using optical tweezers; the question of whether we are alone in the universe to the plight of those caught up in Australia's detention of asylum seekers. Audiences learned about North Korea's self-imposed political isolation, and what the geographical isolation of Antarctica can teach us about climate change; how quantum physics can help us to isolate information, and the choreography of atoms during structural change.

Above:

Professor Christine van Ruymbek giving the first lecture of the series, 'On escaping or not escaping solitude'

Organisers Professor Sir Harry Bhadeshia, Darwin Fellow and Emeritus Tata Steel Professor of Metallurgy, and Dr David Gershlick, Senior Member and Sir Henry Dale Fellow at the Cambridge Institute for Medical Research declared before the series began "I would say that the people who come to the lectures don't really care whether it's science or humanities. They're just looking for a good story."

The number of repeat attendees, week after week, supported this theory. The Lecture Series had returned to its rightful place as a weekly fixture on local calendars, and a unique opportunity to unpick a subject from eight very different sides.

Thank you to Janet Gibson for her immaculate organisation of the series, to all our speakers, and to Catering Manager Ivan Higney and his team for a series of delicious and imaginatively themed Formal Halls.

Erasmus Seminars

The Darwin Erasmus Seminar series was introduced in the autumn to fill a gap between the outward-facing Darwin College Lecture Series and the more casual internal Lunchtime Seminar Series. Aimed at a Darwin audience and followed by a Formal Hall, the Erasmus Seminars provide a timely opportunity to hear from members of the Cambridge community addressing global challenges.

This year's speakers were:

- Professor Catherine Barnard, Professor of EU Law and Employment Law
What happens when enforcement doesn't happen: Brexit, free movement and... Great Yarmouth
- Professor Jonathan Heeney, Professor of Comparative Pathology and Head of the Laboratory of Viral Zoonotics
Preventing the next Pandemic
- Dr Jennifer Schooling, Director of the Centre for Smart Infrastructure and Construction
Smart infrastructure – how data is helping us deliver infrastructure services fit for the 21st century

I've been hooked ever since

Award-winning cell biologist PROFESSOR RON LASKEY explains how a sixth form science class set in motion a 60 year career in genetic innovation



In the sort of moment which teachers' dreams are made of, Professor Ron Laskey still remembers his first ever Sixth Form Biology class in 1960.

"One of the first things I came across was DNA and its structure. I was hooked, and have been hooked ever since on that as an area to work on," says the cell biologist and cancer researcher, who has received a CBE for Services to Science, and a Cancer Research UK Lifetime Achievement Prize in Cancer Research.

Though he points out that he was "too young to be excited by the discovery of the DNA structure," in 1953 when he was eight years old, that breakthrough shaped Ron's career and the field to which he has contributed so significantly.

Following a degree in Zoology at Oxford, Ron completed a PhD under the supervision of John Gurdon, with whom he would later found the Gurdon Institute.

"I worked on transplanting nuclei from adult cells back into eggs without nuclei, to see if they had retained all the genetic information. Which was an exciting project to be doing in the 1960s!"

Three years as a postdoc in London at the Imperial Cancer Research Fund (now Cancer Research UK) gave Ron the opportunity to study viruses and their effects on cells.

"While there, John Gurdon had moved to the MRC Laboratory of Molecular Biology in Cambridge, and a year after he had moved there I joined him at his invitation and set up my own lab, initially within John's space."

Completing the experiments they had begun together transplanting the nuclei of adult skin cells, Ron then "went off in several other directions", including exploring how viruses could be used to understand cell function.

But sometimes the most significant encounters in a scientific career are those which do not fit neatly into a CV.

"In between Oxford and London I had six weeks in Cold Spring Harbor on Long Island, where to my amazement I was immediately invited to dinner by Jim and Elizabeth Watson. Jim clearly wanted to pick my brains on what was going on in British science, and was very supportive ever since. And when I went to the LMB, Francis Crick was my head of division jointly with Sidney Brenner (who won the Nobel Prize for Medicine in 2002)."

Ron's career, as he explains, has focused on the cell nucleus, the site of DNA production. Careers like his, and the transformations in human understanding which they have made possible, have shaped and been shaped by a sequence of dramatic developments in the field of genetics over the past 80 years.

"Genetics has advanced in sudden leaps forward. The first was discovering that DNA was the genetic material, which pre-dated Watson and Crick and was discovered in the 1940s, and was the first big cornerstone of what happened next. Then the structure of DNA immediately showed how genetic information was passed from one cell to another. That was a massive advance because it showed that the separation of the two strands provided templates for making the next two strands. Genetics suddenly became tangible."

Within the timespan of Ron's own working life, one particular breakthrough stands out.

"There are lots of important steps like solving the genetic code, but the one that really blew me away completely was in 1970. At the end of my six weeks in Cold Spring Harbor there was a symposium on tumour viruses, and there was one talk in the abstracts which was so totally misplaced that I felt terribly sorry for the poor graduate student who was being asked to give a talk on some strange enzymes of bacteria, at a meeting which was entirely about viruses that cause tumours in animals."

"It was one of the most mind-blowing talks I ever heard, because what she had done in her PhD was show that a group of enzymes that protect bacteria from invading DNA was able to cut DNA at precise sites, and you could therefore construct a map of DNA. This was totally transformative. It was utterly amazing, and I've never forgotten that talk. It meant that DNA was no longer a long piece of string with no landmarks – there were landmarks, road signs, all sorts of things along it. The possibility of it making sense arose."

Ron has pursued a lifelong curiosity to understand what tells cells when to divide and when not to, a focus which he says he has sometimes followed in "some esoteric ways". For many years his research made extensive use of frog eggs which, he explains, act as "a ready-made cell proliferation machine – in the time that a human cell divides once to make two cells, a frog egg has made thousands of cells".

"I worked on transplanting nuclei from adult cells back into eggs without nuclei, to see if they had retained all the genetic information... an exciting project to be doing in the 1960s!"

The realisation in 1998 that protein markers which he had identified could be used to identify cells which are dividing when they shouldn't be has since been used in screening for several forms of cancer.

In 1982 Ron accepted the position of Charles Darwin Chair of Animal Embryology at Cambridge, and shortly afterwards was asked by César Milstein to become a Fellow at Darwin.

"Darwin is a delightfully inclusive environment. I have to say that one of the things that attracted me to Darwin was that it was less hierarchical than the other Colleges which had approached me, and it also recognised that partners exist, and can be entirely suitable for bringing into College at frequent intervals, which not all Colleges recognised! I'm delighted that I did come to Darwin. In fact I knew that I wanted to, but didn't know if I could take an initiative to try. Just in time Darwin asked me!"

The Gurdon Institute, which Ron helped to found as an Institute for the Study of Cancer and Developmental Biology with John Gurdon in the late 1980s, is today a world-leading centre of research. While the impact of its work, and his own individual contributions to science, will have lasting and momentous benefits for humanity, it is the Institute's role in fostering the talents of other scientists which Ron cites as his proudest legacy.

"All the original young group leaders that we hired to set up new cancer research groups in the Gurdon Institute became Fellows of the Royal Society before they were 50, which was enormously satisfying. I'm proud of the people I've passed the torch onto, who've done some very good things, and are continuing to do good things."

Genetics Panel Discussion

The most fundamental processes of life

Three Darwin Fellows talk to Communications Manager LAURA KENWORTHY about how their distinctive approaches to genetics offer different insights and opportunities.

Dr Aylwyn Scally, Darwin Fellow, Researcher in Human Evolutionary Genetics, Department of Genetics

Dr Torsten Krude, Darwin Fellow, Lecturer and Researcher in Cell Biology, Department of Zoology

Dr Tamsin Samuels, Herchel Smith Postdoctoral Fellow, Department of Genetics



“If you start off with a fertilised egg which has one copy of the genome, how do you end up with all the complicated different tissues and different cell types that we have?”

Tamsin

LK: Could you each tell me a little bit about your area of interest, and how you arrived at it?

AS: We all work on very different areas and aspects of genetics. I'm an evolutionary geneticist, so I'm interested in genetics as a means to understand what happened in the past. It's inherent in the nature of the genome, that it records information about the past, but understanding what that actually is, and interpreting that information, is very difficult. It's all jumbled up, mixed up with all kinds of other things that we don't yet know or understand about ourselves.

TK: I work on the process of DNA replication, which is the process that happens in every cell that we know of that is based on DNA as a coding molecule. Every cell has to duplicate its own entire genetic information before it divides and segregates one perfect copy in each of the two daughter cells. And only through that process, the accurate duplication of the genome, can life be sustained.

TS: My interest is how an organism is built. If you start off with a fertilised egg which has one copy of the genome, how do you end up with all the complicated different tissues and different cell types that we have when you're starting with the same information? And so that comes into how you regulate which genes are switched on and off, at what time, and how the process by which a cell specialises is controlled and directed.

LK: What were your routes to those particular points of focus?

AS: My pathway is through a kind of mathematical and computational approach. My original background was as a theoretical physicist, and I

came into genetics partly because there was a need to apply these mathematical methods and tools and computational approaches, and that's something that physicists are trained in. But I should say, my interest when I was a physicist was also in understanding what happened in the past and to some extent how we evolved, in that I worked in astrophysics and my PhD was on the formation of planetary systems and solar systems. So in some sense I was just working on an earlier part of the story.

My work is on population genetics, and that's essentially a mathematical model for how genomes evolve in populations. It's using these mathematical tools to try and get at information about what happened in the past. When did populations, groups, species diverge from each other? How did that happen? How big were they in the past? What factors were there that caused that to happen?

TK: I studied chemistry and biology, with a focus on molecular biology, got a PhD in the subject of biochemistry, and was a postdoc in Ron Laskey's lab, where I started to work more on the cellular aspect. So I moved from viruses, to the cell, to the genome. I would argue that what I'm doing is a kind of molecular genetics, and it's the heart of inheritance. From one cell to another, from one organism to the other, it allows populations to form, members of a population to recombine ever so slightly their own DNA, to make changes or stability within populations. I think these are the most fundamental processes of life.

TS: My background is similar in that I was trained in biochemistry and my PhD is biochemistry as well, and I only joined the Genetics department or even decided to think of myself in any way as a geneticist

Genetics Panel Discussion

in 2020, so quite recently. I guess I consider myself more of a developmental biologist or a stem cell biologist, using genetics as a tool.

So by the time I got into research I was interested in using all the genetic tools that are available to try and understand the regulation of the genome and what different genes are doing. And the reason I've spent most of my research working on flies is that there are incredible genetic tools to inactivate different genes, or activate them inappropriately and see what happens. We also do a lot of genome sequencing to see what genes are expressed in different tissues.

AS: I think the work that Tamsin's doing is very much a modern realisation of the classic genetics approaches that were done back through the decades. The earliest genetics departments were set up and people were doing all of these experiments with flies, crossing them, trying to identify which genes were involved, associated with which traits and phenotypes.

TS: It was just much harder then!

AS: Yes, back then it was literally by mating. Now you can actually select out particular genes and bits of the chromosome and knock it out or add it in and see what happens.

LK: So in the timeframe of your own careers, are there particular breakthroughs which have happened in the field that you remember as significant?

TK: I think that technological developments have changed the field significantly. First and foremost is high-throughput DNA sequencing that is affordable. Done here in Cambridge – that was a massive breakthrough. It allows us to do things now that we were not able to do. Then the availability of cheap computing, churning through massive data sets – that was unimaginable 20 years ago.

And then biochemical techniques that allow us to efficiently extract and amplify DNA for sequencing, literally to be able to pick a tiny piece of biological material and get to the position to extract the DNA sequence in the form of 'genetic words'. I think this is absolutely mindboggling and revolutionary beyond recognition.

AS: For me probably the biggest thing was the ability to sequence ancient DNA. The idea of actually digging up a fossil that was somebody who died 1000, 10,000, 50,000 years ago and obtaining DNA from them was just an almost unimaginable fantasy. It has absolutely transformed things because now we don't just have to try to reconstruct things from present day sequences; we have a direct window into the past. It's like a new telescope for astronomers.

TS: I've been involved in research only for about a decade. And so at that point genomes were all pretty much sequenced. During my undergrad degree CRISPR came out – gene editing – so that was really big, everyone was super excited about that.

AS: So, Tamsin, some of these technologies that Torsten and I have seen are things that previously we would have just dreamed of. What would be your wishlist for the technology that you would like to have in the next 10 years or so? A superpower, if you like!

TS: So more recently you can now sequence the RNA in single cells, and a lot of the work that I do is on the regulation of the RNA after that, how much is translated, how much protein you produce. And you can't do any of that in single cells yet. So I would think pushing more of the other types of molecular biology whole genome wide, but in single cells. Which I'm assuming is probably in the pipeline with someone! But not as yet.

“We have a direct window into the past.
It's like a new telescope for astronomers.”

Aylwyn

“I’m finding the artistic approach to science more and more appealing the older I get.”

Torsten

LK: Are there specific questions that you’re working on to try to answer, or is it more fluid than that?

TK: Yes, definitely very defined and focused projects. In each of our cells we’ve got 2m of DNA. We know it takes about eight hours for that 2m of DNA to be duplicated. And we know the speed, how many letters, how many base pairs per second are being made by one machine. And therefore we know that there need to be about 50,000 machines going on in parallel. So if we have 50,000 start sites, if any of those fires twice, then it’s carnage, the cell is doomed. So this has to be very tightly regulated.

But now I am personally focusing on two things. Using a combination of genome biology and biophysics, with a bit of cell biology, to identify where these start sites are, where the DNA replication begins in the human genome, and to look at how efficiently these sites are used. And I am also looking at the molecules that assemble at these sites to make the machinery that eventually replicates the DNA. We have been investigating how that is assembled - what factors do we need, what components that float around in the cell nucleus at the right time and the right concentration have to come together at that site to build this machine that then begins to duplicate the DNA. And we have made some significant contributions to identify some really unexpected components.

AS: The process of replication is fundamental from an evolutionary sense. It’s very important in fact that it’s not 100 per cent perfect, because if it were then we would have no evolution. We would all be the same as the first molecule that replicated. So a really central question in genetics, for me anyway, is understanding what makes these mutations happen, or what factors affect them. Why is it that in some organisms there are more mutations per generation, more changes from one generation to the next than in other organisms? Some individuals pass on more differences to their offspring than others – are there factors that affect that? All of those questions are fundamental to how the evolutionary process works and therefore if we want to understand what

happened in the past we’ve got to understand this process.

TS: In my career so far I’ve had questions that span three or four years at a time that then sort of overlap and move forward. I don’t think I would know now what I want to work on in 40 years. I suppose for both of you, the possibilities must have changed so much since you started, and I assume that will carry on going forwards. So we don’t know what we could have done, or what will be the interesting questions!

LK: And what excites you all about the questions that you’re asking and the field that you’re working in?

TK: Curiosity. To create a concept. I’m finding the artistic approach to science more and more appealing the older I get. There was a moment when I was sitting there and I thought “I’m the only human on the planet that understands this problem,” which is scary and exciting, even if it’s a tiny problem. But now my students understand it as well, so research leads to teaching. That’s my motivation.

TS: I feel like I want to reiterate partly what you said. Problem-solving is the other. I think trying to work on a problem that other people aren’t working on is more motivating than feeling like other people are chasing the same idea. I’ve not really been in a situation of racing to solve the same problem – I’d rather try and think of something different that I have the particular skills or interest to do.

AS: It’s funny though, I think there is definitely a sense in some fields of this pressure, this fear of competing or being scooped. Even if you have an exciting result, there’s just the fear of somebody else doing the thing that you’re doing better than you. I certainly felt it too, but as you get older or more advanced in your career you realise it’s not such a worry. It happens, sometimes someone else publishes something that you were working on, but often it’s actually just a sign that what you were working on is an interesting question, and that there’s scope for multiple takes and views on it.

Professor Anne Ferguson-Smith

explains why, despite juggling multiple roles and responsibilities, she will always have time to discuss genetics.



Professor Anne Ferguson-Smith is a busy woman. The Darwin Fellow and former Head of the University's Department of Genetics is Arthur Balfour Professor of Genetics, Pro-Vice-Chancellor for Research and International Partnerships, Fellow of the Royal Society and President of the Genetics Society. The day we speak she is battling through jetlag, having returned from Singapore the day before. In June she was appointed CBE for services to Medical Research in the King's Birthday Honours, and was Jim Al-Khalili's guest on BBC Radio 4's *The Life Scientific*.

Her role at the Genetics Society, which was founded in 1919 and promotes research, training, teaching and public engagement in all areas of genetics is "quite big and a real honour", she says.

"I accepted the role before I knew I was going to become Pro-Vice-Chancellor, so my life turned out to be a little busier than I thought."

However, you get the impression that if a job is connected to genetics, she would struggle to turn it down.

"I love genetics – I'm very happy to talk to people about genetics!" she says cheerfully.

As the daughter of medical geneticist and founder of the Cambridge Resource Centre for Comparative Genomics Professor Malcolm Ferguson-Smith, now aged 91, one could say she entered the family business. But Anne is dismissive of suggestions that she deliberately followed her father's example.

"I had choices. I didn't decide when I was young that I was going to be a scientist and then a geneticist, and I didn't stand in awe of my father or want to follow in his footsteps. But I have always been fascinated by genetics and I did see my first chromosome when I was a child and was sort of smitten."

However, while she plays down her own family's contribution to it, Anne is rightly proud of the role that Cambridge as a whole has played in the development of her subject.

"The discovery of the structure of DNA happened 70 years ago, but before that there was a very strong history of genetics at Cambridge, starting from much earlier. I would say it was one of the birthplaces of genetics as a discipline. The Genetics Department was formed in 1912 with the endowment of the Balfour Professorship of Genetics, but before that William Bateson and colleagues such as Edith Saunders and Reginald Punnett (the first Balfour Professor), were working together and uncovering fundamental principles of genetics."

This pride in Cambridge's genetic credentials extends to the present. Anne

is particularly clear that the University's decision to retain a specific Department of Genetics, while other institutions are losing or combining them, was the right call.

"With the onset of genome biology and genome sequencing, the discipline of genetics was seen as a sort of tool that touched everything in the biological sciences. Now, of course, genome biology does touch most of biological and biomedical science, but the discipline of genetics, particularly in an educational context, is extremely important. It's about the study of heredity and the study of inheritance, relates to evolution and populations, and DNA is a central part of that. And there are multiple areas in which there are still plenty of conceptual advances to be made. So institutions that have lost their genetics departments I think are the poorer for it, particularly since our natural scientists and our medical students need to have a grounding in the understanding of inheritance in order to really effectively apply genome biology to what they do. All our students should have an understanding of genetics because of its impact on society."

When Anne started out as a molecular geneticist, the focus of the field was on identifying and sequencing genes, as well as looking for mutations associated with particular inherited diseases. She points out that molecular genetic analysis has transformed both research and the analysis of patient populations.

"It's an integral part now of early detection and prevention of disease, and it's an integral part of our understanding of the complexities of our populations and how some people get diseases and others

"The public really care about the transmission of their own traits to their offspring."

don't. My particular area is the field of epigenetics. Of course, all our cells have the same DNA, and that DNA is packaged into these structures called chromosomes, and chromosome biology has been a longstanding field that's very much depended on microscopy (cytogenetics). But now, with the advent of molecular genetics and sequencing technologies, the old classical type of cytogenetics of my father's time doesn't exist so much anymore, and molecular genetics and functional genomics is the direction of travel."

As a leading authority on genomic imprinting and epigenetic mechanisms, Anne has devoted much of her career to expanding our understanding of how cell types can simultaneously have identical DNA and yet be different from each other.

"Epigenetics is in general about how DNA is packaged into chromosomes to influence both the structure of the chromosome and how genes are regulated along it," she explains.

"So, for example, a brain cell packages its DNA in a way that enables genes that are important for brain function to be expressed, whereas a liver cell will package its chromosomes in such a way that those particular genes are not accessible in a liver cell, and instead liver genes are open for expression. Epigenetic modifications to DNA and to the proteins that package it, influence a gene's accessibility to the factors that turn it on or off.

Epigenetic modifications are chemical marks that sit 'on top' of either the DNA or the histone proteins around which DNA is wrapped. One of the best studied is DNA methylation."

Perhaps counterintuitively, however, epigenetic marks do not appear to pass between generations, something which Anne believes is frequently misunderstood.

"Genetic material, or DNA, is of course at the centre of inheritance and is transmitted from one generation to the next. But there's a big question about the extent to which the epigenome can be transmitted. You might imagine that if an epigenetic modification is sitting on the parent's DNA, there is the potential for that non-genetic information to be transmitted to offspring. But actually one of the things that's very important about epigenetic modifications in mammals is that the epigenome is erased and reconstructed, not once, but twice, from one generation to the next. I don't think that concept is well appreciated."

Only a tiny proportion of our DNA encodes genes that code for proteins, Anne explains.

"But that doesn't mean that the other 98% of it is not functionally relevant, for example as regulatory sequences. In humans, around half of our DNA is repetitive - sequences of DNA that are repeated over and over and over again, and many of those sequences look like viral DNA. Many of those sequences also have the ability to jump around, because they contain some of those regulatory sequences and viral genes that enable them to integrate into the genome. It's very important that is suppressed. One of the things that epigenetic modifications have evolved to do is to be targeted to those sequences and package them tightly to make them inaccessible to the gene expression machinery. Over time, some of these repetitive sequences have

mutated, and now actually don't really look like mobile elements anymore yet they are still epigenetically modified and act as regulatory sequences affecting the behaviour of neighbouring genes. These sequences are not in identical places in different individuals, so they could explain why one individual is different from another or why one individual might have a disease and another one doesn't".

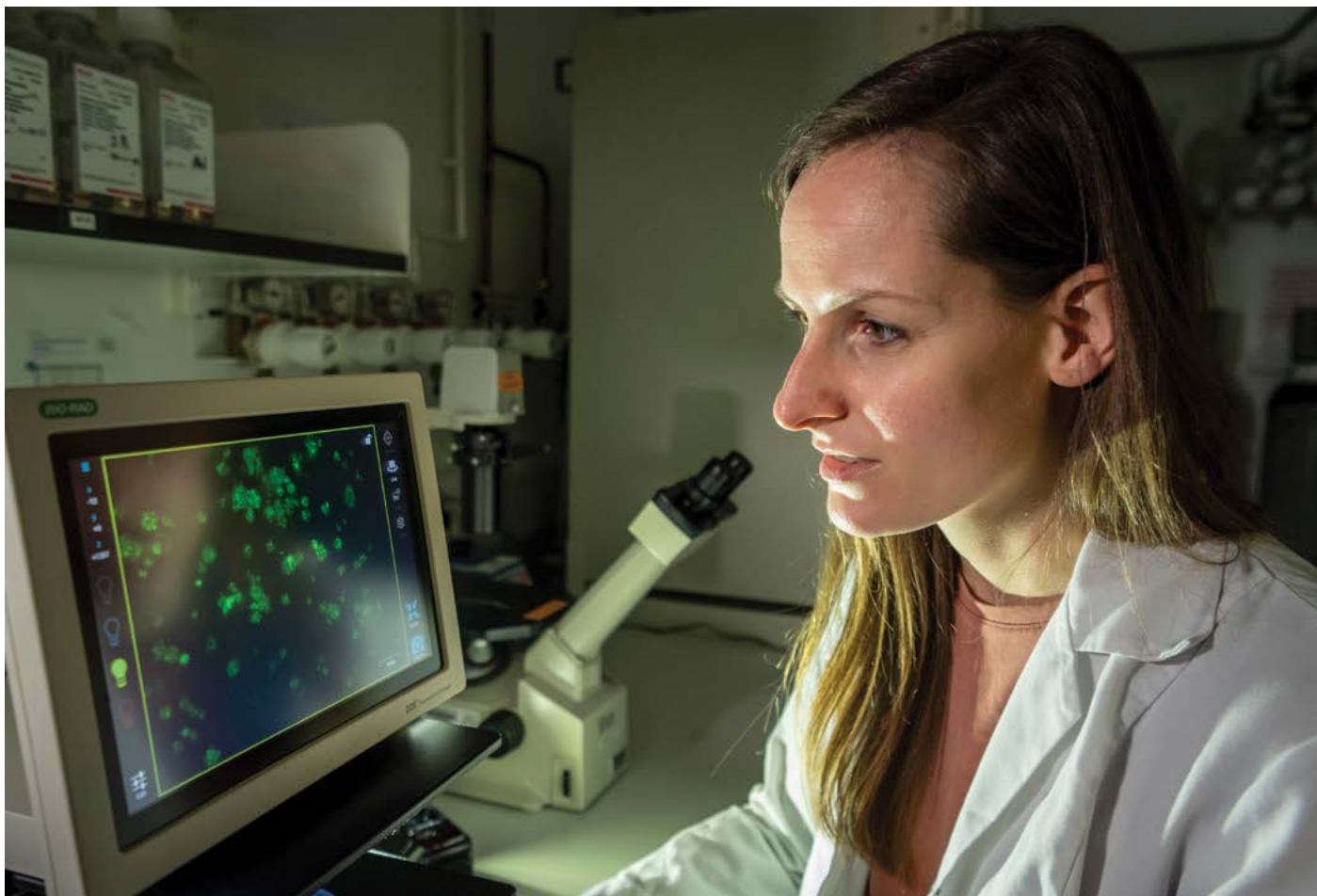
The possibilities have been enhanced through the advent of CRISPR technology, enabling advances in the targeted editing of the genome, which has transformed both experimental research in genetics and epigenetics, and the ability to develop therapeutic applications.

Anne's excitement and enthusiasm for the ever-evolving possibilities of genetic research are tangible, even as hectic schedules across her multiple roles compete for her seemingly limitless energy. This year the Genetics Society marked the 70th anniversary of the structure of DNA with a series of lectures and prizes, celebrating a milestone which fixed genetics permanently in the public consciousness.

"I think we underestimate the public's understanding of genetics; we found that especially after COVID, the public's knowledge and interest is growing," Anne says. "The public really care about the transmission of their own traits to their offspring and the impact of mutation and their lifestyles on themselves and their children. It's a huge discipline, and the discovery of the structure of DNA was of course central to that, but there was a discipline before that and there remains plenty still to understand and apply in the future."

Dr Jasmin Taubenschmid-Stowers

How embryonic stem cells hold the key for new understanding



© Keith Heppell

When Dr Jasmin Taubenschmid-Stowers left Austria after completing her PhD at Vienna's Institute of Molecular Biotechnology, she knew that Cambridge would provide exciting opportunities to pursue her research. What she didn't expect was that she would become one of the first scientists to identify a subset of human embryonic stem cells, which enables the earliest stages of development to be studied without the use of human embryos.

"It was quite unbelievable," says Jasmin, who was lead author on the study published last year by the Babraham Institute's Reik Lab. "It was a combination

of being in the right place at the right time, because we have tools available that beforehand were not available. These new single cell methods allowed us for the first time to identify these cells and really capture them efficiently, because they have been kind of neglected."

Until recently, the only human embryonic stem cells available to researchers were those corresponding to the epiblast of the post-implantation blastocyst. New protocols introduced a few years ago allowed researchers to culture cells representing an earlier stage, the pre-implantation inner cell mass of the blastocyst. The Reik Lab team discovered

that an even earlier stage could be replicated, using cells which correspond to the eight-cell human embryo, termed 8-cell-like cells.

"They are very unstable, and this is a very transient stage, but certain features that we see in a specific sub-type of cells reflect surprisingly well what we see in the eight-cell embryo, so that's been fascinating, and very surprising."

The equivalent cells in mice, known as 2-cell-like cells owing to the fact that the same stage of development is a two-cell stage in mice, were identified over a decade ago.

"It took 10 years for us to find the same in humans, and I was always wondering 'why has nobody seen this; it probably doesn't exist,'" Jasmin recalls. "So I was very surprised that I was among the first ones to actually find it. The interesting thing is that they have always been there. They represent a small population of normal, pre-implantation stage embryonic stem cells, and we have examples in the fridge which people five to seven years ago had in the lab. We looked for those cells because now we know what to look for, but they've been there all along, it's just that nobody noticed them before."

While at the Babraham Institute Jasmin was a Research Fellow at Darwin, an affiliation she held from 2020 until earlier this year, when the team, led by Professor Wolf Reik, collectively moved to Altos Labs' Cambridge Institute of Science.

"Darwin was super supportive on the social side, particularly arriving during the pandemic, which was in general a bit of a tough time," she says.

Altos, which also has sites in San Diego and San Francisco, is a recently established life sciences company focused on cellular rejuvenation. The transition to industry means that, while Jasmin will continue to explore the possibilities revealed by the discovery of 8-cell-like cells, she will do so with a more specific outcome in mind.

"The kind of full academic option would have been to just continue on this path, but the focus of the company is a bit different. It is related – that's, after all, why our group was hired – but it's not exactly the same. So I will try to use these in vitro model systems to see what we can learn about cell health and

"They've been there all along,
it's just that nobody noticed
them before."

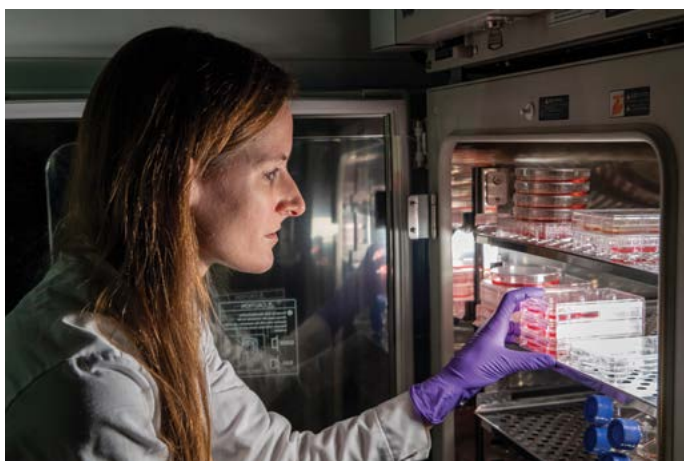
resilience. Because stem cells of course don't age. While other cells age, differentiated cells, somatic cells like skin cells... all of these other cells age."

The ageing process of other types of cell is of particular interest in relation to the egg and sperm cells which give rise to the embryo. While the component cells may have aged, if they succeed in fertilisation the resultant embryo does not carry the effects.

"The next generation, the embryo, starts anew. It doesn't carry this old age over from the mother, so that's why embryonic development is also interesting to consider in terms of age reset. For this kind of natural renewal or natural reprogramming that happens every generation again and again. And we think that we can look at nature and this natural process of development to find out how we can support the natural reprogramming of a cell, maybe also in artificial ways."

Working in industry has meant getting used to a dramatic increase in the number of meetings, as well as, due to close collaboration with the company's Californian sites, a crash course in American working habits. But, with the majority of her colleagues having made a recent transition from academia, the prevailing culture is reassuringly familiar.

"Our group leaders are still scientists that come from academia, we do science in a very similar way, and we have a lot of freedom, as long as it's focused towards the mission, which is to improve cell health and resilience. The good thing is we all come from different backgrounds and we all bring something unique. The diversity of labs that has joined Altos in Cambridge is huge, from extra-cellular matrix to development like my lab, neurobiology... so everyone brings their background with them and we all work towards a shared goal. Altos is very collaboration oriented. So they really want this diversity and they want us to think out of our box and work together and find new approaches to tackle old problems. It's a kind of sweet spot between academia and industry. We don't have to write grants or apply for fellowships, and we can still work on whatever we want to as long as we can justify how it would benefit the greater goals. This freedom doesn't exist in many places in that way and I'm excited to be a part of it."



© Keith Heppell

Moritz Blumer goes fishing



If more people knew that a PhD in Computational Genomics could involve spending weeks on end scuba diving in Lake Malawi, there might be more applications than the University could handle. For Moritz Blumer, the fieldwork is a fascinating highlight of his research into the species diversity of the Lake Malawi's cichlid fish.

"Malawi cichlids have been studied for their diversity in appearance for more than a century," the third year Darwin PhD student explains. "In less than a million years, which is a very short time on an evolutionary scale, an estimated 800-1000 species of cichlids evolved from one or a handful of ancestors in Lake Malawi. This makes the system ideal to study speciation. Speciation rates in cichlids are unparalleled by any other vertebrate group. Most interesting to me is that ever since people started to look into Malawi cichlid genetics, it became very clear that their genomes are much less diverse than what one would expect from the extreme variation in physical appearance."

Even though all species can be crossed in a lab setting and hybridisation is common in the wild, the pronounced differences in appearance and ecology suggest treating them as different species. A significant question in evolutionary biology is how speciation can take place in the face of hybridisation and the absence of geographical barriers.

"It's possible now to sequence full genomes at large scale," says Moritz. "So we're trying to sequence as many taxa and

specimens as possible to understand how this huge phenotypic diversity relates to genetic diversity, and to investigate the basis of explosive speciation. Malawi cichlids are from a genetic point of view a very complex and interconnected system, and frequent hybridisation makes species delimitation challenging. One of the most interesting findings so far is the presence of large structural rearrangements within chromosomes, which we suspect are playing a role in speciation and adaptation."

"...as a biologist, studying at a College named after the Darwin family is very cool!"

This research drew Moritz from his native Germany, where he completed an undergraduate degree in Biological Sciences and a Masters in Ecology and Evolution at Goethe University Frankfurt, followed by a Master thesis at Dresden's Max Planck Institute of Molecular Cell Biology and Genetics, to Cambridge.

"I wanted to come specifically to work with Professor Richard Durbin on this project. I remembered the cichlids as textbook examples from high school science classes and was really excited by Professor Durbin's genomics work. Getting my head around the College system took a bit of time, but once I started researching I really liked for example the fact that Darwin was the first College to admit women and men. And as a biologist, studying at a College named after the Darwin family is very cool!"

Having previously studied the evolution of vampire bats, the focus on fish has necessitated a change of element.

"Most of the fieldwork is spent scuba diving and trying to catch the fish, which is fun! Preserving the samples after a long day of fieldwork, and organising their transportation back to Cambridge is the time-consuming part."

While in Malawi Moritz and his group work closely with the University of Malawi and the Malawi Fisheries Research Institute. Before his next two-month field trip later this summer, however, he is completing a four-month internship in genomics research at the University of Montana.

"It couldn't be more different from Cambridge, in every possible way," he laughs, gesturing at the mountains in the background of our Zoom call. "But it's been a great experience."

Katarina Grobicki catches flies



When Katarina Grobicki was at school, a career spent analysing fruit fly genes wasn't on her radar.

"I didn't know 'scientist' was a job," the Darwin PhD student says now. "My teachers suggested I apply for medicine, because there was an assumption that if you were good at science that was what you did, whilst my mum, who's a nurse, told me not to go near healthcare!"

Instead she studied Natural Sciences at Newnham, followed by an MPhil in Genetics. It was during her undergraduate degree that she began to realise that pursuing science for the sake of science was what she wanted to do longer term.

"The actual practicals were quite formulaic, but talking to the postgraduate demonstrators about their PhD research was really exciting. I also did a summer project at Oxford during my undergraduate degree which really showed me that I enjoyed being in a lab."

Katarina made the short transfer down the road from Newnham to Darwin for her PhD, to take advantage of the opportunity to be part of a wholly graduate community. Her research explores the importance of translation in germline development, looking specifically at the ovary of the fruit fly.

"Proteins are the workhorses of the cell, and translation is the final step of gene expression, which produces the proteins encoded by our genes. I'm looking at ribosomes, the machines within the cells which synthesise all proteins. The earlier stages of gene expression (such as transcription) are very regulated

and have been well-researched, while historically ribosomes have been thought not to be particularly regulated. We're now realising that ribosomes can vary between different tissues, and that regulation of translation and ribosome production is an essential part of the control of processes such as stem cell differentiation."

Gene editing technology has transformed the possibilities of this area of research, and Katarina is aware that her experience is unrecognisable when compared with that of her predecessors.

"The whole system of academia is quite bizarre, but I really love the science."

"I can't imagine doing science before CRISPR!," she says. "Over the course of my PhD I've mainly been studying 11 different genes, and have made at least five mutations in each, plus designed tools to overexpress certain genes or tag them with fluorescent proteins. Flies are brilliant, and compared to other species there are just so many tools available for manipulating their genetics, thanks to them being used as a model for over 100 years, with each generation of scientists producing new tools."

During the pandemic, after lockdown, access to the lab was granted according to a strict shift pattern, and Katarina found herself only able to go in after 3pm. She signed up as a virtual volunteer with the Brilliant Club, a charity through which PhD students offer their time to support able but disadvantaged students in secondary schools.

"I taught them about germline versus somatic genes and gene editing – it was amazing how quickly the students grasped the mechanics of CRISPR-Cas9, and by the end of the term we had a really interesting discussion about the ethical issues surrounding the Chinese CRISPR babies (three children born in 2018-19 whose genes had been edited as embryos)."

With the end of her PhD now looming, Katarina is looking ahead to the next stage of her academic career.

"I'm currently madly trying to do as many experiments as I can before I write it up. It's such a strange world if you're not familiar with it – when I say to my family that I'm applying for postdocs they say 'is that *another* degree?' The whole system of academia is quite bizarre, but I really love the science."

Development Office news



The Development Office has seen significant change this year as the College said farewell both to **Sam Venn** (above-left, centre), Director of Development for the past six years, and **Sophia Smith** (above-right), who for 18 years was the point of connection between Darwin and its alumni.

Sophia, who retired in February, first joined the College as Alumni Secretary, launching a fledgling events and engagement programme. Over nearly two decades she witnessed the introduction and growth of the College's fundraising efforts, as well as the rise of social media and its transformation of alumni relations.

Sophia held multiple roles within the now well-established Development Office, turning her hand to events, fundraising and communications, and was also the longstanding editor of the *Darwinian* magazine.



Sam, the College's first Development Director, stepped down in May. Over afternoon tea, former Master Professor Mary Fowler paid tribute to him for professionalising Darwin's growing programme of fundraising, as well as for building relationships with alumni around the world.

Dr Mike Rands, the present Master, recalled how Sam had supported him in taking up his role mid-pandemic, initiating virtual introductions to students and alumni, and enabling him to lead a dispersed community.

Both Sam and Sophia have made an enormous contribution to the life of the worldwide Darwin community, and between them shaped the College's engagement with its alumni. We wish them both all the very best.

Appointments and Awards throughout our Community

Professor Anne Ferguson-Smith has been appointed Commander of the Order of the British Empire (CBE) for services to Medical Research in the King's Birthday Honours List. A longstanding Fellow of Darwin, Anne is Arthur Balfour Professor of Genetics, Pro-Vice-Chancellor for Research and International Partnerships, Fellow of the Royal Society and President of the Genetics Society.

Professor Ron Laskey, Darwin Fellow and Emeritus Professor of Animal Embryology, has been named an Officer of the French National Order of Merit by President Emmanuel Macron.

Two Darwin alumni were recognised in the King's Birthday Honours in June.

Ms Jane Marriott OBE (MPhil in International Relations, 1998) was named as a Companion of the Order of St Michael and St George for services to British Foreign Policy. Having served for the past four years as British High Commissioner to Kenya, Ms Marriott takes up the role of British High Commissioner to Pakistan this summer.

Dr Ed Garratt (MPhil English Literature 1999; PhD in English Literature 2005) received an OBE for services to the Integrated Care System, in his role as Chief Executive of the NHS Suffolk and North East Essex Integrated Care Board.

Darwin alumnus **Lhendup Tharchen** (above-right), MPhil Conservation Leadership, 2016–17) has been recognised



by the Explorers Club as one of 50 "extraordinary individuals changing the world". A forester and conservation biologist from Bhutan, Lhendup has spent the past decade surveying the country's population of tigers and snow leopards, studying the co-existence of humans and wildlife, and developing conservation action plans.



Darwin Fellow **Dr Ioannis Kontoyiannis** (above) has been named Fellow of the Institute of Mathematical Statistics. Ioannis, who is Churchill Professor of Mathematics of Information, received the honour in recognition of his outstanding contributions to fundamental problems in information theory; and for consistent and important contributions in developing the deep connections of information theory with probability and statistics.

Darwin alumna **Dr Trang Nguyen** (below) has been selected as the overall winner of the Science and Sustainability British Council Study UK Alumni Awards in Vietnam, and is now a finalist in the global awards to be announced later this year.



Darwin Fellow **Dr Thorsten Boroviak** has been granted a Career Development Award by the Wellcome Trust. The scheme provides funding for mid-career researchers with the potential to be international research leaders, allowing them to develop their research capabilities and drive innovative programmes.

Daniel Buhl, a Darwin PhD student in Biological Sciences at the School of Veterinary Medicine, and former DCSA President, was awarded the Trinity Bradfield Prize this term, granting him support to commercialise his research. Daniel was awarded First Prize for Rapid Diagnostics,

a diagnostic test for bacterial infections in cows. A reliable test would help to reduce the risk of antimicrobial resistance and infection from animals to humans.

Two Darwin students received medals at STEM for Britain, a major scientific poster competition organised by the Parliamentary and Scientific Committee.

Bea Jones, a third-year PhD student in the Photoactive Materials group at the Department of Materials Science and Metallurgy, was awarded the Roscoe Medal (Gold prize) for Chemistry, while **Isabel Esain-Garcia**, fourth-year PhD student in Medical Sciences at the Cancer Research UK Institute and Department of Chemistry won the Physiological Society Prize in Biological and Biomedical Sciences.



Third year PhD student in Chemistry **Niamh Hartley** (above) has been elected as DCSA President for the academic year 2023–24. Niamh takes over from Chelsea Edmonds, who has ably represented the student body for the past year. Originally from Manchester, Niamh studied as an undergraduate at the University of York, and spent time overseas as a visiting student at the University of Rochester, New York, and Tokyo Institute of Technology. Her PhD research is focused on electrochemical carbon capture.

Meg Groom (below), Darwin PhD student in Physics, and the College's Sustainability Engagement Coordinator, received a Vice-Chancellor's Social Impact Award at an event organised by Cambridge Hub, a student-led group promoting social action. The award recognised her academic research on lithium-ion batteries, as well as her involvement in sustainability and community-building initiatives in Darwin and at Cambridge.



Meg also received an award for community engagement at the University's Green Impact awards, for her innovation of Project Second Life. Darwin Catering Manager **Ivan Higney** (below) received the Sustainability Hero award at the same event.



Darwin Fellow and Professor of Cognitive Neurology **Professor James Rowe** (below) has been elected as a Fellow of the Academy of Medical Sciences in recognition of his work to improve the diagnosis and treatment of people with dementia.

"I am delighted and honoured to be elected to the Fellowship of the Academy of Medical Sciences," he said.



Taking refuge at Darwin



Fifteen months ago, Dr Olha Kushniruk lived in a flat in central Kyiv with her husband and two teenage sons. She was employed by the National Academy of Sciences, where she worked as a Senior Research Fellow with a particular interest in Ukrainian music, while her husband worked as a scientist at the Institute for Problems of Materials Science.

This peaceful, rewarding life came to an end in February 2022 with the Russian invasion of Ukraine. While families across the country wrestled with whether to stay or go, for Olha the decision had a critical urgency. A month after the invasion, and within a week of their departure, her elder son turned 18. Had they stayed, he would have been called up to fight for his country.

“On 5th March we left Ukraine, and on the 11th he was 18. I had no time, I was hysterical. When we crossed the border the official, a Ukrainian lady, saw his documents and his date of birth and said ‘you are ok, you are ok.’”

Although maternal instinct meant Olha felt she had no choice but to get her children out of the country, it was not an easy decision to leave.

“It was the main reason for me to leave my motherland. Because in Ukraine a passion for our motherland is passed from early childhood from parents to children. It goes deep into the soul. So that’s why it’s not easy to move.”

The family initially fled to France, where Olha had relatives. But, while they were well looked after, the language barrier meant that Olha’s employment prospects were severely limited.

“It’s a great pleasure to be a member of Darwin College,
to be a participant in different events in these walls
connected with Charles Darwin.”

“We were there for six months, and I studied French with volunteers, but it was not possible for me to realise my professional skills.”

Instead, Olha recalled a visit to the UK ten years previously, when her university had participated in a hospitality scheme with the University of Cambridge. She had got on well with her supervisor, Professor Marina Frolova-Walker of the Faculty of Music, and got in touch to outline her situation.

“She answered at once suggesting we speak online, face to face, and told me that the British Academy had put together a programme of Researchers at Risk Fellowships, which I would be eligible to apply for.”

Through the programme, Olha came to Cambridge for a two-year Fellowship at the Faculty of Music, where she is researching the choral arrangements and symphonies of the Ukrainian composer Alexander Jacobchuk. Darwin has been able to provide her and her sons with accommodation, in the Hills Road house left to the College last year by biochemist and immunologist Celia Milstein. Celia and her husband, the Nobel prize winning biochemist César Milstein, a Fellow of Darwin, had a lifelong affiliation with the College after moving to Cambridge from Argentina in the 1960s, following a military coup. In a strange point of connection with their home’s current inhabitants, Celia’s parents were Jewish immigrants to Argentina from Ukraine.

“It’s a beautiful, large space, with a wonderful garden. It’s a great pleasure to be a member of Darwin College, to be a participant in different events in these walls connected with Charles Darwin.”

In addition to the house, Celia Milstein left her Steinway piano to the College, where it was installed in the Old Library last September. Olha has played the instrument frequently, including before each session in a series of events for women in academia, arranged by Professor Fiona Karet and Dr Chloe Kattar earlier this term.

“It was an opportunity to set the mood for the ideas being discussed. The Steinway has an extraordinary character of sound.”

Olha’s husband has remained at home in Kyiv, though his health does not permit him to fight. He is currently managing a student hall of residence, in addition to his academic activity, and keeps in touch with the family via online calls.

Her older son is completing his degree remotely while attending English lessons and pursuing his own musical interests. His younger brother has settled in happily at Coleridge Community College, where he recently played the guitar in a concert organised by the school’s “extraordinary music teacher”.

In addition to her research, Olha has thrown herself into new experiences since her arrival in England.

“At first I just wanted to rest,” she admits, “but now I’m trying to improve myself in different ways. I’ve had the great opportunity to study English for free at the Bell School, which is wonderful for me and my son. I’m trying to cook new things, to get involved with the Ukrainian community in Cambridge, and I recently sang in a concert of Ukrainian songs at Great St Mary’s.”

Having had to take the unthinkable decision to flee her country for her own and her children’s lives, Olha is determined to enjoy the freedoms now granted to them.

“It was such a stressful situation, to leave home with just one bag on your back, just our documents. We travelled through Poland to Berlin, to Cologne, to Paris, to Nantes. To see that situation all around us, the railway station full of refugees... I can’t imagine now that it was me. But our time must be for us, not for Putin. He wanted to take away our time of life, but we need to understand that we need to live for ourselves.”

Grade II Listing for Rayne Building and Dining Hall

The Rayne Building and the Dining Hall, both built in the late 1960s shortly after the foundation of the College, have both been listed at Grade II by the Department for Culture, Media and Sport (DCMS) on the advice of Historic England. Newnham Grange and the Hermitage have also been relisted at Grade II.

The buildings were designed by architects Howell, Killick, Partridge and Amis to blend unobtrusively with the existing historic buildings on site. Housing the Porters' Lodge, staff offices, student accommodation and the Dining Hall, they form a central hub of the College, without detracting from the original houses in which it is based.



Darwin College Bursar, John Dix, said:

"We are pleased that the sympathetic design of the buildings, and the sense of cohesion they create within the College, has been recognised in this way. While the historic significance and aesthetic appeal of Newnham Grange and the Hermitage have long been recognised, the Dining Hall and the Rayne Building are more than simply filler. They are fine modern buildings central to much of Darwin's life as a College, and a worthy reflection of the ambitions of the College's founders."

Darwin Fellow develops revolutionary new needle-free vaccine

Darwin Fellow Professor Jonathan Heeney has developed a breakthrough innovation in the prevention of future pandemics. DIOS-CoVax targets both SARS-Cov-2, the virus which causes Covid-19, and related coronaviruses, and is delivered through a needle-free blast of air directly into the skin.

Having undergone safety trials in Southampton, clinical trials are now underway in Cambridge.

Professor Heeney said: "Our vaccine is innovative, both in terms of how it aims to protect against the virus responsible for our current pandemic and future coronaviruses, but also in how it is delivered. If you're someone who hates needles, our vaccine could be the answer as it's delivered by a jet of air, not a needle."

Grant to decarbonise Frank Young House

Darwin has been awarded funding by Salix under Phase 3b of the Public Sector Decarbonisation Scheme, which will support plans to reduce the carbon impact of student accommodation.

The grant will be applied towards the cost of a refurbishment of Frank Young House, which will be closed for six months from September. The building's existing gas-fired boilers will be replaced with air source heat pumps, and the double glazing will be upgraded.

The project forms part of the College's wider plans to achieve net zero over the next decade.

The Bursar, John Dix, said: "We are delighted to have been awarded this grant. The work at Frank Young House is a very significant project as we embark on decarbonising our estate and making our contribution to addressing the climate change challenge."



Painting on loan to Palace

A painting of Josiah Wedgwood, which has hung for many years in the Richard King Room, left Darwin this spring for an adventure of its own, on display at Kensington Palace.

The portrait, thought to be by Joshua Reynolds, forms part of the exhibition 'Crown to Couture', exploring how the fashions of the 18th century nobility have inspired outfits worn on the red carpet 300 years later. The exhibition runs from 5th April to 29th October.

Wedgwood, the maternal grandfather of Charles Darwin, was the founder of the Wedgwood ceramics company. His innovative techniques led the industrialisation of British pottery, and his entrepreneurial approach meant his tableware was hugely in demand among the fashionable of the day. He was also a prominent campaigner for the abolition of slavery.

Sports

Thank you to everyone who represented Darwin in inter-collegiate sport over the 2022–23 academic year. Darwin proved to be the team to beat during Michaelmas term in College Basketball, comfortably winning all their league games and securing the Division 1 title.

The combined Wolfson/Darwin/St. Edmund's team was unbeaten in division 2 of the Women's Football league.

Table Tennis Division 1 Michaelmas champions were Darwin, who won all five of their matches

Eight Darwin teams competed in inter-collegiate sport this year, representing the College in eight of the 14 regular leagues available, three of which were combined with another College.

Congratulations to all who took part in this year's Darwin-Wolfson sports day on Saturday 18th March - a triumph for the Darwin team.

The event, an annual fixture between Darwin and our sister College at Oxford, returned this year for the first time since before the Covid-19 pandemic. The team of 50 Darwinians competed in rowing, croquet, ultimate frisbee, tennis, squash, and numerous other activities including University Challenge, eventually carrying home the trophy.

Thank you to Wolfson for hosting a wonderful day of friendly competition, as well as a thoroughly celebratory evening. We look forward to welcoming the Wolfson team to Cambridge in 2024.

When **Taihei Matsumoto** (right) joined Darwin in October to begin an MPhil in Engineering for Sustainable Development, he was determined to make the most of the varied opportunities that Cambridge had to offer. At the Freshers' Fair, his attention was caught by the Cambridge University Dancesport Team.



Above: Chike Pilgrim at Oxford Town Hall

"I thought they looked so cool, and I wanted to give it a try."

Four months later, Taihei found himself taking first place in both the Beginners' Jive and the Beginners' Cha Cha at the Inter Varsity Dance Championships at Blackpool's Winter Gardens.

With lessons three days a week and individual practice taking up much of the rest of his spare time, dance is coming to



Above: Taihei Matsumoto at Blackpool's Winter Gardens

define Taihei's Cambridge experience in a way that he could never have predicted.

"I enjoy the fact that it's getting me out of my comfort zone," he says. "I've done lots of team work, and lots of things as an individual, but it's different working with a partner. You have to really communicate with that person, and work together to achieve shared goals. I'm having a lot of fun with it – I think I'll definitely keep doing it after Cambridge."

Congratulations to Darwin PhD student in Archaeology **Chike Pilgrim** (above), who was part of the triumphant 12-fighter Varsity Squad representing Cambridge University Amateur Boxing Club against Oxford this spring. The longest-running amateur boxing fixture in the world, the Amateur Boxing Varsity was launched in 1897. Chike won his bout in the heavyweight category via technical knockout, contributing to a final score of 6-3. Chike's triumph in Oxford Town Hall was named Sporting Moment of the Year at the University of Cambridge Sports Awards in June.

"Chike Pilgrim somehow launched our Cambridge team, who were already up on the moon, into the stars," said a spokesperson for CUABC. "Unforgettable in Boxing Varsity History."

Handing over the trowel



Above: Derrienne Bell

When Rod Ailes and Ros Keep took on the challenge of the Darwin gardens in January 1993, they had no idea of the role they would play in the next three decades of their lives. Over the past 30 years, they have transformed the gardens into a unique riverside space which reflects what makes Darwin different.

Having moved to Cambridge from Tooting, South London in 1989, after falling in love with the city on a visit to the Botanic Gardens, Rod and Ros had taken on the gardening duties at an external property owned by the College. Impressed with their work, Dr Derek Bendall, then a Fellow of the College, approached them to see whether they would consider working on the College gardens.

“There were barely any plants, other than some peonies and some prickly things that people had to walk past,” says Rod now. “But it was a leap of faith by the College to offer it to us. Not many gardeners get the opportunity to take on a College garden as a blank canvas – elsewhere you’re just continuing what’s been done for 800 years.”

Running alongside the river, the Darwin gardens incorporate the outdoor spaces both of Newnham Grange, and the separate houses of Newnham Terrace. Rod and Ros have deliberately maintained the distinctions between these different areas, creating what Rod calls “gardens within a garden”.

“We’ve made them individual, both botanically and atmospherically,” he says.

The gardens have now been designed to provide seasonal interest all year round, with planting ranging from the traditional to the more horticulturally exotic.

“The dynamic nature of it is really exciting,” says Dr Torsten Krude, Associate Professor in Zoology, who succeeded Derek Bendall as Gardening Fellow.

“Every week there’s an atmosphere of experiment, finding out what’s survived. And the commitment and enthusiasm of the people involved is transformative.”

Those with an active interest in the gardens now include the members of DarGar, the student gardening society, as well as the College Green Officer, the Beekeeping Society and the Sustainability Engagement Coordinator.

“It’s not just our influence,” Rod emphasises. “There’s a good symbiotic relationship with the Gardening Fellows and the students. It needs other people. And for 15 years we worked alongside Andrew Birkett – he designed the rose garden.”

The era of Ros and Rod has seen the garden’s use by Darwin members increase dramatically, with seating expanding from space for 15 to 120 people.

“We don’t want to overdo it with the benches and turn it into a park,” says Rod. “But you do have to take functionality into account. It’s a space to be used – from somewhere to sit with a cup of coffee, to putting up marquees for May Balls, to barbecues on



the island. Students from other Colleges often have their functions here because they’re not allowed to use the gardens in their own Colleges in the same way. Whenever you bump into a former student returning for a visit, they always remember the garden. It’s a neutral space in a busy College – a pressure release valve.”

This sense of a garden in constant, active use was part of what attracted Derrienne Bell, who joined Darwin as the College’s first full-time gardener in February.

“I came in and immediately felt at home,” she says. “I loved it. It’s an oasis – it’s quite wild, and not over-manicured, but it’s unified by so many different interests, with something for everyone. The students have all been chatting to me – the allotment group have already invited me to tea!”

Since completing her traineeship at the Botanic Gardens, Derry has worked at Magdalene College, as well as in private gardens. But the scale of the set-up at Darwin, which allows her to take it on solo, has a special appeal.

“Jobs like this don’t come up very often, in interesting gardens that are manageable for one person,” she says.

Rod and Ros, who say they are not retiring but “stepping aside”, know that they will miss the students, as well as the early mornings to themselves in this distinctive and beautiful space which they have cultivated for 30 years. But both are likely to remain familiar faces.

“We’ll come back,” confirms Ros. “We’ll sit and have a cup of tea and watch Derry do all the work.”

Above: The Master, Rod Ailes, Ros Keep, Tim Milner and Torsten Krude

Obituary

Dr Olga Kennard

(1922 – 2023)



Dr Olga Kennard (Lady Burgen) died in March, three weeks shy of her 99th birthday. An Honorary Fellow of Darwin, and widow of former Master Sir Arnold Burgen, who died last year, she was a pioneering scientist who overcame the limitations imposed on women's careers to leave a significant and lasting legacy in the world of chemistry.

Born in Budapest in 1922, Olga Weisz was the eldest of three children, the daughter of a merchant banker and an antiques dealer. The family fled growing antisemitism in Hungary in 1939, arriving in the UK just two weeks before the outbreak of the Second World War. Olga completed her schooling at grammar schools in Hove and Evesham, and in 1942 came to Cambridge to read Natural Sciences at Newnham College.

After completing her studies, four years before women were officially granted degrees by the University, she joined the Cavendish Laboratory where she worked with Max Perutz on the structure of haemoglobin and completed the lab's first x-ray structure of a small organic molecule.

Not permitted, as a woman, to pursue PhD research at Cambridge, she moved to London to join the scientific staff of the Medical Research Council, where

she established a crystallographic laboratory and began to bring together experimental crystallographic data.

Olga returned to Cambridge in 1962 following the end of her marriage to Dr David Kennard, with whom she had two daughters. Persuading the Department of Chemistry to invest in a diffractometer to analyse the structure of small molecules, she established the Cambridge Crystallographic Data Centre (CCDC) in 1965. The CCDC, which she directed until 1997, became a globally essential resource, facilitating research in pharmaceuticals, agrochemicals, materials, and commercial and academic applications. In 1992 the CCDC moved to a purpose-built (and award-winning) building commissioned by Olga. It logged its millionth chemical structure in 2019.

Olga remained officially on secondment from the MRC throughout her career, never formally holding a Cambridge University position, although the University awarded her a doctorate of science in 1973 and she became a Fellow of Lucy Cavendish College. She was elected as one of the first female Fellows of the Royal Society in 1987, and a Royal Society Olga Kennard Research Fellowship was established in her name.

In 1988 she was awarded an OBE for services to scientific research on the structure of biological molecules, and in 1993 she was elected as a member of the Academia Europaea. The German Chemical Society awarded her the Gmelin-Beilstein Memorial Medal for her outstanding contribution to chemistry in 2007. Shortly before her death, she received notification that she was to receive the Gregori Aminoff Prize, awarded by the Royal Swedish Academy of Sciences.

Beyond science, Olga maintained strong interests in art, architecture and design throughout her life, serving as a trustee of the British Museum from 2004-12. She was a valued and engaged member of the Beth Shalom Reform community in Cambridge, particularly involved in the building of the community's first permanent synagogue in 2015.

Olga is survived by her daughters, Susie and Julia, and by her five grandchildren.

Darwin College Register 2023

VISITOR

The Right Honourable Ian Duncan, Lord BURNETT of MALDON, Lord Chief Justice of England and Wales

MASTER

Michael Russell Wheldon RANDS BSc DPhil; (2020)

VICE MASTERS

Fiona Eve KARET PhD FMedSci; (2014); Professor of Nephrology, Cambridge Institute for Medical Research

Sara Theresa BAKER PhD; (2012); Professor in Developmental Psychology and Education, Faculty of Education

DEAN

Duncan James NEEDHAM PhD; (2013); Associate Lecturer, Faculty of History

DEPUTY DEANS

Matthew Russell JONES PhD; (1992); Reader in Information Systems, Judge Business School

Simone Nicole WEYAND PhD; (2016); Group Leader, Department of Biochemistry

BURSAR

John Tannatt DIX LLB MA; (2014)

COLLEGE SECRETARY

Julian Graham EVANS MA; (2014); Secretary of the School of the Humanities and Social Sciences

COLLEGE PRAELECTOR

Christine VAN RUYMBEKE PhD; (2015); Ali Reza and Mohamed Soudavar Professor in Asian and Middle Eastern Studies

ACTING DEVELOPMENT DIRECTOR

Fiona Janet DUFFY BA MA; (2023)

OFFICIAL FELLOWS

Andrew Mawdesley PITTS PhD; (1990); Professor of Theoretical Computer Science, Department of Computer Science and Technology

Carol Elspeth Goodeve BRAYNE CBE MSc MD FRCP FFPH; (1995); Professor of Public Health Medicine, Cambridge Institute of Public Health

Anne Carla FERGUSON-SMITH PhD FRS FMedSci; (1997); Arthur Balfour Professor of Genetics, Department of Genetics, Cambridge University

Christopher Michael BISHOP PhD FRS FRSE; (1998); Director, Microsoft Research Cambridge

Torsten KRUDE PhD; (2000); Associate Professor, Department of Zoology

Alan Frank BLACKWELL PhD; (2001); Professor of Interdisciplinary Design, Department of Computer Science and Technology

John Harold NILSSON-WRIGHT PhD; (2001); Associate Professor, Faculty of Asian and Middle Eastern Studies

Emily Fleur SHUCKBURGH OBE PhD; (2001); Director, Cambridge Zero

Mark Edmondus Jan DE ROND DPhil; (2006); Professor of Organisational Ethnography, Judge Business School

Dénes SZÜCS MA PhD; (2007); Reader in Cognitive Neuroscience and Psychology, Department of Psychology, Wine Steward

Carl Edward RASMUSSEN PhD; (2008); Professor of Machine Learning, Department of Engineering

Russell Paul COWBURN PhD ScD FRS; (2011); Director of Research, Cavendish Laboratory

Thomas Jeffrey MILEY PhD; (2011); Lecturer in Political Sociology, Department of Sociology

Chris Guy SANDBROOK PhD; (2011); Senior Lecturer in Conservation Leadership, Department of Geography

Jonathan Luke HEENEY PhD ScD; (2012); Head of The Laboratory of Viral Zoonotics, Department of Veterinary Medicine

Jan Dietrich Karsen LÖWE PhD FRS; (2012); Research Leader, MRC Laboratory of Molecular Biology

Paul Stuart ANDERSON PhD; (2013); Associate Professor in Middle Eastern Studies, Faculty of Asian and Middle Eastern Studies

Jane Elizabeth FRANCIS DCMG PhD; (2013); Director, British Antarctic Survey

Paul Joseph LEHNER PhD FRCP FMedSci FRS; (2013); Professor of Immunology and Medicine, Cambridge Institute for Medical Research

Eric WOLFF PhD FRS; (2013); Royal Society Research Professor, Department of Earth Sciences

Julia M DAVIES MA PhD; (2016); Head of Transport Group, Department of Plant Sciences

Timothy Nicholas MILNER MA; (2016); University Ceremonial Officer and additional Pro-Proctor, Deputy College Praelector

Aylwyn Olav SCALLY PhD; (2016); Associate Professor, Department of Genetics

Angela Mary WOOD MA PhD; (2016); University Lecturer in Biostatistics, Department of Public Health and Primary Care

Maha ABDELRAHMAN PhD; (2017); Reader in Development Studies and Middle East Politics, Faculty of Asian and Middle Eastern Studies

Alexandra BRINTRUP PhD; (2017); Associate Professor in Digital Manufacturing, Institute of Manufacturing

Paolo CAMPANA PhD; (2017); Associate Professor in Criminology and Complex Networks, Institute of Criminology

Daniel Haskell WEISS PhD; (2017); Polonsky-Coexist Lecturer in Jewish Studies, Faculty of Divinity

James Benedict ROWE PhD; (2018); Patrick Sissons Fellow, Director of Cambridge Centre for Frontotemporal Dementia and Related Disorders, Department of Clinical Neurosciences

Jennifer Mary SCHOOLING OBE PhD FICE; (2018); Director of the Centre for Smart Infrastructure, Department of Engineering

Thorsten Edwin BOROVIAK PhD; (2019); Principal Investigator, Laboratory for Primate Embryogenesis, Department of Physiology, Development and Neuroscience

Darwin College Register 2023

Ioannis KONTOYIANNIS PhD; (2020); Professor, Chair of Information & Communications, Department of Engineering
Edwin David ROSE PhD; (2020, Munby Fellow); Advanced Research Fellow, Department of History and Philosophy of Science
Angelos MICHAELIDES PhD FRS; (2021); 1968 Professor of Chemistry, Department of Chemistry
Jacqueline COX MA; (2022); Keeper of the University Archives, University Library, College Archivist
Annouchka Cassandra BAYLEY PhD; (2022); Chair of the Arts and Creativities Research Group, Faculty of Education
Lalanti VENKATASUBRAMANIAN; (2022); Research Associate, Department of Zoology
Professor Eric Baird FRENCH PhD; (2023); Montague Burton Professor of Industrial Relations and Labour Economics, Faculty of Economics
Flora Barbara SAMUEL BA PhD RIBA; (2023); Professor of Architecture, Department of Architecture

VISITING FELLOWS

Nora MORONEY PhD; (2022); Munby Fellow in Bibliography, University Library

RESEARCH FELLOWS

Hong GE PhD; (2018); Research Fellow in Machine Learning, Senior Research Fellow, Department of Engineering
Anna Christine BELCHER PhD; (2019); Research Fellow in Ecological Biogeochemistry, Postdoctoral researcher, British Antarctic Survey
Raphael Bezerra de Silva Raphael UCHÔA PhD; (2019); Adrian Research Fellow in History & Philosophy of Science, Research Fellow, Faculty of History
Jan BEHRENDTS PhD; (2020); Research Fellow in Physics, Postdoctoral Researcher, Cavendish Laboratory
Samuel James COBB PhD; (2020); Research Fellow in Chemistry, Leverhulme Research Fellow, Yusuf Hamied Department of Chemistry

Jasmin TAUBSENSCHMID-STOWERS PhD; (2020); Research Fellow in Epigenetics, Altos Laboratory
Nathaniel ANDERSON PhD; (2021); Charles & Katharine Darwin Research Fellow in Cancer and Genomics, Postdoctoral Fellow, Wellcome Sanger Institute
Rajesh Kumar BHAGAT PhD (2021); Research Fellow in Mathematics, Leverhulme Early Career Fellow, Department of Applied Mathematics and Theoretical Physics
Adrien HALLOU PhD; (2021); Research Fellow in Cell Biology and Physics, Herchel Smith Research Fellow, Gurdon Institute
Arthur Samuel Richard HARRIS PhD; (2021); Lloyd-Dan David Research Fellow in Ancient Science, Lloyd Dan David Research Fellow, Needham Institute
Chloe KATTAR PhD; (2021); Research Fellow in History, Research Fellow Faculty of History, Fellow Librarian
Sophie Leanne MORRISON PhD; (2021); Research Fellow in Engineering, Researcher, Department of Engineering
Sandra PETRUS-REURER PhD; (2021); Research Fellow in Surgery, Postdoctoral Research Associate, Saeb-Parsy Laboratory
Tamsin Joy SAMUELS PhD; (2021); Research Fellow in Genetics, Herchel Smith Research Fellow, Department of Genetics
Finn Edward STIRLING PhD; (2021); Research Fellow in Biochemistry, Postdoctoral Researcher, Department of Biochemistry
Jess Emma THOMPSON PhD; (2021); Research Fellow in Archaeology, Research Associate, McDonald Institute for Archaeological Research
Alison ANDREWS PhD; (2022); Henslow Research Fellow, Mathematics, Department of Applied Mathematics and Theoretical Physics
Lakshmi BALASUBRAMANIAM PhD; (2022); Herchel Smith Research Fellow, Department of Physiology, Development and Neuroscience
Maharshi Harshadbhai DHADA PhD; (2022); Research Fellow in Industrial Asset Management, Department of Engineering

Saffron EAST PhD; (2022); Adrian Research Fellow in Black and Asian British and Irish History, Faculty of History
Amin EL-YOUSFI PhD; (2022); Research Fellow, Department of Sociology
Igor KAVRAKOV PhD; (2022); Research Fellow in Structural Engineering, Department of Engineering
Xiaolei ZHANG PhD; (2022); Research Fellow Statistical Genetics and Genomics, European Bioinformatics Group

HONORARY FELLOWS

Geoffrey Ernest Richard LLOYD Kt PhD FBA; (1985)
Jeffrey William EDINGTON PhD DSc; (1998)
Amartya Kumar SEN CH MA PhD (Hon) LittD FBA FRSE; (1998)
Michael Charles SHEPPARD MA DPhil; (2000)
Charles Antony Richard HOARE Kt DSc FRS FREng; (2001)
Ekhard Karl Hermann SALJE PhD FRS; (2002)
Robert Anthony RAYNE; (2004)
Martin John, Lord REES of LUDLOW OM PhD (Hon) ScD FRS; (2004)
Bernard Michael de Lerisson CAZENOVE; (2005)
Jean Olwen THOMAS DBE MA ScD FRS FMedSci; (2007)
Robert Hughes JONES PhD; (2008)
Simon Hastings BITTLESTON PhD; (2013)
Alan Roy FERSHT Kt PhD FRS FMedSci; (2014)
Nicola Margaret PADFIELD MA DipCrim DES; (2014)
Gregory Paul WINTER Kt CBE PhD FRS FMedSci; (2014)
Robin Wayne CARRELL PhD ScD FRS FMedSci FRSNZ; (2015)
Janet ROSSANT CC PhD (Hon) ScD FRS FRSC; (2017)
Elizabeth Helen BLACKBURN AC PhD (Hon) ScD FRS FAA FRSN; (2018)
Simon Douglas KEYNES PhD LittD FRHistS FSA FBA; (2018)
Eric Stark MASKIN PhD (Hon) ScD; (2018)
Valerie Jane GOODALL DBE PhD (Hon) ScD; (2019)
Sally Claire DAVIES GCB DBE FRS FMedSci; (2020)

Philippa Jane ROGERSON PhD; (2020)
Heather Jane HANCOCK LVO DL MA; (2021)
Amrita NARLIKAR PhD; (2021)
Euan George NISBET PhD; (2020)
Elizabeth Jane ROBERTSON MA PhD (Hon)
ScD FRS FMedSci; (2022)
Julia Mary SLINGO DBE (Hon) ScD FRS,
(Hon) FRMetSoc, (Hon) FRSC (Hon) FInstP;
(2023)
Angela Mary Bruce DARWIN JP; (2023)

EMERITUS FELLOWS

Reginald Frederick William GOODWIN MA
PhD MRCVS; (1966)
Bruce Anthony NEWTON ScD FRCPath;
(1968)
George Thomas GÖMÖRI MA BLitt; (1969)
Elizabeth Somerville LEEDHAM-GREEN MA
PhD; (1973)
Roger George WHITEHEAD CBE MA PhD
FIBiol; (1973)
Peter Furneaux FRIEND MA PhD; (1974)
Nicholas JARDINE MA PhD; (1975)
Dean Ullathorne HAWKES MA PhD RIBA;
(1976)
Richard HENDERSON CH PhD FRS; (1981)
Ronald Alfred LASKEY CBE PhD FRS; (1982)
Janine Delysia BOURRIAU MA FSA; (1983)
Nicholas James Bertram Alwyn BRANSON
MA PhD; (1983)
Andrew Christopher FABIAN OBE MA PhD
FRS; (1983)
Simon John SCHAFFER MA PhD;
(1984)
Harshad Kumar Dharamshi Hansraj
BHADESHIA Kt PhD FEng FRS; (1985)
Leopold Eftimios Anagnostis HOWE MA
PhD; (1986)
Adrian Thomas GROUNDSD DM FRCPsych;
(1987)
Mohammad Munawar CHAUDHRI PhD;
(1990)
Kathleen Michelle WHEELER PhD; (1990)
Karalyn Eve PATTERSON FRS FMedSci FBA;
(1991)
Margaret CONE PhD; (1992)
John Robert COOPER PhD; (1993)
Francois André PENZ PhD; (1995)
Richard Anthony COX ScD; (1999)
Peter John BRINDLE MA MPhil FCI FInstD;
(2001)
Peta Margaret STEVENS MA; (2001)

Felicia Adina HUPPERT PhD; (2002)
Ian MCCONNELL MA PhD MRCVS FRCPath
FRSE; (2003)
Christopher CULLEN MA PhD; (20)
Michael Edwin AKAM DPhil FRS; (2006)
Philip Alexander DAWID MA ScD FRS; (2007)
Lawrence William SHERMAN PhD; (2009)
Martin Kenneth JONES PhD FSA; (2011)
Christine Mary Rutherford FOWLER MA PhD
FRAS FGS FRCGS; (2012)

BYE-FELLOWS

David Alan FRIEDMAN DPhil PhD (inc.);
(2017)
Catherine Morag Elisabeth HOWIE; (2018)
Arokia NATHAN PhD; (2018)
Alec BUCHANAN PhD MD; (2021)
Toshihiko AONO PhD; (2022)
Akiko OKAMATSU PhD; (2022)

DISTINGUISHED ASSOCIATES

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FREng FInstP CPhys
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The Right Honourable Igor, Lord JUDGE
(Hon) LLD, Commissary
Professor Sheila Tayback LEATHERMAN CBE
Dame Barbara Mary STOCKING DBE

SENIOR MEMBERS

Ms Patricia ASKE; Darwin College
Ms Saumya BALSARI; Author
Dr Nigel BOWLES; Centre for Financial
History
Dr Davide CHIARUGI; Wellcome-MRC
Institute of Metabolic Science
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Diseases
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Alumni Society
Dr Nebojša RADIĆ; Language Centre
Dr James SMITH; Department of Public
Health and Primary Care
Dr Daniel WUNDERLICH; School of Arts,
Humanities and Social Sciences

POSTDOCTORAL ASSOCIATES

Dr Pablo ALCON; MRC Laboratory of
Molecular Biology
Dr Randolph ALTMAYER; Department of
Applied Mathematics and Theoretical
Physics
Dr Diana ARSENI; MRC Laboratory of
Molecular Biology
Dr Leah ASTBURY; Department of History
and Philosophy of Science
Dr Maryam AZIMI; Department of
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Dr Jokubas BARONAS; Department of Earth
Sciences
Dr Christopher BEAUDOIN; Department of
Biochemistry
Dr Daniele BIASCI; Department of Medicine

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Dr Sumit Kumar BIRWA; Cavendish Laboratory
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Dr Eleanor CAMPBELL; Department of Biochemistry
Dr Dora Luz CANO RAMIREZ; Department of Plant Sciences
Dr Jude CASTELINO; British Antarctic Survey
Dr Chrispin CHAGUZA; Wellcome Sanger Institute
Dr Hao-Chung CHENG; Department of Applied Mathematics and Theoretical Physics
Dr Si CHEN; Department of Applied Mathematics and Theoretical Physics
Dr Eleanor DRAGE; Centre for Gender Studies
Dr Michael EDWARDS; Centre of South Asian Studies
Dr Maud FORMANEK; Sainsbury Laboratory
Dr Jen FREER; British Antarctic Survey
Dr Heye FREYMUTH; Department of Earth Sciences
Dr Avishai GILKIS; Institute of Astronomy
Dr Andrea GIOVANNETTI; Institute of Criminology
Dr Florian GOLLNOW; Department of Geography
Dr Or GRAUR; Department of Astronomy
Dr Georgios HADJIDEMETRIOU; Department of Engineering
Dr Tobias JACKSON; Department of Plant Sciences
Dr Chiho JEON; Department of Engineering
Dr Katy JORDAN; Faculty of Education
Dr Nanna KAALUND; Scott Polar Research Institute
Dr Sanne KAALUND; Department of Clinical Neurosciences
Dr Luke KEMP; Cambridge Zero
Dr Emma LAWLOR; MRC Epidemiology Unit
Dr Michela LEONARDI; Department of Zoology
Dr Xuan LIANG; Department of Physiology, Development and Neuroscience
Dr Francesco MUIA; Cavendish Laboratory
Dr Min-Yen ONG; Faculty of Music
Dr Sonia PASCOAL; Department of Zoology
Dr Matishalin PATEL; Department of Zoology

Dr Laura PELLEGRINI; MRC Laboratory of Molecular Biology
Dr Jessica RIGLEY; Institute of Astronomy
Dr Sabin ROMAN; Centre for the Study of Existential Risk
Dr Isobel ROMERO-SHAW; Department of Applied Mathematics and Theoretical Physics
Dr Souvik ROY; Department of Chemistry
Dr Manu SASIDHARAN; Department of Engineering
Dr Helene SCOTT-FORDSMAND; Department of History and Philosophy of Science
Dr Trishant SIMLAI; Department of Geography
Dr Julia SNYDER; Faculty of Divinity
Dr Enric STERN-TAULATS; Department of Materials Science and Metallurgy
Dr Jason Qianchen SUN; Department of Engineering
Dr Stefanie ULLMANN; Centre for Research in Arts, Social Sciences and Humanities
Dr Kavyaa VENKAT; MRC Laboratory of Molecular Biology
Dr Kaveesha WIJESINGHE; Department of Biochemistry
Dr Hantin YANG; MRC Laboratory of Molecular Biology
Dr Tun Jan YOUNG; Scott Polar Research Institute
Dr Maria ZACHAROPOULOU; Department of Pharmacology
Dr Joseph ZHANG; Department of Chemistry

GRADUANDS PRESENTED JULY 2022–JULY 2023

DOCTOR OF PHILOSOPHY

Anglo-Saxon, Norse and Celtic Studies

Ross SMYTHE

Performance, ritual and messaging in Encomium Emmae reginae

Applied Mathematics and Theoretical Physics:

Robin Graham CROFT

The numerical modelling of the dynamics and gravitational radiation of compact binaries in general relativity

Antranik SEFILIAN

Secular dynamics of self-gravitating debris discs

Loren HELD

Hydrodynamic and magnetohydrodynamic convection in accretion disks

Archaeology

Danielle BUSS

Foraging ecology and population structuring of baleen whales in the western South Atlantic and eastern South Pacific

Architecture

Dena QADDUMI

Post-Arab Spring Tunis: materializing revolution in the city

Astronomy

Peter MCGILL

Gravitational lensing in the Solar Neighbourhood and towards the Milky Way bulge

Biochemistry

Philip BARRY

Exploiting a novel organotypic model of SOX2-driven early squamous lung cancer to identify potential routes to chemoprevention

Steven CASTELLANO

Structural studies of multidrug resistance efflux pumps in multiple families

Millie FOX

Assembly of nuclear dimers of the PI3K regulatory subunits underpins the proliferative activity of Activated Cdc42- associated Kinase, ACK

Juan SCHNETTLER FERNANDEZ

Exploring the emergence of pesticide degradation in the α/β hydrolase superfamily

Biological Science

Minji AI

Pain alleviating effects of mesenchymal stem/stromal cells and derived extracellular vehicles in osteoarthritis

José ALMEIDA

Computational analyses of blood cells: somatic evolution and morphology

Yasemin BARIŞ

Functional and structural investigations of human replisomes assembled from purified proteins

Harriet CRAWLEY-SNOWDON

Structure/function studies on Vps9 domain-containing Ankyrin Repeat Protein (VARP)

Rachel EDGAR

Multioomic Investigation of the human gut toward insight into childhood inflammatory bowel disease pathogenesis

Charlene FABIAN

Investigating the role of the polycomb repressive complex 2 in human in vitro pancreatic differentiation

Dorottya HORKAI

*Elucidating the effects of dietary change on replicative ageing in *Saccharomyces cerevisiae**

Gregory JORDAN

Analysis of alignment error and sitewise constraint in mammalian comparative genomics

Oana KUBINYECCZ

The roles of DPPA2, DPPA4 and SMARCA5 in mouse zygotic genome activation, epigenetic reprogramming and development

Twm MITCHELL

RNA binding proteins ZFP36 and ZFP36L1 limit CD8+ T cell differentiation and effector function

Pablo RODRÍGUEZ

The role of a pore-forming protein, Mpeg1, in cytosolic import

Jonida TAFILAKU

The proteasome and its ancillary proteins

Brenda VALEIRAS

Probing RNA binding specificities of AID/APOBEC proteins by iCLIP

Biostatistics

Stephen David COLEMAN

Bayesian model-based clustering of multi-source data

Harry GRAY

High-dimensional covariance estimation with applications to functional genomics

Alessandra SERRA

Adaptive designs and methods for more efficient drug development

Biotechnology

Jiyeong CHUN

Functional silk-like protein

Chemical Engineering

Aurelia LI

Building and exploring databases of porous materials for adsorption applications

Kaiwen ZHANG

Continuous synthesis of metal halide perovskite nanoparticles with sharp and stable emission

Chemistry

Alexander CUMBERWORTH

Monte Carlo simulation of DNA origami self-assembly

Ieva GOLDBERGA

Elucidating structure and dynamics of extracellular matrix collagen using solid-state NMR

Maarten HARDENBERG

Exploration of a liquid droplet state for α -synuclein in vitro and in vivo

Katarina PISANI

Understanding the molecular bases of neurodegeneration: from the structural characterization of the aggregates to the establishment of an iPSC-derived neuronal model

Chanon PORNRUNGROJ

Enhancing solar fuel synthesis via complementary approaches: round-the-clock operation and heat utilisation

Andrea POSSENTI

Transcriptomic studies of protein homeostasis perturbations in neurodegenerative disorders

Simon RAMIREZ HINESTROSA

Diffusiophoresis in complex and confined fluids

Cyan WILLIAMS

Utilisation of cellulose nanocrystals for the fabrication of photonic materials

Classics

Edoardo CHIATTELLI

The long augment in Homer. A formula-based approach

Florence KIPPS

The political philosophy of Xenophon's Memorabilia

Konstantinos LYGOURIS

Fifth-century CE Greek Christian verse paraphrase

Tulsi PARIKH

The material of Polytheism in Archaic Greece understanding Greek religion through patterns of dedicatory practice and thought, ca.750–480 BCE

Clinical Biochemistry

Iain HAY

Structure and function of the R2B adhesive receptor tyrosine phosphatases

Ioannis KAMZOLAS

A systems biology approach to the pathogenesis and progression of Non-Alcoholic Fatty Liver Disease

Clinical Neurosciences

Colleen Silky LIMEGROVER

Traumatic injury-induced cell responses in human cortical organoids

Olivia SHEPPARD

Revealing mechanisms of sporadic Alzheimer's disease by modelling in organotypic hippocampal slice cultures

Alicia WILCOX

Understanding mechanisms related to psychosis in Motor Neurone Disease

Computer Science

Alexandre RAYMOND

Explanations for autonomous agents

Criminology

Menaal Safi MUNSHEY

Palestinian refugees in Lebanon: experiences of intimate partner violence, support, and justice

Divinity

Amal Ahmad AWAD

Al-Rāzī's philosophy of mind

Earth Sciences

Alena GIESCHE

A multi-archive reconstruction of Holocene summer and winter monsoon variability in NW South Asia

Patrick MORTIMER

Capillary pressure effects in the geological storage of carbon dioxide

Dhan-Sham RANA

Non-stoichiometry and radiation damage effects in zirconium carbide and layered carbide ceramics for nuclear fuel cladding applications

PHDS CONTINUED...

Isobel ROWELL

New ice core records from West Antarctica and their spatial context: from 1000 to 100,000 years

Economics

Nikolas KUHLEN

Essays on probabilistic machine learning for economics

Lidia SMITKOVA

Essays on production structure and economic integration

Emile MARIN

Exchange rates, capital controls and the hegemon's dilemma

Education

Soizic LE COURTOIS

Fostering and capturing children's inner motivation to learn in the early primary classroom in England

Po TSAI

Exploring levels of quality of teaching based on the dynamic model in Taiwan: constraints and perspectives

Engineering

Socrates ANGELIDES

Blast resilience of glazed façades: towards a new understanding of the post-fracture behaviour of laminated glass

Adriano BELLOTTI

Distribution and regulation of ion channels in neurons: quantitative studies of global ion channel transport and homeostatic synaptic scaling

Kane CHANDLER

Unsteady wetness effects in low pressure steam turbines

Daoming DONG

Improving the computation efficiency for computer-generated holography

Nadeem EL GABBANI

Novel diagnostic techniques for investigations into energy and matter transport in dynamic systems

Lampros GAVALAKIS

Entropy in data compression, additive combinatorics and probability

Joseph IBRAHIM

Control of the buffer and logarithmic layers in wall-bounded turbulence

Jun MA

Numerical study of acoustophoretic aggregation of particles in microfluidic channels

James MACDONALD

Digitally enabled surface function modification for wide area applications

Joshua Mark MAYNARD

Unsteady flows in cantilever compressor stator tip clearances and the effect of real tip geometry

Sarah NELSON

Accelerating the delivery of climate targets: technology and behaviour in the road to net zero

David Lawrence NERY

A framework for estimating difficulty and exclusion from tasks of everyday living

Robert PINSLER

Advances in active learning and sequential decision-making

Paweł PRZYTARSKI

High fidelity simulation of loss mechanisms in compressors

Adrià SALVADOR PALAU

Distributed collaborative prognostics

Peter SMITH

Improving the security of continuous variable quantum random number generators

Yutao ZHENG

Studies of premixed turbulent flames under flamelet assumptions

Parham ZOLFAGHARI

Sinusoidal model based segmental speech coding

English

Gillian MOORE

'So many ways of being better': Contemporary US fiction and cultures of self-help

Olivia ROSANE

Writing home: depictions of forced displacement in romantic era and contemporary poetry

Genetics

Jessica Louise ELMER

Variable DNA methylation in the mouse genome: repetitive elements, unique regions and functional implications

Zeynep ÖZTÜRK

Testing roles of Hereditary Spastic Paraplegia (HSP) proteins in organization of axonal endoplasmic reticulum (ER) and ER-mitochondria contact

Lewis THOMSON

The evolution of somitogenesis: mechanisms of paraxial mesoderm elongation in zebrafish and other vertebrates

Geography

David DURAND-DELACRE

Epistemic mobilities of climate migration: a French case study

Annette GREEN

Vital connections: a multi-scalar exploration of the conservation corridor assemblage in Tanzania

Noam OBERMEISTER

How and what do science advisers learn? Insights from environmental science-policy in the UK.

Haematology

Miriam BELMONTE

Understanding the role of extrinsic regulators in normal and malignant haematopoiesis

History

Martin CREVIER

Museums, connections, and imagination in the making of a British world, 1870–1945

History and Philosophy of Science

Sebastian KROUPA

Georg Joseph Kamel (1660-1706): a Jesuit pharmacist at the frontiers of colonial empires

Law

Petrus HATTINGH

The interpretation of bilateral tax treaties: changing tax law - unchanging treaty obligations?

Materials Science

Varun CHODA

The electrochemistry of the corrosion inhibitors in the oil and gas industry

Cheng-Yen LAO

Beyond lithium-ion technology: lithium-sulfur and potassium-ion for better and cheaper batteries

Benjamin MARTINEAU

Multivariate analysis for scanning (transmission) electron microscopy

Medical Science

Fay Marie ALLEN

Mitochondrial metabolism elucidated by rapid fractionation from tissue

Giulia BARSUOLA

Forgetfulness of things past: the impact of suppression and metacognitive beliefs on the intrusion of autobiographical and non-autobiographical memories

Charles DUNLOP
Targeting the DNA damage response protein ATR kinase in pancreatic cancer

Michael FERNANDOPULLE
Lysosomes and ribonucleoprotein dynamics in neurons

Meltem GUREL
Intratumoral B and T cell receptors: reconstruction and analysis

Cristina JAUSET GONZALEZ
Dissecting cell-autonomous and microenvironmental factors governing lymphatic metastasis in breast cancer

Anja Veronika GRUSZCZYK
Mitochondrial dysfunction during ischaemia reperfusion injury in models of organ transplantation

Alexander KAULA
Effects of priming on subsequent associative memory: testing prediction error and attentional accounts

Tatjana KOVAČEVIĆ
Elucidating age and pregnancy related alterations in the murine mammary gland

Beverly MCCANN
Mitochondrial genome engineering in the murine germline using designer nuclease technology

Ryan PRESTIL
Modelling neurodegenerative diseases in human iPSC-derived neurons

Marta SECZYNSKA
Epigenetic repression of intronless mobile elements by the HUSH complex

Yingcan WANG
Mechanisms of spoken word recognition and memory encoding studied through competitor priming

Ludovic WESOŁOWSKI
SMARCB1 maintains lineage fidelity in clear cell renal cell carcinoma

Amy YAU
The persistence of poor diet and diet inequalities

Medicine

Benjamin KRISHNA
Investigating and exploiting the latency-associated expression of the human cytomegalovirus gene US28 in early myeloid lineage cells

Miriam LISCI
Mitochondrial regulation of CD8+ T cell cytotoxicity

Eirini VAMVA
Towards optimising HIV-1 derived lentiviral vectors through structure informed genome modifications

Pathology

Rebecca HARRIS
Ubiquitination of proteins involved in metabolism and immunomodulatory drug sensitivity in lymphocytes

Rebecca OETTLE
Human antibody-mediated immunity against infection and parasite fecundity in Schistosoma mansoni and Schistosoma haematobium infection

Pharmacology

Robbin DE KRUIJF
Understanding transport mechanisms of BSEP to improve the prediction of DILI compounds

Roxanna HAJBABAIE
Investigating small-molecule inhibitors of platelet aggregation

Sian STOCKTON
Construction and biological characterisation of custom engineered protein degradation tools

Photovoltaics

Heather GOODWIN
Overcoming efficiency limits in optoelectronic devices

Physics

Jack BATEY
On-chip multiplexers for transferable nanomaterials: design, fabrication and applications

Alexander CASALIS DE PURY
Mirror-coupled nanoantennas with hexagonal-boron nitride spacers

Hwanhee CHO
Exciton dynamics in organic semiconductors for efficient electroluminescent devices

Ben GEYTENBEEK
On effective field theory of dark matter

Stuart MACPHERSON
Tracking and exploiting charge carrier movement and photochemical processes in light-harvesting energy materials

Catriona MURRAY
Optimising the detection of temperate, terrestrial planets around ultra-cool dwarfs with SPECULOOS

Daniel REED
Phase stabilised superlattices for quantum simulation

Jake ZIPFEL
Design and optimisation of a novel magnetic detection scheme for encoded magnetic information carriers

Politics and International Studies

Erica GASTON
Tactical control or bureaucratic tactics? An analysis of checks and controls on local, hybrid, and substate forces in US foreign policy

Psychology

Ana Maria FROTA LISBOA PEREIRA DE SOUZA
Electroencephalographic and cognitive underpinnings of inhibitory control in obsessive-compulsive disorder: from actions to thoughts

Physiology, Development and Neuroscience

Giulia ANTONAZZO
Curation, characterisation and prediction of Drosophila signalling pathway members

Shuyu LIU
The roles of EGFR and FGFR2 in cell shape maintenance of human lung tip progenitor epithelial cells

Plant Sciences

Bethan MANLEY
Invisible to arbuscular mycorrhizal fungi: positional cloning and characterisation of a novel arbuscular mycorrhizal mutant in Zea mays

Mara SGROI
Evolutionary conservation of host responses to arbuscular mycorrhizal symbiosis in liverworts

Polar Studies

Hannah CUBAYNES
Whales from space: Assessing the feasibility of using satellite imagery to monitor whales

Psychology

Chiara TOSCHI
Neural and psychological mediators of trait impulsivity: cortico-striatal circuitry and catecholaminergic neuromodulation

Pure Mathematics

Sam COLLINGBOURNE
The Gregory–Laflamme instability and conservation laws for linearised gravity

Slavonic Studies

Jon ROOZENBEEK
Media and identity in wartime Donbas, 2014–2017

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PHDS CONTINUED...

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Alice PEARSON

The discipline of economics: performativity and personhood in undergraduate economics education

Sociology

Eliran BAR-EL

Positioning the intellectual: Žižek as a sociological phenomenon

Robert DORSCHHEL

The social codes of tech workers: on the quest to be middle class wealthy and morally worthy

Rebwar SALIH

Kurdish politics in the cauldron of the Middle East: lessons from the Kurdish Regional Government (KRG) of Iraq from post-invasion 2003 to the 2017 independence referendum

Veterinary Medicine

Ruby COATES

Development and validation of a CRISPR interference system for gene regulation in Campylobacter jejuni

Andromachi KARACHALIOU PRASINO

Using mathematical models to evaluate and inform immunisation strategies with MenAfriVac in the African meningitis belt

Zoology

Madeleine EMMS

The demography of Red Sea reef fishes since the Last Glacial Maximum

Jenaid REES

The evolution and function of pharyngeal arch signalling centres in jawed vertebrates

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Daniel O'HERLIHY

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Rudolfs TREILIS

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Chris DUNNE
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Jack PROUDFOOT
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Ashley VAN BRUYGOM

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Gas Turbine Aerodynamics

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Ultra Precision Engineering

James MACDONALD

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Wernhard BERGER
Allan BROWNRIGG
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Interdisciplinary Design for the Built Environment

Myron NG



Alumni Events 2023–24

Alumni are warmly welcome to visit the College at any time. If you are in Cambridge, do pop in for lunch or enjoy the gardens, and there are also punts to hire. Please email the Alumni and Development Office for more details.

We would be delighted to see as many of you as possible at our Garden Party at the end of September, open to all alumni and their families.

Alumni Garden Party **Sunday 24 September 2023**

Booking open now!

Alumni Reunion Dinner **Friday 10 May 2024**

(by invitation to those celebrating 10,20,30 and 40 years since matriculation)

Alumni Zoom Talks **October 2023 - February 2024**

Alumni Formal Hall **Friday 15 March 2024**

Alumni Formal Hall **Friday 3 November 2023**

60th Anniversary Celebration **Saturday 6 and Sunday 7 July 2024**

Remember to keep us up to date with your current email and home address so you don't miss out on future copies of the Darwinian or invitations to events. You can update your details by dropping us an email or scanning the QR code, right.



Editor: Laura Kenworthy. We especially welcome short articles, pictures and news from all alumni.
Correspondence to: darwinian@darwin.cam.ac.uk

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A celebration of the 40th anniversary of the discovery of the structure of DNA, in 1993, from Professor Ron Laskey's private collection.
Standing (left to right):

James Watson, Priscilla Barrett, Michael Berridge, Ron Laskey (Darwin Fellow), Cesar Milstein (Darwin Fellow), Alan Fersht (Honorary Fellow), Max Perutz (Honorary Fellow), Peter Goodfellow, Gabriel Horn and Hans Kornberg

Sitting (left to right):

Elizabeth Watson, Fred Sanger, (Lord) Alec Todd, Olga Kennard (Honorary Fellow and later Lady Burgen)