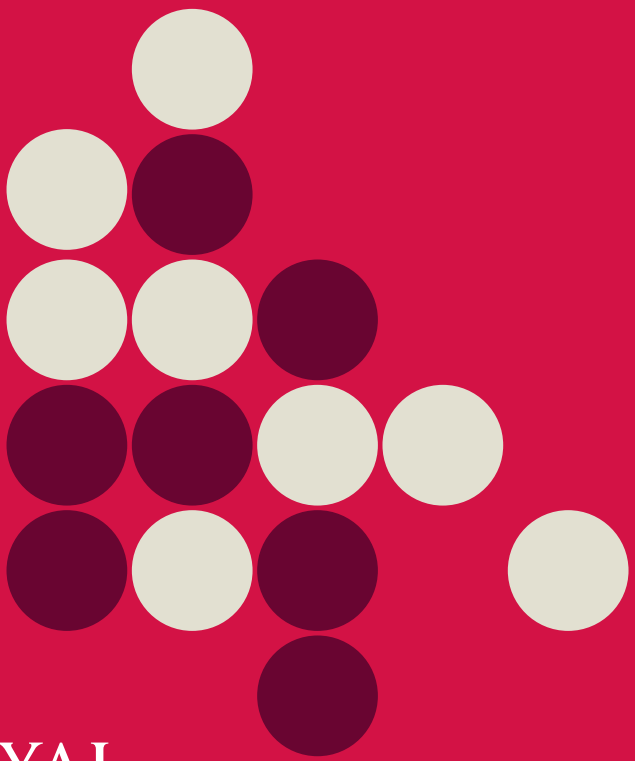
Career pathway tracker

40 years of supporting early career research fellows



THE ROYAL SOCIETY

Career pathway tracker
Initiated in 2018, the Career pathway tracker takes place approximately every five years. The project aims to understand the long-term impact of the Society's early career research fellowships, and the impact on science and society these alumni have had as their careers develop.

This booklet summarises the findings of the Society's second *Career pathway tracker report*, commissioned in 2024, 40 years since the first early career research fellowships were awarded. The report used data from alumni surveys conducted in 2018 and 2024 from University Research Fellowships, Dorothy Hodgkin Fellowships, and Sir Henry Dale Fellowships and was delivered by Careers Research and Advisory Centre (CRAC) Ltd.

The findings, quotes, quantitative and qualitative data included here are taken from the CRAC report, with additional data from the Royal Society's records used to supplement these findings.

Quotes have been edited for length and clarity.

Career pathway tracker: 40 years of supporting early career research fellows

Issued: April 2025 DES9034
ISBN: 978-1-78252-762-6

This booklet and the full *Career pathway tracker report* by CRAC can be viewed online at:
royalsociety.org/career-pathway-tracker

Cover image: Representation of the Go board when Move 37 was played by AlphaGo, during a match against Lee Sedol, winner of 18 world Go titles. Led by University Research Fellow alumnus David Silver, AlphaGo is the first AI program to beat a human professional player.
Read more on page 24.

Contents

President's foreword

Above
Sir Adrian Smith, President of the Royal Society.

Just over 40 years ago the Royal Society embarked on an experiment – the challenge was to identify the best way to support outstanding postdoctoral researchers to make the jump to permanent positions. Our goal was to support outstanding individuals to conduct science for the benefit of humanity.

In this document we look back at the results and we can be proud. Alumni of our early career fellowship schemes have helped shape the world around us. They have played key roles in battling the COVID-19 pandemic and developed new materials and technologies across fields such as healthcare, the environment and energy and communications.

Nine in ten of the people we funded had published significant research before the end of their award and over seven in ten have secured an additional significant research grant before the end of their award. Eighty-five recipients have gone on to be elected Fellows of the Royal Society, and research fellows have received a Nobel Prize and a Fields Medal.

With science being such a collaborative effort, leadership and the building of teams are also key assets for early career researchers and again our support seems to be working. The researchers we have funded have supervised close to 10,000 doctoral students and well over 7,000 postdoctoral students, and employed 500 technicians.

The success extends beyond careers in academia. Alumni have gone on to be hugely successful entrepreneurs and many have forged industry collaborations. There have also been policy makers and influencers, administrators and media personalities.

This breadth does not happen by chance. Our schemes have developed to support people to explore different skills with mentoring and programmes in areas including entrepreneurship, public engagement, communications, and policy and public affairs.

This report also highlights the elements of our funding that alumni felt supported them to thrive such as the length of the fellowships providing financial stability, the flexibility, and the ability to prioritise research over teaching and administration.

Science has never been more important in helping us to understand and tackle the big challenges. It is also essential to driving growth. Early career researchers are often in the most intellectually productive period of their career and so it is vital that we provide the best possible support to allow them to flourish and follow their curiosity. This report shows what a good job the Royal Society's early career research fellowships are doing.

Introduction

The transition from junior postdoctoral positions to independent research leadership can be a challenging part of a scientist's career, as permanent positions are highly competitive. The Royal Society has been offering dedicated early career research fellowships to support talented researchers making this leap for over four decades, primarily through funding by the UK Government (currently the Department for Science, Innovation and Technology) plus other partnerships and funders.

Whilst challenging, this period can be a hugely exciting and productive part of a scientist's academic life as they establish their unique research interest and carve out a space for themselves within the research landscape. The flexibility of the Royal Society's fellowships enables researchers to focus on their science, allowing them the freedom to explore novel and challenging ideas and experimental approaches on their journey to research independence.

The University Research Fellowship was the first of these early career awards offered by the Royal Society. Running since 1983, it has provided over 1,200 researchers with long-term support across eight years to establish their careers and develop as research leaders in their respective fields.

In addition to the University Research Fellowship, the Dorothy Hodgkin Fellowship, named in honour of the Nobel Prize winning chemist and Fellow of the Royal Society, was established in 1995. It supports outstanding early career researchers who require flexible working due to personal circumstances, whether these are caring responsibilities or health conditions. These are challenges Dorothy Hodgkin balanced alongside her own long and successful research career. This fellowship has supported over 200 researchers on the first step towards establishing their own independent research careers.

Both University Research Fellowships and Dorothy Hodgkin Fellowships were featured in our 2018 Career pathway tracker, and in the 2024 tracker they are joined by the Sir Henry Dale Fellowship, which was offered in partnership with Wellcome between 2012 and 2021. During this time, Sir Henry Dale Fellowships supported over 200 early career researchers in biomedical science. This research fellowship was named after Sir Henry Dale, a pharmacologist and Nobel laureate who served as both Chairman of Wellcome and President of the Royal Society during his lifetime.

To understand the impact of our fellowships on recipients and to track their varied career progression since completing their grants, we surveyed alumni from these fellowship schemes. Many have gone on to produce groundbreaking research, educate and inspire the public, or influence change within society. Many also provided feedback highlighting the instrumental role of these fellowships in both the establishment and progression of their careers.

Scientific achievements

90%

The number of alumni who published a significant paper as a principal investigator before the end of their award.

The Royal Society funds a vast array of research, and our early career research fellowships are no exception; from black holes to nanomaterials, our alumni have worked on some spectacular science. This includes contributions to some of the major discoveries that have shaped the research landscape over the past 40 years, including the dawn of DNA sequencing, the detection of gravitational waves, and the discovery of the Higgs boson. Our funding allows researchers time and flexibility to focus on their science, develop new approaches, and forge collaborations, setting them up for future success.

A primary objective of the Royal Society's early career fellowships is to provide talented researchers with the support required to kickstart their independent scientific journey, acting as a springboard for their careers.

Over the past 40 years, many alumni have gone on to have highly distinguished careers and made amazing contributions to science and society. Some of these achievements have been recognised with prestigious awards; at least eight of our alumni have been awarded a Knighthood or Damehood, and the cohort includes a Fields Medallist and a Nobel Prize laureate. Eighty-five alumni have been elected Fellows of the Royal Society, in addition to other learned societies around the globe, in recognition of their contributions to their fields.

The flexibility of the Royal Society's fellowships allows scientists to pursue high-risk, high-reward research, which in turn helps them to establish themselves in their field. Publishing their first significant research paper as a principal investigator is a key indicator of this, something that an impressive 90% of recipients achieved.

"The prestige (and financial value) of the grant was, I think, the main reason that I landed a (proleptic) permanent job very soon after the award."

Professor David Loeffler

University Research Fellow 2012 – 2020, Professor of Mathematics, UniDistance Suisse

Professor David Loeffler's research focuses on number theory, attempting to understand the properties of whole numbers using algebraic and geometric approaches. His current work is on the unsolved Birch-Swinnerton-Dyer conjecture which relates to 'elliptic curves' and is one of the $1 million Millennium Prize Problems selected by the Clay Mathematics Institute of Cambridge, Massachusetts. He is the joint winner of the Whitehead Prize (2014), and the Philip Leverhulme Prize (2015), with his wife and frequent collaborator Professor Sarah Zerbes, for their discoveries, which include the construction of several new Euler systems, mathematical tools that play a major role in research on the BSD conjecture and related problems. David was also an invited speaker at the International Congress of Mathematicians in 2022.

"Without a question the University Research Fellowship gave me a huge career boost. The prestige (and financial value) of the grant was, I think, the main reason that I landed a (proleptic) permanent job very soon after the award; and the opportunity to concentrate exclusively on high-risk, high-gain research projects allowed me to build a much stronger enduring research programme than I would otherwise have had. In short, the University Research Fellowship made my career."

Similarly high numbers also secured additional funding for their research during their fellowships. This demonstrates the calibre of their research and ensures they will have the financial resources to continue their work after the fellowship ends.

Many researchers highlighted that the length of the fellowships provides financial stability. This, coupled with flexibility, and the ability to prioritise research over teaching and administrative duties, were important factors in enabling them to produce high quality research and progress their own careers.

72%

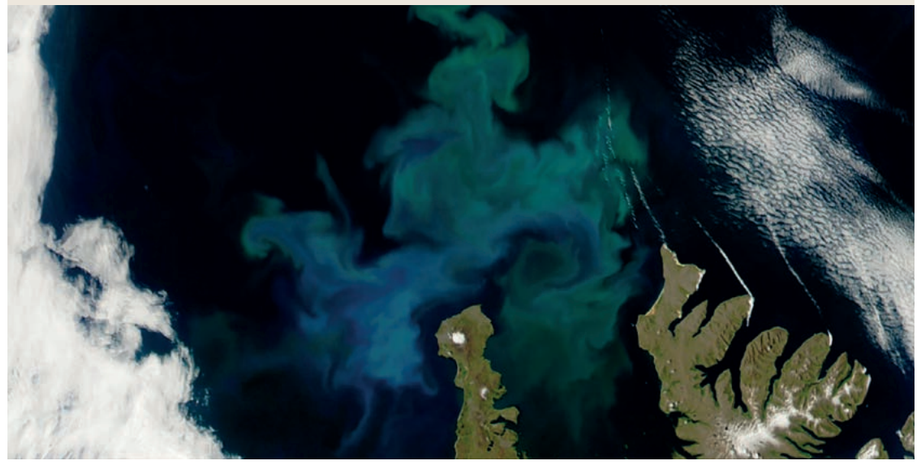
The number of alumni who secured an additional significant research grant before the end of their award.

Professor Sinéad Collins FRSE

University Research Fellow 2010 – 2018, Chair of Microbial Evolution, University of Edinburgh

"Now that my University Research Fellowship has been finished for quite some time, I can still see how the lines of inquiry I opened during it are useful; some of them, especially the ones that were very high risk and so would have been near-impossible to fund at their beginning stages, have gone on to become pilot data for standard grants. The most important and enduring benefit of the University Research Fellowship has been the collaborations ... the prestige of having a University Research Fellowship did help with international collaborations a lot."

Professor Sinéad Collins is a marine microbiologist studying the evolution of microalgae. After training in Canada and Germany, Sinéad took up a NERC fellowship and then a University Research Fellowship at the University of Edinburgh. She is currently Professor of Microbial Evolution there, and Borealis Fellow at Umeå University Sweden. Her research currently investigates how phytoplankton respond physiologically and evolutionarily to many environmental changes at once, and she has recently studied this in polar environments. Sinéad co-chairs the Scientific Committee on Ocean Research project *Changing Ocean Biological Systems* (COBS), which develops resources for improving research on marine organisms' responses to environmental change.



Left
Phytoplankton bloom near Iceland. © iStock.com / Gizem Gecim.

SPOTLIGHT ON

The legacy of graphene

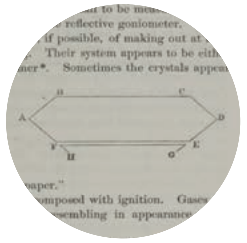
Scientists had long theorized a form of carbon, where atoms were arranged into a honeycomb pattern in a two-dimensional (2D) sheet, a single atom in depth. The Royal Society's involvement in the history of graphene can be traced back to an 1859 paper published in *Philosophical Transactions of the Royal Society of London*, where Professor B C Brodie likely observed crystals of graphene oxide and noted its highly laminated structure.

In 2004, Professor Andre Geim and his then PhD student Kostya Novoselov were in the habit of conducting Friday evening experiments, investigating areas of interest that were unrelated to their day-to-day work. They applied some Sellotape to a chunk of graphite, solid carbon, resulting in very thin layers of the material sticking to the tape. Transferring these layers to a silicon plate, they had taken the first step towards isolating and characterising a single atomic layer of graphene, an achievement for which they shared the Nobel Prize in Physics in 2010, whilst Kostya was a University Research Fellow.

Kostya would go on to launch a highly successful research career working with 2D atomic crystals, becoming one of the most highly cited researchers of all time.

The interesting properties of graphene – strong but incredibly thin and flexible, transparent yet impermeable to gasses, an exceptional conductor of heat and electricity – made it a flashpoint for new research, opening a whole new field of study.

Since then, the Royal Society's early career grants have continued to support many other researchers investigating this unique material and harnessing its properties and applications in innovative ways. This includes Professor Rahul Raveendran Nair (see page 9), who also works at the National Graphene Institute at the University of Manchester. These researchers make up the next generation of scientists bringing 2D nanomaterials out of the lab and into our everyday lives from healthcare to energy storage.

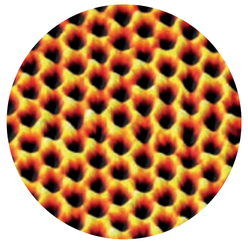


1859
Professor B C Brodie publishes a paper in *Philosophical Transactions of the Royal Society of London* observing the laminated structure of graphene oxide crystals.

2004
Single layered graphene isolated using 'sticky tape method'.

2006 – 2014
Kostya Novoselov completes his University Research Fellowship.

2010
Geim and Novoselov share the Nobel Prize for Physics.



TODAY
Over 500 publications on graphene in Royal Society Journals.
More than 90 grants focussing on graphene awarded by the Royal Society.

CASE STUDY

Professor Rahul Raveendran Nair

University Research Fellow (2014 – 2022)

"The Royal Society Fellowship gave me the opportunity to conduct independent research and granted me significant academic freedom."

Building on the work of Nobel Prize winning colleagues at the National Graphene Institute, Professor Rahul Raveendran Nair's research focuses on the application of 2D nanomaterials – particularly graphene-based materials – as 'smart' filters. These could provide safe drinking water, mitigate environmental pollution, and even help beer-drinkers avoid hangovers.

After completing his Masters degree at Mahatma Gandhi University, India, Rahul did his PhD at the University of Manchester with Nobel laureate Sir Andre Geim FRS, and continued postdoctoral research on graphene-based nanomaterials. Crucially, he demonstrated in 2012 that membranes made from graphene oxide—a chemical derivative of graphene—allow water to pass through unimpeded while blocking most other molecules – making it a promising material for filtration and separation applications.

As a University Research Fellow, Rahul established his own group at the National Graphene Institute, and his team's research on innovative graphene oxide-based membranes for water filtration has garnered widespread recognition, made headlines and earned prestigious awards.

He says: "This support was instrumental in advancing my research excellence, helping me build an international reputation. The fellowship programme also played a crucial role in securing research grants and establishing my own research group, all while allowing me to focus with minimal teaching and administrative responsibilities."

His team has engineered smart graphene oxide-based membranes which respond to electrical currents, or more recently pH, by altering their permeability. This means they can be fine-tuned to control flow rate or even shut off completely. They are also collaborating with industrial partners to apply these membranes in several critical areas, including energy-efficient seawater desalination for clean water production, removal of chemical contaminants from water, and separation of water from jet fuel.

Rahul was recently appointed as a Royal Academy of Engineering Research Chair, where he is working with Carlsberg to bring graphene-based filtration to the food and beverage industry, where it has a range of potential applications, including being used to de-alcoholise beer.

2007 – 2012
PhD and Postdoctoral Fellow, The University of Manchester

2012 – 2014
Leverhulme Early Career Fellow, The University of Manchester

2012
Published *Science* paper on water permeation through graphene-based membranes

2014 – 2022
Royal Society University Research Fellow, The University of Manchester

2016
Appointed Professor of Materials Physics, University of Manchester

2017
Published *Nature Nanotechnology* paper on Tuneable sieving of ions using graphene oxide membranes

2018
Awarded Creativity Prize, Prince Sultan Bin Abdulaziz International Prize for Water (PSIPW)

2023
Royal Academy of Engineering Research Chair, Royal Academy of Engineering

2024
Received Blavatnik Awards for Young Scientists

2024
Appointed Henry Royce Institute 2D Materials Research Area Lead

© Pablo Castagnola
Max Delbrück Center.

"The early support from my Royal Society fellowship allowed me to make very early contributions in this field, before it became mainstream."

CASE STUDY

Professor Ana Pombo

Dorothy Hodgkin Fellow (1998 – 2002)

In order to understand how DNA is organised within the nucleus of a cell, Professor Ana Pombo built her own tools to study this emerging field. Her pioneering method Genome Architecture Mapping (GAM) has given us insights into how genes interact in everything from development to addiction.

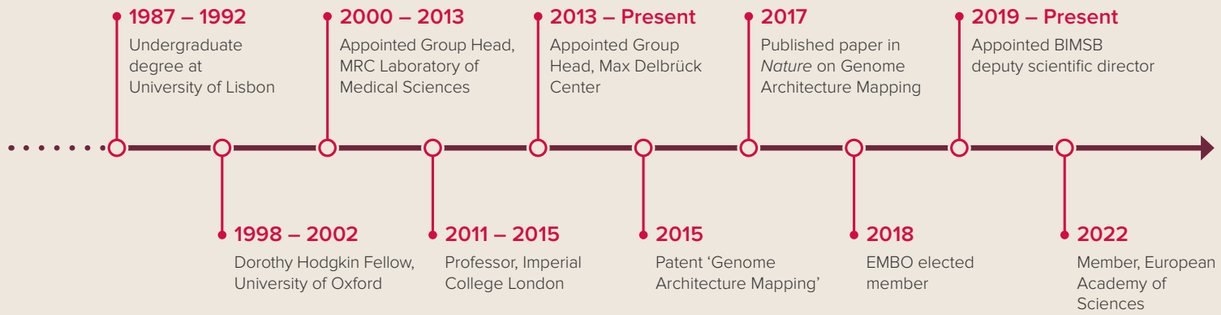
Originally trained in Portugal, Ana arrived in the UK in 1994 to complete her PhD at the University of Oxford, where she stayed on with the Dorothy Hodgkin Fellowship which helped establish her research career.

Ana's work focuses on how three-dimensional genome architecture – how genes are arranged within cells – affects their function. Genes located far away from each other on a DNA strand can be twisted into close proximity to interact, adding another layer of regulation to how genes are expressed.

The tiny scale of these interactions makes them hard to study, so Ana invented new methods to visualise DNA interactions. She initially developed a technique called cryoFISH before creating GAM, which allows for higher resolution. She patented this method in 2015, and her 2017 Nature paper on it has been widely cited.

GAM involves preserving the delicate genomic architecture of cells and then rapidly freezing them in order to take very thin slices of their nuclei. These snapshots of the genome can be compared across hundreds of cells and combined with statistical methods to predict the likelihood that genes near each other interact. In this way, her work has highlighted the networks of genes responsible for disease, addiction, and developmental disorders.

Ana moved to Germany in the 2010s, where she currently leads a research group at the Max Delbrück Center for Molecular Medicine in Berlin and is Deputy Scientific Director of the Berlin Institute for Medical Systems Biology (BIMSB) at the centre. She recently won one of the highest profile research awards in Germany, the Leibniz Prize, which comes with €2.5 million of funding.



Careers in academia

Our fellowships have supported many researchers to forge a career in academia. This is a highly competitive environment, but many of our alumni have secured permanent or tenured positions soon after completing their awards and quickly progressed their careers.

The immediate impact of fellowships on career progression is illustrated by the positions our alumni achieve directly after completing their award, with almost 70% managing to secure a much sought-after permanent academic position. A high proportion also go on to secure the senior position of Professor as their very first job following their award.

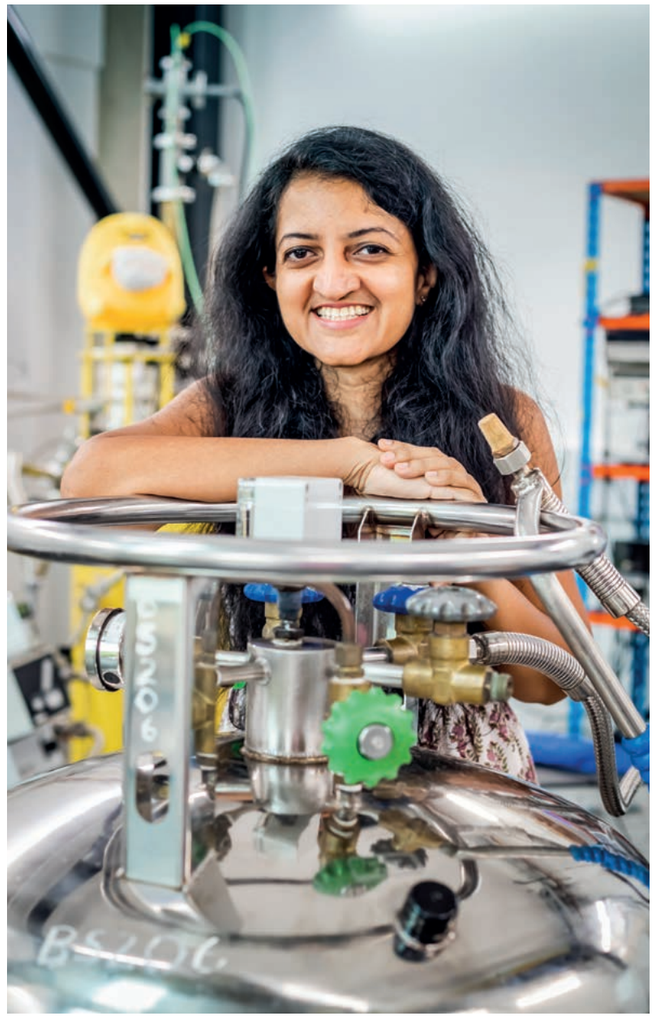
As the careers of our alumni mature, an increasing proportion have attained professorships (see Figure 1 on page 14) since the cohorts were last surveyed in 2018. This is particularly notable for Dorothy Hodgkin Fellowship alumni, who in the 2018 dataset lagged behind the University Research Fellowship group due to the earlier career stage to which the award is targeted, and the younger age of the scheme. In the intervening five years, a much higher proportion of Dorothy Hodgkin alumni have attained professorships as their careers continue to develop.

The Sir Henry Dale Fellowship alumni are much earlier in their careers as a cohort in comparison to University Research and Dorothy Hodgkin Fellowship alumni. Additionally, the Sir Henry Dale Fellowship programme was active for a much shorter period. This is reflected by the positions alumni hold at present. The majority are senior research staff, but have not yet attained professorships, and it will be interesting to see how their careers progress in future Trackers.

"The fellowship allowed me to have a career in academic research. The benefit and support of the Royal Society fellowship team meant that when I was first offered a chair, I opted to delay taking it up (and the salary increase) in order to finish the fellowship, so that I could retain the support and prestige of the fellowship… I became full professor when my fellowship ended in 2018, and shortly thereafter Head of Department, then, for one year, the Interim Dean of Life Sciences, and now I am a Pro-Vice Provost. The experience as a University Research Fellow and the confidence it helped build was key to all of this."

Professor Stephanie Schorge (University Research Fellow 2010 – 2018), Sophia Jex-Blake Professor of Physiology, Head of Department of Neuroscience, Physiology and Pharmacology and Pro-Vice Provost (Scientific and Technology Platforms) at University College London.

Professor Stephanie Schorge studies mutations in the ion channels of neurons to find potential ways for treating forms of drug-resistant epilepsy. In 2022, she co-founded spinout company EpilepsyGtx, which looks to translate her research into cutting-edge gene therapies, where she is currently a scientific adviser.



Above
Professor Suchitra Sebastian in the lab.

"I was able to focus on research unburdened by other career responsibilities, and to chart my own trajectory. The time and freedom offered by the Royal Society University Research Fellowship meant that I could craft high-risk, discovery-oriented physics exploration that I would not have been able to do otherwise. Ultimately this paid off with the discovery of novel quantum phases that were completely unexpected and unconventional in nature. The support of the University Research Fellowship also meant that I was able to spend dedicated time learning the skills I needed to write successful large grants, eventually winning an ERC grant."

Professor Suchitra Sebastian (University Research Fellowship 2010 – 2017), Professor of Physics, Cavendish Laboratory, University of Cambridge.

Professor Suchitra Sebastian's research group performs experiments to find unconventional emergent quantum phenomena, by applying extreme conditions like pressure, temperature, and magnetic fields to selected materials. Previously, she obtained an MBA and worked in management consultancy, before changing fields to pursue a PhD in Applied Physics at Stanford University, launching her independent research career with a University Research Fellowship at the University of Cambridge. Suchitra's talent was quickly recognised; she was named one of 30 'Exceptional Young Scientists' at the World Economic Forum in 2013. Now Professor of Physics at the Cavendish Laboratory, she was recently awarded a Breakthrough New Horizons Prize for her work, revolutionising our understanding of materials including high-temperature superconductors.

"Along with meeting my partner, buying a house, getting a dog, and having two children, receiving a University Research Fellowship was in many ways the defining moment of my life. It opened the door to an academic career, gave me flexible funds to get my research going, that's super important at the beginning, and gave me the esteem on grant applications to probably be successful quicker than would otherwise be the case."

Professor Stephen T Liddle FRSE FRSC (University Research Fellow 2007 – 2015), Professor and Head of Inorganic Chemistry, Co-Director of the Centre for Radiochemistry Research, The University of Manchester.

Professor Steve Liddle studies how actinide atoms, like thorium, uranium, neptunium, and plutonium interact with other elements. He is Head of Inorganic Chemistry and Co-Director of the Centre for Radiochemistry Research at the University of Manchester and became President-Elect of the European Rare Earth and Actinide Society (ERES) in 2023. He has won many awards for his work including the Royal Society of Chemistry's Tilden Prize in 2020, and has supervised 120 co-workers.

95%

of alumni felt the award had made it easier to secure a permanent position.

90%

of alumni felt the award made a significant difference to the speed of their career progression.

SPOTLIGHT ON

Retirement in research careers

As evidenced by the high engagement with the Career pathway tracker, many of our alumni continue to be involved with the Society over the course of their career, becoming involved in committees, applying for further grants, or being elected Fellows of the Royal Society. Since the 2018 Career pathway tracker, some of our alumni from the earliest University Research Fellowship cohorts have retired. Those who took the time to complete the survey report still being involved in research activities to some extent, for example as Emeritus Professors.

Cosmologist Professor Tom Shanks has spent his career observing galaxies. One of the first University Research Fellowship recipients, he has supervised more than 25 PhD students over his career and continues to be involved in research and supervision as an Emeritus Professor.

"Gaining one of the first University Research Fellowships here in 1983 set up my research career for life and gave me a superb base to work from. I moved smoothly to Lecturer, Reader and then Professor after 7 – 8 years as a University Research Fellow. I have supervised countless numbers of PhD students and postdocs and I hope they enjoyed the experience as much as I did. I can recommend applying for a University Research Fellowship for anyone who is considering it. It's a great step towards an academic career."
Professor Tom Shanks (University Research Fellow 1983 – 1990), Emeritus Professor, Department of Physics, Durham University

FIGURE 1

Current employment levels of early career fellowship alumni

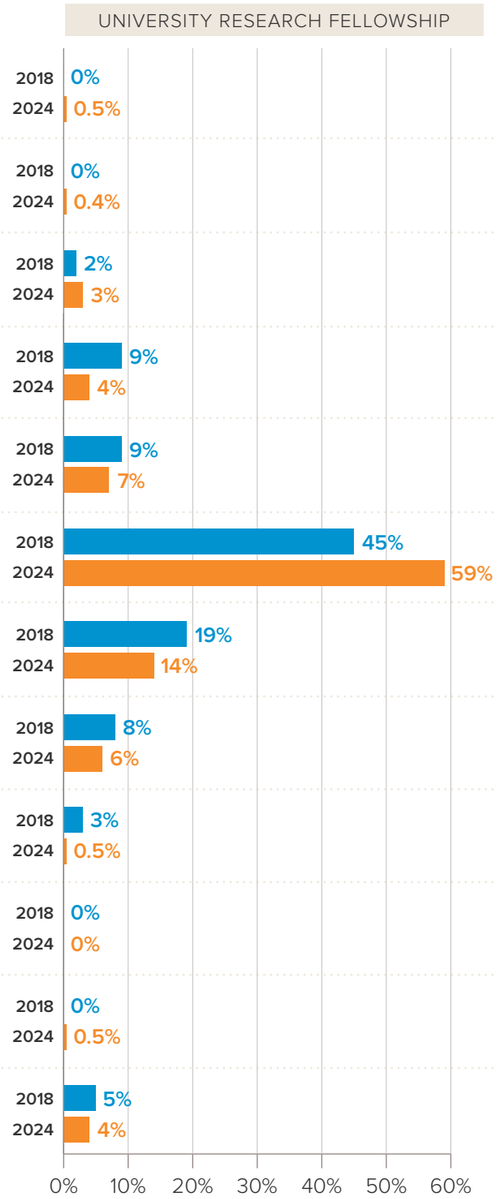
Results from the 2018 *Career pathway tracker* are shown in blue and 2024 results in orange for University Research Fellowship and Dorothy Hodgkin Fellowship schemes. As this is the first time Sir Henry Dale Fellowships have been surveyed, only the 2024 results are available.

KEY

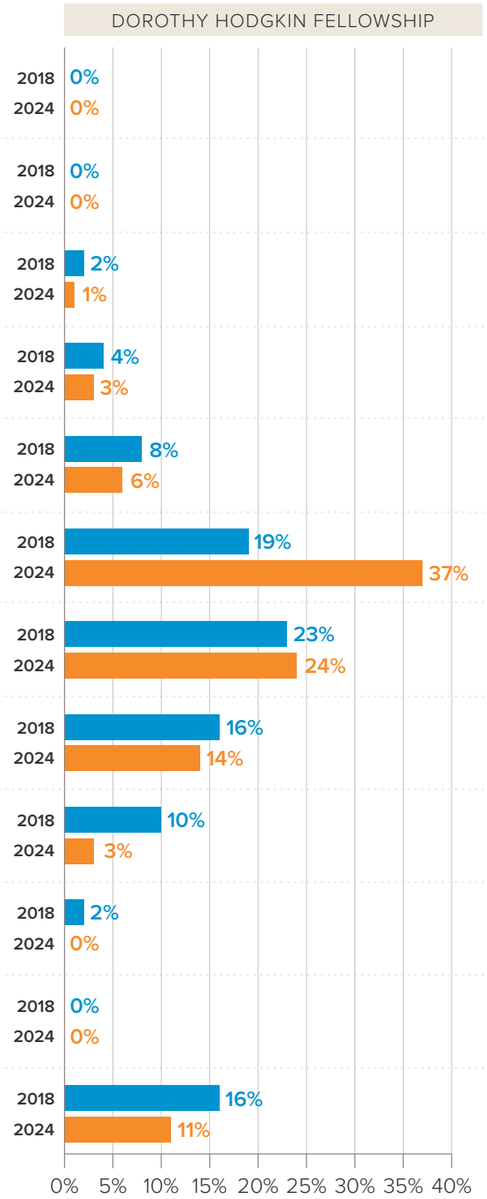
2018 2024

Description	Example job title or descriptor
Head of institution	Vice-Chancellor
Highest level of manager reporting to Head of institution	Deputy/Pro Vice-Chancellor
Head/Director of major academic area; Director of function/s	Executive Dean; Dean, Head of College; Finance Director; Director of Research
Head of an academic centre	Head of Department; Associate Dean; Director
Head of small centre; senior function head	Director; Division Leader; Head of Human Resources
Professor; function head	Professor; Functional Manager
Senior academic lead	Associate Professor; Reader; Principal Lecturer; Principal Research Fellow
Senior academic staff	Assistant Professor; Senior Lecturer; Senior Research Fellow; Royal Society Research Fellow
Academic staff	Subject Lecturer; Postdoctoral Research Fellow; Research Fellow; Research Associate
Academic staff	Lecturer; Researcher; Postdoctoral Research Fellow/Associate/ Assistant; Research Officer
Self-employed	
Non-academic	

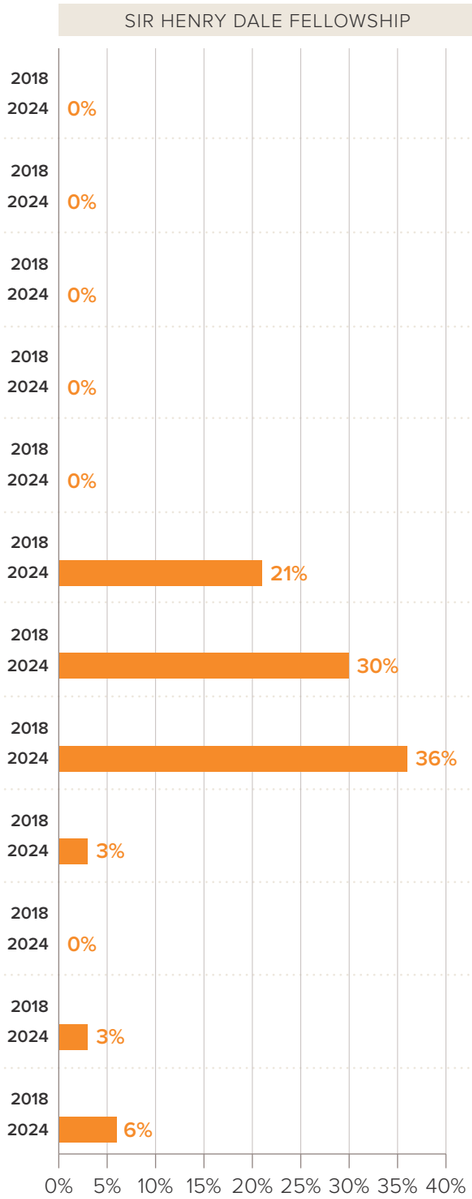
Current employment levels of University Research Fellowship alumni
(780 respondents in 2018, and 559 in 2024)



Current employment levels of Dorothy Hodgkin Fellowship alumni
(96 respondents in 2018, and 115 in 2024)



Current employment levels of Sir Henry Dale Fellowship alumni
(33 respondents in 2024)



CASE STUDY

Professor Clare Carmalt

Dorothy Hodgkin Fellow (1997 – 2001)

“The fellowship gave me a fantastic start to my independent academic career. It gave me the time to think through research ideas, develop grant applications, do the research and write papers. The prestige of having a fellowship was also very positive and I believe helped raised my national and later international profile.”

Professor Clare Carmalt is the first woman to become the Head of Chemistry at University College London (UCL), following a successful career since she joined as a Dorothy Hodgkin Fellow in 1997. She has received multiple accolades for her work on materials chemistry.

Since arriving at UCL, Clare has balanced research with various leadership roles. She secured a lectureship after completing her Dorothy Hodgkin Fellowship in 2001, progressing to Professor in 2009, before serving as Head of Inorganic and Materials Chemistry, and Vice Dean (Education) for the Mathematical and Physical Science faculty. In 2016 she became the first woman to head up UCL’s chemistry department.

Clare’s team researches how inorganic materials can be synthesised, particularly for use as thin films which can coat surfaces and have many important applications. They have produced ‘self-cleaning’ coatings including light-activated photocatalytic ones – where dirt is broken down by a reaction involving light, and superhydrophobic – or super water-repellent – coatings, where water rolls off. They also work on transparent conducting oxide (TCO) films which are used in many technologies including smart phones and solar panels.

Clare has received several awards from the Royal Society of Chemistry for her innovative research, including the Meldola Medal Prize in 2000, the Applied Inorganic Chemistry Award in 2019, and the Tilden Prize in 2024. She also has several industry collaborations aiming to produce practical applications for this chemistry including the development of sustainable manufacturing processes for TCOs.

Clare was recognised by UCL for her outstanding service with a One UCL Award in 2021.

1995 – 1997
Postdoctoral researcher, University of Texas, Austin

1997 – 2001
Dorothy Hodgkin Fellow, School of Chemistry, University College London (UCL)

2000
Awarded The Meldola Medal Prize

2009
Professor, School of Chemistry, UCL

2010 – 2016
Appointed Head of Inorganic and Materials Chemistry, UCL

2014 – 2016
Appointed Vice Dean (Education) for the Mathematical and Physical Science faculty, UCL

2016
First female Head of Chemistry, UCL

2019
Received the Applied Inorganic Chemistry Award

2021
Received One UCL Award

2024
Awarded the Tilden Prize

CASE STUDY

Professor Jim Thomas

University Research Fellow (1995 – 2004)

“The award of my Royal Society University Research Fellowship was crucial to my career. I had seven years working as a secondary school teacher between my undergraduate and [being] a PhD student. Given the conservative nature of UK academia, particularly in hiring policies, I honestly believe that if I had not become a University Research Fellow I would never have had an independent academic career.”

When Professor Jim Thomas returned to academia as a mature student after years of teaching, he was warned it would be hard. But he has had a highly successful career, with his research leading to the discovery of one of the first antimicrobials in recent years, and the launch of a spinout company.

As a child Jim aspired to become a scientist leading him to study chemistry at university. However, after graduating he instead trained as a teacher and taught in the UK before moving to a secondary school in rural Kenya. During this time, he reflected on what he wanted to do next, ultimately returning to his childhood ambition of becoming a scientist.

Jim went back to his own studies completing a PhD at the University of Birmingham. His persistence, in spite of warnings that as a mature student it would be difficult for him to pursue a career in academia, secured him a postdoctoral position with Nobel laureate Professor Jean-Marie Lehn at the University of Strasbourg, funded by a Royal Society European Exchange Fellowship.

He returned to the UK as a postdoc at the University of Sheffield before taking up a University Research Fellowship to start his own research group. Jim has continued to research and teach at Sheffield for the past 30 years, becoming Professor of Bioinorganic Chemistry in 2015.

Jim’s team’s work on metal complexes has led to the discovery of novel antimicrobials with the potential to treat antibiotic resistant bacteria, and the formation of MetalloBio where he is Chief Scientific Officer. The spinout aims to develop these complexes as drugs and antimicrobial coatings.

1983
PGCE Physical Science, Worcester College of Higher Education

1986 – 1989
Appointed Head of Physical Science, rural Kenyan High School (Voluntary Service Overseas Contract)

1988 – 1989
GRSC (Part II) Chemistry, Staffordshire Polytechnic

1989 –1993
PhD in coordination chemistry, University of Birmingham

1993 – 1994
Postdoc, Royal Society European Fellowship, Université Louis Pasteur, Strasbourg, France

1995 – 2004
University Research Fellow, University of Sheffield

1999
British Association Media Fellow at *New Scientist* news desk

2001 – 2004
Royal Society’s Partnership Grants review committee

2015 – Present
Professor of Bioinorganic Chemistry, University of Sheffield

2021 – Present
Co-founder and Chief Scientific Officer, MetalloBio

Leadership and mentoring

86%

of alumni successfully recruited a member of research staff during their award.

73%

of alumni successfully supervised a PhD student during their award.

Research is seldom conducted by an individual in isolation. Discoveries are made due to the work of teams, or even wider collaborative networks of scientists. Our fellowships aim to foster leadership qualities over the course of the award, as an essential skill for any scientist.

One of the first steps towards an independent research career is establishing a research group. Whilst the size and structure of teams varies between disciplines, recruiting staff to manage can be considered a major milestone in most researchers' careers. Most alumni achieved this by the end of their award. The numbers are particularly high in the most recent cohorts, with all Sir Henry Dale Fellowship alumni and a very high proportion of the most recent Dorothy Hodgkin Fellowship and University Research Fellowship alumni hiring research staff.

Successfully supervising a doctoral student through their PhD is a similarly important achievement and demonstrates strong leadership and mentoring skills.

Again, this achievement was met by all Sir Henry Dale Fellowship alumni and very high proportions of the most recent University Research and Dorothy Hodgkin Fellowship alumni.

Since the Society began offering early career research fellowships, our alumni have supervised thousands of doctoral students and postdoctoral researchers and have directly managed hundreds of technical support staff over the course of their careers. These numbers demonstrate that these awards support not just the primary investigator, but teams of researchers, and that our awardees are actively engaged in training the next generation of scientists.

In addition to mentoring junior scientists, as their careers have progressed, many of our alumni are having a broader influence on the research landscape and culture, assuming leadership roles in their institutions, collaborative projects, or networks in their field. Several have also been elected presidents of learned societies or have left academia to fulfil leadership roles in industry, with several CEOs represented in our cohort.

"I am proud of [my PhD students], and of myself for giving them what they needed to shine."

Professor Elva Robinson

Dorothy Hodgkin Fellow 2010 – 2015, Professor in Ecology, University of York

Professor Elva Robinson is a behavioural ecologist. She studies how ants adapt socially to challenges like habitat disturbance and how they can aid ecosystem restoration. She is particularly interested in polydomous ants, where one colony lives in several nests, and what we can learn from this unusual behaviour about cooperation between groups. Elva combines research with teaching at the University of York, and told us that training and supervising PhD students was one of her proudest achievements.

"Supporting two of my PhD students to complete their PhDs, despite substantial personal challenges. Just as the Royal Society supported me as an individual who needed flexibility, I have provided them with a supportive and flexible working environment, and each of them completed their PhD successfully by their respective deadlines. I am proud of them, and of myself for giving them what they needed to shine."

Professor Richard Templer OBE FRSC FRSA

University Research Fellow 1988 – 1994, Imperial College London

Professor Richard Templer is an Emeritus Professor of Climate Innovation at Imperial College London and who throughout his career has had a big impact on training and career development for students and entrepreneurs. He was instrumental in establishing Imperial College London's Centre for Doctoral Training (CDT), which has now been running for 20 years. In 2010, he co-founded the EU-funded climate innovations agency and network Climate-KIC and then its post-Brexit successor, Undaunted, in 2023.

This hub for the UK's climate innovation community creates new routes into green entrepreneurship, and supports startups and small businesses tackling climate change. He told us these were some of the proudest achievements of his career.

"... the creation of the Chemical Biology Institute and its CDT in Chemical Biology which is now the oldest and continuously funded CDT in the UK. Graduates have done spectacularly well – co-founders of Oxford Nanopore, Research leaders at the Max Planck Institute, CSIRO leadership... the list is long, and I am very proud to have been able to help so many (250 or so) young researchers make their mark ... I went on to co-found a large 14-year EU funded programme called Climate-KIC – a university-business partnership developing innovations to address climate change. I ran the UK arm of this and then went on to focus on London as a global hub for climate innovation now called Undaunted. This has helped 158 start-ups to found and raise over $1bn of investment over the last decade. I would never have had the chutzpah or tools to do any of this without my fellowship. The University Research Fellowship gave me confidence in my own abilities. I obtained at a time that academic posts were in short supply, and it taught me how to be entrepreneurial and determined in the face of obstacles."

9,665

doctoral students supervised.

7,390

postdoctoral researchers supervised.

500

technical support staff hired.

Left
Professor Polina Bayvel (University Research Fellow 1993 – 2003) visits the Royal Society with members of her research team to celebrate the 30th anniversary of her award. Polina went on to become a Royal Society Research Professor, receive a Wolfson Research Merit award and was elected a Fellow in 2016. She is an optical engineer and leads the Optical Networks Group (Department of Electronic and Electrical Engineering) at University College London.

CASE STUDY

Professor Yadvinder Malhi CBE FRS

University Research Fellow (1999 – 2005)

When Professor Yadvinder Malhi was elected as President of the British Ecological Society (2021 – 2023), he became the first person of an ethnic minority background to hold the office since its inception in 1913. An ecosystem ecologist, throughout his career he has established and led many international networks of researchers to study complex ecosystems in novel ways so we can understand – and protect against – threats to these environments.

While Yadvinder has an undergraduate degree in Physics and a PhD in Meteorology, he became captivated by the ecology of rainforest ecosystems during his postdoctoral fieldwork in Brazil to understand the carbon balance of the Amazon rainforest. He now studies the resilience and recovery of ecosystems worldwide in the face of our changing climate at the University of Oxford's Environmental Change Institute, and as Director of the Leverhulme Centre for Nature Recovery.

He uses innovative techniques in his work from establishing a "vertical laboratory" in the Peruvian Andes which investigates how soil and plants cope in different climates, to applying remote sensing technologies in rainforests around the world.

He credits his University Research Fellowship for helping him establish his research profile and independent reputation. He says: "It enabled me to invest in long-term development of a research network in some challenging tropical countries, which began to yield outputs only after 5 years, a timescale too short for most grants... I owe a lot to the University Research Fellowship to have got me to my current position and profile."

The international networks of research sites that Yadvinder has helped establish, focus on the long-term monitoring of complex ecosystems, providing insights into the impact of human activity and climate change on forests, how they adapt, and the limits of their resilience.

He currently leads a group of over 50 PhD students and postdoctoral researchers, working on multidisciplinary approaches to ecosystem science and nature recovery. He was named in the ENDS Report Power List 2024 as one of the top ten most influential UK academics in environmental research.

He hopes that his success demonstrates that studying ecosystem science is an achievable, exciting, and vitally important career path for people from all backgrounds.

1993
PhD, Meteorology, University of Reading

1999 – 2005
Awarded University Research Fellowship, University of Edinburgh and University of Oxford

2005 – 2006
Lecturer, University of Oxford

2006 – Present
Professor of Ecosystem Science

2009 – Present
Director, Oxford Centre for Tropical Forests, University of Oxford

2016
Received Marsh award for Climate Change, British Ecological Society

2017
Elected to Fellowship of the Royal Society

2017 – 2019
President for the Association for Tropical Biology and Conservation

2018
Awarded Patron's Gold Medal of the Royal Geographical Society

2020
Awarded CBE

2021 – 2023
President of the British Ecological Society

2022 – Present
Director, Leverhulme Centre for Nature Recovery

CASE STUDY

Professor Gilean McVean FMedSci FRS

University Research Fellow (2001 – 2004)

Professor Gil McVean is a leader in the field of statistical genetics and has made significant contributions to numerous national and international projects. He has dedicated considerable time to support the next generation of academics, mentoring and supervising over 30 PhD students throughout his career.

After completing his University Research Fellowship at the University of Oxford in 2004, Gil stayed on to become Professor of Statistical Genetics. He says his University Research Fellowship offered him "an important boost in confidence at a critical career stage and the ability to focus exclusively on research."

Today, Gil is considered a world leader in employing mathematical, statistical and computational methods to better understand biological and evolutionary processes.

This includes research to learn about genetic phenomena such as recombination, mutation and natural selection that underpin human variation. His work has led to the first fine-scale genetic map in humans, which has helped scientists identify where specific genetic variations are located within human chromosomes and how this relates to disease, in the International HapMap Project.

He has also helped identify a gene called PRDM9, which plays a role in positioning so-called 'hotspots' within the genome – these are areas with high rates of recombination, when genetic material is swapped between DNA strands.

Gil's discoveries and his subsequent work have also seen him play a leading role in the 1000 Genomes Project.

A founder and non-executive director of the University of Oxford's Big Data Institute, he is also a co-founder of Genomics plc, a company focusing on the genomic prevention of disease. In January 2025, Gil took up a four-year term as President of the UK's Genetics Society.

Gil's contributions to science have been widely recognised, earning him the 2010 Francis Crick Medal and Lecture and the 2012 Weldon Memorial Prize. In 2016, he was elected as both a Fellow of the Royal Society and the Academy of Medical Sciences.

2001 – 2004
Awarded University Research Fellowship, Department of Statistics, University of Oxford

2006 – Present
Professor of Statistical Genetics, University of Oxford

2010
Francis Crick Medal and Lecture

2010
1000 Genomes Project

2012
Awarded Weldon Memorial Prize

2014
Co-founder of Genomics plc

2016
Elected to the Fellowship of the Royal Society

2017 – 2020
Founding director of Big Data Institute, University of Oxford

2024 – Present
Principal Scientist, Ellison Institute of Technology Oxford

2025 – Present
Appointed President of the Genetics Society

Commercialisation and careers outside academia

1 in 10

of our alumni have experience working in a sector other than academia at some point during their career.

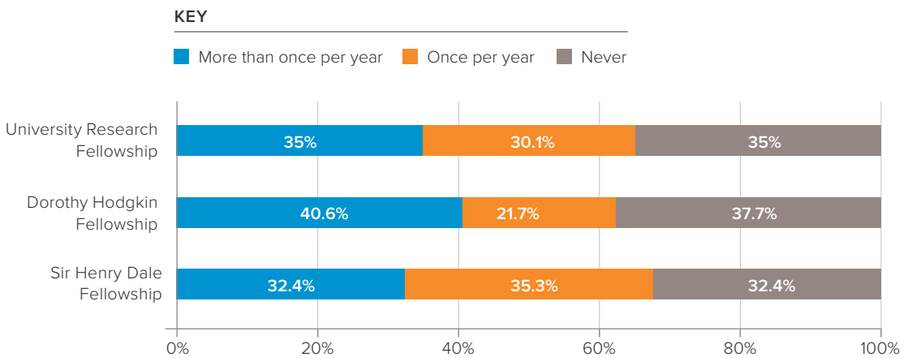
Whilst many of our alumni have had successful careers in traditionally academic roles, not everyone followed this trajectory, with some instead choosing to pursue careers in a wide range of other sectors including industry, policy, and teaching. More still have moved between academia and industry or have strong links with companies relevant to their research, alongside their academic roles.

Approximately 7% of alumni said they were currently working outside academia. However, this is likely to be an underestimate as those remaining in academia are more likely to engage in our survey. We hope to improve the response rate of those outside academia in future years.

The fact that most of our alumni have continued in academic careers doesn't mean that they are disengaged with industry. In fact, many of them have created startups or spinouts from their research, regularly collaborate with industry, or have worked outside academia for part of their career. Over 80% of University Research Fellowship alumni report at least one ongoing industry collaboration and around two-thirds of respondents from each research fellowship reported having at least one commercialisation or knowledge exchange activity per year.

FIGURE 2

Percentage of alumni engaged in knowledge exchange and commercialisation alongside their research



More than 10% of University Research Fellowship and Dorothy Hodgkin Fellowship alumni reported establishing a key industry collaboration, with 29% of University Research Fellowship alumni filing patent applications as part of their work. As well as their own spinouts and collaborations with smaller companies, our alumni have worked with notable names in industry including Microsoft, Google, HP, Octopus Energy, Tata Steel, Proctor & Gamble, Rolls Royce, GSK, AstraZeneca, and many more.

Hitting upon research that was commercialisable often came as a surprise to our researchers. Much of the Society's funding is for fundamental research which does not specifically seek to produce commercial outputs. However, the commercial successes of our alumni highlight that these can emerge from basic research quite unexpectedly.

"I never thought my academic research could potentially end up in such a commercial arena and also meaningfully address such an important clinical challenge."

Professor Jim Thomas (University Research Fellowship 1995 – 2004), Professor of Chemistry, University of Sheffield, and Chief Scientific Officer, MetalloBio

Professor Jim Thomas co-founded MetalloBio Ltd with one of his students in 2021, looking to bring metal-complex based compounds with antimicrobial properties to market in order to treat antibiotic-resistant infections.

Professor Jonathan Blackburn

University Research Fellow 1995 – 2003, Research Chair in Applied Proteomics and Chemical Biology, University of Cape Town; Distinguished Fellow, Standard BioTools.

Professor Jonathan Blackburn completed his University Research Fellowship at the University of Cambridge where he founded Sense Proteomic in 1999, becoming its Chief Scientific Officer. While the company has changed ownership several times, Jonathan has maintained his involvement on a part-time basis. In 2006, he moved to the University of Cape Town where he is currently Research Chair in Applied Proteomics and Chemical Biology, Deputy Director, Institute of Infectious Disease and Molecular Medicine, and Head of the Division of Chemical & Systems Biology. His current research focuses on using proteomic techniques to identify biomarkers – early diagnostic or predictive indicators – for a range of diseases including tuberculosis and cancer.

"During the course of my University Research Fellowship, I founded a biotech company, Sense Proteomic Ltd, spun out of my academic lab at the University of Cambridge. The protein microarray technology developed by Sense Proteomic is commercialised today by Standard BioTools Inc and is utilised by all of the top 10 pharma companies worldwide, as well as by hundreds of academic groups, to gain a deep, quantitative understanding of the functional humoral immune landscape of disease, in liquid biopsies and at the site of disease."

"The protein microarray technology... is commercialised today by Standard BioTools Inc and is utilised by all of the top 10 pharma companies worldwide."

CASE STUDY

Professor David Silver FRS

University Research Fellow (2011 – 2016)

In Seoul in March 2016, Lee Sedol, one of the world's highest ranked players of the complex board game Go, lost four out of five games in a widely televised tournament and watershed moment. His opponent was AlphaGo, an artificial intelligence program developed by Professor David Silver and his team at DeepMind.

Games have been a constant from the start of David's career. After graduating, he co-founded video game design company Elixir Studios in 1998 producing titles including *Republic: The Revolution*. He left Elixir in 2004 to pursue a PhD at the University of Alberta where he first began developing algorithms for playing Go.

David moved back to the UK and continued his research with a University Research Fellowship in 2011, specialising in a type of machine learning called reinforcement learning, where an algorithm learns by trial-and-error using feedback from its environment in a similar way to humans.

He continued to have strong links with the private sector, having consulted for AI development startup DeepMind since its 2010 inception. He relinquished his URF early to join the company as a principal researcher in 2013. A year later, it would be acquired by Google for more than $400 million.

David has led several high-profile projects at DeepMind, as well as AlphaGo. After its success, he and his team went on to develop more general-purpose AI which can play a range of games – with no prior knowledge of the rules or human play strategies – to a superhuman level.

These advances in artificial intelligence have gone on to shape programs including AlphaFold, which David has also been involved in. AlphaFold predicts 3D protein structures from their amino acid sequences and won DeepMind researchers Demis Hassabis and John Jumper a share of the Nobel Prize for Chemistry in 2024.

2000 – 2004
Co-founder Elixir Studios

2011 – 2016
Awarded University Research Fellowship, University College London

2013 – Present
Lead Researcher, DeepMind

2014
Google buys DeepMind for over $400 million

2015
Published *Nature* paper on learning from pixels to reach human level performance on Atari games

2016
AlphaGo beats Lee Sedol

2018
Awarded Marvin Minsky Medal for outstanding achievements in AI

2018
Published paper in *Science* on AlphaZero, which can play chess, shogi, and Go to a superhuman level by teaching itself to play

2021
Elected to the Fellowship of the Royal Society

2023
Led post-training of DeepMind's AI agent, Gemini

CASE STUDY

Associate Professor Almut Beige

University Research Fellow (2002 – 2010)

Quantum physics and non-invasive blood glucose testing for diabetes may not seem to have an obvious connection, but this is an area Dr Almut Beige has made strides in through her spinout company NIQS Tech. While remaining in academia, she has not only commercialised her own research but supported the next generation of scientists to become entrepreneurs.

Almut, who is Head of the Theoretical Physics Group at the University of Leeds, co-founded the start-up NIQS Tech with colleague Professor Gin Jose in July 2022. They are seeking to use quantum sensing to test blood glucose levels in people with diabetes without using needles or drawing blood. Previous attempts to make non-invasive glucose monitors have involved using spectroscopy – which harnesses how the properties of light change through a sample – but the accuracy of these tests can vary depending on factors like skin colour and thickness.

The technology that NIQS Tech uses, involving novel optical interactions, aims to overcome these limitations. With over 830 million people worldwide living with diabetes, the impact of NIQS' innovation holds immense global potential.

After completing her PhD at the University of Göttingen in Germany in 1998, Almut worked in a few postdoctoral positions including at the Max Planck Institute for Quantum Optics in Garching and at Imperial College London. Her main research interests are the foundations of quantum physics with an eye on potential applications in quantum technology. In 2005, Almut relocated to the University of Leeds and has remained there since.

"The fellowship has given me a great confidence boost and a lot of freedom to do more long-term research instead of having to worry about the next postdoc. The fellowship was one of the biggest gifts that the UK has given me as a person and as a researcher and is one of many reasons I decided to return here."

Almut is currently an Associate Professor in the School of Physics and Astronomy.

1998 – 2000
Quantum Optics and Laser Science Group (QOLS), Imperial College London

1992 – 1998
MPhys and PhD at the Institute for Theoretical Physics, University of Göttingen

2000 – 2002
Laser physics group, Max Planck Institute of Quantum Optics

2002 – 2010
Awarded University Research Fellowship, University of Leeds

2002 – 2005
Quantum Optics and Laser Science Group (QOLS), Imperial College London

2003 – 2004
Department of Applied Mathematics and Theoretical Physics (DAMTP), University of Cambridge

2005 – Present
Quantum Information Group (Theoretical Physics Group since 2014), School of Physics and Astronomy, University of Leeds

2022
Founded NIQS Tech

2023
NIQS Tech wins Royal Society of Chemistry emerging technologies competition

Public engagement

Right
Professor Brian Cox (University Research Fellow 2005 – 2012) during filming the Royal Society's Brian Cox School Experiments; a series of free videos and resources designed to inspire and engage students with practical science. Brian was Royal Society Professor for Public Engagement in Science from 2015 – 2025 and was elected a Fellow in 2016.

Our alumni have a long history of public engagement, and several have very successful and high-profile careers in science communication. The next generation of our award holders are also taking their science out of the lab to inspire and educate the public.

Some of our alumni feature among the UK's best known public science communicators. Professors Brian Cox and Marcus du Sautoy have both featured in an impressive number of TV science programmes and published many books, bringing physics and mathematics to huge audiences. Both are also past winners of the Royal Society's Faraday Prize and Lecture for their contributions to communicating science.

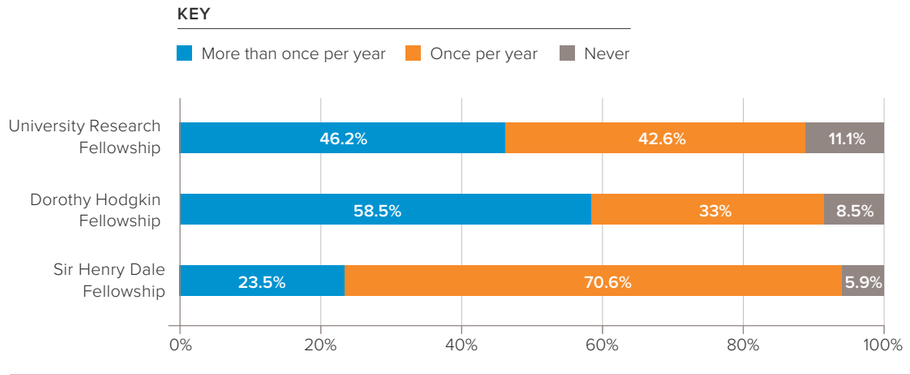
University Research Fellowship alumni Professors, Colin Pulham and Lucie Green, who was the first female presenter of The BBC's *The Sky at Night*, have both been awarded the Royal Society's Kohn Award for early-career scientists contributing to public engagement.

Award-winning author and neuroscientist Professor Sarah-Jayne Blakemore, author of *Inventing Ourselves: The Secret Life of the Teenage Brain*, received both a Dorothy Hodgkin Fellowship and a University Research Fellowship between 2004 and 2016, and was elected as Fellow of the Royal Society in 2024.

However, you don't need to be a household name or a bestselling author to get people excited about science. In fact, almost all our alumni reported involvement in at least one outreach activity per year. Notably, Dorothy Hodgkin Fellowship alumni were particularly likely to engage in multiple events per year, a trend that is even stronger in the most recent cohort where 100% of respondents participated in some form of engagement and 68% did so more than once a year (see Figure 3).

FIGURE 3

Percentage of alumni involved in public engagement activities.



These projects range from the local to the international and include an amazing array of different activities. Survey respondents described TV and radio appearances, consulting on TV programmes, public lectures, and visiting schools as examples of their engagement. Many reported publishing popular science books, including winners of the Royal Society's Young People's Book Prize, and the Royal Society's Trivedi Book Prize. University Research Fellowship alumnus Raman Prinja, Professor of Astrophysics at University College London, has published several popular science books with the aim of inspiring children.

His book *Night Sky Watcher* was shortlisted for the Royal Society Young People's Book Prize in 2015, and his most recent book *Planetarium: Welcome to the Museum*, won the award in 2019.

Many alumni pointed to their research fellowships as being an important factor in supporting them to become involved in public engagement. Some found the training provided by the Royal Society to be particularly helpful, whilst others highlighted the importance of the time and flexibility the grants offered as a factor in enabling them to participate in these activities.

Professor Tara Shears
University Research Fellow 2000 – 2007,
Professor of Physics, University of Liverpool.

Professor Shears studies particle physics, making use of the Large Hadron Collider at CERN. She became the University of Liverpool's first female Physics professor in 2012 and is currently Vice-President for Science and Innovation at the Institute of Physics. She says that the University Research Fellowship was one of the first times she felt supported to try science communication and has since been interviewed in numerous publications, appeared on radio and TV, and spoken at Science Festivals. Her videos with the Royal Institution have reached millions of viewers.

Tara told us about her experience with public engagement during her University Research Fellowship:

"It was something I'd never done before, and I wanted to do a good job of it – which meant I never tried it in the two two-year fellowships I'd held previously as there never seemed to be enough time for anything. The Royal Society media training scheme helped too. I had the time to do a proper job, and it was fine, and engagement is something I have kept up ever since. Communication is so important. I really believe we have to tell people about our science, and it should be a natural part of our research lives. Luckily, thanks to the University Research Fellowship, I was able to develop skills to enable me to do this."

"Communication is so important. I really believe we have to tell people about our science, and it should be a natural part of our research lives."

SPOTLIGHT ON

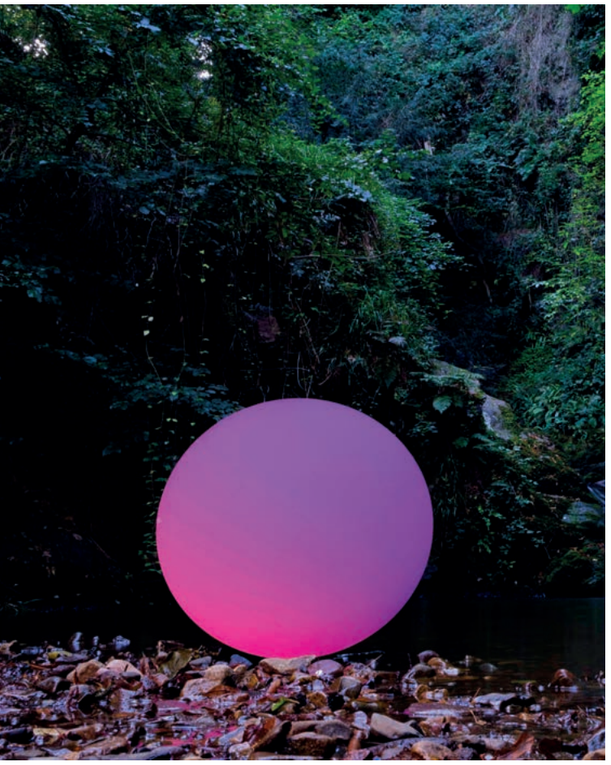
The art of science

Art and science take quite different approaches when it comes to understanding the world around us, but when they come together, they can produce exciting new insights. Several of our early career alumni have facilitated art and science collaborations or multidisciplinary projects which help people engage with science from a new perspective.

Professor Suchitra Sebastian (University Research Fellowship 2010 – 2017) founded the Cavendish Arts Science programme in 2016. This programme creates collective encounters between art and science that explore the universe, our humanity, and our place in the world. The programme supports artistic work that questions traditional centring of voices and ways of knowing, through artist fellows collaborating with physicists at the Cavendish Laboratory. Artistic creations have taken the form of sonic installations, moving image work, dance choreography, and more.

Dr Annapoorna Kuppuswamy (Sir Henry Dale Fellow 2016 – 2022) is involved in ENSNARED, a collaboration between neuroscientists, stroke survivors, and artist Sofie Layton. These artworks, which range from digital art to immersive installation and sculpture, give the audience insight into what it is like to live with post-stroke fatigue. This project raises awareness of a neglected and invisible condition as well as providing hope through research and understanding.

Below
50cm Pure Structural Colour disc in Shropshire, by Dr Andrew Parker. Photography by Ben Osborne, 2019.



Professor Silke Weinfurtner (University Research Fellow 2013 – 2022) co-founded University of Nottingham's ARTlab, which provides a collaboration space for artists and scientists to work on transdisciplinary and multidisciplinary projects together. They also host an artist in residence programme and run engagement events and exhibitions. Their most recent collaboration, due to open in 2025, is the exhibition Cosmic Titans in partnership with Lakeside Arts Nottingham, which explores how we understand and perceive unobservable phenomena such as black holes.

Dr Andrew Parker (University Research Fellow 1999 – 2006) founded Lifescaped, a company borne out of his research into structural colour completed during his University Research Fellowship. Lifescaped now conducts research and produces bio-inspired art and commercial products. In 2021 he partnered with Kew Gardens for the exhibition Naturally Brilliant Colour which showcased his work, the first manmade recreations of this type of structural colour. These colours are created by light reflecting off microscopic structures such as the scales in the wings of a butterfly, or the feathers of a bird, creating strikingly bold, bright, and iridescent hues in the absence of pigment.

CASE STUDY

Professor Marcus du Sautoy OBE FRS
University Research Fellow (1995 – 2005)

As a teenager, Marcus du Sautoy attended the Royal Institution's first ever Christmas lectures on mathematics in 1978 by Professor Christopher Zeeman. 28 years later, Marcus himself would stand on that same stage, as part of his extensive efforts to inspire the public on maths. He has been Charles Simonyi Professor for the Public Understanding of Science at the University of Oxford since 2008.

Having discovered his love for mathematics at school, Marcus began to study symmetry in his PhD, a topic he is still exploring today. He had a lot of early success, presenting his work in prestigious journals and conferences, securing a University Research Fellowship in 1995.

He became interested in communicating his discoveries to the public, and feels that the Royal Society was encouraging and supportive as he increased the amount of engagement work he was doing. He was one of the first members of the Society's Committee for Science and Society set up in the early 2000s.

Over his career, Marcus has brought maths to the public in an impressive number of TV and radio shows, as well in numerous books, including *Around the world in 80 games* published in 2023.

Marcus has also managed to combine his love of music, theatre, and maths: he was a consultant on Complicite's production of *A Disappearing Number* in 2007 and the National Theatre's production *The Curious Incident of the Dog in the Night-Time* in 2012, and wrote and performed in his own play *I is a Strange Loop/X & Y* at the Barbican in London in 2019. He has also explored the maths of Mozart's opera *The Magic Flute* for a live audience at the Royal Opera House in 2013 and established PRiSM, the Centre for Practice and Research in Science and Music at the Royal Northern College of Music in Manchester in 2017.

1986 – 1989
PhD, Mathematics, University of Oxford

1995 – 2005
Awarded University Research Fellowship, University of Oxford

2001
Awarded Berwick Prize from the London Mathematical Society

2003
Published his book *The Music of Primes: Why an unsolved problem in mathematics matters*

2006
Presenter of The Royal Institution Christmas Lectures

2008 – Present
Charles Simonyi Professor for the Public Understanding of Science

2010
Awarded OBE

2011
Presented the documentary *The Code*, BBC2

2016
Elected to the Fellowship of the Royal Society

2023
Published his book *Around the world in 80 games*

CASE STUDY

Professor Lucie Green

Dorothy Hodgkin Fellow (2005 – 2010)
University Research Fellow (2012 – 2021)

Professor Lucie Green has combined her research on solar eruptions with a prolific career in science communication – becoming the first female presenter of BBC's *The Sky at Night* in 2013.

Engaging people with science was central to Lucie's career from the start; after completing her PhD in solar physics at University College London (UCL), she worked for The Faulkes Telescope Project, a charity which helps students access telescopes to observe the Universe from their classrooms.

Returning to research at UCL's Mullard Space Science Laboratory (MSSL) in 2005 with a Dorothy Hodgkin Fellowship, Lucie made science communication a core part of her work. The award allowed her flexibility to balance the competing demands of her research on coronal mass ejections – the eruptions of magnetised plasma from the Sun – with her growing media and engagement career.

After building up MSSL's portfolio of public engagement activities and coordinating outreach for the United Nations' sponsored event The International Heliophysical Year, Lucie won the Royal Society's prestigious Kohn Award for her outstanding contributions to science communication in 2009.

Lucie continued her engagement efforts during and after her time as a University Research Fellowship recipient and has presented and appeared on numerous TV and radio programmes including *Solar Max*, *Horizon: Venus Transit*, *Stargazing Live* and *The One Show*. She has also organised science festivals, open days, school visits and talks, and in 2016 published her first book *15 Million Degrees: A Journey to the Centre of the Sun*.

2003 – 2005
Communications Manager, Faulkes Telescope Project

2005 – 2010
Awarded Dorothy Hodgkin Research Fellowship, UCL Mullard Space Laboratory

2009
Received the Royal Society's Kohn Award

2010
First appearance on *Stargazing Live*, *BBC*

2010 – 2012
Leverhulme Early Career Fellowship

2012
Presenter *Horizon: Venus Transit*, *BBC*

2012 – 2021
Awarded University Research Fellowship, UCL Mullard Space Laboratory

2013
Presenter *The Sky at Night*, *BBC*

2015
Sculpture bust unveiled at the Royal society

2024 – Present
Co-lead on MESOM (Moon-Enabled Sun Occultation Mission) spacecraft concept development, aiming for launch in 2034

Policy contributions

One of the many ways our alumni have impacted wider society is through their contributions to policy making, using their expertise to directly advise governments and other international organisations and contributing primary research to inform their decision making.

From the countries our alumni mention in their survey responses, as a cohort, they are having a truly international impact. From Belize to Kenya, the World Health Organisation to the UK Government, our alumni have been engaged in a range of policy activities which have influence across the globe.

They have contributed their expertise in a wide range of policy fields, including climate change, information security, health and disease, diversity in STEM, research culture, and disaster response.

There are many examples of our alumni getting involved on the international stage using their expertise in epidemiology, vector control, zoonosis, and vaccine development to advise and influence major international organisations, like the World Health Organisation, to make evidenced-based decisions and improving health outcomes across the globe.

"I have worked with policy makers to contribute the results of my research to policy development, including through editing two briefings for the Parliamentary Office of Science and Technology, and serving as a technical adviser to the House of Commons Science and Technology Committee."

Professor Steven Murdoch (University Research Fellow 2012 – 2022), Professor of Security Engineering, University College London

Professor Steven Murdoch's research focuses on online security and he uses his expertise to advise on this issue in the policy sphere. He is a director of the Open Rights Group which campaigns for digital rights, as well as a fellow of the British Computer Society and the Institution for Engineering and Technology.

40%

of alumni report engaging in some form of policy activity.

Left
Member of Professor Thomas Gorochowski's reserach team picking bacterial colonies from an agar plate. Thomas is a current University Research Fellow at the University of Bristol, where he is Professor of Biological Engineering.

Professor Nuno Faria

Sir Henry Dale Fellow 2017 – 2022,
Professor in Virus Genomic Epidemiology, Imperial College London

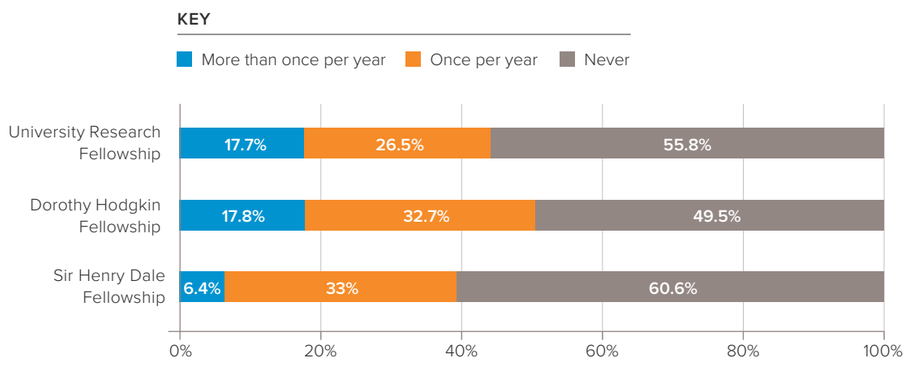
Professor at the MRC Centre for Global Infectious Disease Analysis, School of Public Health, Imperial College London, and Visiting Professor at the Institute of Tropical Medicine from the University of São Paulo in Brazil, Nuno Faria's research looks at the evolution and spread of rapidly evolving viruses like yellow fever, chikungunya, and Zika as well as SARS-CoV-2. He works with the World Health Organization providing expert advice to the WHO Global Arbovirus Initiative and WHO Virus Evolution Technical Advisory Groups. Nuno has been a Principal Investigator on several international projects including the Centre for Arbovirus Discovery, Diagnosis, Genomics and Epidemiology (CADDE) from 2019 – 2023 and presently the Dengue and Zika Immunology and Genomics Multi-Country Network (DeZi). He told us about some of his proudest achievements: "Working closely with global colleagues and with the World Health Organization during public health emergencies of international concern has contributed to improving operational strategies for pathogen genomic epidemiology across the world and has helped bridge the gap between research and policymaking."

Other areas where respondents indicated strong policy engagement were climate change, biodiversity, and sustainability. Several alumni reported contributing to Intergovernmental Panel on Climate Change (IPCC) reports or disseminating information at United Nations Climate Change Conferences (COPs).

Whilst many alumni engage in policy alongside their academic careers, some have gone further, taking their scientific training and experience into a new career in the policy sector. As an example, Dr Deirdre Black completed her Dorothy Hodgkin Fellowship in 2011, before joining the Royal Society of Chemistry (RSC), where she is now Head of Science and Sustainability Strategy Lead, delivering the RSC's first integrated sustainability strategy. Two of our alumni are now working to put science into action at the Bill and Melinda Gates Foundation.

FIGURE 4

Percentage of alumni engaged in policy-making



CASE STUDY

Professor Deborah Greaves OBE FREng

University Research Fellow (2000 – 2008)

Wave and tidal energy generation can be challenging; not only must equipment harness the raw power of the sea, but it must survive the same impressive and unpredictable forces. This is a design challenge that engineer Professor Deborah Greaves has spent her career tackling, but her expertise is also shaping policy. She leads the Supergen ORE Hub bringing together researchers and policy makers to facilitate offshore renewable energy technologies, and was a delegate to the United Nations Climate Change Conference of the Parties (COP29) in Baku last year.

Growing up on the Devon coast, Deborah developed an early love of the ocean. She also enjoyed maths and physics and wanted to apply these skills to make a lasting difference to people's lives, motivating her to take a degree in Civil Engineering.

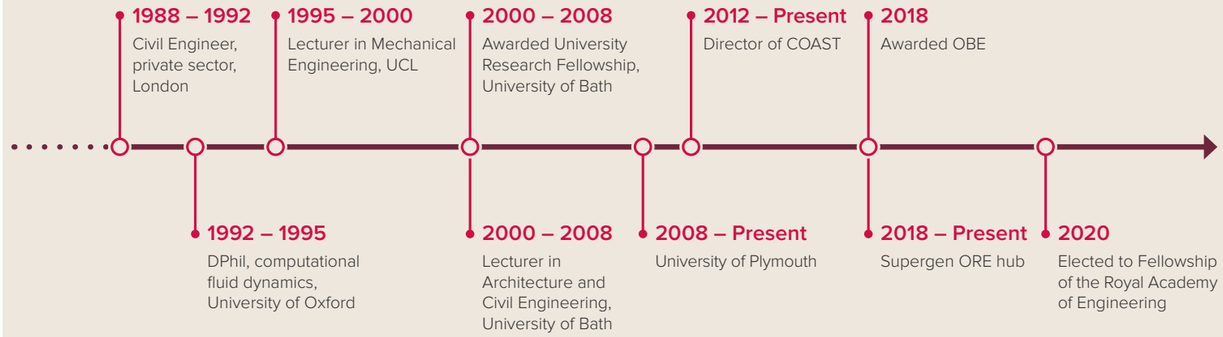
After four years working in the private sector, Deborah returned to academia to complete a DPhil at the University of Oxford. She also returned to her love of the ocean, studying the behaviour of waves using computational fluid dynamics. Deborah wanted to apply her work to renewable energy, and taking up a University Research Fellowship at the University of Bath allowed her to do just that.

"The University Research Fellowship was incredibly valuable to me in establishing my research career and enabling me to become an independent researcher. It was also invaluable in enabling me to have the freedom to work part time during a period when I was taking maternity leave."

Sixteen years on, Deborah is an expert in this field, and leads the Coastal, Ocean and Sediment Transport laboratory (COAST) and the Centre for Decarbonisation and Offshore Renewable Energy (ORE) at the University of Plymouth. She is also Director of the Supergen ORE Hub: a £16.5 million project funded by the UK government, that brings together academic and private researchers, policymakers, and the public to design the next generation of offshore wind, wave, and tidal energy technologies.

Deborah has co-authored numerous policy briefs and has contributed to panel discussions about ocean science and renewable energy at various high-profile events such as COP29 and the G7 Summit events. Deborah has also been part of the University of Plymouth's delegation since COP26.

In 2018, Deborah was awarded an OBE in part for her research and policy leadership at ORE, and for her work inspiring women in STEM.



CASE STUDY

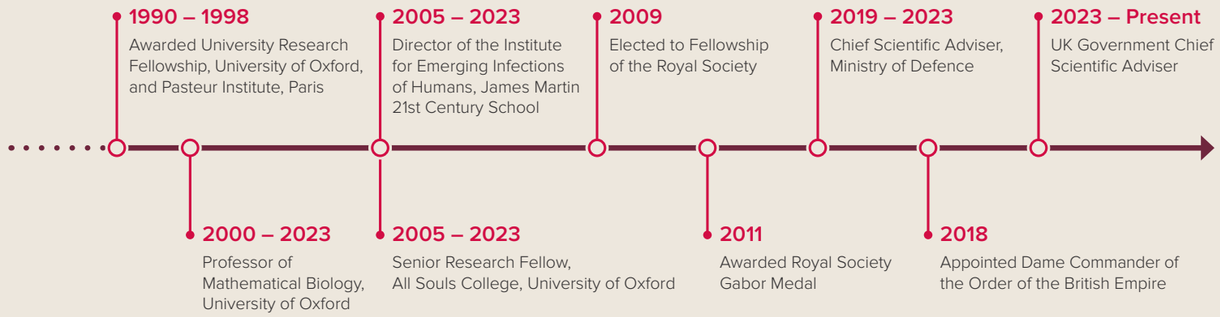
Professor Dame Angela McLean DBE FRS HonFREng
University Research Fellow (1990 – 1998)

Professor Dame Angela McLean was appointed UK Government's Chief Scientific Adviser in 2023, ensuring excellent scientific advice is at the heart of decision making. She was previously Chief Scientific Adviser at the Ministry of Defence – making her the first woman to hold either of these roles.

Angela's scientific expertise is in the use of mathematical modelling to understand the spread and evolution of infectious diseases. She was a key figure in guiding the Government's response to the COVID-19 pandemic, serving on the UK's Scientific Advisory Group for Emergencies (SAGE). Here she helped to shape government strategy throughout the emergency from initial lockdowns to the carefully planned reopening of the economy as the vaccination campaign was rolled out. She also advocated for clear communication between scientists, policymakers and the public.

Angela began to be involved in policy using her scientific expertise in advisory roles to various government bodies including the Department for Environment, Food and Rural Affairs (DEFRA) Science Advisory Council and the Department of Health's National Expert Panel on New and Emerging Infections, whilst she was a Professor of Mathematical Biology at the University of Oxford. Policy has increasingly become her bread and butter, and she took up the full-time position of Government Chief Scientific Adviser in April 2023.

In 2009 Angela was elected as a Fellow of the Royal Society. She received a damehood in the 2018 Queen's Birthday Honours List in recognition of her services to Mathematical Biology and Scientific Advice for Government.



COVID-19 pandemic response

Since the last Career pathway tracker in 2018, the world experienced an international and scientific emergency: the COVID-19 pandemic. While much of our daily lives were put on pause during this crisis, many scientists, including several of our research fellows and alumni, were hard at work trying to address the unfolding pandemic.

These researchers helped governments make informed policy decisions by providing advice, tracking infection rates, and modelling how events might unfold.

They were involved in basic research, essential for understanding the virus, and its genome. Our alumni also used their expertise and research to tackle false information and contributed to our understanding of the virus's origins (see 'An antidote to false claims', below).

Many scientists pivoted from their original research topic to focus on supporting the pandemic research effort (See Figure 5), with internal data telling us that approximately 8% of active Dorothy Hodgkin Fellows did so.

SPOTLIGHT ON

An antidote to false claims

Dr Viki Male is a senior lecturer in Reproductive Immunology at Imperial College London, where she studies how immune cells in the uterus are involved in pregnancy and birth. She was awarded the Sir Henry Dale Fellowship from 2015 – 2022, and although she initially shut down her research during the pandemic, she found that her expertise was unexpectedly in demand.

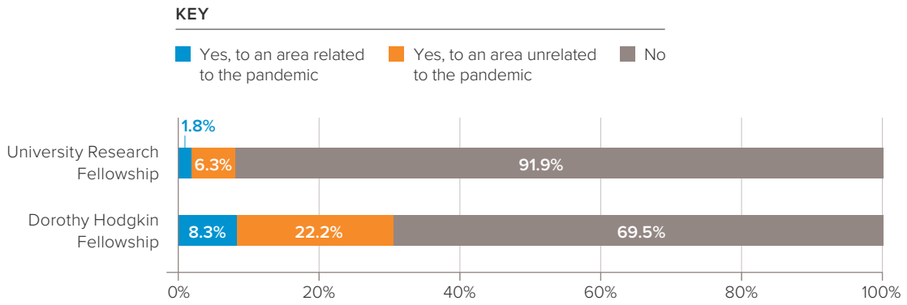
Noticing false claims circulating on the internet about vaccines, fertility and pregnancy, she began talking to people about their concerns around COVID-19 and reproductive health. Rather than dismissing their worries, Viki saw a need to thoroughly investigate issues around immunisation and fertility to inform and reassure the public:

"In the UK, no funding was available for this, so I ran this small study on a shoestring. Larger and better ones have been published since (many of which I am a co-author on), but this was important because it was one of the first to define the (small and rapidly reversed) effects of COVID-19 vaccination on the menstrual cycle – important for allowing people to make an informed decision about vaccination, particularly in the face of misinformation that vaccination would harm female fertility."

She has since spoken to many news outlets, including the BBC, to disseminate this research and fact-check the false claims about vaccines and fertility.

FIGURE 5

Percentage of active award holders during the pandemic who changed their research direction.



In addition to the devastating impact the COVID-19 pandemic had on health and welfare across the world, it also caused widespread disruption to many professional sectors, including scientific research. Many scientists were forced to put work on hold with restricted access to laboratories, reduced opportunities to collaborate, and loss of important resources. With funding from the UK Government, the Royal Society made 127 extensions to those in the final years of their research fellowships. This supported them and their wider teams to continue their work despite the unprecedented levels of disruption they experienced.

During emergencies such as the COVID-19 pandemic, the Scientific Advisory Group for Emergencies (SAGE) is convened to provide essential scientific information and technical advice to the UK Government. Several of our early career alumni participated in SAGE, most notably, several members of the Scientific Pandemic Influenza Group on Modelling (SPI-M), which produced essential models of different scenarios and interventions. These models enabled policy makers to understand the many possible outcomes of disease spread, and to select interventions most likely to have a positive impact.

Our alumni include co-chairs of SPI-M Professor Dame Angela McLean FRS and Professor Mathew Keeling. Professor Keeling was awarded an OBE for contributions to the COVID-19 Pandemic alongside Professors Julia Gog and Graham Medley, University Research Fellowship alumni who also served on this group (roughly 9% of SPI-M held a Royal Society early career research fellowship at some point in their career).

The SPI-M group also made history when they were awarded the University of Oxford's Weldon Prize for noteworthy contributions to the development of mathematical or statistical methods applied to problems in biology. This was the first time the award was presented to a group of researchers rather than an individual. These prestigious awards highlight the exceptional and essential work these scientists carried out under incredibly challenging circumstances.

CASE STUDY

Professor Julia Gog OBE

University Research Fellow (2004 – 2012)

Professor Julia Gog studies how infectious diseases spread using mathematical models at the University of Cambridge. Her scientific work, along with her strong interest in public engagement – helping to run the UK's largest citizen science project with the BBC – informed her advice to government during the COVID-19 pandemic.

Julia's early research focused on the influenza virus, including studying the 2009 swine flu pandemic, but her time as a University Research Fellowship taught her the importance of engaging with the public.

"There was a clear message during the University Research Fellowship to get involved with public engagement of science and [it] showed me why we should care about this, and why we have responsibilities here. [...] The COVID-19 pandemic also brought with it more opportunities for public engagement, including being a co-presenter of a RI Christmas lecture."

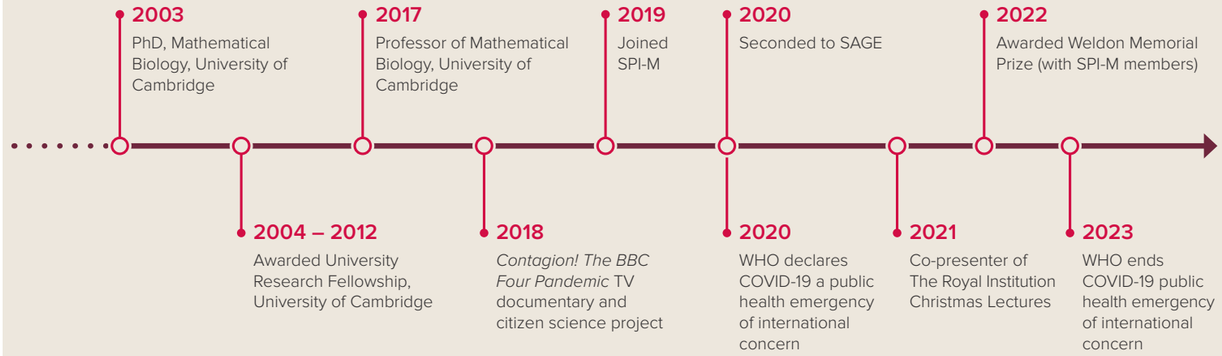
In 2018 she worked with the BBC on *Contagion! The BBC Four Pandemic*. In this citizen science project and documentary, nearly 29,000 volunteers downloaded a contact tracing app, allowing Julia and her team to study how people's behaviour influenced the spread of a fictional disease.

Off the back of this work, Julia was approached to join the UK Government's Scientific Pandemic Influenza Group on Modelling (SPI-M) which provides expert advice on disease modelling. Soon afterwards she would be applying her research to the very real COVID-19 pandemic.

Julia was seconded to the Government to work on the pandemic response, participating in SAGE (Scientific Advisory Group for Emergencies) and running prediction models. Data from the BBC pandemic project helped identify which interventions would have the biggest impact on reducing disease spread.

During this time Julia was inspired to co-create the JUNIPER network, bringing together researchers across the UK working on pandemic modelling. Over the course of the COVID-19 pandemic, they produced over 120 documents for SPI-M, and they continue to work together to prepare for future pandemics.

Julia was awarded an OBE for her pandemic efforts, and continues with her public engagement work alongside research.



CASE STUDY

Professor Eddie Holmes FRS
University Research Fellow (1994 – 1999)

Evolutionary virologist Professor Edward Holmes studies the origins of RNA viruses and how they can jump from one species to another. His release of the first genome sequence of the virus that caused COVID-19 was central to tackling the pandemic.

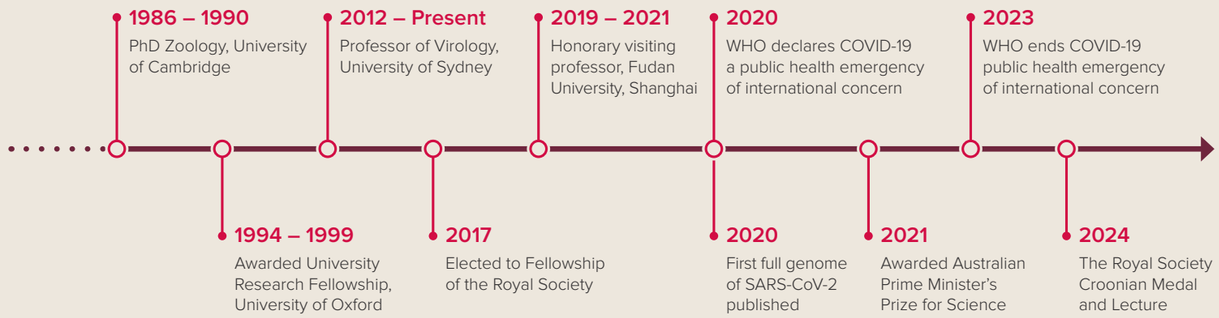
Working with colleagues at Fudan University in China, Eddie released the first full genome of SARS-CoV-2, the coronavirus that causes COVID-19, in January 2020. This was a milestone in efforts to control the virus, allowing researchers to understand how it worked, design tests for its detection, and ultimately create effective vaccines.

Eddie started with a degree in anthropology, switching to a PhD in zoology, where he studied the molecular evolution of primates. After witnessing the impact of HIV/AIDS during his first postdoctoral position in California, Eddie's interests shifted towards understanding the origin of viruses. He worked on this both in the UK and America.

He has continued to research viral evolution ever since, relocating to the University of Sydney in 2012 where he is Professor of Virology.

His current work investigates the amazing diversity of viruses in different hosts and environments: the global virosphere. Eddie also investigates the sources of future pandemics by sampling for viruses in high-risk areas, where the proximity of many different species makes it more likely that viruses will jump (and potentially mutate to novel forms) between hosts.

Eddie has received many awards for his research on COVID-19, including the Australian Prime Minister's Prize for Science in 2021, and the Royal Society Croonian Medal and lecture in 2023. He is a Fellow of both the Royal Society and the Australian Academy of Science.



Supporting our researchers

Our research fellowships have provided crucial support to many researchers, enabling them to build highly successful careers. These grants offer the time and flexibility needed for them to find their feet as research leaders while also providing training and resources to boost their confidence as they develop their careers. This combination of flexibility and support empowers researchers to pursue high-risk, innovative science, establishing them as key players in their field.

The short-term nature and inflexibility of employment in STEM fields can be an additional barrier to career progression and maintaining diversity in the workforce. The research fellowships offered by the Royal Society aim to combat this and prevent talented scientists leaving the UK research sector due to lack of support. Awards can be taken flexibly and on a part-time basis if necessary, accommodating scientists with caring responsibilities or health conditions which make it hard to balance their work.

Our alumni found the combination of freedom and support offered by the Royal Society's fellowships to be valuable in their development as researchers (see Figure 6). A very high proportion of alumni indicated that the award gave them more time to focus on research, as well as valuing the flexibility and prestige. Furthermore, the payoff of these awards is highlighted by the spectacular scientific achievements and careers of alumni.

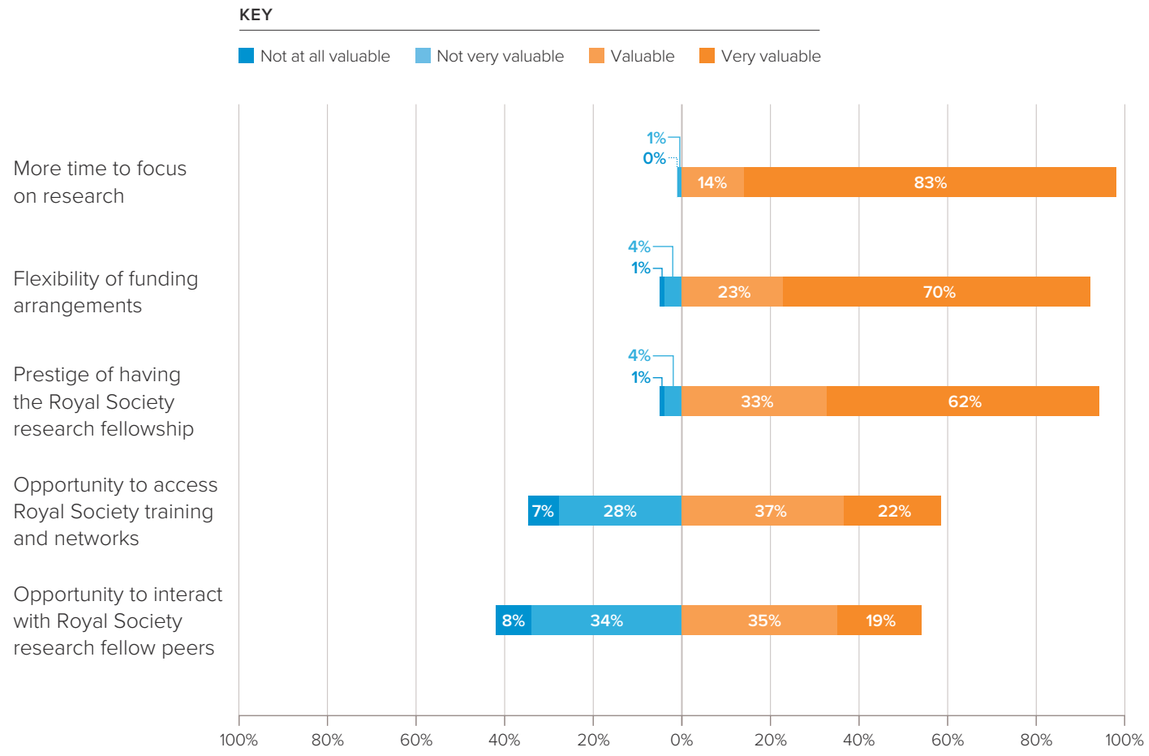
"Having the time, resources and freedom to focus on my research allowed me to establish myself within the field. This has helped with subsequent collaborations and continued research, funding applications etc. I was able to establish my lab group and research without having to juggle the demands of a teaching and research contract, which I am now doing as a full academic member of staff. Having a fellowship that enabled my own development through cohort training and events was invaluable to me."

Dr Clare Howarth (Sir Henry Dale Fellow 2015 – 2022), Senior Lecturer, School of Psychology, University of Sheffield.

The Sir Henry Dale Fellowship allowed Dr Clare Howarth to move from postdoctoral fellow to independent researcher. Her lab investigates how blood flow is regulated in the brain and how this changes during neurodegenerative diseases such as Alzheimer's disease.

FIGURE 6

The benefits of holding a Royal Society early career research fellowship that our alumni most valued.



Note: Figures do not total 100% as some respondents chose 'not applicable' to these questions.

Assessment of the proportion of our alumni taking career breaks or taking their award on a part-time basis suggests that gradually, an increasing number of scientists are taking advantage of these options.

These alumni, particularly early Dorothy Hodgkin Fellowship awardees, have also had the opportunity to set an example for their younger peers, showing that it is possible to pursue an academic career alongside career breaks, such as maternity leave. Examples like this will hopefully continue to shift the perceptions of researchers taking career breaks and normalise a more flexible approach to work, which will benefit the whole scientific community.

Left
Researchers in the lab of Dr Artem Bakulin operating ultrafast laser spectroscopy. Artem is a current University Research Fellow at Imperial College London.

Professor Silke Weinfurtner
University Research Fellow 2013 – 2022, Professor of Theoretical and Experimental Physics, University of Nottingham

Professor Silke Weinfurtner runs the Gravity Laboratory at the University of Nottingham. Her research uses analogue systems such as superfluid helium to study the properties of black holes and the early universe. She is leading a UK-wide programme on Quantum Simulators of Fundamental Physics, and is the Director of Knowledge Exchange and Research Development at the School of Mathematical Sciences, and the co-founder of ARTlab Nottingham.

“The networking was extremely important and helped me establish connections to a number of amazing scientists and role models associated to the Royal Society.”

Professor Jenny Clark
Dorothy Hodgkin Fellow 2009 – 2013, Professor of Materials Physics, University of Sheffield.

Professor Jenny Clark is a biophysicist, applying laser spectroscopy techniques to understand the properties of organic semiconductors. Jenny worked in the US and Italy before settling in the UK. Throughout her career she and her husband have prioritised their family and she feels her Dorothy Hodgkin Fellowship enabled her to balance having children with research from an early stage.
“I wouldn’t still be in academia without the Dorothy Hodgkin fellowship. I chose to have children during my Dorothy Hodgkin Fellowship and, owing to the nature of the Fellowship felt that I could do so on my own terms: I was the first Royal Society fellow in my department to take maternity leave for my first child and the first academic to take maternity leave in my current department for my second child. I chose to take the full leave entitlement, unusual for academics, and I continue (10 years later) to work part-time. I would never have had the confidence to do this without the fellowship … Overall, it made a huge difference to me.”

CASE STUDY

Professor Jason Hall-Spencer
University Research Fellow (2001 – 2008)

“Thanks to the University Research Fellowship scheme I am now a professor in an international hub of marine science expertise.”

Growing up on the Plymouth coast, Professor Jason Hall-Spencer was fascinated by marine life, poking about in rockpools before learning to dive as a teenager. He also witnessed how these ecosystems are damaged by humans, galvanising his desire to conserve these delicate habitats. Jason’s University Research Fellowship allowed him to strengthen his links to policy makers, and he realised he could use research to have an impact on environmental protection.

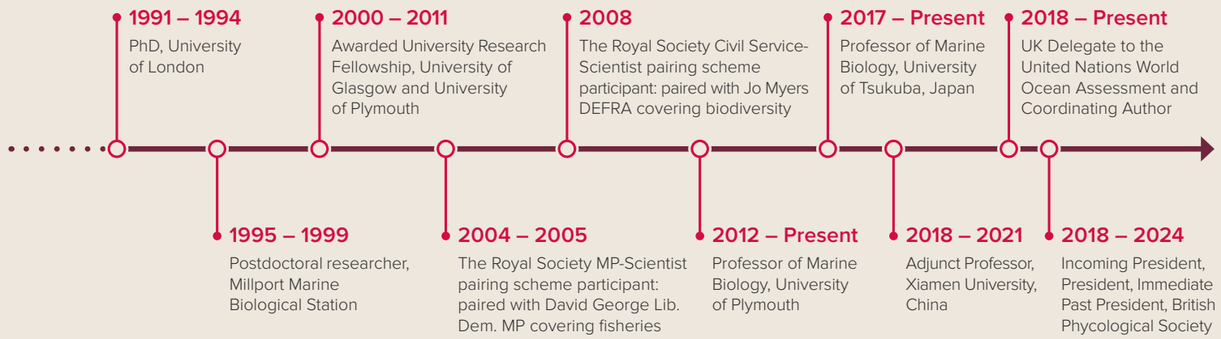
Throughout his career Jason has studied a range of ocean habitats from deep-sea cold-water corals in the Arctic, to addressing invasive lionfish in Mediterranean reefs, before coming home to Plymouth where he is a professor of marine biology at the university. During his University Research Fellowship, he pioneered work studying sites naturally rich in carbon dioxide, where the gas is expelled from the seabed. These locations act as real-world laboratories for understanding how the ocean will react to climate change, including processes like ocean acidification: an area in which he is now a world-leading expert.

Jason had considered leaving academia for environmental law. However, several experiences during his University Research Fellowship persuaded him that he could have a strong and meaningful impact on protecting marine life through research.

These included pairing schemes that the Royal Society offers, partnering scientists with an MP or civil servant so that both parties can gain insights into how research can inform policy decisions, visiting each other in their workplaces.

He says these experiences, as well as the Royal Society training course on science policy, were influential in showing him how scientists could facilitate policy through their work: “The University Research Fellowship made a huge difference; it is the reason that I am still a marine scientist (I was about to leave to train in environmental law). The science-policy training with MPs and within DEFRA was especially valuable as it helped me see the positive influence that scientists can have in societal debate and decision making.”

Jason’s work has influenced UK and international policy on marine protection, and he has contributed to Intergovernmental Panel on Climate Change reports.



CASE STUDY

Professor Russell Minns
University Research Fellow (2011 – 2019)

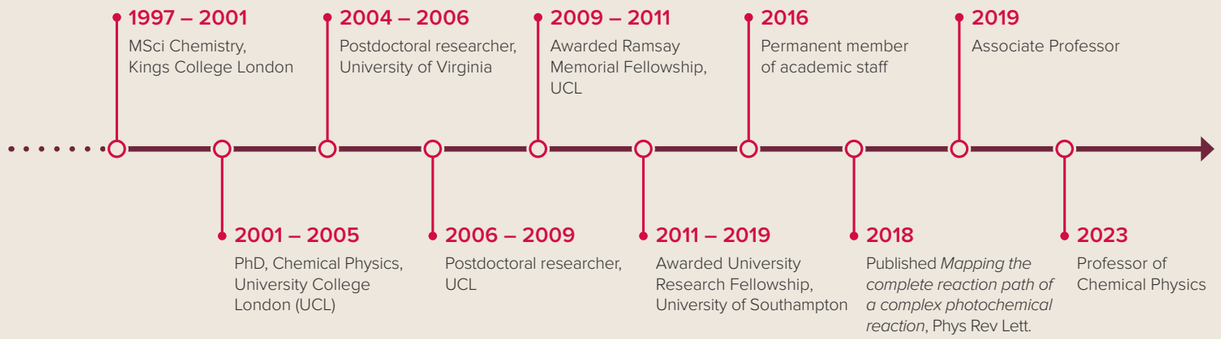
One of Professor Russell Minns’ proudest career moments was mapping a photochemical reaction – where molecules react to light – from start to finish for the first time. He was able to do this using ultrafast lasers, whilst his University Research Fellowship allowed him to balance this research time with family life.

Russell studies the physics of chemical reactions at the University of Southampton, which he joined with his University Research Fellowship in 2011. Specifically, he investigates the photochemical reactions central to some highly important chemical and biological processes such as photosynthesis and vision.

His research exploits advances in laser technology to develop new spectroscopy approaches and study what happens during photochemical reactions as chemical bonds are broken apart and new ones formed. Photochemical reactions happen extremely fast, making it particularly challenging to work out what is going on in this phase.

In 2018, Russell and his team mapped the reaction path of carbon disulphide dissociating in response to light, marking the first complete measurements of a complex photochemical reaction. Essential to this work was the use of the ultrafast Artemis laser at the Central Laser Facility in Harwell, which Russell was also involved in developing at the Rutherford Appleton Laboratory. However, using these state-of-the-art facilities require weeks-long stretches of experiments booked in advance, which can pose a challenge to researchers juggling a young family.

Russell has managed to successfully balance these competing demands, working flexibly to care for his three children and taking paternity leave during his University Research Fellowship. He believes this freedom and flexibility offered by the award has made a difference to his career: “The University Research Fellowship has allowed me to be more adventurous and to take risks in the scientific goals I have set. The freedom and prestige means you have opportunities that are otherwise hard to come by and allows you to explore projects that may take time to develop.”



Diversity in STEM

38%

Average proportion of Royal Society early career research fellowships held by women since 2004.

71%

Average proportion of Dorothy Hodgkin Fellowships held by women since 2004.

Science benefits from a diversity of ideas and approaches, and so the Royal Society is committed to ensuring that people from a wide range of backgrounds are supported in building scientific careers. To do this, we actively encourage participation from underrepresented groups. Our early career fellowships are an opportunity to foster and support the careers of scientists from all backgrounds at the very beginning of their journey.

Women have historically been underrepresented in STEM fields (we currently know very little about the proportions of gender diverse people in STEM careers as we have only started to collect this data in recent years). At present, approximately 42% of postdoctoral researchers in the UK are female, which drops to around 30% for non-bioscience subjects, where the disparity is most pronounced. The proportion of our research fellowships going to female researchers has varied in the past 20 years, between 26% and 54%, but averages at around 38%. Whilst this number is similar to the proportion of eligible applicants, there is clearly still work to be done.

The Dorothy Hodgkin Fellowship was established to address some of this disparity, specifically targeted to researchers requiring enhanced flexibility or the opportunity to work part-time, allowing them to accommodate caring responsibilities or health conditions. A degree of flexibility is now embedded in all our early career awards, and many of our alumni across the schemes comment on how this has enabled them to balance their personal and professional lives.

"The Royal Society fellowship allowed me to pursue innovative and highly risky research, to carve my research niche that allowed to obtain an independent PI position. It also helped extend the time required to set up my independent research group during which I had my daughter."

Professor Ana Pombo (Dorothy Hodgkin Fellow 1997 – 2003), Group lead and Professor, Max Delbrück Centre for Molecular Medicine & Humboldt University of Berlin, Deputy Scientific Director BIMSB (Berlin Institute for Medical Systems Biology).

Professor Ana Pombo moved from Portugal to complete a PhD at the University of Oxford. She was awarded her Dorothy Hodgkin Fellowship soon after, continuing her work on genome organisation and regulation at Imperial College London. In 2013, she relocated her family and her laboratory to Berlin where she leads a large interdisciplinary team at the Max Delbrück Centre for Molecular Medicine.

Above
Early career researchers induction day, 2025.

In the UK, people from minority ethnic groups are also highly underrepresented in STEM professions, making up only around 29% of postdoctoral researchers. Applicants from these backgrounds comprise 18% of the most recent University Research Fellowship and Sir Henry Dale Fellowship applications, and 21% of the Dorothy Hodgkin Fellowship applications. Despite this, there are notable success stories from the past 40 years of the Royal Society's early career awards, some of whom are presented here.

Researchers from Black heritage backgrounds are particularly underrepresented at the application stage for our early career awards. The Royal Society's Career Development Fellowship, launched in 2024, provides four years of funding specifically to researchers from underrepresented groups in STEM. This was run as a pilot with researchers of Black heritage, and if successful may be broadened to other underrepresented groups.

This award aims to support researchers at a slightly earlier career stage than our existing fellowships, as these talented scientists are at greater risk of exiting the research pipeline before becoming eligible for a University Research or Dorothy Hodgkin Fellowship.

There was evidently strong demand for a programme like this, with over 200 applications submitted for the first round in 2024. In future years, Career Development Fellows will also be included in the Tracker to help us understand how we can best support underrepresented groups on their path to research leadership.

By Alanna Grant.

CASE STUDY

Professor Kate Hendry

University Research Fellow (2013 – 2018)

In her role as a Senior Ocean Scientist at the British Antarctic Survey, Professor Kate Hendry leads polar expeditions. But she is also working to ensure that these opportunities are available to a wider range of researchers, making sea-going science more inclusive.

Researching how marine nutrient cycling is impacted by climate change frequently takes Kate to the Antarctic. She says one of the highlights of her career so far was being co-chief scientist on the maiden voyage of the UK's flagship research vessel, the Royal Research Ship (RRS) Sir David Attenborough. This vessel enables cutting-edge research in some of Earth's most extreme environments, featuring state of the art laboratories, and a 'moon-pool' at the centre of the ship for deploying equipment into directly into the ocean.

She was also chief scientist on an expedition to the Labrador Sea aboard the RRS Discovery in 2017, marking the first time when all the UK's research ships were at sea on expeditions led by female chief scientists.

As well as her scientific achievements, Kate is working to improve the accessibility of sea-going research. She advises the Challenger Society for Marine Science on inclusivity and diversity in oceanography, supports the Diversity in UK Polar Science Initiative, and has written about how the challenges faced by women, and other people from backgrounds underrepresented in science – who were historically excluded from voyages – can be addressed in sea-going science.

Kate also advocates more broadly for increased accessibility; she learned British Sign Language after finding out about the barriers to deaf and hard of hearing scientists in oceanography. She has taken this skill into science communication, helping to teach school children about the environment in sign language.

2004 – 2008
PhD Earth Sciences, Hertford College, University of Oxford.

2008 – 2011
Research cruises with US Antarctic programme

2009 – 2011
Doherty Scholar, Woods Hole Oceanographic Institution

2011 – 2013
Research Lecturer in Climate System Science, Cardiff University and Climate Change Consortium of Wales

2013 – 2018
Awarded University Research Fellowship, University of Bristol

2017
Chief Scientist, RRS Discovery expedition

2019
Steering group member, Diversity in UK Polar Science Initiative

2021
Founder, Challenger Society Equity, Diversity, Inclusivity and Accessibility working group

2022
Senior Scientist, British Antarctic Survey

2023
Co-Chief Scientist, RRS Sir David Attenborough

© Matthew Thompson.

CASE STUDY

Professor Rachel Oliver OBE FREng

University Research Fellow (2006 – 2011)

Professor Rachel Oliver is a materials engineer who investigates the semiconductors which underpin many technologies we use in our daily lives. Alongside her role as Director of the Cambridge Centre for Gallium Nitride, and Chief Scientific Officer at a successful spin-out company, Rachel also advocates for diversity in STEM careers, particularly addressing barriers to funding.

Throughout her career Rachel has innovated new techniques for studying the structure of gallium nitride (GaN) crystals, and construction methods which enhance their efficiency. These materials have many applications, including LEDs (light-emitting diodes), and transistors used in chargers. Even small changes to the efficiency of LEDs have the potential to make a big difference to our energy use, and therefore our carbon emissions.

The applications of these materials go much further than this. For example, Rachel has developed the first indium-GaN single photon source, which has applications in quantum computing and cryptography.

In 2018, she co-founded the startup Porotech aiming to bring microLED innovations to the market, with a £1.5 million seed investment in 2020. In 2024, Porotech partnered with Foxconn to establish a world-leading microLED production facility.

While completing her engineering degree, women made up around 16% of Rachel's cohort, and these proportions remain relatively unchanged today. The slow pace of this change has motivated Rachel to address the imbalance of women and minority groups in STEM fields.

In 2016 she founded the advocacy group TIGERSTEMM, and later appeared in Parliament to successfully convince the House of Commons Science and Technology Select Committee on the need for an inquiry into the impact funding policies have on diversity in STEM careers. Rachel has attended Parliament several times since as an expert witness on this subject.

Rachel also advocates for increased equity in her institution and profession. As a Gender Equality Champion at the University of Cambridge she was instrumental in ensuring that the impact of the COVID-19 pandemic on women's careers was properly considered in University promotion processes. She currently co-chairs the Royal Academy of Engineering Diversity and Inclusions Committee.

Her research has been widely celebrated: she was listed in the Top 50 Women in Engineering 2020 by the Women's Engineering Society, is a Fellow of several learned societies including the Royal Academy of Engineering, and in 2025 was awarded an OBE for services to materials engineering.

2000 – 2003
PhD, University of Oxford

2006 – 2011
Awarded University Research Fellowship, University of Cambridge

2011 – 2013
Lecturer, University of Cambridge

2018 – Present
Founder and Chief Scientific Officer, Porotech

2018 – Present
Professor, Materials Science University of Cambridge

2019
Founder, TIGERSTEMM

2021
IEEE Photonics Society Distinguished Lecturer

2021
Elected to Fellowship of the Royal Academy of Engineering

2023
UK delegate on the Semiconductor Sector visit to Washington DC on behalf of the UK Government

2023
RAEng Chair in Emerging Technologies

Where are they now?

Research Fellows are highly likely to remain in the UK for at least

10 years

after completing their award.

The Royal Society aims to attract and retain research talent in the UK whilst also fostering healthy collaborations with the international research community. Our alumni can be found across the globe, with many choosing to continue their careers in the UK after completing their research fellowship.

"It is hard to know what career path I would have taken if I had not had a University Research Fellowship; however, I am almost certain that I would have left the UK for a position in France or the USA. The fellowship provided a foundation for my progression as an independent scientist, allowing me to set up a lab, develop (lasting) collaborations, visit institutes abroad and ultimately obtain a permanent position in the UK. I feel extremely fortunate to have had the opportunities provided by the University Research Fellowship."

Professor Luke Skinner (University Research Fellow 2006 – 2014), Professor of Earth System Science, University of Cambridge.

Professor Luke Skinner studied for a degree in Geological Engineering in Canada before completing his Master's and PhD at the University of Cambridge. He took up his University Research Fellowship to start his own lab in Cambridge in 2006, where he still works as Professor of Earth System Science researching the carbon cycle and climate change.

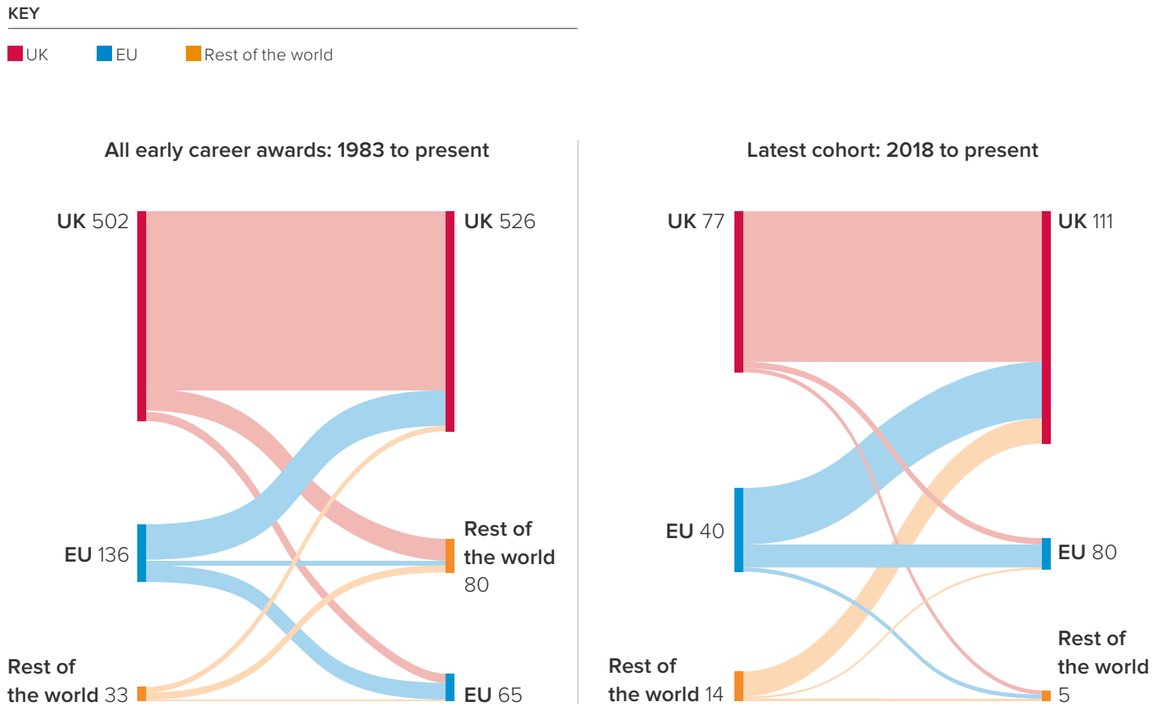
We can use the nationality of our alumni at the beginning of their award, and where in the world they end up, to understand the retention of our researchers in the UK after their fellowships. Since our first cohort of early career research fellows in 1983, we have been successful in both retaining and attracting researchers to the UK (Figure 7).

In our most recent cohort, we can also see two key trends; the proportion of international researchers is increasing, and they are more likely to still be in the UK after finishing their award.

This positive retention effect can be seen very strongly for the first 10 years post-fellowship, so it is likely that as these researchers' careers mature, some will move abroad. However, this 10-year window, where data suggests alumni are more likely to remain within the UK, includes some of the most productive years of a scientist's career as they fully establish themselves as independent researchers and continue to rise in seniority, before taking on more senior administrative roles within their institutions.

FIGURE 7

Nationality of our award holders across all three early career schemes compared to the countries they are based in today.



82%

of alumni report at least one active international collaboration.

Even though many of our alumni choose to stay in the UK, they are strongly embedded in the international research community, with 82% reporting that they had at least one ongoing international collaboration, and the majority reporting that they had two or three. It was also common for alumni to spend some time abroad during their careers with 44% reporting this prior to receiving their research fellowship, 21% during their award, and 27% afterwards.

All of this data suggests that our research fellowships are supporting scientists who are part of a thriving international research community, whilst at the same time preventing a "brain-drain" in the UK research sector.

Professor Julia Cordero

Dorothy Hodgkin Fellow 2013 – 2015, Sir Henry Dale Fellow 2015 – 2021, Professor of Systemic Signalling Biology, Wellcome Trust Senior Research Fellow, University of Glasgow

Professor Julia Cordero studies how intestinal stem cells are regulated to adapt to their environment and repair damage, how problems like cancer can emerge when these mechanisms go awry, and how communication between the gut and other organs influences whole body health and disease. Julia grew up and studied in Argentina, and then in the US before moving to Scotland for a postdoctoral position at the CRUK Beaston Institute in Glasgow.

Her Dorothy Hodgkin Fellowship allowed her to start her own group in Glasgow in 2013, followed by a Sir Henry Dale Fellowship in 2015. She won a CRUK Pioneer award in 2019 and was interviewed as a "Cell Scientist to Watch" by *Journal of Cell Science* in 2021.

"The Royal Society Fellowships were transformative in many ways. It provided a stepping stone to independence and the opportunity to do the research I wanted and to hire a team to do it. It gave me an enormous sense of pride and achievement. It boosted my self-confidence."

CASE STUDY

Dr Annapoorna Kuppuswamy

Sir Henry Dale Fellow (2016 – 2022)

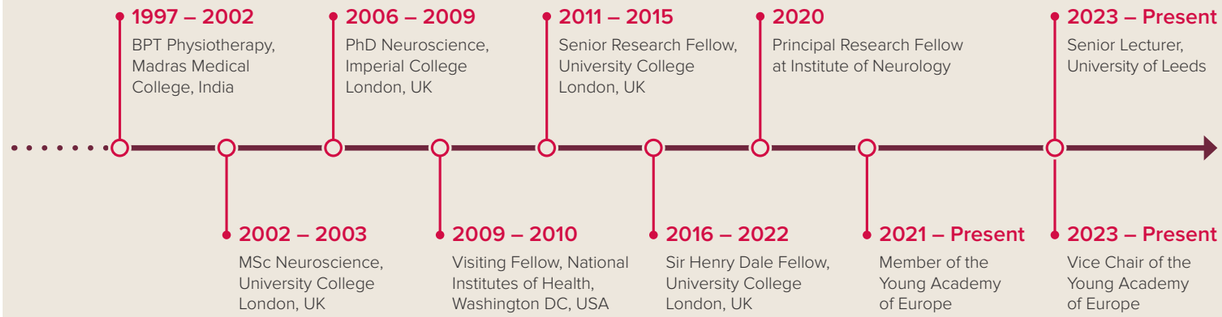
Dr Annapoorna Kuppuswamy trained as a physiotherapist in India but became increasingly interested in the brain changes that caused the neurological symptoms she was learning to treat. She switched to a career in neuroscience, winning a scholarship to study for a Masters at University College London (UCL). She credits her Sir Henry Dale Fellowship for helping her establish her research independence.

After her Masters, Anna stayed in London to complete her PhD in neurobiology and behaviour at Imperial College London. She moved across the Atlantic for a postdoctoral position at the US National Institutes of Health for a year, enjoying the academic freedom there, and returned to the UK in 2010 ready to begin her own independent research group. Each move, she says, was driven by her specific research goals.

In 2016, Anna took up a Sir Henry Dale Fellowship, and says: "Obtaining the Henry Dale fellowship allowed the establishment of an independent research career using a high-risk strategy which was a significant step towards independence... It provided me the opportunity to pursue a line of work which I would not have otherwise had."

Her research focuses on chronic fatigue, a debilitating but common experience for people with neurological disorders such as patients recovering from a stroke or people with Parkinson's disease. Her lab aims to understand how fatigue arises in the brain and is particularly interested in how problems with sensory perception and processing can cause this symptom.

Anna's lab use a combination of different brain imaging technologies, as well as non-invasive brain stimulation and behavioural studies, working with patients experiencing post-stroke fatigue. After 12 years at UCL she is relocating her lab group to the University of Leeds for the next stage of her career journey.



CASE STUDY

Professor Duncan Lorimer FRS
University Research Fellow (2001 – 2006)

Not only did Professor Duncan Lorimer's work on collapsed stars called pulsars lead to the discovery of a new astronomical phenomenon and start an entire new field, but his career has also taken him across the globe.

Duncan uses radio telescopes, located around the world, to study faint electromagnetic signals from distant astronomical objects. His research focuses on pulsars: a type of neutron star that emits highly concentrated electromagnetic beams at regular intervals from its magnetic poles. A neutron star itself is formed when a massive star dies and collapses under its own weight.

As pulsars rotate their beams can be detected on Earth as pulses of radiation, most readily received by radio telescopes. Duncan started working with these facilities during his PhD in Manchester at the Jodrell Bank Observatory and spent time in Australia, Germany, and the USA, before arriving at the Arecibo Observatory in Puerto Rico in 1998. Here he met his future wife and collaborator, fellow radio astronomer Maura McLaughlin.

The couple moved to the UK in 2001 to work at the Jodrell Bank Observatory, where Duncan took up his University Research Fellowship. He says the fellowship "provided me a great deal of freedom during my early career".

Among the accomplishments he is most proud of during that era is publishing the *Handbook of Pulsar Astronomy.*

In 2006, Duncan and Maura received an offer from West Virginia University (WVU) to build an astronomy research programme there, prompting them to move their young family to America.

Within a year, their group observed a mysterious signal which was different anything previously seen from pulsars: it was much more intense and appeared to come from outside our galaxy, likely several billion light years away. Several more years of dedicated research from scientists around the world confirmed the phenomenon, with thousands more of what are now known as Fast Radio Bursts (FRBs) detected since. Their source, however, remains a conundrum and an area of highly active research.

Duncan and Maura, both still at WVU, shared the Shaw Prize in Astronomy 2023 with Matthew Bailes, director of the Australian Research Council, for their discovery of FRBs. Duncan collaborates with students and colleagues from around the world, using exciting new radio facilities including the Five Hundred Metre Aperture Spherical Telescope (FAST) in China, currently the world's largest radio telescope.

1991 – 1994
PhD, Jodrell Bank Observatory, University of Manchester

1995 – 1998
Postdoctoral fellow, Max-Planck-Institute for Radio Astronomy, Bonn, Germany

1998 – 2001
Arecibo Observatory, Puerto Rico

2001 – 2006
Awarded University Research Fellowship, University of Manchester, Jodrell Bank Observatory

2004
Published *Handbook of Pulsar Astronomy* (Cambridge University Press) with longtime collaborator Michael Kramer

2006 – Present
West Virginia University, USA

2007
Fast Radio Bursts discovery (original signal dubbed the 'Lorimer Burst')

2019 – 2024
Associate Dean for Research, WVU Eberly College of Arts and Sciences, USA

2023
Awarded the Shaw Prize with Maura McLaughlin and Matthew Bailes

2025
Eberly Distinguished Chair for Academic Excellence, WVU

Early career research fellowship to Fellow of the Royal Society

Professor Fraser Armstrong FRS
University of Oxford

Dame Frances Ashcroft FMedSci FRS
University of Oxford

Professor David Attwell FMedSci FRS
University College London

Professor Sir Shankar Balasubramanian FMedSci FRS
University of Cambridge

Professor Martin Barlow FRS
University of British Columbia

Professor Polina Bayvel FREng FRS
University College London

Professor David Beerling FRS
University of Sheffield

Professor Jean Beggs FRSE FRS
University of Edinburgh

Professor Andrew Blake FREng FRS
University of Cambridge

Professor Sarah-Jayne Blakemore FBA FMedSci FRS
University of Cambridge

Professor Jonathan Blundy FRS
University of Oxford

Professor Richard Borcherds FRS
University of California, Berkeley

Professor Tom Bridgeland FRS
University of Sheffield

Professor Kevin Brindle FMedSci FRS
University of Cambridge

Professor Neil Burgess FMedSci FRS
University College London

Professor Michael Cates FRS
University of Cambridge

Professor David Charlton FRS
University of Birmingham

Professor Tim Clutton-Brock FRS
University of Cambridge

Professor Andrew Cooper FRS
University of Liverpool

Professor Brian Cox FRS
University of Manchester

Professor Gideon Davies FMedSci FRS
University of York

Dame Athene Donald FRS
University of Cambridge

Professor Marcus du Sautoy FRS
University of Oxford

Professor Artur Ekert FRS
University of Oxford, National University of Singapore

Professor Jeff Errington FMedSci FRS
University of Sydney

Professor Adam Eyre-Walker FRS
University of Sussex

Dr Andrew Fitzgibbon FREng FRS
Graphcore Ltd

Dame Lynn Gladden FREng FRS
University of Cambridge

Professor Alan Grafen FRS
University of Oxford

Professor Roger Hardie FRS
University of Cambridge

Professor Andrew Harrison FRS
Central European Infrastructure Consortium

Professor Peter Haynes FRS
University of Cambridge

Professor Janet Hemingway FMedSci FRS
Liverpool School of Tropical Medicine

Professor Peter Holland FRS
University of Oxford

Professor Edward Holmes FRS
University of Sydney

Professor Marian Holness FRS
University of Cambridge

Professor Laurence Hurst FMedSci FRS
University of Bath

Professor Malcolm Irving FRS
Kings College London

Professor Christopher Jiggins FRS
University of Cambridge

Professor (Edith) Yvonne Jones FRS
University of Oxford

Professor Peter Keightley FRS
University of Edinburgh

Professor Rebecca Kilner FRS
University of Cambridge

Professor Loeske Kruuk FRS
University of Edinburgh

Professor Jane Langdale FRS
University of Oxford

Professor Susan Lea FMedSci FRS
National Cancer Institute, NIH, USA

Professor Malcolm Levitt FRS
University of Southampton

Professor Simon L Lewis FRS
University College London and University of Leeds

Professor David Lilley FRS
University of Dundee

Professor Duncan Lorimer FRS
West Virginia University

Professor Andrew MacKenzie FRS
Max Planck Institute and University of St Andrews

Professor Yadvinder Singh Malhi FRS
University of Oxford

Professor Tamsin Mather FRS
University of Oxford

Dame Angela McLean FRS
Government Office for Science

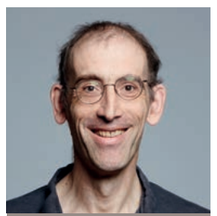
Professor Gilean McVean FMedSci FRS
University of Oxford

Professor Paul Midgley FRS
University of Cambridge

Professor Gerard Milburn FRS
University of Queensland

Professor Russell Morris FRS
University of St Andrews

Professor Peter Nellist FRS
University of Oxford



Professor Francis Nimmo FRS
University Of California, Santa Cruz

Professor Sir Konstantin Novoselov FRS
University of Manchester

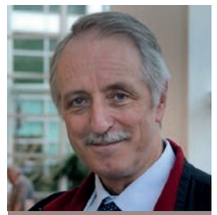
Professor Rachel O'Reilly FRS
University of Birmingham

Professor Andrew Orr-Ewing FRS
University of Bristol

Professor Miles Padgett FRS
University of Glasgow

Professor Tracy Palmer FMedSci FRS
Newcastle University

Professor Michael Payne FRS
University of Cambridge



Professor Sir John Pethica FREng FRS
Trinity College Dublin

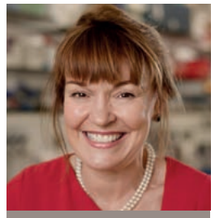
Professor Sally Price FRS
University College London

Professor Oliver Pybus FRS
University of Oxford

Professor Sheena Radford FMedSci FRS
University of Leeds

Professor Andrew Rambaut FRS
University of Edinburgh

Professor David Richardson FREng FRS
University of Southampton

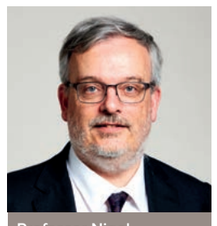


Dame Carol Robinson FMedSci FRS
University of Oxford

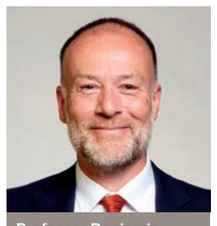
Professor John Rodenburg FRS
University of Sheffield

Dame Nancy Rothwell FMedSci FRS
University of Manchester

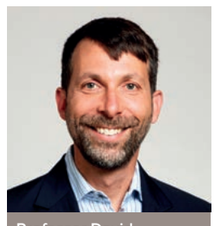
Professor Matthew Rushworth FRS
University of Oxford



Professor Nigel Scrutton FRS
University of Manchester



Professor Benjamin Sheldon FRS
University of Oxford



Professor David Silver FRS
Deep Mind, University College London

Professor Henning Sirringhaus FRS
University of Cambridge

Professor Timothy Softley FRS
University of Birmingham

Professor Adrian Sutton FRS
Imperial College London

Professor Richard Thomas FRS
Imperial College London

Professor Nicholas Turner FRS
University of Manchester

Professor David Wales FRS
University of Cambridge

Professor Colin Wilson FRS
Victoria University

Professor Rachel Wood FRS
University of Edinburgh

Women in STEM

2025 marks the 80th anniversary of the first women elected to the Royal Society Fellowship, Dame Kathleen Lonsdale FRS and Dr Marjory Stephenson MBE FRS.

This milestone provides an opportunity to celebrate the achievements of women in science, technology, engineering and mathematics, and to consider what might be different by the 100th anniversary of female Fellows in 2045.

To find out more, visit **royalsociety.org/women-in-stem**

Right Dame Kathleen Lonsdale FRS (left) and Dr Marjory Stephenson MBE FRS (right).

Acknowledgements

This publication was produced by the Royal Society based on the findings from the externally commissioned report by Careers Research and Advisory Centre (CRAC) Ltd.

The Royal Society would like to thank the following experts who have provided input on this project.

Grants Committee representatives
Professor Veronica van Heyningen CBE FMedSci FRS
Professor Paul Madden FRS FRSE

Additional contributors
Professor Gert Aarts FLSW
Professor Ben Green FRS
Professor Marta Kwiatkowska FRS
Professor Charalambos Kyriacou FMedSci
Professor Jane Langdale CBE FRS
Professor Ros Rickaby OBE FRS
Professor Sophie Scott CBE FMedSci FBA
Professor Stephen Smartt CBE FRS
Professor Angela Vincent FMedSci FRS
Professor Eric Wolff FRS
Professor Eli Zysman-Colman FRSC

Editor
Shaoni Bhattacharya

Many staff at the Royal Society contributed to the production of this report. The Grants Monitoring, Evaluation and Learning Team are listed below.

Royal Society staff
Callum Brooker, Monitoring, Evaluation and Learning Officer
Jenny Clark, Grant Reporting and Analysis Manager
Tanja Floyd, Senior Manager, Monitoring, Evaluation and Learning Lead
Catriona MacDonald, Monitoring, Evaluation and Learning Officer

The Royal Society is a self-governing Fellowship of many of the world's most distinguished scientists drawn from all areas of science, engineering, and medicine. The Society's fundamental purpose, as it has been since its foundation in 1660, is to recognise, promote, and support excellence in science and to encourage the development and use of science for the benefit of humanity.

The Society's strategic priorities emphasise its commitment to the highest quality science, to curiosity-driven research, and to the development and use of science for the benefit of society. These priorities are:

- The Fellowship, Foreign Membership and beyond
- Influencing
- Research system and culture
- Science and society
- Corporate and governance

For further information
The Royal Society
6 – 9 Carlton House Terrace
London SW1Y 5AG

T +44 20 7451 2500
E grants@royalsociety.org
W royalsociety.org

Registered Charity No 207043

ISBN: 978-1-78252-762-6
Issued: April 2025 DES9034