

Royal Botanic Gardens
Kew

**Future Leader
Fellowships in Plant
and Fungal Science**

2020



Foreword

Never before has there been such urgency to understand and protect the world's biodiversity. Tackling this major challenge for the future of our own species and the health of our planet requires time, resources and training.

This flagship programme at the Royal Botanic Gardens, Kew (Kew) will enable the brightest and most innovative young scientists to develop their research projects in their field of expertise while gaining the necessary leadership skills for the next stage of their careers. Kew's Future Leader Fellows will profit from a dynamic and cross-disciplinary scientific environment, direct access to the world's most extensive plant and fungal collections, and state-of-the-art laboratory facilities. The Fellowships will be spread across Kew's two sites: Kew Gardens and Wakehurst. With over two million annual visitors to our gardens and many public-facing activities, such as our Science Festivals, there will be invaluable opportunities to communicate research findings and engage with citizens and policymakers. With this combination of resources, training and opportunities, we hope to provide early-career researchers with the skills and knowledge they need to become the world's future leaders in plant and fungal sciences.



Professor Alexandre Antonelli
Director of Science



Contents

| | |
|---|-----------|
| Foreword | 1 |
| Science at the Royal Botanic Gardens, Kew | 4 |
| Collections and facilities | 7 |
| Kew Science departments | 9 |
| Fellowship details | 10 |
| What does the Fellowship offer? | 11 |
| Am I a suitable applicant? | 15 |
| Open Fellowship positions in 2020 | 16 |
| One Fellowship in Biodiversity Informatics and Spatial Analysis | 18 |
| Intelligent data analysis | 19 |
| Two Fellowships in Comparative Plant and Fungal Biology | 20 |
| Integrated monography | 21 |
| Two Fellowships in Natural Capital and Plant Health | 22 |
| Plant health genomics | 23 |
| Crop plant and harvestable product genomics | 25 |
| Application process | 26 |

Science at the Royal Botanic Gardens, Kew



The Royal Botanic Gardens, Kew (hereafter ‘Kew’) was founded in 1759, and from its beginnings as a Georgian royal garden it has become a global centre for plant and fungal science, tackling urgent environmental challenges.

Kew operates across two sites: Kew Gardens in south-west London, a UNESCO World Heritage Site, and Wakehurst in West Sussex, which is home to Kew’s Millennium Seed Bank. Kew also has a permanent research station in Madagascar, one of the world’s biodiversity hotspots. With over 300 scientists, Kew has an extensive research programme that includes a wide range of projects – from the analysis of genomes to the discovery and identification of new species and the impact of climate change on the wild relatives of crops.

Kew’s *Science Strategy (2015–2020)* outlines our scientific vision to document and understand global plant and fungal diversity and its uses, bringing authoritative expertise to bear on the critical challenges facing humanity today. It sets out three strategic priorities for Kew Science:

1. To document and research global plant and fungal diversity and its uses for humanity.
2. To curate and provide data-rich evidence from Kew’s unrivalled collections as a global asset for scientific research.
3. To disseminate our scientific knowledge of plants and fungi, maximising its impact in science, education, conservation policy and management.



Collections and facilities

Underpinning the scientific research carried out at Kew are the Science Collections, which incorporate both living and preserved material, from dried plant and fungal specimens to DNA and living seeds. This important resource, documenting plant and fungal diversity through time and space, forms one of the largest and most diverse botanical and mycological collections in the world, containing over 8.5 million items and representing approximately 95% of the world's vascular plant genera and 60% of fungal genera. These extensive scientific collections of plants, fungi and artefacts from across the globe lie at the heart of the organisation and form the foundation of Kew Science. Researchers also have the rich resources of the Library, Art and Archives and Living Collections to facilitate their research.

To support our scientists across the many disciplines of plant and fungal science at Kew, we have a wide range of state-of-the-art research facilities, including laboratories for flow cytometry, molecular biology, seed biology and small molecule analysis. At Wakehurst, the Wellcome Trust Millennium Building, which houses the Millennium Seed Bank, is a purpose-built facility for the long-term storage and study of seeds collected from across the world.





Kew Science departments

Kew Science has six research departments, described below, and these are supported by three further departments with research capabilities: Library, Art and Archives, Analytical Methods, and the Office of the Science Directorate.

Biodiversity Informatics and Spatial Analysis:

applying computational techniques to analyse, edit, curate, organise, mine and disseminate data and to evaluate trends and patterns through time and space.

Collections:

managing and developing Kew's Science Collections, which contain over 8.5 million items, representing over 95% of known flowering plant genera and approximately 60% of the known genera of fungi.

Comparative Plant and Fungal Biology:

understanding the principles that determine plant and fungal diversity and applying this knowledge to the global challenges of today.

Conservation Science:

undertaking rigorous, evidence-based research and conservation activities to improve the global outlook for biodiversity.

Identification and Naming:

species discovery, naming and curation, and undertaking accurate taxonomy – the bedrock on which all of Kew's pure and applied science is based.

Natural Capital and Plant Health:

researching plant and fungal natural assets and the ecosystem services they underpin in order to provide benefits and services to humankind.

Fellowship details



What does the Fellowship offer?

The Future Leader Fellowship in Plant and Fungal Science Programme provides a unique opportunity for early-career researchers to develop their scientific portfolio and skills in a vibrant research environment.

Five Fellowships will be awarded by Kew on an annual basis to talented early-career researchers with innovative and viable research ideas. The programme aims to provide Fellows with an internationally outstanding level of educational and professional development, empowering them to establish themselves as independent researchers in their discipline by the end of the Fellowship.

Fellowships at a glance

- Five Fellowships awarded annually
- Four-years in duration
- £5,000 for research expenses
- Opportunities for secondment
- Development and mentorship scheme

The programme offers a four-year research fellowship based at either Kew Gardens or Wakehurst within one of Kew Science's six research departments. The yearly call for applications will include information on the positions available and in which departments. The research area will be defined, along with the research priorities for the relevant department. Each Fellow will be line-managed by a senior researcher at Kew and will become fully integrated into one of our research teams and Kew Science as a whole.



Kew will provide a stimulating research environment with access to state-of-the-art facilities, world-class collections, unique public engagement opportunities and over 300 plant and fungi experts to collaborate with.

The Fellowship will include a budget of £5,000 for research expenses, and the opportunity to carry out a secondment of up to three months at a UK or overseas academic or non-academic organisation.

Fellows will be encouraged to use their time at Kew as an opportunity to build their track record through publishing high-quality academic papers and securing research funding. They will also be given support to allow them to develop their research networks, both at Kew and externally, supervise MSc and PhD students, contribute to science communication and public engagement activities, and commit time to a variety of career development opportunities.

Central to the Fellowship is a comprehensive development and mentorship scheme that all Fellows complete during their time at Kew. This scheme will provide Fellows with all the opportunities needed to gain the necessary skills and training to establish themselves as independent researchers. It includes a range of training workshops on topics from grant writing to research impact, a mentorship programme, bi-annual meetings with the Director of Science, and opportunities for researcher-led development. Researcher-led development allows Fellows to come up with creative ways to provide opportunities not just for themselves but for all Fellows at Kew. This could include activities such as symposia, discussion groups or writing retreats.

The Future Leader Fellowship in Plant and Fungal Science is equivalent to a postdoctoral research role, and the Fellowship aims to provide early-career researchers with the time and resources to build their track record so they can move on to an independent research role following completion of the Fellowship. As a part of this, Fellows are encouraged to contribute to the development of research funding proposals.



Am I a suitable applicant?

Ideal applicants for these positions are early-career researchers on an upward trajectory, with innovative and interesting research ideas aligned to the relevant research department.

Applicants should have:

- completed at least one postdoctoral research position, although strong applicants who have just finished their PhD will also be considered
- experience of contributing to publications and other research outputs – strong applicants will have published six peer-reviewed papers, with three as the first author
- a PhD or equivalent in a relevant subject, awarded no more than seven years from the application closing date

The seven-year period excludes interruptions such as parental leave or long-term illness. For maternity leave, an 18-month extension will be applied for each child born during this period. For paternity and long-term illness, the extension will be applied based on the amount of leave taken.



Open Fellowship positions in 2020

A close-up photograph of a scientist in a white lab coat and purple gloves working with green grass-like plants in petri dishes in a laboratory setting. The scientist is on the right side of the frame, and the plants are in the foreground. The background is a blurred laboratory environment.

There are five Fellowships available each year, each positioned within one of the six research departments at Kew. The Fellowships available in 2020 are outlined on the following pages, along with information on the research area and the research priorities for the department.



The Biodiversity Informatics and Spatial Analysis department apply computational techniques to analyse, edit, curate, organise, mine and disseminate data to evaluate trends and patterns through time and space.

Intelligent data analysis

The Intelligent Data Analysis team, led by Dr Nicky Nicolson, specialise in the use of computational techniques such as clustering, classification and network, image and text analysis to develop a rich data model to enhance the use of, and accessibility to, Kew's priceless physical and digital collections. These collections provide a huge evidence base to support species discovery and conservation, and can help us to answer fundamental questions about the ecology and evolution of the world's plants and fungi.

Kew holds a rich array of scientific information in the form of structured data, images and texts. These resources cover the range of stages in the process of describing species: field collection, specimen identification and distribution, and the publication of scientific results and datasets. These datasets can be mined for entities and relationships to form a more interconnected data model – to unlock a rich evidence base in support of plant and fungal science. The Intelligent Data Analysis team work collaboratively with colleagues across similar collections-based organisations, as well as data mobilisation programmes such as the Global Biodiversity Information Facility and the Biodiversity Heritage Library.

This Fellowship provides a unique opportunity for a computer scientist to use Kew's vast collections as training data for machine learning applications to answer novel applied computational research questions. These training data are supported by motivated plant and fungal experts who are best placed to validate and explore results.

They would like to hear from motivated applicants with specialist knowledge in scientific programming and use of toolkits and libraries in areas such as AI and machine learning, data manipulation, exploration and cleaning, data summarisation and visualisation.

Two Fellowships in Comparative Plant and Fungal Biology



The Comparative Plant and Fungal Biology department work to understand the principles that determine plant and fungal diversity and apply this knowledge to the global challenges of today. The two 2020 Fellowships are within the Integrated Monography team.

Integrated monography

The Integrated Monography team, led by Dr Olwen Grace, specialise in the systematics, taxonomy and evolution of Earth's most economically and ecologically important groups of plants. They discover and describe species on a global scale, uncovering the evolutionary dynamics and relationships of plants using taxonomy, 'omics' technologies, and a variety of morphological and geographical comparative data. They aim to complete the tree of life for Kew's focal plant groups and unlock fundamental biodiversity knowledge for the broadest audiences and applications, so that these valuable resources are conserved and available to use for the future.

They want to hear from applicants with specialist knowledge of a lineage or plant family that warrants the dedicated attention of a Fellow at Kew. Applicants' research interests will align closely to the Integrated Monography team as they seek to accelerate the classification and comparative study of the plant kingdom using Kew's collections.

They also seek to appoint a Fellow to add to Kew's dedicated research capacity on the orchid family, Orchidaceae – one of the most diverse, valuable and threatened plant families on Earth. In this post, the Fellow will have the opportunity to contribute to various aspects of Kew's scientific remit, including, for example, conservation and sustainable use, fungal symbioses and seed biology, and adaptive traits.

As a Fellow in the Integrated Monography team, the successful applicant's research interest in their nominated plant group will go beyond phylogeny and classification to answer broader questions, such as their relevance to the challenges facing humanity today, as articulated in Kew's *Science Strategy*. They will demonstrate this with a plan to disseminate their work to a wide audience.

Two Fellowships in Natural Capital and Plant Health



The Natural Capital and Plant Health department research plant and fungal natural assets and the ecosystem services they underpin in order to provide benefits and services to humankind.

Plant health genomics

The Plant Health team, led by Professor Richard Buggs, use genomic methods to understand the genetic basis of plant health. Their cutting-edge research in evolutionary genomics impacts policy and management, dealing with new epidemics and climate change. Recent successes include: the discovery of genetic loci for ash dieback resistance in European ash trees using a genome-wide association study; the discovery of candidate genes for emerald ash borer resistance in the ash pan-genome using convergence analysis; and the prediction of local adaptation in Scottish populations of dwarf birch using patterns of genome-wide single nucleotide polymorphism. Current research builds on these findings, and they are also applying these methods to UK oak populations and plants grown by farmers in Ethiopia's southern highlands.

They are seeking a talented researcher with a background in genomics, statistics, phylogenetics, metagenomics or population genetics to research existing and new genomic datasets. You will work in a friendly and collaborative group that currently includes one senior research leader, one research leader, one postdoctoral researcher and six PhD students.



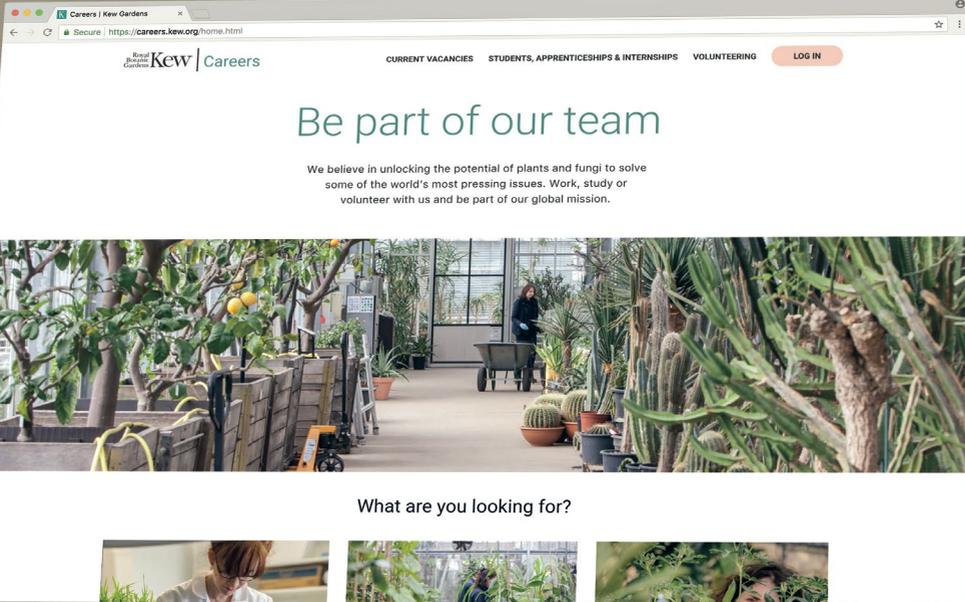
Crop plant and harvestable product genomics

The Plant Resources team, led by Dr Aaron Davis, focus on the understanding of plant diversity for the benefit of humankind, including plants that we use daily and those that provide us with essential ecosystem services. Their work broadly comes under the heading of crops, including food, beverages, timber/wood and forage. They work across many disciplines, encompassing physical and molecular diversity, genomics, agroecology, agrometeorology, climate change, plant physiology and anatomy. The research is linked to industry, societal and governmental needs (UK and overseas) and communities, with an emphasis on problem solving and achieving impact. Their reach is global, with a focus on Africa, the Americas and the UK.

They are seeking an experienced and motivated scientist who has a proven track record in plant genomics or a related discipline, ideally with a familiarity of crops, harvestable products, or crop wild relatives. Applicants should have excellent wet-lab skills, for example the production of DNA/RNA data, including experience with sequencing and transcriptomics, and corresponding dry-lab skills, such as bioinformatics and computational genomics.



Application process



The screenshot shows the Kew Gardens Careers website. The browser address bar displays "https://careers.kew.org/home.html". The navigation menu includes "CURRENT VACANCIES", "STUDENTS, APPRENTICESHIPS & INTERNSHIPS", "VOLUNTEERING", and a "LOG IN" button. The main heading is "Be part of our team", followed by the text: "We believe in unlocking the potential of plants and fungi to solve some of the world's most pressing issues. Work, study or volunteer with us and be part of our global mission." Below this is a large photograph of a greenhouse interior with various plants and a person working. Underneath the photo is the question "What are you looking for?" and three small thumbnail images: a person working in a lab, a person in a greenhouse, and a close-up of plants.

Careers | Kew Gardens

CURRENT VACANCIES STUDENTS, APPRENTICESHIPS & INTERNSHIPS VOLUNTEERING LOG IN

Be part of our team

We believe in unlocking the potential of plants and fungi to solve some of the world's most pressing issues. Work, study or volunteer with us and be part of our global mission.



What are you looking for?



The application

Applications must be submitted through the Kew careers portal (<https://careers.kew.org/home.html>). Applicants must complete an online application form and include a CV and research summary as attachments. The research summary does not have a set format but should not exceed three sides of A4. The summary should provide an outline of what your plans would be for the four-year Fellowship, which will then be developed into a full research plan if successful.

The interview

Candidates with the strongest applications will be invited to interview in February 2020. The interview will be held at Kew Gardens but can be arranged via Skype for international applicants. The interview process will include a short presentation by applicants on their research ideas followed by questions from the interview panel.

Advice for applicants

We highly recommend that anyone considering applying for this opportunity contacts FLFScience@kew.org to arrange a meeting to discuss their application with the potential line manager. This will be an informal conversation but will be a great way of getting a clear understanding of whether this position is right for you and what will make a strong application to the relevant department.

Applicants should ensure they have read the relevant Job Profile for the Fellowship they are applying for – it includes information on the specific skills, experience and qualifications we are looking for.

Timeline

| | |
|---|---------------------|
| Future Leader Fellowship in Plant and Fungal Science Programme launch and applications open | 11 November 2019 |
| Deadline for applications | 17 January 2020 |
| Interviews | 10–21 February 2020 |
| Fellowship start date | 1 April 2020 |



If you have any further questions on any aspect of the programme, please email FLFScience@kew.org.

Front cover: © RBG Kew

Images © RBG Kew / Dar Rex / Jeff Eden / Ines Stuart-Davidson / Jim Holden / Thom Hudson / Steve Lancefield / Wolfgang Stuppy / © David Rabehevitra; p. 14 / © Phil Cribb; p. 20 / © Alan Schaller; p. 20–21 (Courtesy of Union Hand-Roasted Coffee)

Printed on 100% recycled paper

© The Board of Trustees of the Royal Botanic Gardens, Kew (2019) (unless stated otherwise)





Royal Botanic Gardens
Kew

kew.org