The Roles	Research Associates in Electron Microscopy Development
Franklin Challenge	Multidimensional Imaging
Location	Harwell Campus, Didcot
Grade and salary	From £38,500 per annum (depending on skills and experience)
Hours full/part	Full Time (37.5 hours per week)
Contract type	Fixed-Term Contracts (2 or 3 Years)
Vacancy references	10380, 10381, 10382, 10383, 10384, 10385

The Rosalind Franklin Institute (the Franklin) is a technology institute established by the UK Government as a unique centre committed to advancing tools that are needed to transform healthcare in the future.

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Roles Overview:
Our teams are aligned across a number of technology and life science challenges as part of our strategic focus, with scientists, technologists and software engineers working together in a multi-disciplinary and collaborative environment at our state-of-the-art research facility at Harwell in Oxfordshire. For more information on the Franklin's Challenges click here.

The Multidimensional Imaging (MDI) Challenge team, led by Professor Angus Kirkland, leads pioneering research in advancing electron ptychography, liquid phase electron microscopy, electron spectroscopy and diffraction underpinned by a strong fundamental theoretical platform.

We currently have a number of Research Associate vacancies to support this Challenge and its projects in the following areas:

1. Advanced Methods and Algorithms Applied to Electron Ptychography of Biological Specimens (10380) 24m Fixed Term.
2. Advanced STEM/SEM Acquisition Methods to Enable the Study of Beam Sensitive Biological Samples (10381) 24m Fixed Term.
3. Imaging Protein Dynamics using Liquid Phase Electron Microscopy (10382) 36m Fixed Term.
4. Electron Diffraction-Based Mapping of Molecular Condensates (10383) 24m Fixed Term.
5. Nanoscale Electron Spectroscopic Mapping of Antibiotic Uptake and Resistance Mechanisms (10384) 24m Fixed Term.
6. Technicolour Intracellular Space - Potential Mapping Using 4D STEM (10385) 24M Fixed Term.

Applications are encouraged from candidates with backgrounds in physics, biophysics, biochemistry, applied mathematics or related disciplines with an interest and experience of advanced EM methods.

You will have access to state-of-the-art instrumentation, including: a double aberration-corrected 300kV Cryo (S)TEM, two 300kV conventional Cryo TEMs, three Cryo Dual beam FIBs and a 300kV chromatically corrected TEM for fast *in situ* observations alongside advanced sample preparation and computational facilities.

As a Research Associate at the Franklin, you will bring the scientific knowledge and skills needed to deliver a specific research project within a team delivering a research program. Through this work, you will build scientific independence, develop new science and leadership skills, and establish a growing external reputation.

Standard Responsibilities:
- Plan and conduct experiments, analyse and interpret results and deliver peer reviewed outputs.
- Deliver both internal and external presentations.
- Work within a larger project team, contributing to Institute wide projects around key Franklin Challenges.
- Support and develop others including day-to-day supervision of students or visitors.

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- Enhance your research through collaboration with other researchers and make active contributions to scientific dissemination through a developing network.
- Understand, interpret, create and communicate appropriately within a research context.
- Present findings at national and international meetings/conferences and maintain an up-to-date understanding of developments in the field.
- Publish research articles in leading academic journals.
- Foster collaborations with others at the Franklin.
- Work with others in a safe and timely manner considering all those who will be affected by your work.

Any other duties that arise in the normal evolution of the Franklin and that can be reasonably requested of the post holder.

	Standard Skills and Experience
Selection Criteria	• A submitted PhD or equivalent doctoral qualification. • An understanding of the key concepts related to the post. • An ability to define the project area and manage problems and conflicts. • Knowledge and understanding of recent advances in the field. • The ability to make a unique contribution and gain broader awareness within your area of specialism. • Experience in formulating research questions and devising strategies to address these. • An ability to assimilate new methods and to use an appropriate variety of research methods to deliver the project goals. • A flexible approach to research and when required to seek guidance and recognise risk. • The ability to build support and collaboration to attain goals, working across disciplines. • Effective organisational and communication skills. • An understanding of established standards of good research practice.

For specific role requirements, please refer to individual vacancies as set out below.

You may choose to apply for more than one role. Please stipulate your vacancy preference on the application form, in line with your skills and experience.

Job Title: Research Associate in Ptychographic Algorithm Development (10380)
Project: *Advanced Methods and Algorithms Applied to Electron Ptychography of Biological Specimens*
Project Lead: Dr Amirafshar Moshtaghpour

Role Overview:
Our team of physicists, engineers, biologists and mathematicians focus on electron microscopy theory, method and technology development, and the successful applicant's work will involve optimisation of

the data acquisition for ptychography using efficient solutions to ptychographic inverse problems.

You develop and validate mathematical models, reconstruction algorithms, and optimised scanning strategies for more efficient data acquisition and processing of low fluence data.

A team of scientists will support this activity enabling bids for future funding and career growth.

Project keywords
Ptychography, Electron Microscopy, Inverse problems, Computational Imaging, Phase Retrieval, Compressive Sensing, Machine Learning, Deep Learning

Project collaborators:

- Dr Judy Kim
- Dr Maud Dumoux
- Dr Ali Mostaed
- Prof Angus Kirkland
- Prof. Mark Iwen (Michigan State University, USA)
- Dr. Andrew Maiden (University of Sheffield, UK)
- Dr. Jaroslav Fowkes (STFC, UK)
- Dr. Benedikt Daurer (Diamond Light Source, Ptypy Project, UK)
- Prof. Laurent Jacques (UCLouvain, Belgium)
- Dr. Jonathan Dong (EPFL, Switzerland)
- Dr. Mohammad Golbabaei (University of Bristol, UK)
- Prof. Mike Davies (University of Edinburgh, UK)

Key Responsibilities

- Participate in all aspects of the required theory and algorithm development and quantitative analysis of experimental data.
- Design novel algorithms for ptychographic data acquisition and reconstruction.
- Any other duties as set out in the Standard Responsibilities section above.

	Skills and Experience	
Selection Criteria	**Essential:** • A PhD in applied mathematics, physics, engineering, computer science, or a related field. • Interest in both theoretical and numerical developments. • Demonstrated expertise in computational imaging and inverse problems. • Experience in phase retrieval and/or ptychography.	**Desirable:** • Experience in practical electron microscopy. • Familiarity with C++, GPU and parallel programming.

	• Strong programming skills in Python (including PyTorch) or MATLAB.

Job Title: Research Associate in STEM/SEM Acquisition Methods (10381)
Project: *Advanced STEM/SEM Acquisition Methods to Study Beam Sensitive Biological Samples*
Project Lead: Dr Abner Velazco Torrejon

Role Overview:
Our team of physicists, engineers, biologists and mathematicians focus on electron microscopy theory, method and technology development, and the successful applicant's work will establish new acquisition methods in electron microscopy for imaging biological samples to reduce resolution limiting radiation damage and charging.

You will develop new acquisition methods in electron microscopy for imaging biological samples with the aim to reduce radiation damage and charging in these materials. To achieve these goals, new experimental scanning and illumination methods, will be implemented together with the development of data processing techniques for quantitative analysis.

Project keywords
Transmission Electron Microscopy, 4D STEM, Volume EM, Radiation Damage

Project collaborators
- Dr Maud Dumoux
- Dr Thomas Glen

Key Responsibilities
- Develop advanced STEM/SEM acquisition methods to enable the study of beam sensitive biological samples using the advanced instrumentation available.
- Prepare suitable high-quality specimens.
- Any other duties as set out in the Standard Responsibilities section above.

	Skills and Experience	
Selection Criteria	**Essential:** • A PhD in physics, materials science, engineering, structural biology or a related field. • The operation of Transmission and Scanning Electron Microscopes at an advanced level. • The operation of FIB / SEM instruments.	**Desirable** • Experience in sample preparation. • Experience in volume EM data acquisition and reconstruction. • Programming skills in Python or MATLAB.

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Job Title: Research Associate in Imaging Protein Dynamics (10382)
Project: *Imaging Protein Dynamics Using Liquid Phase Electron Microscopy*
Project Lead: Dr Brian Caffrey

Role Overview
Our team of physicists, engineers, biologists and mathematicians focus on electron microscopy theory, method and technology development, and the successful applicant's work will develop innovative biochemical solutions to support molecular dynamic simulations of cryo-EM and LPEM maps, as applied to antimicrobial resistance.

A team of scientists will support this activity enabling bids for future funding and career growth.

Project keywords
Transmission Electron Microscopy, Molecular Dynamics, Liquid Phase EM, Antimicrobial Resistance

Project collaborators
- Dr Adrián Pedrazo
- Prof. Michele Vendruscolo (University of Cambridge)

Key Responsibilities
- Collaborate closely with an interdisciplinary team of experimentalists working in structural biology and the development of liquid cell EM.
- Develop novel MD based approaches to simulate cryo-EM and LPEM maps.
- Any other duties as set out in the Standard Responsibilities section above.

	Skills and Experience	
Selection Criteria	**Essential** • A PhD in biochemistry, microbiology, chemistry, molecular biology or related disciplines. • A demonstrated track record in the application and development of biochemistry/molecular biology techniques to health and disease.	**Desirable** • Experience in cryo-EM methods. • Understanding of molecular dynamics simulations and/or structural biology techniques. • Programming skills in Python or MATLAB. • Experience in protein expression and/or bacterial biology.

Job Title: Research Associate in Diffraction Mapping of Condensates (10383)
Project: *Electron Diffraction-Based Mapping of Molecular Condensates*
Project Lead: Dr Judy Kim

Role Overview
Our team of physicists, engineers, biologists and mathematicians focus on electron microscopy theory, method and technology development, and the successful applicant's work will establish a new way to study membraneless amorphous materials using electron diffraction and electron spectroscopy.

Approximately 50% of the human proteome is disordered (unfolded). However, our cellular structural biology techniques have been refined to detect and characterise isolated folded proteins within the cell. We will build a new analysis pipeline that uses electron diffraction with high spatial resolution to characterise the conformational state of different regions of cellular space. Condensates form from protein and nucleic acid multivalent interactions and are commonly referred to as liquid-liquid phase separation or droplet formation which have similar composition to their matrix, but may have different conformations or states of local disorder. They are organelles without a membrane and thus dynamically dissolve and form to affect human health in neurodegeneration, oncology, cardiovascular disease. This physics and materials science-based approach will open a new door for human health discovery.

A team of scientists will support to collaborate in this interdisciplinary approach enabling bids for future funding and career growth.

Project keywords
Transmission Electron Microscopy, 4D STEM, Scanning Electron Diffraction, Spectroscopy, Condensates, Liquid-Liquid Phase Separation, Structural Biology

Project collaborators
- Dr Marcus Gallagher-Jones
- Prof. Andrew Baldwin (Oxford University)
- Dr Karina Pombo-Garcia
- Dr Mohammed Yusuf
- Dr Adrián Pedrazo
- Prof Angus Kirkland
- Prof Ben Davis
- Prof. Lorena Ruiz-Perez (U. Barcelona)
- Dr Shigeyuki Morishita (JEOL Ltd.)
- Dr Damien McGrouther (JEOL UK)

Key Responsibilities
- Participate in all aspects of the methodology development, quantitative analysis and its application.

- Design and perform experiments using the advanced instrumentation available.
- Prepare suitable high-quality specimens.
- Any other duties as set out in the Standard Responsibilities section above.

	Skills and Experience	
Selection Criteria	**Essential** • A PhD in physics, materials science, engineering, structural biology or related field. • The operation of Transmission Electron Microscopes at an advanced level. • Demonstrated expertise in computational analysis of image/diffraction data. • A strong foundation in crystallography. • Programming skills in Python or MATLAB.	**Desirable** • Experience in Cryo electron microscopy. • Experience in sample preparation using FIB-SEM instruments. • Experience of working in a wet lab for sample preparation.

Job Title: Research Associate in Mapping of Antibiotic Uptake (10384)
Project: *Nanoscale Electron Spectroscopic Mapping of Antibiotic Uptake and Resistance Mechanisms*
Project Lead: Dr Adrian Pedrazo-Tardajos

Role Overview
Our team of physicists, engineers, biologists and mathematicians focus on electron microscopy theory, method and technology development, and the successful applicant will work on methods to visualise antibiotic uptake, probed using electron spectroscopy.

The aim of this project is to visualise and quantify the uptake of antibiotics in different biotargets under relevant conditions using novel correlative approaches focused on multidimensional electron spectroscopy. This role forms part of a wider research effort to reduce antimicrobial resistance across scales.

You will contribute to the development and optimisation of novel TEM- and SEM-based microscopy and spectroscopy (including EELS) workflows under different conditions in multiple dimensions. You will also support data acquisition and analysis and enable the synergistic integration of these techniques with complementary characterisation methods at high spatial and temporal resolution.

A team of scientists will support this activity enabling bids for future funding and career growth.

Project keywords
Antibiotic Mapping, Electron Spectroscopy, Correlative Mapping, Antimicrobial Resistance

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Project collaborators

- Dr Judy Kim
- Dr Thomas Glen
- Dr Lucile Moynie
- Prof Angus Kirkland
- Prof. Peter Hill (King's College London)
- Dr Damien McGrouther (JEOL UK)
- Prof Sergio Lozano-Perez (University of Oxford)
- Prof Marco Fritzsche (The Kennedy Institute of Rheumatology/Rosalind Franklin Institute)

Key Responsibilities

- Participate in all aspects of the required methodology development, quantitative analysis and its application.
- Design and perform experiments using the advanced instrumentation available.
- Prepare suitable high-quality specimens.
- Any other duties as set out in the Standard Responsibilities section above.

	Skills and Experience	
Selection Criteria	**Essential** • A PhD in physics, materials science, engineering, structural biology or a related field. • The operation of Transmission and/or Scanning Electron Microscopes at an advanced level. • Demonstrated experience in energy loss spectroscopy.	**Desirable** • Experience in Cryo electron microscopy. • Experience in sample preparation using FIB-SEM instruments. • Experience in light microscopy and/or correlated multimodal imaging. • Programming skills in Python or MATLAB.

Job Title: Research Associate in Potential Mapping Using 4D STEM (10385)
Project: *Technicolour Intracellular Space – Potential Mapping Using 4D STEM*
Project Lead: Dr Judy Kim

Role Overview

Our team of physicists, engineers, biologists and mathematicians focus on electron microscopy theory, method and technology development, and the successful applicant's work will establish a method to add new dimensionality to cryoEM data using specimen potential maps.

You will develop methods to detect potential gradients in cryogenic specimens to better understand the mechanisms of interaction between membranes, lipids and nucleic acid. In particular, mitochondrial diseases, lysosomal storage disease, and viral infection pathways require the visualisation of inherently

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insulating components and their contact points with organelles.

A team of scientists will support this activity enabling bids for future funding and career growth.

Project keywords
Transmission Electron Microscopy, 4D STEM, Electron Ptychography, Structural Biology, Integrated Centre of Mass, CryoEM, Intracellular Interactions

Project collaborators
- Dr Adrián Pedrazo
- Dr Amirafshar Moshtaghpour
- Prof Angus Kirkland
- Dr Mohammed Yusuf
- Dr Mark Boyce (University of Oxford)
- Prof Sir David Stuart
- Dr Shigeyuki Morishita (JEOL Ltd.)
- Dr Damien McGrouther (JEOL UK)

Key Responsibilities
- Participate in all aspects of the required methodology development, quantitative analysis and its application.
- Design and perform experiments using the advanced instrumentation available.
- Prepare suitable high-quality specimens.
- Any other duties as set out in the Standard Responsibilities section above.

	Skills and Experience	
Selection Criteria	**Essential** • A PhD in physics, materials science, engineering, structural biology or a related field. • The operation of Transmission Electron Microscopes at an advanced level. • Demonstrated expertise in computational analysis of image/diffraction data. • An understanding of ptychography and related methods. • Programming skills in Python or MATLAB.	**Desirable** • Experience in Cryo electron microscopy. • Experience in sample preparation using FIB-SEM instruments.

The Rosalind Franklin Institute is committed to equality, diversity and inclusion and welcomes applications from all. These job descriptions set out the skills and experience we believe are needed to be able to do these jobs but, research also tells us women are much more likely than men to take this

list of requirements as absolute and self-select out of the process. If you think you can deliver any of these roles then we want to hear from you, regardless of the boxes you did not tick.

Please note that whilst these roles are at a postdoctoral researcher level and require candidates to hold a PhD/DPhil (or equivalent), we may consider candidates who are close to completion of their PhD/DPhil qualification, in which case the initial appointment will be made at £37,500 per annum (to be increased on completion of the PhD/DPhil qualification).

Staff Benefits

- 25 days holidays, plus Bank holidays and Christmas holiday shutdown
- Generous pension scheme (employer's contribution currently up to 18%)
- Group Life Assurance (also known as Group Life Insurance)
- Hub building with state-of-the-art laboratories
- Hybrid and Flexible Working
- Training and professional development opportunities for staff at all levels
- Bus pass discount scheme and good transport links to Oxford and surrounding area
- Access to employee discount platform (Perkbox)
- Occupational Health and Wellbeing support including Employee Assistance (24/7 support and counselling)
- Health Cash Plan
- Subsidised canteen and food outlets on campus
- Cycle to Work Scheme
- Free on-site parking
- A beautiful campus location set in stunning Oxfordshire with social and sports clubs open to staff

Flexible Working

We offer flexible working arrangements for employees including flexible hours, part-time hours and hybrid working to help everyone get the right balance between work and personal life.

Professional Development

As an organisation we appreciate that our people are one of our biggest strengths. We are committed to supporting your learning and development, helping you gain the skills you need to succeed in your role. Regardless of your level of experience and your role, we can assist you with building your expertise, experience, and professional qualifications at key career stages.

Reflecting the world we live in

Our underlying aim is to produce the best science for research today, and this means resolutely embracing a diverse team, who have a wide range of experiences, skills and knowledge to push forward on the innovative work our institution delivers. Both our work and our institution are better for it.

We are proud that our science teams reflect a wide range of both national and international expertise. With support given for sponsorship and relocation to the UK.

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Engineering and Physical Sciences Research Council

For further information, view our equality, diversity and inclusion policy.




Adventure - Our projects, by their nature, carry significant risk, combined with significant pay-off in scientific, economic, and patient benefits if successful. Risk is mitigated by engaging experts from across disciplines and working together to approach large challenges.

Engagement - Our projects are not conceived of or delivered by one organisation alone, they engage multiple partners across academia and industry and there is demonstrable support for their development by these communities.

Novelty - Our technologies will be novel in their application and design, offering tools to the academic and industrial communities which enable significant new research potential and economic benefit.

Utility - Our technologies will be sought after by both academic and industrial communities, and access will be opened to as wide as possible, ensuring that the research benefits are maximised.

Partnerships & Collaborations

Our Funders

The Institute operates as an independent charity, with funding provided by the UK government through UK Research and Innovation, managed by UKRI-EPSRC.

Our Partners

The Institute has been formed by a group of ten university partners from across the UK, Diamond Light Source, and the research council UKRI-STFC.

- University of Oxford
- University of Birmingham
- Kings College London
- University of Leeds

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- Diamond Light Source
- University of Cambridge
- University of Edinburgh
- Imperial College London
- University of Manchester
- University of Southampton
- University College London (UCL)
- STFC-UKRI

Collaborations

Developing our technologies is best done hand in hand with the communities who will use them – we are keen to collaborate in the development stage of our technologies, to bring both test questions and technical expertise. For more information on the types of collaborations that we are looking for at the Franklin, please visit our collaborations webpage

Our Location

The Hub at Harwell

The Rosalind Franklin Institute is a national interdisciplinary research centre, funded by the UK Government through UK Research and Innovation (UKRI). We are dedicated to creating new disruptive technologies which will allow us to see the biological world in new ways, from picometre-scale atoms to centimetre-scale tumours. These technological advances will speed up the discovery of new medicines, help find new diagnostics and contribute to a deeper understanding of human health and disease.

The Franklin operates from a purpose-built research facility on the Harwell Science and Innovation Campus near Didcot, a unique community of government, academia and industry working to accelerate progress on key issues. The 700-acre campus is steeped in world-firsts, and technology and research are at the heart of everything Harwell does.

Our building houses both specialist laboratories, research scientists and operational staff within a state-of-the art facility designed to inspire our people in their work and create a welcoming hub for our collaborations and visitors. Our research values of adventure, novelty, engagement, and utility are drawn on and exemplified by the Franklin team through our collaborations with universities and industrial partners, both in the UK and internationally.

Harwell Campus

Harwell Campus is Europe's largest Science and Innovation Campus. With a heritage of 75 years at the forefront of UK innovation and discovery, The Campus continues to drive scientific advancements to the benefit of the UK economy and to improve the human condition, centered around an open innovation community and culture. The contribution that Harwell makes to the UK is significant - leading in research and achieving commercial success in key global markets, including Life Sciences, Space, Energy, Supercomputing, AI and Big

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Data. With 6,000 people employed across +200 public, private, and academic organisations, and an estimated Gross Value Added (GVA) of over £1billion, Harwell provides job creation and economic growth that benefits the whole country.

Recruitment Process

Inclusion and Reasonable Adjustments
Our approach to working is collaborative, welcoming, and encourages diversity in all its forms. We are committed to creating an inclusive environment where every applicant has an equal opportunity to showcase their talents and abilities. This includes making adjustments for candidates with specific needs. Please contact us at recruitment@rfi.ac.uk to discuss your requirements confidentially.

How to apply
To apply for any of the above vacancies, you need to create an account via our recruitment portal, with your CV and a cover letter explaining why you think you are the right person for this job. Please include information about your education and work experience. To register please visit our website. **You may choose to apply for more than one role. Please stipulate your vacancy preference on the application form, in line with your skills and experience.**

To browse all available employment opportunities at the Franklin please visit our current vacancies page here

Acknowledging your application
Once you have submitted your application you will receive an automatic email confirmation. You can check the progress of your application or change your contact details at any time by logging into your account. For any questions regarding applications please contact recruitment@rfi.ac.uk

Outcome of applications
We aim to provide an update on the status of your application within 6 weeks of the closing date of the vacancy. We may receive a large volume of applications for our vacancies, so it might not always be possible to respond individually to every application.

References
If you are successful at interview, we would like to obtain two professional/academic references at the offer stage. Please ensure your referees' contact details are up to date while applying.

Applicants should refer to our Candidate Privacy Policy

Informal enquiries can be addressed to recruitment@rfi.ac.uk

Prof. Angus Kirkland
Science Director and Challenge Lead
View Profile