Department of Physics
Clarendon Laboratory
Parks Road, Oxford OX1 3PU

UNIVERSITY OF OXFORD

Job Description and Selection Criteria

Job title	Postdoctoral Research Assistant in single-molecule biochemistry and biophysics of DNA replication
Division	Mathematical Physical and Life Sciences
Department	Physics
Location	Clarendon Laboratory, Parks Road, Oxford
Grade and salary	Grade 7: £36,024 -£44,263 per annum
Hours	Full time
Contract type	4-year fixed-term
Reporting to	Professor Nynke Dekker
Vacancy reference	171346
Additional information	Closing date – midday on 28 March, 2024

Research topic	single-molecule biochemistry and biophysics of DNA replication
Principal Investigator / supervisor	Professor Nynke Dekker
Project team	
Project web site	http://nynkedekkerlab.tudelft.nl/
Funding partner	
Recent publications	Daniel Ramírez Montero, Zhaowei Liu, and Nynke H. Dekker **De novo fabrication of custom-sequence plasmids for the efficient synthesis of long DNA constructs including extrahelical features for single-molecule experiments**

	Biophysical Journal, **123**, 31-41 (2024) Humberto Sánchez, Zhaowei Liu, Edo van Veen, Theo van Laar, John F.X. Diffley, and Nynke H. Dekker **A chromatinized origin reduces the mobility of ORC and MCM through interactions and spatial constraint** *Nature Communications* **14**, 6735 (2023) Daniel Ramírez Montero, Humberto Sánchez, Edo van Veen, Theo van Laar, Belén Solano, John F.X. Diffley, and Nynke H. Dekker **Nucleotide binding halts diffusion of the eukaryotic replicative helicase during activation** *Nature Communications* **14**:2082 (2023) Humberto Sánchez, Kaley McCluskey, Theo van Laar, Edo van Veen, Filip M. Asscher, Belén Solano, John F.X. Diffley, and Nynke H. Dekker **DNA origins retain mobile licensing proteins** *Nature Communications* **12**, 1908 (2021)

The role

During our lifetimes, we copy approximately a lightyear's worth of DNA, and how the different components of the molecular machinery (the replisome) work together to achieve this successfully is an area of highly active research. Here, you will take on the exciting challenge of **understanding the *dynamics* of DNA replication** by studying the activity of eukaryotic replisome at the single-molecule level. You will examine replisome composition, replisome motion dynamics, and the interplay between these two quantities; and examine how these change in the context of chromatin or obstacles on the DNA. To do so, you will design and employ novel biochemical approaches (e.g. protein purification, protein labelling, ensemble assays) that report on DNA replication as well as enable single-molecule studies (using optical tweezers, magnetic tweezers, single-molecule fluorescence, or a combination of the above). Integrating such approaches with the knowledge or methods of cryo-electron microscopy is also of interest. You should have an intrinsic interest in integrating biochemical and biophysical approaches, and interacting with external collaborators in molecular biology and biochemistry at the University of Oxford and elsewhere in the United Kingdom is essential. In doing so, you will publish high-quality scientific papers to advance this exciting field.

Responsibilities

- use your knowledge of ensemble biochemistry and protein purification to design experiments in DNA replication;
- develop novel biochemical approaches that enable experiments in DNA replication at the single-molecule level;
- come up with suggestions to expand the interdisciplinary skillset as necessary for the benefit of the project;
- perfrom both ensemble and single-molecule experiments that enhance our understanding of DNA replication;
- develop your quantitative analysis skills and use these to analyze your data;
- help to establish a scientifically outstanding and warmly communicative interdisciplinary team at the University of Oxford;
- publish your results together with other biochemists and biophysicists on the team;

- have the opportunity to obtain teaching experience and improve your leadership skills while guiding undergraduate and graduate students;

Pre-employment screening

All offers of employment are made subject to standard pre-employment screening, as applicable to the post.

If you are offered the post, you will be asked to provide proof of your right-to-work, your identity, and we will contact the referees you have nominated. You will also be asked to complete a health declaration (so that you can tell us about any health conditions or disabilities so that we can discuss appropriate adjustments with you), and a declaration of any unspent criminal convictions.

We advise all applicants to read the candidate notes on the University's pre-employment screening procedures, found at: www.ox.ac.uk/about/jobs/preemploymentscreening/.

Selection criteria

- a successfully completed Ph.D. degree in biochemistry or closely related field;
- practical experience and scientific maturity in the above areas;
- strong skills and interest in DNA-protein interactions, DNA replication, and protein biochemistry;
- strong experience in protein purification;
- experience with single-molecule methods is a plus;
- a strong motivation to develop a combined biochemistry/biophysics skillset (e.g. understanding of mechanochemistry, single-molecule kinetics, protein biochemistry and biophysics, cryo-EM) in interdisciplinary research;
- an independent, well-organized, and reliable work style together with an ability and interest in working in a small team;
- good interpersonal communication skills and a strong interest in the broader field of biophysics, thereby contributing to our interactive lab culture;

About the University of Oxford

Welcome to the University of Oxford. We aim to lead the world in research and education for the benefit of society both in the UK and globally. Oxford's researchers engage with academic, commercial and cultural partners across the world to stimulate high-quality research and enable innovation through a broad range of social, policy and economic impacts.

We believe our strengths lie both in empowering individuals and teams to address fundamental questions of global significance, while providing all our staff with a welcoming and inclusive workplace that enables everyone to develop and do their best work. Recognising that diversity is our strength, vital for innovation and creativity, we aspire to build a truly diverse community which values and respects every individual's unique contribution.

While we have long traditions of scholarship, we are also forward-looking, creative and cutting-edge. Oxford is one of Europe's most entrepreneurial universities and we rank first in the UK for university spin-outs, and in recent years we have spun out 15-20 new companies every year. We are also recognised as leaders in support for social enterprise.

Join us and you will find a unique, democratic and international community, a great range of staff benefits and access to a vibrant array of cultural activities in the beautiful city of Oxford. For more information, please visit www.ox.ac.uk/about/organisation.

Department of Physics

Oxford Physics is one of the largest and most eminent departments in Europe – pursuing forefront research alongside training the next generation of leaders in Physics.

With an academic staff of over one hundred our activities range from fundamental particles to the furthest reaches of the universe to manipulating matter on an atomic scale. Oxford physicists are probing new ways to harness solar energy, modelling the Earth's atmosphere to predict the future climate, exploring computation on the quantum scale and executing calculations that reveal the fundamental structure of space and time.

Sub-department

The post-holder will be based in the Condensed Matter Physics sub-department, which is one of the six sub-departments that together make up the Department of Physics; these are Astrophysics, Atomic and Laser Physics, Atmospheric, Oceanic and Planetary Physics, Condensed Matter Physics, Particle Physics and Theoretical Physics, with a seventh function (Central Physics) providing administrative and technical support to these sub-departments. Members of all sub-departments take part in research, teaching and matters such as examinations, discussion of syllabi, lectures and liaison with undergraduates and postgraduate students.

For more information please visit: http://www2.physics.ox.ac.uk/

The Nynke Dekker Lab (http://nynkedekkerlab.tudelft.nl/) is a highly successful single-molecule biophysics research lab that is transitioning to the University of Oxford from TU Delft in summer 2024. The lab focuses its studies on understanding DNA and RNA replication from a quantitative perspective both *in vitro* and *in vivo*. The lab employs state-of-the-art biophysical techniques (e.g. advanced single-molecule fluorescence microscopy, optical and magnetic tweezers) together with in-house molecular biology and biochemistry. Studying the dynamics of DNA and RNA replication at the single-molecule level requires broad and integrated expertise; as such, we employ outstanding international scientists trained in biophysics, biochemistry, and cell biology who work together enthusiastically as a multidisciplinary team. You will be part of this group and will interact actively with current members.

Mathematical, Physical & Life Sciences Division

The Mathematical, Physical and Life Sciences (MPLS) Division is one of the four academic divisions of the University of Oxford.

The MPLS Division's 10 departments and 3 interdisciplinary units span the full spectrum of the mathematical, computational, physical, engineering and life sciences, and undertake both fundamental research and cutting-edge applied work. Our research addresses major societal and technological challenges and is increasingly focused on key interdisciplinary issues. We collaborate closely with colleagues in Oxford across the medical sciences, social sciences and humanities, and with other universities, research organisations and industrial partners across the globe in pursuit of innovative research geared to address critical and fundamental scientific questions.

For more information please visit: http://www.mpls.ox.ac.uk/

Athena Swan Charter

The Department of Physics holds a silver Athena Swan award to recognise advancement of gender equality: representation, progression and success for all.

How to apply

Applications are made through our e-recruitment system and you will find all the information you need about how to apply on our Jobs website https://www.jobs.ox.ac.uk/how-to-apply.
Your application will be judged solely on the basis of how you demonstrate that you meet the selection criteria stated in the job description.
As part of your application you will be asked to provide details of three referees and indicate whether we can contact them now.
You will be asked to upload a CV and a supporting statement. The supporting statement must explain how you meet each of the selection criteria for the post using examples of your skills and experience. This may include experience gained in employment, education, or during career breaks (such as time out to care for dependants)
Please upload all documents **as PDF files** with your name and the document type in the filename.
All applications must be received by **midday** UK time on the closing date stated in the online advertisement.

Information for priority candidates

A priority candidate is a University employee who is seeking redeployment because they have been advised that they are at risk of redundancy, or on grounds of ill-health/disability. Priority candidates are issued with a redeployment letter by their employing departments.

If you are a priority candidate, please ensure that you attach your redeployment letter to your application (or email it to the contact address on the advert if the application form used for the vacancy does not allow attachments)

If you need help

Application FAQs, including technical troubleshooting advice is available at: https://staff.web.ox.ac.uk/recruitment-support-faqs
Non-technical questions about this job should be addressed to the recruiting department directly *recruitment@physics.ox.ac.uk*
To return to the online application at any stage, please go to: www.recruit.ox.ac.uk.
Please note that you will receive an automated email from our online recruitment portal to confirm receipt of your application. **Please check your spam/junk mail** if you do not receive this email.

Important information for candidates

Pre-employment screening

Please note that the appointment of the successful candidate will be subject to standard pre-employment screening, as applicable to the post. This will include right-to-work, proof of identity and references. We advise all applicants to read the candidate notes on the University's pre-

employment screening procedures, found at:
www.ox.ac.uk/about/jobs/preemploymentscreening/.

Important information for candidates

Data Privacy

Please note that any personal data submitted to the University as part of the job application process will be processed in accordance with the GDPR and related UK data protection legislation. For further information, please see the University's Privacy Notice for Job Applicants at: https://compliance.admin.ox.ac.uk/job-applicant-privacy-policy. The University's Policy on Data Protection is available at: https://compliance.admin.ox.ac.uk/data-protection-policy.

The University's policy on retirement

The University operates an Employer Justified Retirement Age (EJRA) for very senior research posts at **grade RSIV/D35 and clinical equivalents E62 and E82**, which with effect from 1 October 2023 will be 30 September before the 70th birthday. The justification for this is explained at: https://hr.admin.ox.ac.uk/the-ejra.

For **existing** employees on these grades, any employment beyond the retirement age is subject to approval through the procedures: https://hr.admin.ox.ac.uk/the-ejra.

There is no normal or fixed age at which staff in posts at other grades have to retire. Staff at these grades may elect to retire in accordance with the rules of the applicable pension scheme, as may be amended from time to time.

Equality of opportunity

Entry into employment with the University and progression within employment will be determined only by personal merit and the application of criteria which are related to the duties of each particular post and the relevant salary structure. In all cases, ability to perform the job will be the primary consideration. No applicant or member of staff shall be discriminated against because of age, disability, gender reassignment, marriage or civil partnership, pregnancy or maternity, race, religion or belief, sex, or sexual orientation.

Benefits of working at the University

Employee benefits

University employees enjoy 38 days' paid holiday, generous pension schemes, travel discounts, and a variety of professional development opportunities. Our range of other employee benefits and discounts also includes free entry to the Botanic Gardens and University colleges, and discounts at University museums. See https://hr.admin.ox.ac.uk/staff-benefits

University Club and sports facilities

Membership of the University Club is free for all University staff. The University Club offers social, sporting, and hospitality facilities. Staff can also use the University Sports Centre on Iffley Road at discounted rates, including a fitness centre, powerlifting room, and swimming pool. See www.club.ox.ac.uk and https://www.sport.ox.ac.uk/.

Information for staff new to Oxford

If you are relocating to Oxfordshire from overseas or elsewhere in the UK, the University's Welcome Service website includes practical information about settling in the area, including advice on relocation, accommodation, and local schools. See https://welcome.ox.ac.uk/
There is also a visa loan scheme to cover the costs of UK visa applications for staff and their dependants. See https://staffimmigration.admin.ox.ac.uk/visa-loan-scheme

Family-friendly benefits

With one of the most generous family leave schemes in the Higher Education sector, and a range of flexible working options, Oxford aims to be a family-friendly employer. We also subscribe to the Work+Family Space, a service that provides practical advice and support for employees who have caring responsibilities. The service offers a free telephone advice line, and the ability to book emergency back-up care for children, adult dependents and elderly relatives. See https://hr.admin.ox.ac.uk/my-family-care
The University has excellent childcare services, including five University nurseries as well as University-supported places at many other private nurseries.
For full details, including how to apply and the costs, see https://childcare.admin.ox.ac.uk/

Disabled staff

We are committed to supporting members of staff with disabilities or long-term health conditions. For further details, including information about how to make contact, in confidence, with the University's Staff Disability Advisor, see https://edu.admin.ox.ac.uk/disability-support

Staff networks

The University has a number of staff networks including the Oxford Research Staff Society, BME staff network, LGBT+ staff network and a disabled staff network. You can find more information at https://edu.admin.ox.ac.uk/networks

The University of Oxford Newcomers' Club

The University of Oxford Newcomers' Club is an organisation run by volunteers that aims to assist the partners of new staff settle into Oxford, and provides them with an opportunity to meet people and make connections in the local area. See www.newcomers.ox.ac.uk.