Job title	Mathematical Modeller
Division	Medical Sciences
Department	Nuffield Department of Medicine
Location	Centre for Human Genetics, Building for Genomic Medicine, Roosevelt Drive, Oxford, OX3 7BN
Grade and salary	Grade 8: £45,585 - £54,395 with a discretionary range to £59,421 per annum Whilst this role is a Grade 8 position, we would be willing to consider less experienced candidates who might be suitable to the role with adjusted duties to then be offered as an underfill at Grade 7: £36,024– £44,263, with discretionary range to £48,350 per annum This would be discussed with applicants at interview/appointment where appropriate.
Hours	Full time
Contract type	Fixed-term contract until 30 September 2027 Funding is provided by the GSK
Reporting to	Professor John Todd and Dr Anna Sher (GSK), with oversight from Dr Georgina Kerr
Vacancy reference	171122

Hybrid working arrangements	**The successful person will need to work on site for a minimum of 4 days per week**
Additional information	This role meets the eligibility requirements for a Skilled Worker Certificate of Sponsorship or a Global Talent Visa under UK Visas and Immigration legislation. Therefore, the Nuffield Department of Medicine welcomes applications from international applicants who require a visa.
About us	• University of Oxford - www.ox.ac.uk/about/organisation • Nuffield Department of Medicine (NDM) - https://www.ndm.ox.ac.uk • Unit - www.well.ox.ac.uk / www.imcm.ox.ac.uk • Research - www.imcm.ox.ac.uk
What we offer	https://hr.admin.ox.ac.uk/staff-benefits • An excellent contributory pension scheme • 38 days annual leave • A comprehensive range of childcare services • Family leave schemes • Cycle loan scheme • Discounted bus travel and Season Ticket travel loans • Membership to a variety of social and sports clubs • A welcoming and diverse community

The role

This post provides an exciting opportunity to join the newly established multidisciplinary Oxford-GSK Institute of Molecular & Computational Medicine (IMCM) operating within Nuffield Department of Medicine (NDM) in collaboration with Nuffield Department of Clinical Neuroscience (NDCN), Nuffield Department of Population Health (NDPH) and Department of Physiology, Anatomy and Genetics (DPAG). The Institute is bringing together the very best scientific, clinical, technological and computational expertise from Oxford University and GSK to form a unique industry/academic partnership. The aim of the Institute is to improve tools in, and knowledge from, genetics, genomics, molecular and single cell biology, spatial imaging, machine learning and novel methods of data handling to study the pattern of diseases in new ways. The Institute will develop disease agnostic platforms to change the clinical practise of pathology, helping to identify and validate early potential drug targets, and biomarkers to predict disease progression.

The Institute is built around Fellows and Oxford-GSK project teams located across different departments within the Medical Sciences Division. Projects will initially focus on neurodegeneration and the central nervous system, specifically Alzheimer's disease, Parkinson's disease and amyotrophic lateral sclerosis but it is anticipated the range of activities will expand into other research areas in future.

A highly motivated, ambitious Mathematical Modeller is required to develop and analyse mathematical models that focus on the role of sortilin-mediated progranulin-related pathways in neurodegenerative diseases, reporting to the Oxford-GSK IMCM co-director Professor John Todd and Dr Anna Sher, Director in Quantitative Systems Pharmacology at GSK, and with oversight from the Oxford-GSK IMCM Programme Manager. This position is a unique opportunity to work in a dynamic environment at the Oxford-GSK IMCM and in close collaboration with Clinical Pharmacology and Modelling and Simulation department at GSK, one of the leading global biopharmas, who are at the forefront of the application of model-informed drug development to clinical trials. You will be in regular communication with the Oxford-GSK IMCM project leads and will work collaboratively with the Oxford-GSK IMCM Fellows and other senior researchers in the institute, keeping in mind the Oxford-GSK IMCM's approach and mission. You will work closely with members of the Oxford-GSK IMCM Joint Data Team (including machine learning researchers, statistical geneticists and data managers), enabling effective use of the joint data platform. You will provide a crucial role in optimising and leveraging the potential of cutting-edge techniques.

As the Mathematical Modeller you will be part of a multi-disciplinary, science driven team delivering modelling and simulation excellence to drug discovery and development through better understanding of the patterns and mechanisms in neurodegenerative disease. Responsibilities will include development, analysis and application of mathematical models based on available literature, in vitro imaging and clinical data. The newly developed mechanistic models will be a step towards enhanced quantitative understanding of the role of anti-sortilin pathways in increasing the progranulin (PGRN) levels and in regulating downstream pathways affecting neurodegenerative disease progression.

You will develop mathematical models and perform simulation studies to understand both the neurodegenerative disease processes and anti-sortilin drug pharmacodynamics. The insight into pharmacodynamics will contribute to the generation and testing of mechanistic hypotheses, and Virtual Patients will be also used to inform optimal clinical study design including selection of key biomarkers and optimal patient subpopulations. Additionally, there will be an opportunity to identify, suggest and lead development of novel approaches to utilizing in silico quantitative systems pharmacology (QSP) and integrating it with genomic sciences to inform preclinical and clinical neuroinflammatory drug development.

This position represents an exciting opportunity for a professional with a PhD in Applied Mathematics, Mathematical Biology, Engineering, Physics, Computational Biology, Modelling and Simulations,

Neuroscience, Pharmaceutical Sciences, or other related discipline, and a demonstrated strong publication record.

Responsibilities

You will:

- Contribute to mechanistic modelling approaches to interpret data, generate and test new hypotheses and inform preclinical or clinical drug development for the projects within the Oxford-GSK IMCM.
- Develop, analyse and apply mechanistic mathematical models that will be a step towards enhanced quantitative understanding of the role of anti-sortilin pathways in increasing the progranulin (PGRN) levels and in regulating downstream pathways affecting neurodegenerative disease progression, based on available literature, in vitro imaging and clinical data.
- Perform simulation studies to understand both the neurodegenerative disease processes and anti-sortilin drug pharmacodynamics, and to contribute to generation and testing of mechanistic hypotheses, and utilisation of Virtual Patients to inform optimal clinical study design including selection of key biomarkers and optimal patient subpopulations.
- Contribute to the development of novel approaches to utilize in silico quantitative systems pharmacology (QSP) and integrate with genomic sciences to inform preclinical and clinical neuroinflammatory drug development.
- Ensure alignment of mechanistic modelling approaches and methods across Oxford-GSK IMCM projects to allow cross-project analysis, where appropriate.
- Support the Institute's scientific and strategic objectives and contribute to developing the strategic direction of the Oxford-GSK IMCM.
- Write documentation/reports and contribute to meetings as required.
- Communicate effectively with colleagues at all levels both within Oxford and at GSK to identify needs, risks and develop appropriate solutions, escalating where appropriate.
- Promote the Oxford-GSK IMCM locally and nationally and disseminate research outcomes to advance knowledge in the specialist area.
- Represent the Oxford-GSK IMCM at external meetings/seminars and liaise with sponsors, stakeholders, national agencies, and professional bodies.
- Perform other relevant duties as required to support the group's activities.
- Participate in and support the public engagement and widening access activities of the Department and the University. This is anticipated to be not more than 2 days per year.
- Undertake mandatory training as required by the University, Division and Department. The specific list of training courses may change from time-to-time, in response to both legal and internal University requirements.

Selection criteria

Essential

- Hold a relevant PhD/DPhil in Applied Mathematics, Mathematical Biology, Engineering, Physics, Computational Biology, Pharmaceutical Sciences, or other related discipline.
- Training or previous experience in building differential equation-based models of physiological pathways or biological systems, quantitative systems pharmacology (QSP), quantitative systems toxicology (QST), semi-mechanistic pharmacodynamic (PD) or physiologically-based pharmacodynamic (PBPK) models.
- Demonstrated ability to perform mathematical calculations, computational simulations, complex data analysis.
- Understanding of principles and statistical aspects of mathematical modeling and simulation, including sensitivity analysis and parameter estimation techniques.
- Demonstrated hands-on knowledge of modelling and simulation software tools such as MATLAB, C++, R, Julia, Python, Monolix or other.
- Demonstrable specialist knowledge, skills and experience to develop and oversee large programmes of technical work to a successful conclusion by agreed deadlines.
- Strong publication record commensurate with career stage.
- Interest in learning new areas of biology, building novel quantitative and computational skills and sharing learnings.
- Excellent written and verbal communication skills, including the ability to communicate technical concepts to non-technical audiences.
- Strong interpersonal skills and able to contribute to a supportive, helpful culture and work very closely with end users.
- Self-motivated and able to combine strategic thinking with hands-on bioinformatics skills, with a drive for performance and quality improvement.

Desirable

- Previous experience in neuroscience mathematical modeling of Frontotemporal dementia, Parkinson's disease, Alzheimer's disease or other neurodegenerative disease.
- Previous training, internship or previous experience working in pharmaceutical industry.
- Previous experience of combining mechanistic models with genomic sciences, omics datasets, deep learning frameworks and/or use of machine learning techniques.
- Experience working with industry partners.

Pre-employment screening

Standard checks

If you are offered the post, the offer will be subject to standard pre-employment checks. You will be asked to provide: proof of your right-to-work in the UK; proof of your identity; and (if we haven't done so already) 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 for which you may need us to make appropriate adjustments.

Please read the candidate notes on the University's pre-employment screening procedures at: https://www.jobs.ox.ac.uk/pre-employment-checks

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.

If you would like to apply, **click on the Apply Now button** on the 'Job Details' page and follow the on-screen instructions to register as a new user or log-in if you have applied previously.

As part of your application you will be asked to provide details of two 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). Your application will be judged solely on the basis of how you demonstrate that you meet the selection criteria stated in the job description.

Please upload all documents **as PDF files** with your name and the document type in the filename. Please note using a long file name may prevent you from uploading your documents.

- http://www.ox.ac.uk/about_the_university/jobs/research/

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 department(s).

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@ndm.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 dates

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.