DEPARTMENT OF PSYCHIATRY

Job title
Postdoctoral Researcher in mathematics, data science and mental health (two positions)

Division
Mathematical, Physical and Life Sciences

Department
The Mathematical Institute (in association with the Department of Psychiatry and The Alan Turing Institute, British Library)

Location
The Mathematical Institute (Department of Psychiatry and the Alan Turing Institute)

Grade and salary
Grade 7: £32,236-£36,261 per annum

Hours
Full Time, two days a week in the Mathematical Institute, two days in the department of psychiatry, and one day flexible; it will be necessary to spend at least one day a month at the Alan Turing Institute in London.

Contract type
Fixed-term 2 year (funded to 31 March 2021)

Reporting to
Professor Terry Lyons and Dr Kate Saunders

Vacancy reference
138789

Additional information
These are full-time positions that cannot be held concurrently with any other substantive post without the explicit permission of the Head of Department.

This position is subject to a 9 month probationary period.

Background
This interdisciplinary project in the area between data science and mental health is funded by the Alan Turing Institute, led by Professor Terry Lyons FRS from the mathematics department.
of the University of Oxford, working closely a team lead by Professor John Geddes and Dr Kate Saunders, from the Psychiatry department, in collaboration with three other Turing fellows (Drs Maria Liakita (Warwick), Hao Ni (UCL)), and Harald Oberhauser (Oxford) and as well as a number of graduate students.

The focus of the project is to develop and link new mathematical techniques such as the path signature\(^1\) with other techniques of data science and natural language processing to obtain clinically valuable information from the information streams available in the mental health, and particularly the mood disorder context. The challenge and the research goal will be to develop effective theoretically based tools that work effectively for these complex streams and test them on currently available data available to our clinical partners.

**The role**

The technical emphasis will be on

1) developing deidentified streams of data (such as emotion) that still contain key information
2) developing automated control for the choice and the dimensionality of the input feeds in contexts where the data sets are too small for conventional deep learning type approaches
3) Using language (e.g. from the 3m patient records in Cris) as an input stream
4) Using biometric input streams, mood streams

While all the time trying to develop clear and transferable methodology.

We are looking for two early career scientists with strong mathematical, natural language, or data science track record, well able to work on complex multimodal data in this strongly interdisciplinary team. A knowledge of signature techniques and a track record in their effective application (with other data science techniques) would be an advantage, but otherwise training will be given. The data available for this project is rich; analysing it creatively for clinical benefit will be a key component to the overall project and to the roles of the two PDRAs.

The post-holders will work with other members of the team on high profile projects; they will design and conduct studies using the substantial data available, targeting textual and mood features and learning how to couple with other available data for these individuals. The goal being to achieve novel analyses that are of high intrinsic quality and also of significant value to the Psychiatric community.

The post-holder will receive training and supervision the Turing fellows on the data science aspects of the project and will work closely with Professor Geddes and or Dr Kate Saunders in the clinical design and interpretation aspects.

This is an exciting opportunity for someone at the early stage of their research career to join a well-established team of researchers and a new collaboration.

The post-holders will spend roughly half of their time in each of the departments of mathematics and psychiatry (and it is planned they will have desk space in both) and make occasional trips to the Alan Turing Institute in London (particularly on days of liaison meetings of the team) and will actively engage with the investigators and generally be an enthusiastic and committed full time postdoctoral researcher in the team.

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\(^1\) for emerging applications see e.g. [https://www.turing-gateway.cam.ac.uk/event/ofbw41](https://www.turing-gateway.cam.ac.uk/event/ofbw41)
General Responsibilities

- Conduct academic research and administrative activities to meet deadlines
- Present work at conferences and public meetings
- Collaborate in the preparation of research publications
- Liaise with research collaborators and report on study progress
- Act as a source of information and advice for junior members of the group on methods
- Attend regular academic and supervisory meetings
- Adapt existing and develop new research methodologies and materials
- Prepare working theories and analyse qualitative and/or quantitative data from a variety of sources, reviewing and refining theories as appropriate
- Develop ideas for generating research income
- Other duties as required by the research group leaders

This job description summarizes the main duties and accountabilities of the post but is not comprehensive. The post-holder may be required to undertake other duties of similar level and responsibility.

It is the policy of the Mathematical Institute to give all PDRAs the opportunity to teach, where the conditions of the grant allow this, and to require teaching if there is a departmental need. Such teaching, if undertaken, will not exceed 3 hours per week for 24 weeks of the year and additional remuneration will be paid. It will normally be delivered as classes, but it might also involve giving lectures or college tutorials.

Additional security pre-employment checks

This job includes the following duties which will require additional security pre-employment checks:

- It expected that, subject to a satisfactory DBS check, the successful candidates will be visiting researchers at the Alan Turing Institute.
- A satisfactory Disclosure and Barring Service check due to regulated activity involving ‘at risk’ adults

Selection criteria

Essential

- Have or be close to the completion of a relevant PhD/DPhil
- Have significant and innovative experience drawn from Natural Language Processing, signatures, processing of speech, landmarked, or multimodal data, as well as complementary mathematical skills.
- Excellent data analytic skills and excellent working knowledge of programming language such as Python
- Publications published or in preparation that one expects to appear in leading peer reviewed journals and conferences and at a volume appropriate to the career path so far, demonstrating long term capability to contribute significantly to research in the areas set out above.
- Ability to communicate clearly and concisely with people in a busy setting
- Ability to liaise effectively with senior academics
- Excellent organizational and time management skills.
- Excellent oral and written communication skills.
- Excellent general IT skills (e.g. Excel, Microsoft Office).
- Initiative, ability to work effectively within and contribute to the team
- Able to handle confidential and sensitive issues data in an appropriate manner
Desirable

- Experience of working in interdisciplinary setting
- Experience of working with data derived from clinical populations or more generally from small datasets with significant sequential structure.
- Experience in rough path theory.

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. Income from external research contracts in 2016/17 exceeded £564m and we rank first in the UK for university spin-outs, with more than 130 companies created to date. 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

The Mathematical Institute

The Mathematical Institute, as Oxford’s Department of Mathematics is known, is one of the leading mathematics departments in the world. Our mathematical research, impact and environment were all ranked first in the UK in the 2014 Research Excellence Framework exercise, a government review of research in all UK universities. The Mathematical Institute is the focus of research into both fundamental mathematics and its applications, and our inclusive nature and overall size are key factors in the provision of an outstanding research environment for our members. The large number of faculty, postdocs and students in the Mathematical Institute, all supported by excellent facilities, allows us to maintain a critical mass in research groups encompassing a wide spectrum of mathematics, while our integrated nature fosters collaboration between fields. We also host a large number of academic visitors. Our web pages (www.maths.ox.ac.uk) provide comprehensive information about all of our activities.

The research activities of the Institute as a whole can be gauged from the web pages of the research groups and centres within the Institute (www.maths.ox.ac.uk/research). The range of our research interests is well reflected by the profile of our faculty as listed at www.maths.ox.ac.uk/people. Many members of the Institute have received prestigious prizes and other special recognition for their work; some recent examples can be found at www.maths.ox.ac.uk/news/awards-and-prizes.
The Mathematical Institute moved into the purpose-built Andrew Wiles Building in the University’s Radcliffe Observatory Quarter in September 2013. As well as providing offices for all staff and graduate students, it houses a range of other facilities available to members of the department, including the Whitehead Library, a large range of meeting rooms, teaching spaces, lecture rooms, and social spaces, and a small facility for carrying out table-top experiments. For more information, see www.maths.ox.ac.uk/about-us.

Teaching is central to the life of the Mathematical Institute and we have an annual intake of approximately 300 undergraduates, some on courses jointly with other departments. We admit around 150 students each year across five taught master’s degree courses and have over 230 doctoral students in residence at any one time. Our doctoral programme always attracts the best research students from across the world, and we have a broad mentoring and training programme. Our provision expanded in 2014 following the award of two EPSRC-funded Centres for Doctoral Training.

The Mathematical Institute strives to ensure that all staff and students are given the opportunities and support they need to achieve their potential. We are committed to equality of opportunities and to advancing women’s careers. We support staff returning from long-term absence and provide flexible arrangements for staff with parental responsibilities. Further information about family support can be found in the Standard Terms and Conditions. Our Good Practice Committee contributes to many aspects of our work, see www.maths.ox.ac.uk/members/good-practice.

As part of the department’s commitment to openness, inclusivity and transparency, we strongly encourage applications from all who consider they meet the requirements of the post, and particularly from women and ethnic minorities.

**Department of Psychiatry**

The Department of Psychiatry based on the Warneford Hospital site in Oxford has an international reputation for excellence. The Head of Department is Professor John Geddes. The Department has a substantial research programme, with major funding from Medical Research Council (MRC), Wellcome Trust and National Institute for Health Research (NIHR) and provides highly rated medical training in psychiatry. There are approximately 180 staff including 32 principal investigators leading research groups investigating applying a wide range of approaches from translational neuroscience, experimental medicine, epidemiology, clinical trials and health services research to developmental disorders, mood disorders, cognitive disorders and self-harm and suicide. There are strong links with other departments and institutes both within and outside Oxford: these links ensure that we can apply the best scientific methods to psychiatric and cognitive disorders. The Department has an annual turnover approaching £10 million with more than 50 research grants.

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

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

**Alan Turing Institute**

The Alan Turing Institute is the national institute for data science, with headquarters at the British Library. The Institute is named in honour of Alan Turing (23 June 1912 – 7 June 1954), whose pioneering work in theoretical and applied mathematics, engineering and computing are considered to be the key disciplines comprising the emerging field of data science. The Alan
Turing Institute is interested in research which tackles the big challenges in data science with lasting effects for science, the economy and the world we live in.

Core areas of our research range from data-centric engineering, high-performance computing and cyber-security to smart cities, health, the economy and data ethics.

We apply our data science research to real-world problems, working with partners in industry, government and third sector.

The Turing Institute has cross-disciplinarity at its core; we bring researchers in mathematics and theoretical computer science, statistics and machine learning, algorithm for data analytics and distributed computing, computational social science and data ethics, and industry partners, to work together in an open and collaborative environment with a shared goal to generate world-class research in data science.

How to apply

Before submitting an application, you may find it helpful to read the ‘Tips on applying for a job at the University of Oxford’ document, at https://www.ox.ac.uk/about/jobs/research/

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. You will also be required to upload a curriculum vitae, list of publications, details of teaching experience, a statement of research interests and supporting statement. The supporting statement should describe how you meet the selection criteria outlined in the job description.

Please also provide details of two referees, one should include the applicant's current or most recent employer, whenever possible and indicate whether we can contact them now.

Please upload all documents as PDF files with your name and the document type in the filename.

Applicants should ask their referees to send their letters of reference DIRECTLY to

The Recruitment Administrator (Vacancies)
The Mathematical Institute, Andrew Wiles Building, Radcliffe Observatory Quarter, Woodstock Road, Oxford, OX2 6GG. Tel: 01865 273525: Email: vacancies@maths.ox.ac.uk by the closing date (a letter by email is sufficient) quoting the vacancy reference 138789.

Referees should preferably not, all be from the same institution and whenever possible one should be the applicant’s current, or most recent, supervisor. NOTE: reference letters must be received from your referees by the closing date for your application to be complete.

All applications must be received by 12:00 noon UK time on Tuesday 12th February 2019.

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)
Should you experience any difficulties using the online application system, please email recruitment.support@admin.ox.ac.uk. Further help and support is available from www.ox.ac.uk/about_the_university/jobs/support/. To return to the online application at any stage, please go to: www.recruit.ox.ac.uk.

Please note that you will be notified of the progress of your application by automatic emails from our e-recruitment system. Please check your spam/junk mail regularly to ensure that you receive all emails.

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/preemployscreening/.

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: www.admin.ox.ac.uk/councilsec/compliance/gdpr/privacynotices/job/. The University’s Policy on Data Protection is available at: www.admin.ox.ac.uk/councilsec/compliance/gdpr/universitypolicyondataprotection/.

The University’s policy on retirement

The University operates an Employer Justified Retirement Age (EJRA) for all academic posts and some academic-related posts. From 1 October 2017, the University has adopted an EJRA of 30 September before the 69th birthday for all academic and academic-related staff in posts at grade 8 and above. The justification for this is explained at: www.admin.ox.ac.uk/personnel/end/retirement/acrelretire8+/

For existing employees, any employment beyond the retirement age is subject to approval through the procedures: www.admin.ox.ac.uk/personnel/end/retirement/acrelretire8+/

There is no normal or fixed age at which staff in posts at grades 1–7 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

Training and Development
A range of training and development opportunities are available at the University. Further details can be found at www.ox.ac.uk/staff/working_at_oxford/training_development/index.html.

For research staff only: Support for Research Staff
There is a particularly wide range of support for career development for research staff. Please visit: www.ox.ac.uk/research/support-researchers to find out more.

Pensions
The University offers generous occupational pension schemes for eligible staff members. Further details can be found at www.admin.ox.ac.uk/finance/epp/pensions/pensionspolicy/.

Information for international staff (or those relocating from another part of the UK)
A wealth of information is available on the University’s International Staff website for staff who are relocating to Oxford from abroad, at www.admin.ox.ac.uk/personnel/staffinfo/international/.

The University of Oxford Newcomers’ Club
The Newcomers’ Club is aimed at helping partners of newly-arrived visiting scholars, graduate students and academic members of the University to settle in and to meet people in Oxford.

Transport schemes
The University offers a range of travel schemes and public transport travel discounts to staff. Full details are available at www.admin.ox.ac.uk/estates/ourservices/travel/.

University Club and University Sports Facilities
The University Club provides social, sporting and hospitality facilities. It incorporates a Club bar, a cafe and sporting facilities, including a gym. See www.club.ox.ac.uk for all further details.

University staff can use the University Sports Centre at discounted rates, and have the chance to join sports clubs. Please visit www.sport.ox.ac.uk/oxford-university-sports-facilities.

Childcare and Childcare Vouchers
The University offers quality childcare provision services at affordable prices to its employees. For full details about the services offered, please visit www.admin.ox.ac.uk/childcare/. NB: Due to the high demand for the University’s nursery places there is a long waiting list.

The University also offers nursery fee payment schemes to eligible staff as an opportunity to save tax and national insurance on childcare costs. Please visit www.admin.ox.ac.uk/childcare.

Disabled staff
The University is committed to supporting members of staff with a disability or long-term health condition and has a dedicated Staff Disability Advisor. Please visit www.admin.ox.ac.uk/eop/disab/staff for further details.

BUPA - Eduhealth
Bupa Eduhealth Essentials private medical insurance offers special rates for University of Oxford staff and their families www.eduhealth.co.uk/mini-site/.

All other benefits
For other benefits, such as free entry to colleges, the Botanic Gardens and staff discounts offered by third party companies, please see www.admin.ox.ac.uk/personnel/staffinfo/benefits/.