LONDON'S GLOBAL UNIVERSITY

Job Description

Research Fellow or Senior Research Fellow: Methods Developer x2

Grade: 7 or 8

UCL Department: UCL Queen Square Institute of Neurology

Location: 12 Queen Square

Research Department: Wellcome Centre for Human Neuroimaging

Reports to:

Line Manager: Dr Guillaume Flandin
Head of Research Department: Prof Cathy Price

Director- Prof. Mike Hanna

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HoD- Prof. Cathy Price

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PI- Dr. Guillaume Flandin

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(Senior) Research Fellow x 2

Context

The UCL Queen Square Institute of Neurology (ION) in Queen Square was established in 1950, merged with UCL in 1997, and is a key component of the Faculty of Brain Sciences (FBS), School of Life and Medical Sciences (SLMS), at UCL. The Institute has eight academic research Departments (https://www.ucl.ac.uk/ion/research/research-departments), which encompass clinical and basic research within each theme. In parallel, there are currently six Divisions representing clinical professional affiliations.

The mission is to translate neuroscience discovery research into treatments for patients with neurological diseases.

In addition, a number of important research centres are based at the ION, affiliated with one of our academic research departments: https://www.ucl.ac.uk/ion/research/research-centres

The UCL Queen Square Institute of Neurology has a significant postgraduate teaching and training portfolio, with nearly 500 graduate students at Queen Square. The Institute employs just under 750 staff, and hosts just under 300 honorary & visiting staff, spread over a complex and large estate comprising of over 15 buildings. Our annual turnover is £85 million.

The Institute is closely associated in its work with the National Hospital for Neurology & Neurosurgery (NHNN), University College London Hospitals' NHS Foundation Trust, and in combination they form a national and international centre at Queen Square for teaching, training and research in neurology and allied clinical and basic neurosciences. The Institute also has active collaborative research programmes with other centres of excellence and works in close partnership with them: http://www.ucl.ac.uk/ion/about/related

Research Excellence

A large proportion of the Institute's funding is obtained from the Higher Education Funding Council for England. The most recent research assessment exercise, REF2014, showed that the IoN, as part of the FBS, is the first rated UK institution for neuroscience research output.

The Institute currently holds 627 active research projects, totalling £304 million, for research from the principal medical charities concerned with neurological diseases, and from government agencies such as the Medical Research Council, and we also receive significant philanthropic support.

UCL Neuroscience is currently rated second in the world by ISI Essential Science Indicators. In the calendar year 2019, Institute staff published 1727 papers; 71 were

published in the top 50 of all scientific journals (ranked by ISI impact factors), including Nature, Science, Lancet, BMJ and JAMA. RAND report shows that UCL has the highest share of highly cited publications in Neurology in England: http://www.rand.org/pubs/research_reports/RR1363.html

There are 130 Principal Investigators at IoN, including: 113 professors/ professorial research associates and 25 emeritus professors; 11 Fellows of the Royal Society; 29 Fellows of the Academy of Medical Sciences; 1 Nobel Prize winner.

The Institute hosts the UK DRI Centre at UCL, led by Professor Karen Duff, as one of its 8 research departments: https://www.ucl.ac.uk/uk-dementia-research-institute/uk-dementia-research-institute-ucl

Teaching excellence

The UCL Queen Square Institute of Neurology has a significant postgraduate teaching and training portfolio, with over 500 graduate students (over 280 PhD students) at Queen Square, and taught MSc/MRes courses in: Advanced Neuroimaging; Brain and Mind Sciences (an innovative two year, two centre programme); Clinical Neuroscience; Clinical Neurology; Neuromuscular Disease; Stroke Medicine, Dementia and Translational Neuroscience. A distance-learning Diploma in Clinical Neurology was launched in Autumn 2011. Excellent graduate students of the highest quality are recruited to both ION and UCL-wide PhD programmes, including the LWENC 4-year PhD programme, which are supported through Research Council, charity and industry funded studentships. Institute staff contribute to undergraduate teaching of Clinical Neurology for the UCL Medical School, host an Elective programme for final year medical students and participate in the organisation of several CPD courses: http://www.ucl.ac.uk/ion/education

Equality, Diversity & Inclusion

The Institute prides itself for operating in an all-inclusive environment. Teamwork is highly valued, individual strengths are recognised and celebrated, and there is a commitment to advancing the careers of everyone, regardless of gender or role. We aim to provide a family friendly environment where both women and men feel able to take the time they need for family. The Athena SWAN Charter recognises commitment to advancing women's careers in science, technology, engineering, maths and medicine (STEMM) employment in academia. ION is delighted to have received an Athena Swan Silver Award in October 2015. Mentoring is a crucial part of supporting career progression. While UCL has an online mentoring scheme called u-mentor, we have added a specific mentoring scheme for female academics at the ION. Currently we have 27 mentors who have been trained by an external mentoring expert.

At the Institute we uphold the UCL-wide “Dignity At Work” policy, which, together with support available, protects staff and students from unacceptable behaviour. As an Institute we have pledged to Zero Tolerance: https://www.ucl.ac.uk/ion/working-institute/dignity-work and actively support Wellbeing@UCL : the five year wellbeing strategy for the whole UCL community, supported by our Wellbeing Champions.

Environmental sustainability

The Institute is committed to operating within an environmentally sustainable environment, through the implementation of the UCL Sustainability policy at Departmental level. For more information, please visit our webpage at: http://www.ucl.ac.uk/ion/green-awareness/

For more information on our initiatives: https://www.ucl.ac.uk/ion/working-institute

The Research Department

The Wellcome Centre for Human Neuroimaging at UCL (WCHN; incorporating the Leopold Muller Functional Imaging Laboratory) is an interdisciplinary Centre for neuroimaging excellence. We bring together clinicians and scientists who study higher cognitive function using advanced neuroimaging techniques. Our goal is to understand how thought and perception arise from brain activity, and how such processes break down in neurological and psychiatric disease. The Centre studies all aspects of higher cognitive function and develops cutting edge data acquisition and analysis methods.

Main purpose of the job

We are looking to recruit two post-doctoral researchers to define, implement and deploy strategies for analysing high-resolution functional neuroimaging data from ultra-high magnetic field MRI (7T or more).

Since 2019, in-house facilities of the WCHN include a 7T Siemens Terra MRI scanner with parallel transmission capability, providing access to functional and anatomical information about the human brain *in vivo* with very high precision, spatial specificity and interpretability.

The successful applicants will work interdisciplinarily, liaising between the Methods, Physics and Computational Anatomy teams as well as other research groups within the Centre who are acquiring, or planning to acquire, 7T data. The appointees will design, develop and optimise data analysis algorithms to exploit the ultra-high resolution of 7T data and provide novel tools for intracortical fMRI analyses.

The developed methods will be made available to Centre researchers, as well as others in the international

research community, through the widely used SPM software, which is developed in the Centre. Examples of possible projects include: (i) development and optimisation of analysis techniques exploiting 7T fMRI data to probe discrete units of neuronal computation such as layers, columns, stripes and small sub-nuclei; (ii) development of generative models of anatomically-informed fMRI analyses, for layer-specific, surface-based investigation of cortical processing at 7T; (iii) devising correction schemes to mitigate imaging artefacts caused by magnetic field inhomogeneities, motion and physiology; and (iv) development of a statistical framework for the multiple testing problem in the context of laminar-specific fMRI analyses.

Duties and responsibilities:

1. Main duties :

- Expand the capacity of the SPM software for analysing high resolution functional neuroimaging data.
- Develop methods to probe discrete units of neuronal computation (layers, columns, etc).
- Work independently to frame, analyse and solve research questions in line with the aims of the Methods Group and broader WCHN programs.
- Liaise closely with the WCHN Physics and Computational Anatomy teams to develop post-processing and analysis strategies to facilitate laminar analyses, or combat image distortions and signal dropouts in regions of high magnetic field inhomogeneity.
- Establish own research area.
- Develop and program free and open source data analysis tools in SPM for use by the local and wider research communities.
- Write documentation and tutorials and provide advice to the wider SPM community via email and contribute to the SPM mailing list.
- Write original research articles for international peer reviewed journals, and present results.
- Engage with other Centre members to provide advice on best practice for the analysis of 7T imaging data, and prioritise development needs.
- Support and advise Centre members preparing grant applications in which 7T functional neuroimaging experiments are proposed.
- Provide occasional formal lecturing and teaching, for example on SPM courses.
- Play an active role in the broader research conducted by the WCHN Methods group.

2. Teaching and R&D:

- Provision of teaching on topics related to the post holder's work as requested by the line manager.
- Contributing to the department's multidisciplinary research projects within the strategy.
- Preparing and analysing data for publications for dissemination of research and for presentation at international conferences as well as internal meetings at UCL, and meetings with external collaborators

3. Professional and Quality Assurance:

- Ensuring the highest standard of record keeping, maintaining accurate, complete, and up to date records.
- Ensuring confidentiality is maintained as applicable.
- Attending and contributing to Departmental, Institutional and other meetings as appropriate.
- Acting at all times in accordance with the highest professional standards, and ensuring that these are maintained in the delivery of all aspects of research.
- Adhering at all times to the policies, rules and regulations of the Department, Institute and UCL.
- The post holder will actively follow UCL policies including Equal Opportunities and Information Governance policies.
- The post holder has a responsibility to carry out their duties in a resource efficient way and actively support UCL's Sustainability Strategy, policies and objectives within the remit of their role.
- The post holder will maintain an awareness and observation of Fire and Health & Safety Regulations.

4. General

- As duties and responsibilities change, the job description will be reviewed and amended in consultation with the post holder.
- The post holder will carry out any other duties as are within the scope, spirit and purpose of the job as requested by the line manager.

Person Specification

Criteria	Essential or Desirable	Assessment method (Application/Interview)
Qualifications, experience and knowledge		
A PhD (Senior Research Fellow) or be close to obtaining a PhD (in place before the start date – **Research Fellow only**) in a field such as computer science, engineering, physics, mathematics, statistics or a related subject that involves numerical computing	E	A
Proficiency in multi-dimensional data analysis	E	A/I
Experience analysing / developing data analysis methods for ultra-high field MRI (7T or above)	E	A/I
Demonstrable experience of leading projects to completion (**Senior Research Fellow only**)	E	A/I
Demonstrable experience in at least two of the following areas of methodological development: • Computer vision or medical image computing • Bayesian modelling techniques • Inverse problems or probabilistic generative models of imaging data • Correction schemes for artefacts caused by magnetic field inhomogeneity, motion and physiology • Surface reconstruction and laminar definition • High resolution human fMRI at ultra-high field • Study of effective connectivity with Dynamic Causal Modelling	D (**Research Fellow**) / E (**Senior Research Fellow**)	A/I
Experience of best practices in software development (version control, continuous integration, documentation)	E	A/I
Experience in the development of generative models for neuroimaging in general and for ultra-high field MRI in particular	E	I
Deployment of open source tools, and subsequent support provision	D	A/I
Strong publication record of publishing high quality research results	D	A/I
Experience collaborating with and providing support and advice to colleagues from different disciplines	D	A/I
Skills and abilities		
Excellent software engineering skills, with experience of C or C++, as well as in a higher level language, such as MATLAB, Julia or Python	E	A/I

Criteria	Essential or Desirable	Assessment method (Application/Interview)
Excellent oral and written communication skills, including the ability to convey complex technical information to a broad community of researchers	E	A/I
Ability to write scientific papers fluently and independently	E	A/I
Very strong problem solving abilities	E	A/I
Good inter-personal skills with an ability to work co-operatively in a multidisciplinary setting	E	I
Personal attributes		
Resourceful and able to act on own initiative	E	I
Interested in research and a commitment to supporting high quality research	E	I
Conscientious attitude to the finalisation of any given task	E	I

Apply

To apply for this position visit:

ucl.ac.uk/jobs

If you have any queries regarding the application process, please contact Oksana Shapoval, HR Officer, UCL Queen Square Institute of Neurology, 23 Queen Square, London, WC1N 3BG (email: ion.hradmin@ucl.ac.uk).

The posts are available immediately and are funded by a grant from the Wellcome Trust for the period to 30 November 2023 in the first instance. Posts will be offered subject to satisfactory references and successful completion of a 9-month probationary period.

Salary
Appointments will be on UCL Grade 7 (Research Fellow), the salary for which ranges from £36,028 to £43,533 per annum (including London Allowance) or UCL Grade 8 (Senior Research Fellow), the salary for which ranges from £44,737 to £52,764 per annum (including London Allowance). Progression through the salary scale is incremental. Cost of living pay awards are negotiated nationally and are normally effective from 1st August each year.

If the PhD has not yet been granted, the final accepted version of the thesis must have been submitted to the degree-granting university by the start date. Appointment at Grade 7 is dependent upon having been awarded a PhD; if this is not the case, initial appointment will be at research assistant Grade 6B (salary £31,542 - £33,257 per annum) with payment at Grade 7 being backdated to the date of final submission of the PhD thesis.

Probation
Appointments are subject to receipt of satisfactory references and a probationary period of 9 months.

Hours of work
Full time 36.5 hours per week and times of work are as determined by the Head of Department.

Annual leave
Annual leave is 27 working days for a full time member of staff + 6 UCL closure days in addition to 8 Bank Holidays.

Pension
Appointments are superannuable under the Universities Superannuation Scheme (USS) or, subject to eligibility requirements, the National Health Service Pension Scheme (NHSPS). Further information about USS and the benefits can be found at www.uss.co.uk.

Other benefits
UCL is a dynamic, global university based in one of the most exciting capital cities in the world. Not only does working at UCL offer the opportunity to work with some of the greatest intellects in the world, it also offers competitive terms, conditions and benefits to its staff. In

the 2013 UCL staff survey, 83% of staff would recommend UCL as a good place to work and 86% are proud to work for UCL.

As part of the UCL community you can access free lunch hour lectures, exhibitions and museums and collections. On campus UCL has the Bloomsbury theatre hosting a range of performances and a series of bars, cafes and other facilities, which UCL staff can use.

In addition to 41 days annual leave (inclusive of public holidays and closure days) and generous pension schemes, UCL provides a number of other staff benefits which are linked from the page below:

- ✓ https://www.ucl.ac.uk/human-resources/pay-benefits/staff-benefits

UCL benefits and policies apply equally, whatever the sexual orientation and/or gender identity of employees. Benefits and policies relating to employees partners, includes both different sex and same sex partners.