1 Advertisement

Post Title: Research fellow in bio-inspired artificial intelligence and robotics
School/department: School of Engineering and Informatics, Department of Informatics
Hours: full time. The position will include extended trips to Australia (1-6 months/visit, and approximately 12 months in total over the 3 years)
Contract: fixed term for 3 years
Reference: 2091
Salary: starting at £33,199 and rising to £39,609 per annum
Placed on: 12 August 2019
Closing date: 23 September 2019. Applications must be received by midnight of the closing date.
Expected Interview date: 7 October 2019
Expected start date: 1 November 2019

Are you a talented and ambitious computer scientist, computational neuroscientist or machine learner? Are you looking for an opportunity to use cutting edge technology to gain new understanding of how small-brained insects learn so rapidly and robustly, and in turn develop novel active AI algorithms that are inspired by these insights? We have an opportunity for a Research Fellow to join the Brains on Board team at the Department of Informatics at the University of Sussex. The Fellow will additionally work in close collaboration with a partner Research Fellow at the University of Sheffield and world-leading neuroscientists in Australia. The project is funded through the prestigious £1.2m EPSRC International Centre to Centre Collaboration project: “ActiveAI: active learning and selective attention for rapid, robust and efficient AI.”

Your primary role will be to develop a new class of ActiveAI controllers for problems in which insects excel but deep learning methods struggle. These problems have one or more of the following characteristics: (i) learning must occur rapidly, (ii) learning samples are few or costly, (iii) computational resources are limited, and (iv) the learning problem changes over time. Insects deal with such complex tasks robustly despite limited computational power because learning is an active process emerging from the interaction of evolved brains, bodies and behaviours. Through a virtuous cycle of modelling and experiments, you will develop insect-inspired models, in which behavioural strategies and specialised sensors actively structure sensory input while selective attention drives learning to the most salient information.

The cycle of modelling and experiments will be achieved through extended visits to Australia, which will allow you to interact with biologists and shape novel insect experiments, that in turn will inspire computational and robotic models and novel algorithms. This includes significant scope for you to creatively shape and drive the project to your interests. In particular, you will be able to organise the length of these
visits flexibly but it is anticipated you will spend approximately 12 months in total in Australia over the 3 years in visits of 2-6 months. In this way, we will both advance neuroscience and enable ActiveAI solutions which will be efficient in final network configuration, robust to real-world conditions and learn rapidly.

You will work under the supervision of Professors Andrew Philippides, Thomas Nowotny and Paul Graham within the Department of Informatics at Sussex and will join a team of 4 research fellows and 4 PhD students at Sussex. This is in addition to our collaborators in the Universities of Sheffield and Queen Mary within the £4.8m EPSRC Brains on Board Programme Grant. More specifically, you will be in partnership with a corresponding Research Fellow and team at the University of Sheffield, led by Dr Mike Mangan. Together, you will lead a new collaboration with world-leading research partners in Australia including Professor Andrew Barron at Macquarie University, Dr Bruno van Swinderen at the University of Queensland and Dr Karin Nordstrom at Flinders University through extended secondments.

**Key requirements**

You should be educated to PhD level (or be close to completion) in machine learning, autonomous robotics, artificial intelligence, computational neuroscience or a related discipline, with excellent modelling and analytic skills. You will ideally have some experience with neural networks (especially to model biological or time-varying systems), cross-disciplinary collaborations, computer vision or GPU computing, though candidates must have a desire to improve or acquire skills in these areas.

When applying, please fill in the application form and attach a full CV. Use the space for additional information in support of your application to address in detail what you are bringing to the project and why you are the best candidate for the position, making reference to the role specific criteria as outlined in the Job Description. For informal enquiries, please email Andy Philippides, Professor of Biorobotics at the University of Sussex (andrewop@sussex.ac.uk).

For full details and how to apply see our [vacancies page](#).

*The University of Sussex values the diversity of its staff and students and we welcome applicants from all backgrounds.*

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2. **The School / Division**

Please find further information regarding the school/division at: [www.sussex.ac.uk/informatics/](http://www.sussex.ac.uk/informatics/)

3. **Job Description**

Job Description for the post of: Research fellow in bio-inspired artificial intelligence and robotics
Department: Informatics
Section/Unit/School: EngInf
Location: Chichester 1, CI 111
Grade: Research Fellow I, Grade 7
Responsible to: Professor Andrew Philippides through to Head of School
Responsible for: n/a

Role description: Research Fellow I is an early career-grade research position. Post-holders will be expected to contribute to the work of the research team, and also to develop their research skills with support from more experienced members of staff.

PRINCIPAL ACCOUNTABILITIES

1. To engage in individual and/or collaborative research activity resulting in high-quality publications; and to develop research funding and knowledge exchange income individually or in collaboration with others, as appropriate, depending on the size and scope of the bid.

2. To contribute to School teaching activities.
KEY RESPONSIBILITIES

1. Research, Scholarship & Enterprise

1.1 Develop research objectives and proposals for own or joint research, at acceptable levels, with assistance if required.

1.2 Conduct research projects individually and in collaboration with others.

1.3 Analyse and interpret research findings and draw conclusions on the outcomes.

1.4 Produce high-quality research outputs for publication in monographs or recognised high-quality journals, or performance/exhibition, as appropriate, and contribute to the School’s REF submission at acceptable levels of volume and academic excellence.

1.5 Contribute to the preparation of proposals and applications to external bodies, for example for funding purposes.

1.6 Individually or with colleagues, explore opportunities for enterprise activity, knowledge exchange income and/or consultancy, where permissible.

1.7 Build internal contacts and participate in internal networks and relevant external networks in order to form relationships and collaborations.

1.8 Continually update knowledge and understanding in field or specialism, and engage in continuous professional development.

2. Teaching & Student Support

2.1 Undertake teaching duties, if required.

2.2 Assist in the assessment of student knowledge and supervision of student projects if required.

2.3 Assist in the development of student research skills, for example as part of a postgraduate supervision team.

3. Contribution to School & University

3.1 Attend and contribute to relevant School and project meetings.

3.2 Undertake additional duties, as required by the Principal Investigator and/or Head of School.

4. Role-specific duties

4.1 Formulate, implement and test computational models of insect visual learning (including visual navigation in ants, target tracking in hoverflies and selective attention).

4.2 Apply models of insect visual learning to robotic platforms and test them rigorously in collaboration with the partners in Sheffield and Australia.
4.3 Distil insights from how insects learn rapidly and robustly and from small amounts of data to help develop new active AI algorithms

4.4 Contribute to insect behavioural experiments being undertaken with partners in Australia through extended research visits (2-6 months in duration) and establish a collaboration between the UK and Australian partners

4.5 Embed skills in neural and robotic modelling in the Australian partner research groups

4.6 Contribute to outreach and public engagement activities

4.7 Prepare and publish high quality publications

4.8 In addition to high quality publications, present research results at appropriate scientific meetings and international conferences.

4.9 Contribute to the public dissemination of project progress and results in addition to high quality publications by contributing to the web presence, social media and appropriate other forms of public engagement.

This Job Description sets out current duties of the post that may vary from time to time without changing the general character of the post or level of responsibility entailed.
INDICATIVE PERFORMANCE CRITERIA

- A PhD or equivalent scholarly or relevant professional activity
- Pursuing a line of independent research within a research group.
- Publishing research (either from a recently completed PhD or new original research).
- Other forms of externally recognised professional practice of creative output of a standing equivalent to regular publication of original research.
- Initiating, developing or participating in links between the University and external bodies such as business and industry, the professions, community organisations and policy-makers.
- Evidence of successful engagement in teaching or supervision.

4. Person Specification

ESSENTIAL CRITERIA

1. Normally educated to doctoral level, or other equivalent qualification, or appropriate level of experience, as appropriate to the discipline (see role-specific criteria below).
2. Evidence of engagement in high-quality research activity.
3. Excellent presentation skills, with the ability to communicate effectively, both orally and in writing, with students, colleagues and external audiences.
4. Ability to work individually on own initiative and without close supervision, and as part of a team.
5. Ability to exercise a degree of innovation and creative problem-solving.
6. Excellent organisational and administrative skills.
7. Ability to prioritise and meet deadlines.
8. Excellent IT skills.

ESSENTIAL ROLE-SPECIFIC CRITERIA

1. A PhD (or close to completion) or equivalent experience in machine learning, autonomous robotics, artificial intelligence, computational neuroscience or a related discipline
2. High level of numerical and analytical skills.
3. Expertise with a higher programming language (e.g. C++/Python/Java)

4. Familiarity with modern machine learning methods including deep learning/reinforcement learning

5. Experience of neural simulations or biological modelling

6. Interest in autonomous robotics or adaptive behaviour

7. Knowledge of statistics

8. Ability to spend extended visits (2-6 months duration) in Australia

9. Ability to collaborate openly and to work in multi-disciplinary research teams.

10. Experience of preparing and publishing scientific articles in high impact journals

**DESIRABLE CRITERIA**

1. Emerging track record of high-quality publications in reputable journals and other appropriate media of similar standing.

2. Experience of generating research or knowledge exchange income.

3. Demonstrated knowledge of computational neuroscience methods.

4. Experience of autonomous robotics

5. Experience of computer vision/image processing

6. Experience with the GeNN framework or GPGPU computing/parallel computing

7. Knowledge of neuroscience, in particular relating to insect visual learning or selective attention

8. Experience of animal behavioural experiments

9. Good software engineering skills.

10. Experience of embedded systems

The University is committed to equality and valuing diversity, and applications are particularly welcomed from women and black and minority ethnic candidates, who are under-represented in academic posts in Science, Technology, Engineering, Medicine and Mathematics (STEMM) at Sussex.