School of Engineering and Informatics
Department of Informatics
Three Research Fellows (two year fixed term with possible extensions up to 5 years, full time)
Salary range: starting at £32,004 and rising to £38,183 per annum
Expected start date: 05 January 2017

The Brains-On-Board project (http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/P006094/1) is a multi-university collaboration aiming to create robotic controllers that will enable autonomous robots with the navigational and learning abilities of a honeybee. It involves five research groups at the University of Sheffield, Queen Mary University, London, and the University of Sussex performing research whose goal is biomimetic robot control and which will combine autonomous robotics, computational neuroscience, accelerated neural network simulations on GPU architectures and insect neuroscience and behaviour. In Sussex we are seeking to employ a team of three research fellows for initially 2 years, with possible extension up to 5 years in the first three of those areas.

RF 1 (ref 1388) in bio-inspired robotics, will develop insect-derived models of navigation and apply them to autonomous robots.

The work will include refining and developing models of insect navigation and testing them on robotic platforms ranging from the Sussex Gantry robot through wheeled robots to autonomous aerial vehicles.

A successful candidate will have a keen interest in the interface of computational biology and bio-inspired robotics and a proven track record in working in this area.

RF 2 (ref 1389) in Computational Neuroscience, will work on models of associative learning, multimodal integration and decision making in insects.

The work will include formulating neuronal network models of the mushroom bodies, central complex and motor areas of the bee brain constrained by experimental data. The models will then be employed and tested on robotic platforms, including wheeled robots and aerial vehicles.

A successful candidate will have a keen interest in computational neuroscience and experience with computational modelling.

RF 3 (ref 1390) in Computer Science, working on GPU accelerated simulation of brain models and brain-inspired robot controllers, building on our GeNN meta-compiler and the SpineCreator/SpineML API to GeNN.
The work will include developing methods for model- and hardware-aware GPU-accelerated simulations methods that will allow us to efficiently simulate both large-scale models in Computational Neuroscience on super-computers and bio-inspired robotic controllers on embedded systems GPU accelerators.

A successful candidate will have proven skills in complex software development with a focus on scientific computing.

All RFs will work together on the project within Sussex and in the larger Brains-On-Board team.

We encourage applicants to apply for multiple positions if they are interested and feel qualified. Please indicate any preferences when applying for multiple positions.

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 Descriptions. If you are applying for RF 3 (ref 1390), please provide a link to a major piece of software that you have developed or been involved with (e.g. commits to github or equivalent).

For informal enquiries, please contact Prof Thomas Nowotny (t.nowotny@sussex.ac.uk) or Dr Andy Philippides (andrewop@sussex.ac.uk).

Closing date for applications: 1 December 2016

For full details and how to apply see www.sussex.ac.uk/jobs

The University of Sussex is committed to equality of opportunity

2. Senior leadership and management

The Vice-Chancellor (Professor Adam Tickell) is the senior academic officer and, as Chief Executive, is responsible to the University Council for management of the University. He is supported by an executive group which includes the three Pro-Vice-Chancellors, the Registrar and Secretary, the Director of Finance and the Director of Human Resources. The Heads of the Schools of Studies at Sussex report to the Pro-Vice-Chancellors.

The Registrar and Secretary heads the Professional Services of the University. In addition, under the University Statutes, the Registrar and Secretary is Secretary to the University Council. The Director of Finance reports to the Vice-Chancellor. The Director of ITS reports to the Registrar and Secretary, and the Librarian reports to one of the Pro-Vice-Chancellors.

3. The School / Division

The School of Engineering & Informatics brings together the areas of mechanical and electrical engineering with informatics, in particular computer science and artificial intelligence, and product design.
The School offers a range of undergraduate and postgraduate degrees in its areas of expertise and some are in collaboration with other schools at Sussex to create a distinctive focus that addresses the needs of industry, commerce and society. Examples include the joint degrees with the Department of Music in Music informatics, the MSc in Energy Technology that includes courses on energy Policy from the SPRU, the Science Policy Research Unit, and the MSc in Evolutionary and Adaptive Systems (EASY) that includes modules from Life Sciences and Psychology. This interdisciplinary approach also applies to our research where projects involve various schools, including Psychology, Life Sciences, Mathematical and Physical Sciences, Music and the Medical School.

Distinctive characteristics of the School are: creativity (for instance with degrees in Music Informatics and Product Design), interdisciplinary (including research in biomedical engineering, artificial intelligence and computational neuroscience), strong links with industry (through teaching and research partnerships for example with Rolls Royce, Jaguar cars, Plessey semiconductors and American Express), and an international outlook (with around 30% of our students coming from outside the UK and academic staff and visiting researchers also from many countries).

The Department

As well as teaching and research in core aspects of computer science and software systems, Informatics at Sussex is internationally renowned centre for the study of artificial intelligence, bio-inspired computing, cognitive science, digital media technologies, and human-computer interaction.

The quality of our teaching, student support and facilities is rated highly; for example, the Guardian University Guide 2012 ranks us in the top 10 Computer Science and IT departments in the UK. In the 2010 National Student Survey, we are ranked 3rd for student satisfaction out of all computing departments in the UK. All of our degree programmes are informed by high quality research. In the most recent national assessment of research quality, Informatics at Sussex is in the top 15 in the subject nationally, based on volume of research activity rated as world-leading or internationally excellent.

The CCNR

The Centre for Computational Neuroscience and Robotics (CCNR) was created in 1996 as a joint research venture between the Evolutionary and Adaptive Systems (EASY) group and the Sussex Centre for Neuroscience (also an internationally leading group). The initial aim of the centre was to encourage a two-way flow of ideas and methods between Neuroscience and Artificial Intelligence (AI) in order to provide new ways to help understand behaviour generating mechanisms in natural systems (animals and humans) and to develop control systems for artificial autonomous agents (robots). Although research in these areas continues to flourish, the remit of the CCNR has broadened, and now encompasses a wide range of related cross-discipline activities.

The main research areas covered by the group at present include: modelling neural systems, evolutionary and adaptive robotics, insect and robot navigation, evolutionary electronics including single electron devices, theory of natural and artificial evolution, applications of evolutionary computing and stochastic search, computational creativity and creative machines, history and philosophy of adaptive systems and AI, novel ANN mechanisms for generating adaptive behaviour, machine learning in robotics and other applications.
As well as a very strong relationship with Life Sciences (particularly the Neuroscience and Evolution groups), EASY and CCNR have well established links with other departments at Sussex including: Music, Medicine, Engineering and Psychology. The group have enjoyed substantial funding from research councils: EPSRC, BBSRC, EC, AHRB, Arts Council, British National Space Centre, Wellcome, Nuffield, Leverhulme, HFSP, and direct from industry, including: BT, HP, Xilinx, Intel, Algorithmix, Astrium, Rolls Royce, MathEngine, SKB, NaturalMotion, Infonic, and the MASA group. They collaborate with many other companies and have strong links with most other leading research groups around the world working in related areas.

As well as the faculty listed below, the group currently supports 20 PhD students, 10 post-docs and other associated staff. The group have specialised research labs and facilities. Current EASY/CCNR faculty in Informatics: Prof Phil Husbands, Dr Andrew Philippides, Prof Anil Seth, Dr Luc Berthouze, Prof Thomas Nowotny. Dr Christopher Buckley, Biology faculty: Prof Michael O’Shea, Prof Tom Collett, Prof Mike Land, Prof Daniel Osorio, Prof Paul Benjamin, Dr Paul Graham.

4. Job Description

CORE JOB DESCRIPTION - Ref: 1388

Job Title: Research Fellow in bio-inspired robotics
Grade: Research Fellow I, Grade 7
School: School of Engineering and Informatics
Location: Chichester I Building, Falmer campus, Brighton, UK
Responsible to: Dr Andrew Philippides and Prof Thomas Nowotny, Principal Investigators, through to Head of School
Direct reports: n/a
Key contacts: Members of research group, members of faculty within the School and University.
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 models of insect navigation computationally
4.2 Apply models of insect navigation to robotic platforms and test them rigorously and in collaboration with the partners in Sheffield.
4.3 Contribute to robot maintenance and insect behavioural experiments
4.4 Contribute to outreach and public engagement activities within the brains-on-board project.
4.5 Prepare and publish high quality publications
4.6 In addition to high quality publications, present research results at appropriate scientific meetings and international conferences.
4.7 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.

5. **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. High level of numerical and analytical skills.

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

3. Expertise with a higher programming language (e.g. C++/Python/Java)

4. Experience of embedded systems

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

6. PhD or other equivalent qualification, or appropriate level of experience in a quantitative science discipline.

7. Expertise in working with autonomous robots

8. Experience of bio-inspired robotics

9. Experience of neural simulations

10. Experience of navigation algorithms

11. Knowledge of statistics
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.
4. Knowledge of neuroscience, in particular relating to insects and navigation.
5. Experience of animal behavioural experiments, in particular relating to navigation.
6. Experience with the GeNN framework or GPGPU computing/parallel computing.
7. Knowledge of image processing/computer vision.
8. Good software engineering skills.

CORE JOB DESCRIPTION - Ref: 1389

Job Title: Research Fellow in computational Neuroscience
Grade: Research Fellow I, Grade 7
School: School of Engineering and Informatics
Location: Chichester I Building, Falmer Campus, Brighton, UK
Responsible to: Dr Andrew Philippides and Prof Thomas Nowotny, Principal Investigators, through to Head of School
Direct reports: n/a
Key contacts: Members of research group, members of faculty within the School and University.
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 models of associative learning, multimodal processing and decision making rooted in insect behaviour, anatomy and physiology.

4.2 Apply models of associative learning, multi-modal processing and decision making to robotic demonstrators and test them rigorously and in collaboration with the partners in Sheffield.

4.3 Contribute to outreach and public engagement activities within the brains-on-board project.

4.4 Prepare and publish high quality publications.

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

4.6 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.

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- 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 policymakers.
- Evidence of successful engagement in teaching or supervision.
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. High level of numerical and analytical skills.

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

3. Expertise in a higher programming language (C++/Python/Java)

4. Experience with GPU acceleration or other parallel computing.

5. Good software engineering skills.

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

7. PhD or other equivalent qualification, or appropriate level of experience in a quantitative science discipline.

8. Expertise in computational neuroscience
9. Knowledge of fundamentals in Neuroscience, in particular relating to neural basis of decision making

10. Knowledge of statistics

11. Knowledge in decision making and action selection

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.


4. Experience with the GeNN framework.

5. Experience with autonomous robots

6. Experience with embedded systems, including NVIDIA Jetson

CORE JOB DESCRIPTION - Ref: 1390

Job Title: Research Fellow in Computer Science
Grade: Research Fellow I, Grade 7
School: School of Engineering and Informatics
Location: Chichester I Building, Falmer Campus, Brighton, UK
Responsible to: Dr Andrew Philippides and Prof Thomas Nowotny, Principal Investigators, through to Head of School
Direct reports: n/a
Key contacts: Members of research group, members of faculty within the School and University.
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 Develop model- and hardware-aware algorithms for GPU accelerated execution of neuronal network models as they are developed within the brains-on-board project.

4.2 Further develop the GeNN software framework for GPU accelerated simulations supporting both large scale high performance computing platforms and embedded GPU accelerators for autonomous robots.

4.3 Contribute to outreach and public engagement activities within the brains-on-board project.

4.4 Prepare and publish high quality publications.

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

4.6 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.

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- 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.
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. High level of mathematical, numerical and analytical skills.

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

3. Demonstrated excellent knowledge of a higher programming language, preferably C++

4. Proven excellent software engineering skills

5. Experience contributing to a major piece of software, including version control, testing and release management

6. Experience in parallel computing

7. Experience with GPU accelerated computing

8. Experience with continuous integration
9. Experience with neural simulations

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

11. PhD or other equivalent qualification, or appropriate level of experience in a quantitative science discipline

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. Knowledge of computational neuroscience methods

4. Previous experience with the GeNN framework

5. Knowledge of computational neuroscience methods

6. Knowledge of fundamentals of neuroscience

7. Experience with embedded systems, including NVIDIA Jetson

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 and engineering at Sussex.