



THE POST

College:	College of Engineering, Mathematics and Physical Sciences http://emps.exeter.ac.uk/
Post:	Postdoctoral Research Fellow
Reference No:	P62935
Grade:	F
Reporting To:	Dr James Rankin
Responsible For:	Research Associate

The above full-time post is available from 01/10/2018 for 2 years in the College of Engineering, Mathematics and Physical Sciences.

Job Description

An EPSRC-funded Postdoctoral Research Associate (PDRA) is being recruited by the College of Engineering, Mathematics and Physical Sciences.

The successful candidate will join Dr Rankin in developing mathematical and computational models to deepen our understanding of auditory stream segregation. This is a fundamental process in the auditory system that allows us to separate out and focus on distinct sound streams (e.g. voices) in a dynamic noisy environment. This process involves competition in order to resolve different interpretations of a given environment (e.g. different groupings of objects). Many aspects of this process are still not well understood, such as where in the brain segregation of streams is achieved, how the streams are encoded and the driving neural mechanisms. This project will develop a biologically motivated model inspired by a broad cross section of modelling and experimental literature (from anatomical, neurophysiological, brain imaging and behavioural experiments). Dynamical systems theory will be central to the design and analysis of the model developed. The models developed will be based on networks of coupled neural oscillators. Neural oscillations are understood to be vital for the encoding of temporal information in auditory streaming. Dynamical systems theory including bifurcation analysis and numerical methods will provide the necessary tools to understand the dynamics of the models developed.

The successful candidate will join the Systems Biomedicine and Dynamical Systems research groups housed in the recently launched £50m Living Systems Institute at the University of Exeter. These groups house over 50 researchers applying mathematical and computation approaches to study problems in neuroscience, biology and healthcare. The project will benefit from input from colleagues with expertise in neural networks, bifurcation theory, coupled oscillators and numerical methods.

Candidates with quantitative backgrounds (Mathematics, Physics, Engineering) and from Neuroscience programmes with a strong computational component are encouraged to apply. Programming experience in a high-level language (e.g. Matlab, Python, C/C++) is a must and knowledge of dynamical systems theory is a plus. Experience working on interdisciplinary projects involving the application of mathematical and computational tools to problems in Biology or Neuroscience will be viewed favourably.

For further information contact Dr James Rankin (j.a.rankin@exeter.ac.uk)

Main purpose of the job:

During the project study mathematical and computational models will be developed as inspired by our knowledge of the auditory processing pathway and brain regions encoding perception. The ensuing models will be studied using methods from dynamical systems theory. The aims of the project are to better understanding auditory stream segregation in terms of where auditory streams are encoded, how auditory streams are encoded, and what are the neural mechanisms and dynamic principles behind stream segregation. The models will be developed with a view to making predictions for future behavioural, neurophysiological and neuroimaging experiments.

Main duties and accountabilities:

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1. To undertake research as appropriate to the field of study. The responsibilities may include all or some of the following:
 - Acting as principal investigator on research projects;
 - Developing research objectives, projects and proposals;
 - Conducting individual or collaborative research projects;
 - Identifying sources of funding and contributing to the process of securing funds;
 - Extending, transforming and applying knowledge acquired from scholarship to research and appropriate external activities;
 - Writing or contributing to publications or disseminating research findings using media appropriate to the discipline;
 - Making presentations at conferences or exhibiting work in other appropriate events;
 - Assessing, interpreting and evaluating outcomes of research;
 - Developing new concepts and ideas to extend intellectual understanding;
 - Resolving problems of meeting research objectives and deadlines;
 - Developing ideas for generating income and promoting research area;
 - Developing ideas for application of research outcomes;
 - Deciding on /following research programmes and methodologies, often in collaboration with colleagues and sometimes subject to the approval of the head of the research programme on fundamental issues.
2. To contribute to teaching and learning programmes in the School and to supervise postgraduate research students.
3. To act as research team leader including:
 - Mentoring colleagues with less experience and advising on their professional development;
 - Coaching and supporting colleagues in developing their research techniques;
 - Supervising the work of others, for example in research teams or projects;
 - Developing productive working relationships with other members of staff;
 - Co-ordinating the work of colleagues to ensure equitable access to resources and facilities;
 - Dealing with standard problems and help colleagues to resolve their concerns about progress in research.
4. To routinely communicate complex and conceptual ideas to those with limited knowledge as well as to peers using high level skills and a range of media and to present the results of scientific research to sponsors and at conferences.
5. As determined by the nature of the project and at the direction of the PI, to plan, co-ordinate and implement research programme activity including:
 - Managing the use of research resources and ensuring that effective use is made of them;
 - Monitoring and reporting on the use of research budgets;
 - Helping to plan and implement commercial and consultancy activities;

- Where appropriate, to plan and manage own consultancy assignments.

This job description summarises the main duties and accountabilities of the post and is not comprehensive: the post-holder may be required to undertake other duties of similar level and responsibility. Please visit the Human Resources website to view the Research Fellow role profiles.

Person Specification

Competency	Essential	Desirable
Attainments/Qualifications	PhD (or nearing completion) or equivalent qualification in a related field of study such as Mathematics, Physics, Engineering or Neuroscience	
Skills and Understanding	<p>Knowledge of research methods and techniques</p> <p>Experience applying mathematical and/or computational approaches to model real-world problems, especially in Biology or Neuroscience</p> <p>Experience of programming in a high level language such as Matlab, Python, C/C++</p>	<p>Record of research output in high quality peer reviewed conference/journal publications</p> <p>Background in dynamical systems theory</p>
Prior Experience	<p>Experience of managing research projects and working as part of a team</p> <p>Track record of participating in and presenting at academic conferences</p> <p>Evidence of research activity and published research.</p>	<p>Experience working on interdisciplinary research projects involving experimental collaborators</p> <p>Experience working with experimental data, e.g. from behavioural or neuroimaging experiments</p> <p>Experience working with HPC or cluster computing</p>
Behavioural Characteristics	<p>Excellent written and verbal communication skills.</p> <p>Able to communicate and present material of a specialist or highly technical nature.</p> <p>Able to manage and balance the competing pressures of research and administrative demands and deadlines.</p> <p>Able to liaise with and maintain good working relationships with collaborators, colleagues and students.</p> <p>Able to build contacts and participate in internal and external networks for the exchange of information and collaboration.</p> <p>Actively participate as a member of a research team.</p>	<p>Able to identify potential sources of funding and contribute towards funding proposals</p>

	Engage in relevant training and continuous professional development.	
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Informal Enquiries

Before submitting an application you may wish to discuss the post further by contacting Dr James Rankin email j.a.rankin@exeter.ac.uk.

Terms & Conditions

Our Terms and Conditions of Employment can be viewed [here](#).

Further Information

Please see our [website](#) for further information on working at the University of Exeter.