

THE POST

College: College of Engineering, Mathematics and Physical Sciences
<http://emps.exeter.ac.uk/>

Post: Postdoctoral Research Fellow

Reference No: P58224

Grade: F

HERA: RFEL

Reporting To: Dr Mark Holland

The above full-time post is available from 01 November 2017 for 36 months in the College of Engineering, Mathematics and Physical Sciences.

Job Description

This appointment is funded by the EPSRC for the project "A geometric view of extremes in dynamical systems." The post-holder will work together with Mark Holland in the Centre for Systems, Dynamics and Control in the Department of Mathematics.

Main purpose of the job:

Background: Predicting high impact extreme events, such as severe climatic and economic events is a major societal challenge. Using innovative mathematical techniques this project determines phenomenological mechanisms that lead to the occurrence of extremes, and develops a theory that can be used to predict when such events occur in physical modelling applications. Using dynamical systems theory, the proposed research will use geometrical features of the underlying mathematical models to determine the future extreme behaviour.

For chaotic dynamical systems a theory of extremes is yet to be fully understood. These systems are highly sensitive and the time series of observations can be highly correlated. A key question that we address is when to modify the theory for independent, identically distributed random variables in the case of understanding extremes for deterministic systems. Conversely when are certain probabilistic limit laws (such as Poisson laws) a good description of the extreme phenomenon? Ergodic theory approaches have been very successful in understanding the long-term evolution of these systems and their extremes. This project will develop methods to study extremes of physically relevant functions, such as energy-like functions or wind speed functionals. We apply this theory to explicit dynamical systems (both discrete and continuous) motivated by real-world mathematical models such as for the weather and climate.

The post will include

Original research contributing to the above research project. The successful applicant will be able to present information on research progress and outcomes, communicate complex information, orally, in writing and electronically and prepare proposals and applications to external bodies.

Training & collaboration: the successful applicant will collaborate across disciplines and will actively participate in seminars, workshops and conferences in the subject area.

Main duties and accountabilities:

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 ensure 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 equivalent qualification/experience in a related field of study.	Be a nationally recognised authority in the subject area.
Skills and Understanding	Possess sufficient specialist knowledge in the discipline to develop/follow research programmes and methodologies. Record of research output in high quality publications.	Expertise in dynamical systems/ergodic theory.
Prior Experience		Experience in cross-disciplinary collaboration. Experience of undergraduate /postgraduate teaching and supervision. Experience of acting as principal investigator on research projects. Experience of managing research projects and research teams.
Behavioural Characteristics	Excellent written and verbal communication skills. Able to communicate complex and conceptual ideas to a range of groups. Evidence of the ability to collaborate actively within the Institution and externally to complete research projects and advance thinking. Able to participate in and develop external networks. Able to balance the pressures of research, administrative demands and competing deadlines. Able to identify sources of funding, generate income, obtain consultancy projects, or build relationships for future activities.	Willingness to engage in cross-disciplinary collaboration, together with industry and/or public outreach activities.

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.