



## THE POST

<b>College:</b>	<a href="#"><u>College of Engineering, Mathematics and Physical Science</u></a>
<b>Post:</b>	<b>Postdoctoral Research Fellow</b>
<b>Reference No:</b>	<b>R62551</b>
<b>Grade:</b>	<b>F</b>
<b>HERA:</b>	<b>RFEL</b>
<b>Reporting To:</b>	<b>Dr Prathyush P Menon</b>

### **Job Description**

The project is concerned with monitoring the state of the ecosystem in shelf seas around the UK using a combination of modelling and autonomous vehicles. The shelf sea ecosystem around the UK is under considerable pressure from climate change and pollution. Monitoring the state of the ecosystem using conventional means is prohibitively expensive. CAMPUS is concerned with the development of new methods for monitoring the state of the seas using a combination of numerical modelling and autonomous vehicles (mainly gliders and autonomous underwater vehicles – AUVs). The University of Exeter will undertake two tasks in the CAMPUS programme: the first is to build a statistical spatio-temporal model for short term forecasting; and the second is to further our in-house developed strategies for the guidance and control of autonomous vehicles.

You will be concerned with the development of statistical spatio-temporal models to produce short term forecasts of the shelf sea ecosystem from a combination of dynamical model output (both physical and biological models) and data collected by ships and intelligently navigated gliders. In addition the post holder will work (with Scottish Association for Marine Science) on the development and implementation of guidance and control algorithms for underwater vehicles (gliders and AUVs).

### **Main purpose of the job:**

The job has two main purposes. The first is to build a statistical spatio-temporal model for short term forecasting. The successful applicant will be able to program mathematical statistical models in a high level language (e.g. in R/Python/Matlab). The second is to develop further the in-house methods for guidance and control of autonomous vehicles. The successful applicant will implement guidance and control schemes in a low level language (e.g., in C++) and Robot Operating System middleware to carry out experiments in the ocean environment. Implementation of the guidance and control software will require the use of a third party software development kit made available on a proprietary platform.

### **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 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

<b>Competency</b>	<b>Essential</b>	<b>Desirable</b>
Attainments/ Qualifications	A PhD or equivalent in a related field of study such as (Control Engineering, Engineering mathematics, Machine Learning and Robotics, Mechatronics, or a relevant discipline to the project) or equivalent qualification/experience in a related field of study.	Be a nationally recognised authority in the subject area.
Skills and Understanding	<p>Knowledge of statistics and applied mathematics.</p> <p>Experience of programming in a high level language such as Matlab/Simulink, R/Python.</p> <p>Understanding of probabilistic modelling techniques such as Gaussian Processes.</p> <p>Understanding of robust nonlinear control techniques.</p> <p>Understanding of path following control and trajectory tracking.</p> <p>Understanding the principles of controller implementation on platforms such as Arduino/Raspberry pi.</p> <p>Possess sufficient specialist knowledge in the discipline to develop/follow research programmes and methodologies.</p> <p>Record of research output in high quality peer reviewed conference/journal publications.</p>	<p>Developed probabilistic models using measurement data and carried out calibration of the models.</p> <p>Implemented control techniques on embedded environment.</p> <p>Software skills such as R, Python, Matlab/Simulink, Java, C or C++.</p> <p>Understanding of platforms such as Ubuntu/Linux.</p> <p>Understanding of Bayesian optimisation techniques and multi-objective optimisation techniques.</p> <p>Understanding of Robotic Operating System (ROS) middleware.</p> <p>Good understanding of dynamics of marine autonomous systems such as AUV/Glider etc.</p>
Prior Experience	<p>Experience of managing research projects and research teams.</p> <p>Experience with different large environmental data sets</p> <p>Field work experience (such as sea trials) using autonomous vehicles such as AUV, Glider.</p>	<p>Experience of undergraduate / postgraduate teaching and supervision.</p> <p>Experience of acting as principal investigator on research projects.</p>
Behavioural Characteristics	<p>Excellent written and verbal communication skills.</p> <p>Participation in peer-reviewed conferences and presentation of research.</p> <p>Able to communicate complex and conceptual ideas to a range of groups.</p> <p>Evidence of the ability to collaborate actively within the Institution and externally to complete research projects and advance thinking.</p>	<p>Able to identify sources of funding, generate income, obtain consultancy projects, or build relationships for future activities.</p>

	Able to participate in and develop external networks.  Able to balance the pressures of research, administrative demands and competing deadlines.	
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**Informal Enquiries**

Before submitting an application you may wish to discuss the post further by contacting Dr. Prathyush P Menon, Senior Lecture, telephone (01392 726498) or email [p.m.prathyush@exeter.ac.uk](mailto:p.m.prathyush@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.