



## THE POST

**College:** Engineering, Mathematics and Physical Sciences

**Post:** Senior Research Fellow

**Reference No:** P44454

**Grade:** G

**Reporting To:** Professor Isabelle Baraffe

The above full-time permanent post is available from 1/09/2018 in the College of Engineering, Mathematics and Physical Sciences.

### Job Description

#### Main purpose of the job:

The main purpose of the job is to lead developments and scientific applications in the field of computational astrophysics. The post holder will work in the Astrophysics group with Professor Baraffe on computational astrophysics problems and in particular on 3D (maneto) hydrodynamics modelling of stellar/planetary interiors based on fully compressible, time implicit, multi-dimensional numerical simulations. The overall aim of the project is to provide an advanced description through multi-dimensional simulations of various processes characteristic of star/planet interiors and evolution, such as turbulence, convection, rotation, instabilities or mixing. The post holder will contribute to further development of the 3D numerical tool MUSIC developed by Prof Baraffe and her team. He/she will contribute, in particular, to the implementation and benchmarking of magneto-hydrodynamic (MHD) equations in MUSIC and to the improvement of the time implicit solver. On the long term, the post holder will contribute to strengthening inter-disciplinary links in the field of computational and data sciences with other departments, with the global aim of developing new algorithms and methods for a broad range of applications. The applicant will also develop his/her own research projects in the Astrophysics group and provide academic leadership to research teams, lead and develop internal and external networks and develop links with external academic and/or industrial contacts in order to foster collaboration and generate income.

#### Main duties and accountabilities:

To undertake research as appropriate to the field of study including:

- 1) Acting as principal investigator on research projects;
- 2) Contribute to the development of research strategies for the College.
- 3) Define research objectives and questions.
- 4) Develop proposals for research projects which will make a significant impact by leading to an increase in knowledge and understanding and the discovery or development of new explanations, insights, concepts or processes.
- 5) Actively seek research funding and secure it as far as it is reasonably possible.
- 6) Generate new research approaches and identify, adapt, develop and use research methodologies and techniques appropriate to the type of research.
- 7) Review and synthesise the outcomes of research studies.
- 8) Interpret findings obtained from research projects and develop new insights, expanding, refining and testing hypotheses and ideas.
- 9) Contribute generally to the development of thought and practice in the field.

To contribute to teaching and learning programmes in the College and to supervise postgraduate research students.

To act as research team leader including:

- 1) Provide academic leadership to those working within research areas - for example, by co-ordinating the work of others to ensure that research projects are delivered effectively and to time, or organising the work of a team by agreeing objectives and work plans.
  - 2) Contribute to the development of teams and individuals through the appraisal system and providing advice on personal development.
  - 3) Act as line manager (eg of research teams).
  - 4) Act as a personal mentor to peers and colleagues.
  - 5) Ensure that teams within the College work together and act to resolve conflicts within teams.
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. To plan, co-ordinate and implement research programmes including:
- Managing the use of research resources and ensure that effective use is made of them;
  - Managing research budgets;
  - Helping to plan and implement commercial and consultancy activities;
  - Planning and managing 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	PhD and experience in the subject area.	PhD in computational astrophysics
Skills and Understanding	Possess sufficient specialist knowledge in the discipline to develop research programmes and methodologies. Record of research output in nationally recognised publications.	Strong background in physics, Astrophysics, hydrodynamics and MHD. Strong knowledge in computational methods, in HPC developments and applications. Knowledge and publications in the field of Astrophysics.
Prior Experience	Experience of managing research projects and experience with team work.	Experience with massively parallel simulations, HPC and large code developments. Experience with industrial environment.
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 identify sources of funding, generate income, obtain consultancy projects, or build relationships for future activities. Able to balance the pressures of research, administrative demands	

	and competing deadlines.	
Circumstances		

**Informal Enquiries**

Before submitting an application you may wish to discuss the post further by contacting Prof Isabelle Baraffe, telephone (01392 725123) or email [i.baraffe@ex.ac.uk](mailto:i.baraffe@ex.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.