Australian National University

# Position Description

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|---|---|
| **College/Division:** | **College of Science** |
| **Faculty/School/Centre:** | **Mathematical Sciences Institute (MSI)** |
| **Department/Unit:** | |
| **Position Title:** | **Postdoctoral Fellow** |
| **Classification:** | **Academic Level A** |
| **Position No:** | |
| **Responsible to:** | **Associate Director, Research** |
| **Number of positions that report to this role:** | **N/A** |
| **Delegation(s) Assigned:** | **N/A** |

## PURPOSE STATEMENT:

The ANU College of Science (CoS) encompasses the disciplines of: Astronomy, Biology, Chemistry, Earth Sciences, Environment and Society, Mathematics, Physics, Science Communication and is also home to cross-disciplinary and specialist Institutes and Centres. Staff and students within the ANU College of Science conduct research and deliver a research-led education program that encompasses the entire breadth of the sciences, supported by extensive international networks and by world-class facilities.

The Postdoctoral Fellow in the Mathematical Sciences Institute (MSI) is funded by the Simons Foundation Hidden Symmetries and Fusion Energy Collaboration, whose goal is to create and exploit an effective mathematical and computational framework for the design of stellarators with hidden symmetries. A stellarator is a toroidal magnetic confinement fusion energy concept, in which the confining toroidally asymmetric magnetic field is produced by external field coils. The challenge of finding 3D optimum magnetic fields with hidden symmetries encompasses mathematical and computational problems of great subtlety, straddling optimization theory, plasma physics, dynamical systems, and the analysis of partial differential equations.

ANUs role in the international collaboration is the development and computational realisation of advanced Magnetohydrodynamic (MHD) models that describe the fractal mix of nested flux surfaces, islands, and chaotic field lines that fully 3D plasmas support. The Postdoctoral Fellow will implement a new dynamical formulation of relaxed MHD with flow, under supervision of the grant lead CI's Emeritus Professor Dewar and Professor Hole, into the existing Stepped Pressure Equilibrium Code, developed by Dr Stuart Hudson of Princeton Plasma Physics Laboratory.

The Postdoctoral Fellow contributes to the strategic direction of the MSI by further enhancing the Institute's capability in research, teaching and within the University, and through scholarly and general activities within the community.

## KEY ACCOUNTABILITY AREAS:

### Position Dimension & Relationships:

The Postdoctoral Fellow will work under the broad direction of the Associate Director (Research), conducting research with Professor Matthew Hole and Emeritus Professor Robert Dewer within the Mathematical Sciences Institute (MSI) and work collaboratively with academic, professional staff and students within MSI. The Fellow is expected to interact with external stakeholders, academic and professional staff within the Institute, College and a broader University.

### Role Statement:

In their role as an Academic Level A the Postdoctoral Fellow is expected to:

- Undertake independent research in the area of toroidal magnetic confinement with a view to publishing original and innovative results in refereed journals, present research at academic seminars and at national

and international conferences, and collaborate with other researchers at a national level. This includes working as part of a team on an externally funded project subject to deadlines.

- Collaborate with senior staff to actively seek and secure external funding, assist to prepare and submit research proposals to external funding bodies as appropriate.
- Subject to the requirements of the funding source and where an opportunity exists, the occupant may be required to contribute to the teaching activities of the School at the undergraduate and graduate levels. This includes, but is not limited to, the preparation and delivery of lectures and tutorials, the preparation of online material, marking and assessment, consultations, and with students or acting as subject coordinators.
- Supervise students working on individual or group projects at undergraduate, honours, graduate-coursework levels. Assist with supervision of research students.
- Assist to supervise research support staff in your research area.
- Actively contribute to all aspects of the operation of the School.
- Assist in outreach activities including to prospective students, research institutes, industry, government, the media and the general public.
- Maintain high academic standards in all education, research and administration endeavours.
- Take responsibility for their own workplace health and safety and not willfully place at risk the health and safety of another person in the workplace.
- Other duties as required that are consistent with the classification of the position.
- Comply with all ANU policies and procedures, and in particular those relating to work health and safety and equal opportunity

## Skill Base:

A Level A academic will work with the support and guidance from more senior academic staff and is expected to develop their expertise in teaching and research with an increasing degree of autonomy. A Level A academic will normally have completed four years of tertiary study or equivalent qualifications and experience and may be required to hold a relevant higher degree.

A Level A academic will normally contribute to teaching at the institution, at a level appropriate to the skills and experience of the staff member, engage in scholarly, research and/or professional activities appropriate to their profession or discipline, and undertake administration primarily relating to their activities at the institution. The contribution to teaching of Level A academics will be primarily at undergraduate and graduate diploma level.

## SELECTION CRITERIA:

- A PhD (or awarding of a PhD within six months of appointment commencement) in applied mathematics, computational science, or theoretical plasm physics, or equivalent qualifications and experience in a related area, with a track record of independent research as evidenced by publications in peer-reviewed journals and conferences.
- A demonstrated understanding of (i) fluid dynamics and/or MHD and (ii) excellent numerical analysis and programming skills. Experience in modelling experimental data is desirable, including some knowledge of plasma physics and magnetic confinement fusion.
- An ability and commitment to contribute to bids for competitive external funding to support individual and collaborative research activities.
- Evidence of an ability and willingness to teach at all levels.
- The ability to assist in the supervision of students working on research projects.
- The ability to work as part of a team and to meet deadlines.
- Excellent oral and written language skills and a demonstrated ability to communicate and interact effectively with a variety of staff and students in a cross-disciplinary academic environment and to foster respectful and productive working relationships with staff, students and colleagues at all levels.
- A demonstrated understanding of equal opportunity principles and policies and a commitment to their application in a university context.

*The ANU conducts background checks on potential employees, and employment in this position is conditional on satisfactory results in accordance with the Background Checking Procedure which sets out the types of checks required by each type of position.*

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| **Supervisor/Delegate Signature:** | | **Date:** | |
| Printed Name: | | **Uni ID:** | |

| **References:** |
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| General Staff Classification Descriptors |
| Academic Minimum Standards |

Australian National University

# Pre-Employment Work Environment Report

**Position Details**

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|---|---|---|---|
| **College/Div/Centre** | **College of Science** | **Dept/School/Section** | |
| **Position Title** | | **Classification** | **Academic Level A** |
| **Position No.** | | **Reference No.** | |

In accordance with the Work Health and Safety Act 2011 (Cth) the University has a primary duty of care, so far as reasonably practicable, to ensure the health and safety of all staff while they are at work in the University.

- This form must be completed by the supervisor of the advertised position and appended to the back of the Position Description.
- This form is used to advise potential applicants of work environment and health and safety hazards prior to application.
- Once an applicant has been selected for the position they must familiarise themselves with the University WHS Management System via Handbook guidance https://services.anu.edu.au/human-resources/health-safety/whs-management-system-handbook
- The hazards identified below are of generic nature in relation to the position. It is not correlated directly to training required for the specific staff to be engaged. Identification of individual WHS training needs must be in accordance with WHS Local Training Plan and through the WHS induction programs and Performance Development Review Process.
- 'Regular' hazards identified below must be listed as 'Essential' in the Selection Criteria - see ' Employment Medical Procedures' at http://info.anu.edu.au/Policies/_DHR/Procedures/Employment_Medical_Procedures.asp

**Potential Hazards**

- Please indicate whether the duties associated with appointment will result in exposure to any of the following potential hazards, either as a **regular** or **occasional** part of the duties.

| TASK | regular | occasional | TASK | regular | occasional |
|---|---|---|---|---|---|
| key boarding | ☒ | ☐ | laboratory work | ☐ | ☐ |
| lifting, manual handling | ☐ | ☐ | work at heights | ☐ | ☐ |
| repetitive manual tasks | ☐ | ☐ | work in confined spaces | ☐ | ☐ |
| Organizing events | ☐ | ☐ | noise / vibration | ☐ | ☐ |
| fieldwork & travel | ☐ | ☒ | electricity | ☐ | ☐ |
| driving a vehicle | ☐ | ☐ | | | |
| **NON-IONIZING RADIATION** | | | **IONIZING RADIATION** | | |
| solar | ☐ | ☐ | gamma, x-rays | ☐ | ☐ |
| ultraviolet | ☐ | ☐ | beta particles | ☐ | ☐ |
| infra red | ☐ | ☐ | nuclear particles | ☐ | ☐ |
| laser | ☐ | ☐ | | | |
| radio frequency | ☐ | ☐ | | | |
| **CHEMICALS** | | | **BIOLOGICAL MATERIALS** | | |
| hazardous substances | ☐ | ☐ | microbiological materials | ☐ | ☐ |
| allergens | ☐ | ☐ | potential biological allergens | ☐ | ☐ |
| cytotoxics | ☐ | ☐ | laboratory animals or insects | ☐ | ☐ |

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| mutagens/teratogens/ carcinogens | ☐ | ☐ | clinical specimens, including blood | ☐ | ☐ |
| pesticides / herbicides | ☐ | ☐ | genetically-manipulated specimens | ☐ | ☐ |
| | | | immunisations | ☐ | ☐ |

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| **OTHER POTENTIAL HAZARDS (please specify):** | | | |
| **Supervisor/Delegate Name:** | | **Date:** | |