RESEARCH FELLOW - SCIENTIFIC COMPUTING AND NUMERICAL ANALYSIS

DEPARTMENT/UNIT	School of Mathematics
FACULTY/DIVISION	Faculty of Science
CLASSIFICATION	Level B
DESIGNATED CAMPUS OR LOCATION	Clayton campus

ORGANISATIONAL CONTEXT

Everyone needs a platform to launch a satisfying career. At Monash, we give you the space and support to take your career in all kinds of exciting new directions. You'll have access to quality research, infrastructure and learning facilities and opportunities to collaborate internationally. We're a university full of energetic and enthusiastic minds, driven to challenge what's expected, expand what we know, and learn from other inspiring, empowering thinkers. Discover more at www.monash.edu.

The five Schools of the **Faculty of Science** offer a large and diverse range of disciplines in undergraduate and postgraduate courses. Ten Schools from other university faculties contribute to science teaching at all levels, allowing students to choose their studies from physical, biological, biomedical, behavioural, environmental, mathematical and computer sciences. The Faculty of Science has a strong research reputation. The Faculty's research spans the theoretical to the applied, contributes to new knowledge and technologies, and challenges how we interact with the world. To learn more about the Faculty of Science, please visit our website: www.monash.edu/science.

The **School of Mathematics** (www.monash.edu/science/schools/school-of-mathematics) is one of the largest of the five Schools in the Faculty, and has close working collaborations with other Schools/Departments such as Physics and Astronomy, Earth, Atmosphere and Environment, Computer Science; and other faculties such as Business and Economics, Arts, Medicine, IT and Engineering. The School has strong links with outside institutions such as CSIRO, the Defence Science and Technology Organisation, and the National Australia Bank and a large number of research institutes and universities around the world. In the 2018 ERA assessment, Monash University received a top rating of 5 (well above world standard) for applied mathematics. With the continued expansion and strengthening of Monash Mathematics, the international standing of Mathematics at Monash will continue on its upward trajectory.

The School is multidisciplinary with very active groups in algebra and discrete mathematics, analysis and geometry, topology, applied mathematics, financial mathematics, fluid dynamics, statistics and stochastic processes, numerical analysis and scientific computing, PDEs, operations research, optimisation, machine learning, and mathematical biology. The School provides undergraduate teaching for students in the Faculties of Science, Engineering and Information Technology; as well as postgraduate training in its key areas of research. The School has approximately 60 Academic and Research staff, 150 Teaching Associates, 6 Professional staff, 60 PhD and 60 Masters Students.

POSITION PURPOSE

A Level B research-only academic is expected to carry out independent and/or team research within the field in which they are appointed and to carry out activities to develop their research expertise relevant to the particular field of research.

The Research Fellow position will work on novel numerical approximations of partial differential equations (PDEs) under the guidance of Professor Santiago Badia. Current research lines include the exploitation of machine learning techniques in the design of physics-compatible nonlinear discretisations, nonlinear preconditioning strategies, data assimilation, and other advanced discretisation techniques (e.g., unfitted and hybridised formulations). The team's research is partially supported by the Australian Research Council through two Discovery Projects and a Monash Data Futures Institute Project.

Reporting Line: The position reports to Professor Santiago Badia

Supervisory Responsibilities: Not applicable

Financial Delegation: Not applicable

Budgetary Responsibilities: Not applicable

KEY RESPONSIBILITIES

Specific duties required of a Level B research-only academic may include:

1. The conduct of research either as a member of a team or independently and the production of conference and seminar papers and publications from that research

2. Supervision of research-support staff involved in the staff member's research

3. Guidance in the research effort of junior members of research-only Academic staff in their research area

4. Contribution to the preparation or, where appropriate, individual preparation of research proposal submissions to external funding bodies

5. Involvement in professional activities including, subject to availability of funds, attendance at conferences and seminars in the field of expertise

6. Administrative functions primarily connected with their area of research

7. Occasional contributions to the teaching program as determined by the requirements of the School

8. Co-supervision or, where appropriate, supervision of major honours or postgraduate research projects within the field of the staff member's area of research

9. Attendance at meetings associated with research or the work of the organisational unit to which the research is connected and/or at departmental, school and/or faculty meetings and/or membership of a limited number of committees

10. Other duties as directed from time to time

KEY SELECTION CRITERIA

Education/Qualifications

1. The appointee will have:

   - A doctoral qualification in Mathematics, Physics, Engineering or a related field, with a strong background in numerical methods for partial differential equations.

Knowledge and Skills

2. Strong background in numerical analysis and scientific computing. Candidates should have wide experience in the numerical approximation of partial differential equations in a broad sense and their numerical analysis. Experience in machine learning, numerical linear algebra and high-performance computing will be highly appreciated

3. Computer skills using Linux shell, git, GitHub, etc. Experience implementing numerical algorithms using Julia, Python, C, C++, or FORTRAN

4. Demonstrated manuscript and research proposal preparation skills; including a solid track record of refereed research publications

5. Experience in successfully supervising, mentoring and coaching to support the development of research staff and/or a demonstrated trajectory of leadership capability

6. Experience in supervising and working with major honours or postgraduate students within the discipline

7. The ability to work both independently in a research environment and as part of an inter-disciplinary research team

8. High level organisational skills, with demonstrated capacity to establish and achieve goals

9. Excellent written and oral communication skills

10. A demonstrated capacity to work in a collegiate manner with other staff in the workplace

OTHER JOB RELATED INFORMATION

- Travel to other campuses of the University may be required
- There may be a requirement to work additional hours from time to time
- There may be peak periods of work during which taking of leave may be restricted
- A current satisfactory Working With Children Check is required

GOVERNANCE

Monash University expects staff to appropriately balance risk and reward in a manner that is sustainable to its long-term future, contribute to a culture of honesty and integrity, and provide an environment that is safe, secure and inclusive. Ensure you are aware of and adhere to University policies relevant to the duties undertaken and the values of the University. This is a standard which the University sees as the benchmark for all of its activities in Australia and internationally.