



Job Title: Research Software Engineering Specialist
Grade: 7
Salary: £34,804 to £40,322 per annum
Department: IT Services
Hours/Contract: Permanent and Full-time
Reference: 1858

Role Purpose

We are seeking a HPC software developer to join our Research Software Engineering team (ReSET). ReSET is based in our IT Services Department where it is part of a larger Research Computing Team. ReSET was established at the beginning of 2016 to maximize the uptake and improve the use and efficiency of these facilities, with the aim of improving the research output of the University. In order to support this aim, governance of the service sits outside of IT Services with the ReSET Academic Oversight Group (AOG).

The Research Computing Team delivers a range of services including local and national High-Performance Computing (HPC) facilities, a multi-petabyte Research Data Storage service, virtualized PaaS capability for hosting standard or bespoke servers, as well as a range of research support tools such as wikis, blogs and version control. The Team manages an estate of 900 servers, with 24000 CPU cores across three HPC systems and 6PB data, including a 4000 core ARM based HPC cluster, as part of HPE's ARM Catalyst programme.

In addition to local HPC facilities our researchers make use of EPSRC Tier2 HPC facilities (*HPC Midlands+* and the *Cambridge Service for Data Driven Discovery*), CEDA/JASMIN, ARCHER and DiRAC.

You will add to our existing HPC software engineering. You will have a background developing scientific software using at least one of C, C++ or Fortran, as well as hands-on experience developing parallel software using at least one MPI, OpenMP or CUDA. You should be comfortable working as a lone-developer or as part of a team, working as the lead developer as necessary. You must should also be familiar with software engineering best practice

As well as developing software you will provide researchers with advice on best-practice in software engineering (for example profiling and debugging HPC applications) and ideally you will develop and deliver training courses based around your key areas of expertise.

Resources Managed

Occasionally we may ask you to supervise placement students or Junior RSEs.

Main Duties and Responsibilities	% Time
<p>Software Engineering responsibilities</p> <ul style="list-style-type: none"> To carry out all necessary software development, optimization and modernization, including fully documenting approaches and solutions. To work closely with researchers to scope and cost software engineering support for research grant applications, assisting with writing technical specifications where required. 	60





<ul style="list-style-type: none"> • To develop good working relationships with the Research Service Team in the Library to ensure that solutions provided to researchers meet University criteria for software and open data. • To develop and deliver training workshops for researchers to enhance the software development skills of staff and to promote best practice in software development. <p>Other Responsibilities</p> <ul style="list-style-type: none"> • To proactively bring the service to the attention of researchers, engaging with potential new users, assisting them to investigate how their research might benefit from the service, including running workshops, 1:1 meetings etc., ensuring all subject areas are covered. • To advise the Academic Oversight Group on the prioritisation and selection of projects to be worked on. This will include: <ol style="list-style-type: none"> a) Meeting with individual researchers or research groups and spending time understanding the nature of the research problem. b) Performing initial profiling of codes to identify bottlenecks and hotspots. c) Preparing short reports on proposed work to improve code performance or to develop new code, including estimates of the time required. d) Noting agreed actions and priorities and feeding back to researchers. e) Reporting on completed projects outlining the development work undertaken, including appropriate metrics to demonstrate performance improvements achieved (e.g. efficiency, speed-up, scalability). • Represent the service at meetings within the University such as Division team meetings, and College Research Committee meetings. • Engage with relevant external bodies such as equivalent software engineering teams within the HE sector or the Software Sustainability Institute to ensure up-to-date knowledge of sector initiatives in relation to software and research data, and wider software developments. 	40
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Internal and External Relationships

Internal relationships:

- Work collaboratively with ITS & other colleagues to ensure alignment & effective implementation of a planned Research Software Engineering Service.
- Work closely with the Research and Enterprise Division (for instance when helping researchers prepare grant applications, or commercialization of software and services).





- Work closely with IT Services, the Library and Information Assurance Services on research data issues (e.g. data security, data classification, appropriate curation of data).
- Report to the ReSET Academic Oversight Group in relation to the business of the University Research Strategy, Performance and Policy Committee.
- Liaise with researchers and academic groups, as well as senior academics with research lead responsibilities (e.g. Heads of Departments, Director of Research, etc).

External relationships:

- With relevant external bodies and similar teams elsewhere in sector.
- DiRAC RSE and Technical Working Group
- HPC Midlands+ partner sites and RSEs
- HPE, ARM and Catalyst partner sites

Planning and Organising

- Report on progress to AOG and line managers.
- Plan own workload on a short, medium and long-term.
- Lead on the production and delivery of the reports and notes from meetings as required.

Qualifications, Knowledge and Experience

Essential

- A strong educational background to at least primary degree level in a computational subject *
- Significant experience developing software to run on HPC*
- Experience with one or more of the following languages: Fortran, C, C++*
- Experience with one or more of the following: MPI, OpenMP, CUDA, PGAS*
- Knowledge of parallel numerical algorithms and libraries*
- Experience of version control software*

Desirable

- PhD in a computational subject or equivalent professional experience (e.g. several years of experience as a research programmer in an industrial or academic setting)
- Experience of working in an academic research computing environment
- Experience of working in a research intensive HEI
- Experience of developing or running software services for academics
- Demonstrated research experience in a computational subject *
- Demonstrated track record of research software development and the use of such software to produce research outputs (e.g. refereed publications) *
- Experience in using debugging and performance profiling tools (e.g. Intel vtune, ARM Allinea)
- Experience of Linux Systems Administration
- Experience in other high-level languages (e.g. Python, Julia, R) *
- Experience of Continuous Integration





- Experience of software profiling *
- Experience of mentoring and leading other research programmers either formally or informally *
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****Criteria to be used in shortlisting candidates for interview***

Skills, Abilities and Competencies

Essential

- Enthusiasm and ability for learning new programming languages/APIs as required
- Good technical diagnostic skills
- Ability to work flexibly and under pressure, and to use your own initiative
- Ability to work either on your own or as part of a close-knit team
- Excellent time management; ability to prioritise in line with requirements *
- Excellent interpersonal and communication skills, and the ability to work closely and effectively with academics at all levels of seniority
- Keen interest in research and willingness to engage with researchers in a range of disciplines (through discussion and/or reading publications) at sufficient depth to be able to provide software which fulfils their specific requirements *
- Excellent verbal communication and presentation skills and the ability to explain complex ideas to audiences with a range of background knowledge
- Excellent written communication skills *

Desirable

****Criteria to be used in shortlisting candidates for interview***

Criminal Declaration

If you become an employee, you must inform your manager immediately, in writing, if you are the subject of any current or future police investigations/legal proceedings, which could result in a criminal offence, conviction, caution, bind-over or charges, or warnings.

VITAL

The University encourages all staff to live our [VITAL values](#) which are:
Valuing People, Innovators, Together, Accountable, Leaders.

Equality and Diversity

We believe that equality, diversity and inclusion is integral to a successful modern workplace. By developing and implementing policies and systems that challenge stereotypes across all aspects of our work, we have a culture that recognises and values the diverse contributions of our staff which benefits everyone. Our strong values of inclusivity and equality support our efforts to attract a diverse range of high quality staff and students, and identify our University as a progressive and innovative workplace that mainstreams equality, diversity and inclusion.





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Job Summary

