University of Southampton

Job Description

Post title: **Research Fellow in MX Raman electronics, software and hardware developer (Electrical and software integration of robotics and optics for diagnosis of dementia)**

Date last updated/evaluated: May 2026

Author: Jade Nater

Standard Occupation Code:	2119 – Natural and social science professionals
School / Department:	Chemistry and Chemical Engineering
Faculty / Directorate:	Engineering and Physical Sciences
Job Family:	Education, Research and Enterprise (ERE)
Grade:	Level 4
ERE Pathway (if applicable):	Research
Post reporting to:	Sumeet Mahajan
Post line report(s):	N/A
Post base location:	Highfield Campus - Hybrid

Job purpose:

Research: The Biophotonics group at Southampton is developing a prototype system for rapid dementia diagnostics. As part of our fast-moving development phase, we are seeking a Research Software Engineer to join our interdisciplinary team on a short-term basis (3 months on full-time or part-time basis). The successful candidate will play a key role in refining and integrating sample preparation capabilities into our prototype system. This is a unique opportunity to contribute to an impactful health-tech project with real-world significance. You'll be working alongside a passionate team of scientists and engineers in translating research into a clinically viable tool for early dementia diagnosis.

Leadership, Management and Engagement: Planning own work and contributing effectively to leadership, management and engagement activities, with appropriate guidance, support and supervision.

Key accountabilities and indicative time allocation:

1. **85%**

Research Contribution:

- Develop and optimize robot control algorithms for biomedical sample processing and diagnostics
- Write robust, maintainable code (primarily in Python and GCode, but may involve other languages/tools as required)
- Support and improve hardware/software integration

- Collaborate closely with biologists, clinicians and engineers to ensure practical, real-world performance of the system
- Assist in testing, debugging, and preparing the system for further validation
- Develop and progress a personal programme of research and/or contribute as part of a team to a wider programme of research.
- Develop rigorous and original research contributions that lead to the discovery of new knowledge, insight and/or understanding.
- Regularly produce and/or contribute to research outputs, establishing visibility and credibility among subject-relevant research communities, within and beyond the University.
- Contribute to income proposals.
- Collaborate and network productively with colleagues in own and other departments, disciplines and/or organisations. Engage with a range of public groups, partners or organisations, as appropriate.
- Develop knowledge and understanding of research methodologies (e.g., testing, analysis, interpretation, critical evaluation); select and apply these effectively.
- Contribute to the effective co-creation, sharing of and engagement with research and research findings by a range of audiences (e.g., academic peers, practitioners, policymakers, publics), using a range of methods (e.g., peer-reviewed publications, conferences, public engagement, outreach, media releases).
- Ensure that research outputs are findable, accessible, interoperable and reproducible (FAIR) and, wherever possible, open access.
- Take opportunities to ensure research activities benefit educational practice.
- Contribute to the supervision of postgraduate students and/or research assistants.

2. 5%

Building on the Leadership, Management and Engagement contributions inherent in other Level 4 activities:

- Plan and prioritise own work effectively.
- Undertake defined tasks and contribute effectively to team, department or School-level management, engagement, administration or project work.
- Contribute to short-term and medium-term planning.
- Develop an understanding of School, Faculty and University strategies and objectives.
- Contribute to the wider work of the Faculty and University through effective participation in working groups and committees (e.g., Equality, Diversity and Inclusion committees and self-assessment teams, Health and Safety committees, Research Ethics committees etc.).
- Actively contribute to, and support, Equality, Diversity and Inclusion initiatives within your role, ensuring that EDI principles are integrated into daily tasks and interactions.
- Advise and assist colleagues and students.
- Support and help ensure the health and wellbeing of colleagues.
- Mentor colleagues and support their development.
- Effectively engage in probation, appraisal, career development and continuing professional development activities.
- Help prepare for and/or participate in visit days, open days and public engagement activities
- Use discretion and judgement to select from or adapt existing processes and procedures to achieve outcomes.

3. 5%

To allocate 10 days a year (pro rata if part-time) to undertake training and continuing professional development (CPD), develop research identity and leadership skills in line with the Researcher Development Concordat.

4.	**5%**

Any other duties as allocated by the line manager following consultation with the post holder.

Person Specification – Skills and Competencies

All essential and desirable criteria outlined in this Person Specification will be assessed through a combination of recruitment application and CV, and where applicable numerical or written assessment.

Knowledge, Experience and Qualifications

Essential

- Strong programming skills, ideally in Python, with familiarity in relevant libraries (e.g. NumPy, PyQt)
- Practical experience in machine vision, including image acquisition, processing, and analysis
- Practical experience in robotics
- Ability to work collaboratively in a multi-disciplinary environment
- Comfortable with fast iteration and working towards clear deliverables within a short-term timeline
- Experience with electronics, including PCB assembly, electrical testing, analog and digital signal processing.
- Experience with optics, including design and building of optical subassemblies, alignment.
- Experience with Spectroscopy, including Raman spectroscopy and signal processing.
- Master's degree in Electrical and Electronic Engineering.

Desirable

- Previous work involving hardware integration, especially cameras, spectrometers, or motion stages
- Previous work involving process automation and/or robotics control programming
- Exposure to medical imaging, diagnostics, or biomedical applications
- Experience working in early-stage R&D, product development or start-up environments

Job Hazard Assessment

For any hazards identified below a health clearance will be undertaken by our occupational health provider and form part of recruitment checks. Further ongoing clearance may be required for some roles, including for existing members of staff.

Does the risk assessment identify the need for ongoing health surveillance for this role? No

Physical Environment

Working outside	Not applicable
Exposure to noise levels >80dbA	Not applicable
Working with dust or fumes	Not applicable
Working with skin irritants/sensitisers	Not applicable
Working with chemicals (industrial or cleaning)	Not applicable
Working in a confined space	Not applicable
Working at height	Not applicable

Working with sewage	Not applicable
Contact with cytotoxins	Not applicable
Exposure Prone Procedure (EPP) work	Not applicable
Direct patient care or patient contact / Contact with clinical specimens or pathology work	Not applicable
Ionising radiation	Not applicable

Psychological and Social Environment

Working shifts	Not applicable
Working nights	Not applicable
Lone working	Occasionally <30% Time
Working with children	Not applicable
Exposure to persons with challenging behaviour	Not applicable

Equipment, Tools and Machines

Working with vibrating machinery or tools	Not applicable
Driving duties	Not applicable
Driving LGV, PCVs	Not applicable
Driving forklift trucks	Not applicable
Food handling	Not applicable
Contact with latex	Not applicable

Physical Abilities

Prolonged repetitive movements or actions	Not applicable
Moving or handling heavy loads	Not applicable

Behaviours

Our Inclusion and Respectful Behaviour Policy describes the expectations of everyone who is a part of our community.

Our **Southampton Behaviours** (below) outline the responsibilities we each have in working collaboratively to achieve our University strategy.

Personal Leadership

- I take personal responsibility for my own actions and an active approach towards my development.
- I reflect on my own behaviour, actively seek feedback and adapt my behaviour accordingly.
- I demonstrate pride, passion and enthusiasm for our University community.
- I demonstrate respect and build trust with an open and honest approach.

Working Together

- I work collaboratively and build productive relationships across our University and beyond.
- I actively listen to others and communicate clearly and appropriately with everyone.
- I take an inclusive approach, value the differences that people bring and encourage others to contribute and flourish.
- I proactively work through challenge and conflict, considering others' views to achieve positive and productive outcomes.

Developing Others

- I help to create an environment that engages and motivates others.
- I take time to support and enable people to be the best they can be.
- I recognise and value others' achievements, give praise and celebrate their success.
- I deliver balanced feedback to enable others to improve their contribution.

Delivering Quality

- I identify opportunities and take action to make improvements.
- I plan and prioritise efficiently and effectively, taking account of people, processes and resources.
- I am accountable for tackling issues, making difficult decisions and seeing them through to their conclusion.
- I encourage creativity and innovation in others, to deliver workable solutions.

Driving Sustainability

- I consider the impact on people before taking decisions or actions that may affect them.
- I embrace, enable and embed change effectively.
- I regularly take account of external and internal factors, assessing the need for change, and gaining support to move forward.
- I take time to understand our University strategy and communicate this to others.