# Research Associate in Dimensionality Reduction and Processing of Heterogeneous and Non-Traditional Data

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| Department | Electronic and Electrical Engineering (www.strath.ac.uk/engineering/electronicelectricalengineering/) | | |
| Faculty | Faculty of Engineering (www.strath.ac.uk/engineering/) | | |
| Staff Category | Research | Reference No | 216167 |
| Reports To | Professor Stephan Weiss/Dr Vladimir Stankovic | Grade: | 7 |
| Salary Range: | £32236 - £35,211 | Contract Type: | Fixed Term (30 months) |
| FTE | 1 (35 hours/week) | Closing Date | 02/06/2019 |

## Job Advert

The Department of Electronic and Electrical Engineering (EEE), University of Strathclyde, are seeking to appoint a Research Associate for 30 months to work on the University Defence Research Collaboration (UDRC) phase 3 project, jointly funded by EPSRC and UK Ministry of Defence. This Research Associate position will contribute to UDRC3 under work package 1.3, and will be based within the Centre for Signal & Image Processing at the University of Strathclyde.

**The University Defence Research Collaboration** is a £4M project delivering a programme of research focusing on "Signal Processing in the Information Age" developing new mathematical Signal Processing (SP) techniques to better transform data across many domains into actionable information and meet the requirements for improved situational awareness, information superiority, and auonomy. Pursuing advancements in the areas of scalability, adaptivity, multi-modality, resource management and modern machine learning, we will develop the underpinning SP technology for future military and homeland security applications. This project will be based in the Edinburgh Consortium, which involves the University of Edinburgh, University of Strathclyde, and Heriot-Watt University, and Queen's University Belfast. The significant UK investments in a network enabled capability offers the opportunity to dramatically improve sensing and information gathering capabilities.

The project is jointly funded by the UK Engineering and Physical Sciences Research Council (EPSRC) and UK Ministry of Defence through its Defence Science and Technology Laboratory (DSTL). The project will also work closely with our industrial partners: BAE Systems, Thales, Leonardo, QinetiQ, SeeByte Ltd. and Roke Manor, as well as with other members of the defence industry, in order to provide exploitation routes for technology pull-through.

This Research Associate position provides a unique opportunity to develop signal processing techniques for high-dimensional, heterogeneous and non-traditional data. The project will consider dimensionality reduction, where techniques such as tensor factorisation or polynomial matrix decomposition approaches are potential candidates to lead to low rank or subspace approximations. Robustness to high data volumes and limited reliability of sensors will be key. For scenarios that include heterogeneous and in parts non-traditional sensor data, graph signal processing techniques will be explored to capture complex correlations within and between data streams. Exemplar applications include data acquired by, e.g., large sonar arrays, and irregular, heterogeneous data that draws some inputs form non-traditional sources such as social networks or intelligence reports.

The project is hosted by the Centre for Signal and Image Processing at EEE and the University of Strathclyde and will work on the University Defence Research Collaboration (UDRC3). This £4M grant, funded by EPSRC and Dstl, delivers "Signal Processing in the Information Age" by developing new techniques to better transform data across many domains into

actionable information, and meet the requirements for improved situational awareness, information superiority, and autonomy. Pursuing advancements in scalability, adaptivity, multi-modality, resource management, and machine learning, UDRC3 will develop underpinning technology for future military and homeland security applications. UDRC3 continues a decade-long collaboration between the University of Strathclyde and Dstl, and provides context, impact routes, and new avenues for cutting-edge research in this and related projects.

The researcher will be supervised by Prof Stephan Weiss and Dr Vladimir Stankovic from the University of Strathclyde, and directly interact with our visiting international expert Prof Ian Proudler. You will work closely with other UDRC researchers and interact regularly with our project partners in the UK Defence Science and Technology Laboratory (Dstl) and other companies.

You will have a PhD and honours degree in signal processing. You should have excellent interpersonal and communication skills, with the ability yo listen, engage and persuade, and to present complex information in an accessible way to a range of audiences. This project will require the researcher to attend progress meetings and workshops to present their research results. They will also be expected to attend conferences to present their findings to the wider research community. The researcher may be asked to become involved in the supervision of UG, MSc student projects and PhD students if appropriate.

# Job Description

**Brief Outline of Job:**

The Department of Electronic and Electrical Engineering (EEE), University of Strathclyde, are seeking to appoint a Research Associate for 30 months to work on the University Defence Research Collaboration (UDRC) phase 3 project, jointly funded by EPSRC and UK Ministry of Defence. This Research Associate position will contribute to UDRC3 under work package 1.3, and will be based within the Centre for Signal & Image Processing at the University of Strathclyde.

**Main Activities/Responsibilities:**

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| 1. | Co-ordinating  research work within the framework defined by the project and investigators |
| 2. | Dissemination of research findings through internal reports, conference proceedings, and journal publications. This will include domestic and international travel and support of meetings at the University of Edinburgh and other UDRC Consortium locations and Dstl (Porton Down)). |
| 3. | Interact with other researchers who are working on the UDRC project and proactively engage with Dstl and industrial project partners. Organiseown work and time in order to meet the deadlines and milestones as defined within the project. |
| 4. | Work with the line manager to define and plan a programme of relevant research work and then to produce publishable results within appropriate timescales. |
| 5. | Work independently to plan the schedule of tasks to ensure that work of the projects progresses according to agreed overall timetable. |
| 6. | Organise own time so that different aspects of the project can proceed in parallel giving due consideration to the needs of other members of the team. |
| 7. | Be proactive in interacting with project partners to share data and ideas. |
| 8. | Take a leadership role in regular project meetings to report and review progress, and to generate new ideas and lines of research. |
| 9. | Determine the aims, objectives and deadlines for short to medium term work plan, in discussion with the Line Manager (particularly for medium term planning). |
| 10. | Contribute to long-term strategic planning and development of group activities, in discussion with the Line Manager and other researchers. |
| 11. | Be resourceful in overcoming problems encountered in the development of new approaches and the implementation of existing techniques in the normal course of the research. |
| 12 | Define the methodology to solve the problems in the project. |
| 13 | Work in close cooperation with the other project investigators, project partners, technical staff, and PhD students working on the project to resolve problems, as required. |
| 14 | Supervise student projects, provide advice to students and contribute to teaching as required by, for example, running tutorials and supervising practical work |

# Person Specification

### Educational and/or Professional Qualifications
(E=Essential, i.e. a candidate must meet all essential criteria to be considered for selection, D=Desirable)

E1  A good honours degree and a PhD in signal processing or a clearly related area, with a focus on aspects such as array/statistical signal processing or linear algebra, or a closely related area

### Experience

E2  Proven track record of research in signal processing, with a specific focus on array processing, statistical signal processing, linear algebra, graph theory or a closely related area.

E3  Experience in delivering research project results in a signal processing context; i.e. a record of peer-reviewed journal and conference papers in a relevant area.

### Job Related Skills and Achievements

E4  Capable of working independently, exercising a high degree of initiative and demonstrating a pro-active and flexible approach to work.

E5  Capable of working collaboratively with researchers from different disciplines or technical background.

E6  Ability to work under pressure and meet agreed milestones.

D1  Ability to be adaptive and accepting of new ideas and a willingness to approach new challenges and adjusts plans to meet new priorities.

D2  Practical experience of working in a research project involving academic and industrial partners.

### Personal Attributes

E7  Ability to develop and maintain effective working relationships.

E8  Good time-keeping and time-management, with associated effective prioritisation of tasks.

E9  Excellent interpersonal and communications skills, with the ability to listen, engage and persuade, and to present complex information in an accessible way to a range of audiences.

E10 Ability to contribute ideas and initiate new ways of working.

### Other Relevant Factors

E11 Willing to travel.

# Application Procedure

Applicants are required to complete an application form including the name of three referees who will be contacted before interview without further permission, unless you indicate that you would prefer otherwise. Applicants should also submit a Curriculum Vitae and a covering letter detailing the knowledge, skills and experience you think make you the right candidate for the job. Applicants should also complete the Equal Opportunities Monitoring Form.

# Other Information

Further information on the application process and working at Strathclyde can be found on our website (http://www.strath.ac.uk/hr/workforus).

Informal enquiries about the post can be directed to Professor Stephan Weiss, (Stephan.weiss@strath.ac.uk).

### Rewards and Benefits
Our staff have access to a wide range of outstanding benefits that include financial rewards, family friendly and wellbeing benefits and career development opportunities, details of which can be found here.

### Conditions of Employment
Conditions of employment relating to the Research staff category can be found at: Conditions of Employment.

### Probation
Where applicable, the successful applicant will be required to serve a 9 month probationary period.

**Pension**

The successful applicant will be eligible to join the Universities' Superannuation Scheme. Further information regarding this scheme is available from Payroll and Pensions.

**Equality and Diversity**

We value diversity and welcome applications from all sections of the community.

The University currently holds a Bronze Athena SWAN award, recognising our commitment to advancing women's careers in science, technology, engineering, maths and medicine (STEMM) employment in academia.

**University Values**

The University's Values capture what we're all about: who we are, what we believe in and what we stand for. Our Values have been derived from how we act and how we expect to be treated as part of Strathclyde.