



Research Role Profile

Job Title:	Research Fellow A in Physical Layer Radio for Advanced Infrastructure to Train Communications
-------------------	---

Responsible to:	Dr F Heliot
------------------------	-------------

Responsible for:	Not applicable
-------------------------	----------------

Job Summary and Purpose:
To undertake research in accordance with the specified research project(s) under the supervision of the principal investigator.

Main Responsibilities/Activities
To undertake a range of research activities within a specified research area, assuming responsibility for specific areas of projects and making use of new research techniques and methods, in consultation with the research award holder or supervisor. This may include fieldwork, interviews, laboratory experimentation, critical evaluation and interpretation, computer-based data analysis and evaluation or library research. Using initiative and creativity to identify areas for research develop new research methods and extend the research portfolio. Analysing and interpreting results of own research. Write up results and prepare papers for submission to appropriate journals and conferences, and other outputs as required and/or appropriate. Attend appropriate conferences for the purpose of disseminating research results of personal development. The post holder may also contribute to writing bids for research grants and will contribute to collaborative decision making with colleagues in areas of research. Continually to update knowledge and develop skills, and translate knowledge of advances in the area into research activity. To plan and manage own research activity in collaboration with others. To carry out administrative tasks associated with specified research funding, for example risk assessment of research activities, organisation of project meetings and documentation. Implementation of procedures required to ensure accurate and timely formal reporting and financial control. To contribute to teaching in the Faculty by carrying out student supervision and/or demonstrating within the post holder's area of expertise and under the direct guidance of a member of departmental academic staff, as appropriate. The post holder may occasionally be required to supervise more junior research staff.



Research Role Profile

Person Specification

The post holder must have:

A doctoral degree in a relevant discipline (although individuals who have almost completed a doctoral degree may be appointed). Consideration may also be given to individuals who do not hold a doctoral degree but have required skills based on a number of years experience in specified / relevant fields
--

The post holder will have authority over some aspects of project work and must be capable of providing academic judgement, offering original and creative thoughts and be able to interpret and analyse results.
--

Relationships and Contacts

Direct responsibility to the principal investigator or academic supervisor. The post holder may be asked to serve on a relevant Faculty committee. There may be additional reporting and liaison responsibilities to external funding bodies or sponsors. The post holder may work on original research tasks with colleagues in other institutions.
--

Special Requirements

To be available to participate in fieldwork as required by the specified research project

All staff are expected to:

- Positively support equality of opportunity and equity of treatment to colleagues and students in accordance with the University of Surrey Equal Opportunities policy.
- Help maintain a safe working environment by:
 - Attending training in Health and Safety requirements as necessary, both on appointment and as changes in duties and techniques demand
 - Following local codes of safe working practices and the University of Surrey Health and Safety Policy
- Undertake such other duties within the scope of the post as may be requested by your Manager.



Research Role Profile

Addendum

This document provides additional information relating to both specific aspects of the post/faculty and any post specific person specification criteria. The information contained within this document should always be read in conjunction with the accompanying generic Job Purpose.

Job Title:

Research Fellow A in Physical Layer Radio for Advanced Infrastructure to Train Communications

Background Information/Relationships

The post holder will undertake work on antenna synthesis and physical layer radio to underpin the science to enable practical implementation of an evolution of this concept, 3D Angular Momentum Multiplexing (3DAMM), for advanced infrastructure to train communications. Its application is to provide a low cost, energy efficient solution to deliver reliable gigabit connectivity to train carriages in tunnels. 3DAMM is a highly innovative wireless transmission architecture that has promise of revolutionising spectral efficiency in some wireless links. Together with another researcher appointed to a role focused on RF and antennas, the work will include designing and constructing a concept demonstrator.

Direct responsibility to the co-investigator of the project. The post holder may be asked to serve on a relevant Faculty committee. There may be additional reporting and liaison responsibilities to external funding bodies or sponsors. The post holder may work on original research tasks with colleagues in other institutions. Within the project the post holder will be actively participating in the research team together with another research fellow, the investigators and advisors to the project and will be expected to regularly report on progress.

Person Specification

This section describes the sum total of knowledge, experience & competence required by the post holder that is necessary for standard acceptable performance in carrying out this role. This is in addition to the criteria contained within the accompanying generic Job Purpose.

Qualifications and Professional Memberships	Essential/ Desirable
Strong expertise in signal processing for wireless communication systems, including modulation and coding techniques on the physical layer of a radio, array antennas and their use in multiple input multiple output (MIMO) wireless connectivity	E
Very good understanding of communication theory	E
Strong command of mathematics and simulation in MATLAB	E
Proven track record of innovation supported by publications in high ranked journals and conferences	E
Very good written and verbal communication skills	E
Knowledge and experience in the concept of orbital angular momentum (OAM) for wireless communication	D



Research Role Profile

Knowledge and experience in programming software defined radios such as ADALM-PLUTO	D
Knowledge of current state-of-the art in infrastructure to train communications	D
Key Responsibilities This document is not designed to be a list of all tasks undertaken but an outline record of any faculty/post specific responsibilities. This should be read in conjunction with those contained within the accompanying generic Job Purpose.	
1. To conduct theoretical work and extensive simulations in the broader field of signal processing for wireless communications. 2. To support other members of the research team when they perform propagation measurements in emulated environments. 3. To programme software defined radios together with another research fellow for the purpose of forming hardware in the loop demonstrations of the concept. 4. To write reports and publications as well as make presentations at conferences and events to disseminate the work. 5. To participate in regular team meetings and advisory board meetings to report progress on work and interact with other researchers on the project as appropriate to ensure that interdependencies of the work packages and the tasks are maintained. N.B. The above list is not exhaustive.	