1 Advertisement

Post Title: Research Fellow in Embedded Computing for Digital Communication
School/department: Engineering and Informatics/Engineering and Design
Hours: Full time or part time hours considered up to a maximum of 1.0 FTE
Requests for flexible working options will be considered (subject to business need).
Requires regular working on campus.
Contract: Fixed term until 4 February 2023
Reference: 7630
Salary: starting at £34,304 to £40,927 per annum, pro rata if part time
Placed on: 1 April 2022.
Closing date: 10 May 2022. Applications must be received by midnight of the closing date.
Expected start date: As soon as possible

This advert was recently posted on 7 January 2022 – Previous Applicants need not apply.

The Sensor Technology Research Centre led by Prof. Robert Prance and Prof. Daniel Roggen at the University of Sussex is looking for a Research Fellow to work on a research-intensive and innovative project funded by a large consumer electronics multinational active in the mobile device and telecommunication sector.

The primary aim of the project is to develop a novel near-field capacitive communication channel based on our patented Electric Potential Sensor technology. The focus of the role is to develop a low-power, low-data rate (<1 Mbps) point-to-point communication for future generation of wearable and mobile devices as well as ubiquitous computing applications. For instance, to transmit music from a mobile phone or smart watch to a pair of headphones.
This position requires expertise in embedded computing and digital design for digital communication aspects of the project.

Key responsibilities
Your role will be to research, implement and evaluate various digital modulation and demodulation schemes for electric-field body area networks. This will be done using a combination of FPGA and/or microcontroller systems. You will then explore novel applications for this technology in Wearable, Mobile and Ubiquitous Computing. You will write scientific papers and contribute to project reports, demonstrations and patent filing, working in a core team of four to five researchers within a larger research centre.

Key Requirements
Candidates should have excellent scientific and technical skills and a PhD in computer engineering, electronics engineering, or equivalent. They should have a strong background in embedded computing, digital system design and digital communication. The candidates should know how to realise various modulation/demodulation schemes using commercial or custom FPGA platforms and/or microcontrollers.

The candidate should have a strong interest in exploring novel applications and devices exploiting this communication channel, for example in wearable VR/AR, HCI, health, sports and entertainment applications.

Advantages and career development. This position is ideally suited for somebody who wants to advance their career in the rapidly expanding field of short-range low-power electric field communication and smart wearables. This project will provide an opportunity to publish and present in high-impact journals and conferences as well as filing patents. The project has the potential to lead to a spin-off, further industrial collaboration and offers broad networking opportunities.

Please contact Prof. Daniel Roggen d.roggen@sussex.ac.uk , for informal enquiries.

The University is committed to equality and valuing diversity, and applications are particularly welcomed from women and black and minority ethnic candidates, who are under-represented in academic posts in Science, Technology, Engineering, Medicine and Mathematics (STEMM) at Sussex.

Please note that this position may be subject to ATAS clearance if you require visa sponsorship.

For full details and how to apply see our vacancies page

The University of Sussex values the diversity of its staff and students and we welcome applicants from all backgrounds.

2. The School / Division

Please find further information regarding the school/division at http://www.sussex.ac.uk/engineering/

3. Job Description

Job Description for the post of: **Research Fellow in Embedded Computing for Digital Communication**

Department:	**Engineering and Design**
Section/Unit/School:	**School of Engineering and Design**
Location:	**Sensor technology Research Centre (STRC) Richmond Building**
Grade:	**7**
Responsible to:	**Prof. Daniel Roggen**

KEY RESPONSIBILITIES

1. Research, Scholarship & Enterprise

1.1 Develop research objectives and proposals for own or joint research, at acceptable levels, with assistance if required.

1.2 Conduct research projects individually and in collaboration with others.

1.3 Analyse and interpret research findings and draw conclusions on the outcomes.

1.4 Produce high-quality research outputs for publication in monographs or recognised high-quality journals, or performance/exhibition, as appropriate, and contribute to the School's REF submission at acceptable levels of volume and academic excellence.

1.5 Contribute to the preparation of proposals and applications to external bodies, for example for funding purposes.

1.6 Individually or with colleagues, explore opportunities for enterprise activity, knowledge exchange income and/or consultancy, where permissible.

1.7 Build internal contacts and participate in internal networks and relevant external networks in order to form relationships and collaborations.

1.8 Continually update knowledge and understanding in field or specialism, and engage in continuous professional development.

2. Teaching & Student Support

2.1 Undertake teaching duties, if required.

2.2 Assist in the assessment of student knowledge and supervision of student projects if required.

2.3 Assist in the development of student research skills, for example as part of a postgraduate supervision team.

3. Contribution to School & University

3.1 Attend and contribute to relevant School and project meetings.

3.2 Undertake additional duties, as required by the Principal Investigator and/or Head of School.

4. Role-specific duties

4.1 To implement and evaluate various modulation and demodulation schemes in digital/mixed signal domain

4.2 Thorough documentation and characterisation of the advantage and disadvantage of each method for BAN (body area network)

4.3 Engage and collaborate with the project's core team to implement functional prototypes

4.4 Translate project outcomes to wearable computing application

4.5 Support a potential commercialization of the developed technologies

4.6 Publish scientific results in high quality journals and present your work at international conferences.

4.7 Generate innovation ideas which may result in patents

4.8 Exchange expertise with PhD students and colleagues

4.9 Collaborate with the industrial partners, generate deliverables and reports and assist with flow of information among stakeholders

This Job Description sets out current duties of the post that may vary from time to time without changing the general character of the post or level of responsibility entailed.

INDICATIVE PERFORMANCE CRITERIA

- A PhD or equivalent scholarly or relevant professional activity
- Pursuing a line of independent research within a research group.
- Publishing research (either from a recently completed PhD or new original research).
- Other forms of externally recognised professional practice of creative output of a standing equivalent to regular publication of original research.
- Initiating, developing or participating in links between the University and external bodies such as business and industry, the professions, community organisations and policy-makers.
- Evidence of successful engagement in teaching or supervision.

4. Person Specification

ESSENTIAL CRITERIA

1. Educated to doctoral level, or other equivalent qualification, or appropriate level of experience, as appropriate to the discipline (see role-specific criteria below).
2. Evidence of engagement in high-quality research activity.
3. Excellent presentation skills, with the ability to communicate effectively, both orally and in writing, with students, colleagues and external audiences.
4. Ability to work individually on own initiative and without close supervision, and as part of a team.
5. Ability to exercise a degree of innovation and creative problem-solving.

6. Excellent organisational and administrative skills.
7. Ability to prioritise and meet deadlines.
8. Excellent IT skills.

ESSENTIAL ROLE-SPECIFIC CRITERIA

1. Demonstrable expertise in digital communication and/or digital signal processing including topics such as complex sampling, I/Q representation, digital filter design and implementation (e.g. CIC, FIR, pulse shaping filters)
2. Experience in FPGA system design (VHDL/Verilog)
3. Familiar with direct up-conversion and direct down-conversion
4. Expertise in embedded computing and micro-controller programming
5. Experience with ADC and DAC systems

DESIRABLE CRITERIA

1. Experience with error correction in digital communication systems, source and channel encoding and decoding, channel characterisation and simulation
2. Familiarity with PCB design and low-frequency RF circuits
3. Interest in wearable computing applications for consumer electronics, health, sport and entertainment
4. Successful track record for the practical implementation of modulation/demodulation schemes (e.g. FSK, DQPSK, QAM)
5. Ability to design embedded computing hardware that includes FPGAs, micro-controllers, ADC, DAC
6. Working with experience Software Defined Radio (e.g. GNURadio)