

University of St Andrews
School of Computer Science
Research Fellow – AR1949AC
Further Particulars for Applicants

School of Computer Science

The School

The School of Computer Science is responsible for all teaching and research in Computer Science within the University. We awarded our first degrees in 1971, and since then we have been known both for our high-quality graduates and our research excellence. The School's student numbers of around 315 taught and 45 research postgraduate FTEs give a staff/student ratio of about 1:11. We pride ourselves on delivering courses that combine mathematical and analytical rigour with practical experience in a friendly and personal learning environment, and on our excellent equipment provision. We have a track record in attaining exceptionally high levels of student satisfaction and employability, together with excellent equipment have led to the School of Computer Science placing 1st in the UK in The 2015 Guardian University Guide and the 2013, 2014 and 2015 National Student Surveys and very highly in other league tables. In the 2014 REF 77% of our research activity was identified as "internationally excellent". For more information, see our website <http://www.cs.st-andrews.ac.uk>

Growth strategy

The School is entering a period of growth, fueled by increasing research ambitions and the increasing popularity of our undergraduate and graduate programmes with high-quality applicants. We want to invest in our capacities to target new and emerging areas of Computer Science and its applications, aiming rapidly to achieve the same level of excellence as we have in our existing research areas. We expect that this includes excellence in understanding the basic underlying principles (science goals); in the development of technologies and techniques (engineering goals); in the application of these discoveries and developments to society (impact goals); and in their communication to current and future practitioners (teaching goals).

Research

The School's research activity is broadly organised into five groups, with collaboration between groups and with researchers outside the School being involved. It's increasingly the norm for staff to belong to more than one group. At present the groups are:

- **Artificial intelligence** – including constraint programming, computational algebra, machine learning, natural language processing, image processing, and robotics.
- **Biomedical Modelling and Digital Health** – including computational models of cancer treatment and infectious diseases, and software support for medical devices and data analytics.
- **Computer Systems** – including networking, distributed and autonomic systems, middleware, wireless and sensor networks, data analytics, data integration, cloud systems, and software engineering.
- **Human Computer Interaction** – including pervasive and ubiquitous computing, input and output technologies, natural language processing, distributed learning environments, intelligent interactive systems, and visualization.
- **Programming Language Technologies** – including functional programming, parallel systems, and compiler technology.

Our research is supported by funding from a range of bodies including the Engineering and Physical Sciences Research Council (EPSRC), the European Commission, the Royal Society, the Data Lab and CENSIS Innovation Centres, and the broader software industry.

We are part of SICSA, the Scottish Informatics and Computer Science Alliance which is a collaboration of Scottish Universities whose goal is to develop and extend Scotland's position as a world leader in informatics and Computer Science research and education. The SICSA research themes of Next-generation Internet, Human-Computer Interaction, Modelling and Abstraction and Complex Systems Engineering have been heavily influenced by research in the School.

The Science of Sensor Systems Software (S4) programme

Sensor systems are embedded everywhere: from transportation and lighting, to smart tags and flooded fields, providing information and facilitating real-time decision-making and actuation. Smart cities, internet of things, big data and autonomous vehicles all depend on robust sensor systems that can be trusted to deliver useful, timely and more reliable information.

Extracting information is far from straightforward: sensors are noisy, they decalibrate or may be misplaced, moved, compromised, and generally degraded over time, both individually and as a collective network. Uncertainty pervades the physical and digital environments in which the systems operate. There are increasing requirements to add more autonomy and intelligence, yet we understand very little about programming in the face of such pervasive uncertainty that cannot be engineered away. How can we be assured that a sensor system does what we intend, in a range of dynamic environments? How can we make such a system "smarter"? How can we connect the stochastic nature of environments, the continuous nature of physical systems, and discrete nature of software? Currently we cannot answer these questions because we are missing a *science* of sensor system software.

The S4 programme (<http://www.dcs.gla.ac.uk/research/S4>) aims to develop a unifying science, across the breadth of mathematics, computer science and engineering, that will let developers engineer for the uncertainty and ensure that their systems and the information they provide is resilient, responsive, reliable, statistically sound and robust. The vision is smarter sensor based systems in which scientists and policy makers can ask deeper questions and be confident in obtaining reliable answers, so the programme will deliver new principles and techniques for the development and deployment of verifiable, reliable, autonomous sensor systems that operate in uncertain, multiple and multi-scale environments.

S4 is funded by EPSRC as a five-year, £5.2M Programme Grant. It brings together four of the UK's leading research teams in sensor systems, their design, analysis, deployment, and evaluation. Led overall by Prof Muffy Calder at the University of Glasgow, the other academic collaborators are the University of St Andrews (Prof Simon Dobson), the University of Liverpool (Prof Michael Fisher), and Imperial College (Prof Julie McCann). S4 also includes a portfolio of industrial partners ranging from start-up SMEs to multinational companies and State agencies.

The job description for this role is attached below.

Job Description

Job Title: Research Fellow	Working Hours: Full time/36.25 hours per week
School/Unit: School of Computer Science	Grade/Salary Range: 6/ £32,004-£34,956 per annum
Reporting to: Professor Simon Dobson	Reference No: AR1949AC
Job Family: Academic Research	Start Date: 1 st July 2017 or as soon as possible thereafter
Duration of Post: 36 months fixed term	

Main Purpose of Role

The Research Fellow will work closely with Prof Simon Dobson (St Andrews PI) on the modelling, construction, and analysis of sensor network systems. The S4 programme aims to develop a unifying science, across the breadth of mathematics, computer science and engineering, that will let developers engineer for the uncertainty and ensure that their systems and the information they provide is resilient, responsive, reliable, statistically sound and robust. The vision is smarter sensor based systems in which scientists and policy makers can ask deeper questions and be confident in obtaining reliable answers, so the programme will deliver new principles and techniques for the development and deployment of verifiable, reliable, autonomous sensor systems that operate in uncertain, multiple and multi-scale environments. The programme involves the Universities of Glasgow, St Andrews, Liverpool, and Imperial College. St Andrews leads the work on adaptive systems engineering, especially on how systems need to change as time progresses, the system components fail, and goals change. This will require working closely with the other partners and industrial collaborators and helping to integrate these together into working systems: a strong track record in sensor systems, programming languages, data analytics, or another related area is essential, as is an ability to work within a larger team using formal methods, advanced statistics, and novel programming languages and approaches.

Key Duties and Responsibilities

1. Help lead the research work outlined above, in conjunction with the senior postdoc and the PI, being accountable for the quality of research, and its delivery within the time frame of the project;
2. Plan and manage own research, and contribute to the planning of the research project;
3. Contribute to definition and execution of intermediate milestones and goals, for oneself and project partners;
4. Present research results and actively disseminate them, including by giving talks, writing, revising, and presenting publications to conferences and journals as appropriate;
5. Develop further broadly related research proposals, either singly or jointly;
6. Manage and mitigate research-related problems as they arise;
7. Collaborate with project partners and the wider research community, developing and enhancing academic and industrial relations;
8. Undertake professional development as a researcher.

Please note that this job description is not exhaustive, and the role holder may be required to undertake other relevant duties commensurate with the grading of the post. Activities may be subject to amendment over time as the role develops and/or priorities and requirements evolve.

Person Specification

This section details the attributes e.g. skills, knowledge/qualifications and competencies which are required in order to undertake the full remit of this post.

Attributes	Essential	Desirable	Means of Assessment (i.e. application form, interview, test, presentation etc)
Education & Qualifications <i>(technical, professional, academic qualifications and training required)</i>	Degree in Computer Science, Informatics, Mathematics or a closely related discipline Hold or be about to obtain a PhD in Computer Science		Application, Degree Certificates and/or Transcripts
Experience & Knowledge <i>(examples of specific experience and knowledge sought)</i>	Background in one or more of programming languages, sensor systems, or data analytics Peer-reviewed publications appropriate for career stage	Experience of research proposal development Experience of research collaborations Open-source software development experience	Application, References, Interview
Competencies & Skills <i>(e.g. effective communication skills, initiative, flexibility, leadership etc)</i>	Systems/sensor programming skills Good research communication skills	Mathematical/statistical experience Experience with large-scale data analytics Willingness to take the initiative in research	Application, References, Interview
Other Attributes/Abilities <i>(if applicable)</i>	Be willing to engage in Continuing Professional Development		Application, Interview

Essential Criteria – requirements without which a candidate would not be able to undertake the full remit of the role. Applicants who have not clearly demonstrated in their application that they possess the essential requirements will normally be rejected at the short listing stage.

Desirable Criteria – requirements which would be useful for the candidate to hold. When short listing, these criteria will be considered when more than one applicant meets the essential requirements.

Other Information

We encourage applicants to apply online at www.vacancies.st-andrews.ac.uk/welcome.aspx, however if you are unable to do this, please call +44 (0)1334 462571 for a paper application form.

For all applications, please quote ref: **AR1949AC**

The University of St Andrews is committed to promoting equality of opportunity for all, which is further demonstrated through its working on the Gender and Race Equality Charters and being awarded the Athena SWAN award for women in science, HR Excellence in Research Award and the LGBT Charter; <http://www.st-andrews.ac.uk/hr/edi/diversityawards/>.

The University of St Andrews is a charity registered in Scotland (No SC013532).

Obligations as an Employee

You have a duty to carry out your work in a safe manner in order not to endanger yourself or anyone else by your acts or omissions.

You are required to comply with the University health and safety policy as it relates to your work activities, and to take appropriate action in case of an emergency.

You are required to undertake the Information Security Essentials computer-based training course and adhere to its principles alongside related University Policy and Regulations.

You are responsible for applying the University's equality and diversity policies and principles in your own area of responsibility and in your general conduct.

You have a responsibility to promote high levels of customer care within your own area of work/activities.

You should be adaptable to change, and be willing to acquire new skills and knowledge as applicable to the needs of the role.

You may, with reasonable notice, be required to work within other Schools/Units within the University of St Andrews.

You have the responsibility to engage with the University's commitment to Environmental Sustainability in order to reduce its waste, energy consumption and carbon footprint.

The University & Town

Founded in the early 15th century, St Andrews is Scotland's first university and the third oldest in the English speaking world.

Situated on the east coast of Scotland and framed by countryside, beaches and cliffs, the town of St Andrews was once the centre of the nation's political and religious life.

Today it is known around the world as the 'Home of Golf' and a vibrant academic town with a distinctively cosmopolitan feel where students and university staff account for more than 40% of the local population.

The University of St Andrews is a diverse and international community of over 11,000, comprising students and staff of over 120 nationalities. It has 8,500 students, just over 7,000 of them undergraduates, and employs approximately 2,540 staff - made up of c. 1,190 in the academic job families and c 1,350 in the non-academic job families.

St Andrews has approximately 50,000 living graduates, among them former Scottish First Minister Alex Salmond and the novelist Fay Weldon. In the last 90 years, the University has conferred around 1000 honorary degrees; notable recipients include Benjamin Franklin, Rudyard Kipling, Alexander Fleming, Iris Murdoch, James Black, Elizabeth Blackadder, Tim Berners-Lee and Hillary Clinton.

The University is one of Europe's most research intensive seats of learning. It is the top rated university in Scotland for teaching quality and student satisfaction. In the Research Excellence Framework (REF) 2014 the University was ranked top in Scotland for quality of research output and one of the UK's top 20 research universities.

St Andrews is consistently held to be one of the United Kingdom's top ten universities in university league tables compiled by The Times and The Sunday Times, The Guardian and The Complete University Guide. The University has eight times been named the top multi-faculty university in the UK in the National Student Survey – a direct reflection of the quality of teaching, assessment and facilities. In international and world rankings St Andrews scores highly for teaching quality, research, international outlook and citations. It is established as a World Top 100 institution in annual rankings produced by QS and Times Higher Education.

Its international reputation for delivering high quality teaching and research and student satisfaction make it one of the most sought after destinations for prospective students from the UK, Europe and overseas. In 2015 the University received on average 12 applications per place. St Andrews has highly challenging academic entry requirements to attract only the most academically potent students in the Arts, Sciences, Medicine and Divinity.

The University is closely integrated with the town. The Main Library, many academic Schools and Service Units are located centrally, while the growth in research-active sciences and medicine has been accommodated at the North Haugh on the western edge of St Andrews.

As the University enters its seventh century, it is delivering a varied programme of strategic investment, including the refurbishment of its Main Library and a major investment in its collections, the opening of a research library, the development of a major arts centre and a Music Centre, the refurbishment of the Students' Union, the provision of 900 additional students beds, the relocation of professional services to purpose built accommodation and the development of a wind-farm and green energy centre to offset energy costs.