School of Electronics, Electrical Engineering and Computer Science

Professorship in High Performance and Distributed Computing
Russell Group: the UK's 20 leading research-intensive universities
Professorship in High Performance and Distributed Computing

Queen’s University Belfast has a long and distinguished international history in computer science. Its first lectureship in computing was established in 1959 with its interest in parallel computing being sparked by the seminal work of Tony Hoare FRS who was Professor of Computer Science at Queen’s from 1968 to 1977. Since then high performance and distributed computing (HPDC) has become a pervading theme both within computer science and across the University and one where Queen’s has made a significant impact in parallel languages, tools, algorithms and software.

The School of Electronics, Electrical Engineering and Computer Science wishes to appoint a professor to enhance its international reputation for research in HPDC. The person appointed is expected to become Director of the HPDC Research Cluster and to lead the research and teaching activities in this area. A lectureship associated with this Chair will be advertised following this appointment.

Computing is in the midst of two major paradigm shifts: multi-core parallelism has become the pervading programming model from desk top to supercomputer; and cloud computation models are replacing conventional stand-alone frameworks. Exciting opportunities exist at Queen’s to exploit these opportunities. These include the development of a strategic partnership with Dell Corporation who recently installed a 900 core heterogeneous HPC system in Queen’s; collaboration with SAP research through an established PhD programme for SAP employees; the positioning of Northern Ireland as a global innovation hub for cloud computing by exploiting Project Kelvin, the new direct, secure, high capacity data cable linking the region to North America.

Researchers with expertise in parallel computing or parallel algorithms and who are interested in exploiting emerging opportunities in many-core and cloud computing are particularly encouraged to apply. With the imminent start of Project Kelvin, the successful applicant will have a unique opportunity to collaborate with the local ICT industry in the global exploitation of these technologies in applications areas such as connected health, financial services and creative media.

This is a senior appointment. As Director of Research the appointee will be a member of the School’s Senior Management team. The appointee will lead, direct and facilitate the HPDC team to achieve agreed objectives and will be expected to work in a collaborative manner with the other Directors of Research and colleagues, inside and outside the School, to deliver the vision and strategy of the School and University. The appointee will also perform an important role in mentoring staff within the HPDC research cluster.

The successful candidate will be expected, with colleagues, to create and implement exciting plans to develop new areas of research, to continue to modernise the curriculum and to develop a new Master’s degree in HPDC. The appointee will also be expected to link and integrate these activities with other major developments in computer science and electronics for the wider benefit of the School and the University.

Informal inquiries about the post should be directed to:
Perrett Laver
Tel: +44 (0)20 7659 7936
E-mail: qub@perrettlatver.com
http://www.qub.ac.uk/jobs
Please quote the reference number in all correspondence.

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Looking to the Future

Since its foundation as Queen's College in 1845, Queen's University Belfast has delivered the highest standards of scholarship and intellectual discovery, while contributing to the greater good, locally, nationally and internationally.

Through its research, education and cultural activities, and its status as the UK's Entrepreneurial University of the Year, Queen's is a magnet for inward investment, a major force in local economic prosperity and an inspiring research and learning environment for staff and students from around the world. I was, therefore, enormously honoured when I was invited to follow the distinguished statesman, Senator George Mitchell, as Chancellor of this fine institution.

Most importantly, this University recognises that knowledge knows no boundaries, and Queen's is competing increasingly strongly in the global higher education market place. It has links with leading institutions across the world. It has cemented relationships with China through a £2.3 million Science Bridge Project; and it has forged research links with leading universities in India and Malaysia, and with the Malaysian oil giant Petronas. In the United States, its deepening relationship with Georgetown University and the University of Massachusetts at Lowell adds a further dimension to transatlantic relations.

Queen's has high ambitions, and I endorse these fully. I am enthused by its aspiration to become a global Top 100 university within the next five years.

To support this aspiration, Queen's is investing in an ambitious recruitment campaign to attract the best educators and researchers from around the world. This represents a unique opportunity for those who have the vision and the ability to play a leading role in a dynamic and thriving university with strong international connections.

I look forward to playing an active role in this University's future – a future which will see it continue to enhance its standing on the world stage.

Leading the Way

As one of the UK's leading higher education providers and a global force in research, Queen's is on a journey which has taken it into the Russell Group of the UK's 20 leading research universities in 2006 and to the Times Higher Education Entrepreneurial University of the Year in 2009. Few other universities combine an international reputation for excellence in research and education with a student-centred ethos and a leadership role in the community which it serves - these are the hallmarks of Queen's.

Enterprise is embedded in everything we do. Queen's leads the UK in creating wealth and jobs by commercialising research through spin-out companies, and we also lead the way in embedding key business skills in the curriculum. Our leadership role in this area has been recognised nationally with the award of the Times Higher Education Entrepreneurial University of the Year title.

The University firmly believes that it can best serve Northern Ireland by having a truly global outlook. Its way ahead is charted in its ambitious Academic and Financial Plan, which will see significant investment in key areas in which the University will compete with the best in the world.

Queen's integrated School of Electronics, Electrical Engineering and Computer Science hosts a number of world-class research clusters on both the main campus and in the University Institute of Electronics, Communications and Information Technology (ECIT) which has been established in the Northern Ireland Science Park to promote high quality research and its translation into spin-out companies. The appointee will have a leading role in the University's research programme in High Performance and Distributed Computing, to enhance further Queen's standing as a world-class centre of excellence in education and research.
The School of Electronics, Electrical Engineering and Computer Science

Introduction

Queen’s University’s School of Electronics, Electrical Engineering and Computer Science is among the top in the UK for these disciplines in both research and teaching. As a result, the School has attracted staff and students from over 70 countries worldwide.

The School, which incorporates the Institute of Electronics, Communications and Information Technologies (ECIT www.ecit.qub.ac.uk) and the Centre for Secure Information Technologies (CSIT www.csit.qub.ac.uk) has an academic staff complement of over 50. It comprises almost 250 students undertaking PhD and Master’s programmes, 35 research fellows and nearly 1000 undergraduates across ten degree pathways.

Among the School’s defining characteristics are its strong links with a wide range of industries in the form of collaborative projects and student sandwich year placements. Moreover, the School’s research is well supported by research grants from the EU, UK research councils and local government.

The appointment of a Chair in High Performance and Distributed Computing will enable the School to build on these achievements.

Research Excellence

According to the 2008 UK Research Assessment Exercise 60% of research undertaken within the School has been judged to be either internationally excellent or world-leading.

The School has a strong research-led ethos as reflected by its creation and development of a number of major Research Centres. These include the Institute of Electronics, Communications and Information Technology (ECIT), the Centre for Secure Information Technologies (CSIT), the Virtual Engineering Centre (VEC), the Sonic Arts Research Centre and the International Centre for System-on-Chip and Microwireless Integration (SoCAM).
Its research programme is structured through nine internationally recognised research clusters: High Performance and Distributed Computing; Knowledge and Data Engineering; Speech, Image & Vision Systems; System-on-Chip Architectures; Digital Communications; Electric Power and Energy Systems; High Frequency Electronic Circuits; Intelligent Systems and Control; and Semiconductors and Nanotechnology.

High Performance and Distributed Computing

The work of the research cluster is concerned with the theory and application of high performance and distributed computing. Parallel computing is at the leading edge of research and is crucial to economic development and to the solution of some of the most challenging research problems in science, engineering and medicine.

International collaboration is strongly encouraged with current active collaborations including partnerships with the University of Pisa (grid computing), Universitat Politècnica de Catalunya (grid computing), Laboratoire d’informatique de Paris 6 (reliable scientific computation), Trinity College Dublin and University College Dublin (high performance computing). A successful PhD programme with SAP Research has recently been established. The Cluster also houses and administers Elsevier’s International CPC Program Library of computational science software (http://cpc.cs.qub.ac.uk).

The Cluster’s five academics and eight research staff have interests in:

• Algorithms, programming tools and applications software for next-generation accelerator technology including graphical processing units (GPUs) and field-programmable gate arrays (FPGAs)

• The theory and practice of MultiLevel BSP as an abstract model of multi-core computing.

• Reliable and robust scientific computation.

• Deploying large scientific software on emerging technology and abstracting general principles and guidelines for deployment on future HPC systems.

• Autonomic management of non-functional aspects of distributed/parallel systems.

• Programming environments & resource management tools for heterogeneous computers and computational grids.

• The development of high-level orchestration models for managing cloud-based computations (eg Amazon elastic cloud).
The Institute of Electronics, Communications and Information Technologies (ECIT)

Four of the School's nine research clusters, including some HPDC staff, are based at the £37 million Institute of Electronics Communications and Information Technology (ECIT). These cover research electronic data security, image and speech processing, high performance computing, telecommunications software and antenna design for mobile communications.

ECIT, which opened in 2004, is a specially designed 4000m2 building, located off-campus and is the research flagship for the Northern Ireland Science Park (NISP - www.nisp.co.uk). ECIT has brought together research specialists in complementary fields of Electronics and Computer Science and has now established extensive global industrial and university research connections and collaborations. Currently over 30 high technology companies employing 1,600 people are co-located on the Science Park (www.nisp.co.uk/current-tenants.aspx). These range from multi-nationals such as Citi (financial services software), Microsoft, SAP and Autonomy to SMEs of varying sizes.

Centre for Secure Information Technologies (CSIT)

ECIT is also the location of the UK Centre of Excellence for Secure Information Technologies (CSIT). This EPSRC/TSB Innovation and Knowledge centre was established in 2008 with initial funding of £30 million. CSIT is committed to being a world-class Research and Innovation Centre in Secure Information Technology, producing novel, disruptive high-value systems solutions that strategically position the UK at the forefront of this critical and rapidly emerging sector. The Centre brings together research specialists in complementary fields such as data encryption, network security systems, wireless enabled security systems and intelligent video analysis.

Highest Standards of Teaching

Pathways include Computer Science at BEng/ BSc and MEng levels, Computer Games Development at MEng level, Computing and Information Technology, and Business Information Technology at BSc level, as well as Electrical and Electronic Engineering at MEng and BEng level. All degrees are accredited by the Institute of Engineering and Technology (IET) or the British Computer Society (BCS). All programmes include sandwich options. A new pathway in Software & Electronic Systems Engineering, at both MEng and BEng level, is being offered for entry in September 2010.

Taught MSc Programmes within the School include Computer and Electronic Security, Electronics, Telecommunications, and Educational Multimedia. New MSc programmes are also being introduced in Advanced Wireless Communications, Sustainable Energy and High Performance and Distributed Computing.

As with other UK universities, teaching quality at Queen's is assessed regularly by the national Quality Assurance Agency (QAA). In April 2009 the QAA visited the University to carry out an institutional audit and Queen's received the highest grading QAA can award. The team said Queen's met its highest level of confidence in the management of academic standards and the quality of learning opportunities it offers for its students.
Our World-Class Academic Community

This post offers a unique opportunity to join a leading university at one of the most exciting times in its history, as it moves towards its goal to become a Global Top 100 University.

The Professorship in High Performance and Distributed Computing will play a leadership role in an academic community drawn from around the world. Queen’s nurtures an academic environment which values its scholars and researchers. It provides the highest rewards, professionally and financially, as well as the potential to play an academic leadership role in the higher education sector and in the wider community.

The following profiles highlight the achievements and career progression of a number of senior staff in the School of Electronics, Electrical Engineering and Computer Science.

Professor John McCanny CBE FRS FREng IEEE Fellow
Head of School, ECIT Director

John McCanny is an international authority on VLSI/SoC computational architectures for Signal and Video Processing. He has published five research books, 360 peer reviewed research papers and holds over 20 patents.

He is a Fellow of the Royal Society, the Royal Academy of Engineering, and an IEEE Fellow. He has co-founded two high technology companies, Amphion Semiconductor (now part of NXP) and Audio Processing Technology.

His awards include a CBE, a Royal Academy of Engineering Silver Medal, an IEEE Millennium Medal, the Royal Dublin Society/Irish Times Boyle Medal and the IET’s Faraday medal. He is currently a member of Council of the Royal Academy of Engineering and a member of EPSRC’s ICT Strategic Advisory Team.

Professor Stan Scott
Director of Research, High Performance and Distributed Computing
Director of Education

Stan Scott was appointed to the Chair of Computational Science in 2001. For over 30 years he has been involved in the design and implementation of major software packages in computational science that can exploit high performance computing architectures.

In 1994 he was awarded an Alexander von Humboldt Fellowship which was held at the Max-Planck Institute for Astrophysics near Munich. From 2005-07 he held a visiting professorship at the Laboratoire d’Informatique de Paris 6, Pierre and Marie Curie University.

He is Coordinating Principal Editor of the Elsevier journal Computer Physics Communications and is Director of its associated International Software Library. In 2006 he was awarded the HPC Prize for Machine Utilization by the UK Research Councils’ High End Computing Strategy Committee. He is actively involved in conference and workshop organization including SC10, MRSC 2010 and UK e-Science AHM 2010.
Danny Crookes was appointed to the Chair of Computer Engineering in 1993 and was Head of Computer Science from 1993-2002. He established the Image and Vision Systems research group, which was one of the first groups to develop software tools for parallel image processing on multiprocessor networks. His current research interests include the use of novel architectures (especially GPUs) for high performance image processing. He has applied expertise in language design, optimising compilers and software generators, plus software tools for hardware description and architecture generation, to the goal of developing high level software tools to enable rapid development of real time video processing systems.

Professor Crookes is currently involved in projects in automatic shoeprint recognition (ESPRC), speech separation and enhancement (EPSRC) and the processing of 4D confocal microscopy imagery (sponsored by INI and Andor Technologies). He has some 200 scientific papers in journals and international conferences, and has presented tutorials on Parallel Image Processing at several international conferences.

David Bell joined Queen’s University, Belfast in 2002. He has over 400 peer reviewed publications and has supervised more than 30 PhDs to completion. He has been Principal Investigator for many national and on 18 EU-funded IT research programmes (including MAP, ESPRIT, DELTA, COST, AIM) and has been extensively involved with the Programme Committees of many major international conferences (including PC chair) over many years.

He has also served on the editorial boards on several journals including Computer Journal and North-Holland’s Information Systems as well as being guest editor for journals such Knowledge Discovery and Semantic web. He is the author/editor of several books and has been a member of numerous international advisory and funding groups including being a UK Technology Foresight Panel member.

Professor Bell’s research is centred on data and knowledge management; the linking of reasoning under uncertainty, machine learning, and other artificial intelligence techniques with more established database work – exploiting the close relationship between evidence and data, and data mining techniques. This involves the exploration of other aspects of computing, including knowledge representation, parallelism, data transmission, and computation theory.
Queen’s University Belfast is a leading university in the UK and Ireland, which combines an international reputation for excellence in research and education with a leadership role in the community it serves.

The University’s proud academic tradition stretches back over 160 years. Today, Queen’s influence far transcends its geographical location. As a Russell Group University it is a global force in research. The results of the most recent national Research Assessment Exercise (RAE) identified areas of world-class research across all academic disciplines at Queen’s.

This excellent outcome reinforced Queen’s position as a university leading the way in areas central to society’s future, including engineering, medicine, the humanities and the professions.

Queen’s is now on a transformational journey which will bring it into the Global Top 100 over the next five years.

The global dimension is crucial to its future success. Queen’s already places Northern Ireland firmly on the world stage. Its researchers work closely with more than 250 universities around the world and the University is committed to enhancing these links still further. Among its dynamic partnerships are academic links with leading institutions in India, Malaysia, China, North America, Japan and Australia.

Queen’s students are its lifeblood, and the University is committed to ensuring that they have the best learning experience possible. As the tangible benefits of a £259 million investment in staff, students and infrastructure come to life, this is truer than ever.

Major projects include the magnificent new £50 million McClay Library which opened for business in summer 2009. This landmark building is one of the finest university libraries in the world, housing 1.2 million volumes and 2,000 reader places.

The development of the Elms Student Village, and extensive refurbishment of the Students’ Union, has helped to create one of the best student campuses in the United Kingdom and Ireland. And the excellence of the University’s state-of-the-art Physical Education Centre, one of the best university sports facilities in these islands, is underlined by its selection as a training camp for Olympic athletes in the 2012 London Games.
Major new buildings include ECIT, the University’s Institute of Electronics, Communications and Information Technology, the centrepiece of the Northern Ireland Science Park in Titanic Quarter, and the world-leading Centre for Cancer Research and Cell Biology on the Belfast City Hospital campus.

Current projects include large scale refurbishment programme of research and teaching buildings on the Engineering and Physical Sciences campus, with phased completion between now and 2013.

The campus is also home to a range of major arts initiatives – the award-winning Ulster Bank Belfast Festival at Queen’s, the Queen’s Film Theatre, the only art cinema in Northern Ireland, and the Naughton art gallery, which enrich the lives of Queen’s staff, students and the wider community.

The University’s greatest strengths have always been its staff and students who together make up an exceptional learning community.

From Nobel prize winners to medical pioneers, and from political and business leaders to leading figures in science and the arts, the Queen’s family has made its mark in the professions, in business and in civic and political life throughout the world.
Queen’s and Northern Ireland

Northern Ireland provides a high quality of life in a welcoming environment, and the University plays a pivotal role in its social, economic and cultural development.

This role has been recognised by the Sunday Times, which described Queen’s as “a casebook study of how a university can help drive the regeneration of the city and region in which it is located”.

One of the core values at the heart of Queen’s mission is the desire to make a contribution to the community it serves.

With more than 17,000 students, over 3,500 staff, and an annual turnover of some £290 million, Queen’s is an important institution.

It produces the region’s professionals and many of its civic and political leaders. It plays a key role in promoting community relations, both by leadership and example. It is one of the most inclusive universities in the United Kingdom, and it is an active patron of the arts.

There is another, much more material dimension to Queen’s contribution to the community – as one of the most dynamic forces in creating jobs and wealth for Northern Ireland. The University is the UK’s leading higher education institution in terms of the annual turnover of its spin-out businesses and it contributes to economic development through cutting-edge research, access to technology and consultancy and networking activities.

Queen’s is located in Belfast, the capital of Northern Ireland, one of the world’s most welcoming and fulfilling places in which to live and work. The city offers the highest number of restaurants per head in the UK, a thriving arts scene, an excellent shopping experience and an astonishing array of entertainment and cultural venues, from the Odyssey Arena to the Waterfront Hall to the Grand Opera House.
Northern Ireland’s stunning scenery becomes apparent only a few short miles outside the city centre. Indeed, one 19th century travel writer once dubbed the city a ‘northern Rio’. Although only the size of Yorkshire or Connecticut, Northern Ireland has an astonishing variety of landscapes, cultural and leisure opportunities, a fascinating history and has made a contribution to the world out of all proportion to its compact size.

Within 50 miles of the Queen’s campus you can climb a wild mountain, plunge into Atlantic surf, travel through mystical glens, visit some of the best golf courses in the world, indulge in superb fishing and water sports, and enjoy a cordon bleu meal in a Michelin-starred restaurant.

Northern Ireland is, as one local author suggests, ‘a great country, pretending to be small’.

One of the key benefits of this small corner of the world is its high standard of living. The country’s education system has long been recognised as among the best in Europe. Nearly a fifth of public expenditure is spent on education and Northern Ireland consistently out-performs all other UK regions in academic qualifications.

The region also offers a world-class healthcare service, a range of affordable and desirable property, and has a crime rate less than half the UK average.

Travelling to and from Northern Ireland is both easy and economical. Most major British cities are within an hour’s flying time from Belfast’s two splendid airports which are both quickly accessible from the University area. These airports offer flights to many locations in Ireland and mainland Europe, as well as several direct services to North America. Dublin is a quick two-hour train journey from Belfast and there are regular ferry services to Scotland and England.

Northern Ireland has undergone a transformation in recent years, as it looks towards a new era of economic prosperity and cultural development which celebrates the innovation and creativity of its people. Queen’s University is central to this process.
Post-Specific Information

Details of the post
The Professor of, and Director of Research for, High Performance and Distributed Computing (HPDC) will provide academic leadership in the area of high performance and distributed computing, advance knowledge in high performance and/or distributed computing through research, teaching and industrial collaboration, and augment the HPDC Cluster’s international links and research capabilities.

Employee Specification
The essential criteria for applicants are listed below:

Education and Qualifications
• An honours degree or equivalent in Computer Science or a related discipline
• A PhD in a relevant discipline

Experience
Research and Associated Activities
• An established international research reputation in high performance and/or distributed computing as evidenced by a distinguished record of research publications and sustained record of research grant income
• Experience in leading a research group of academic staff and of mentoring postdoctoral researchers and postgraduate research students

Teaching
• Evidence of high quality lecturing of computer sciences topics at undergraduate and/or postgraduate level

Management, Administration and Contribution to the Community
• Ability to provide strategic academic leadership in research, programme development and teaching
• A clear vision on future research and development plans and how they would benefit the Cluster and School

Other Skills/Knowledge
• Evidence of an emerging international esteem profile

Presentation
• Must demonstrate evidence of the ability to communicate and present academic material clearly and effectively

Personal Qualities
• Evidence of good interpersonal skills, the ability to work independently and as part of a team
• Evidence of leadership qualities

Special Factors and Other Requirements
• Willingness to travel and to work unsocial hours as required

How to Apply
Applications should consist of a covering letter of application, addressing suitability against the person specification, a full Curriculum Vitae with all publications attached. Applications must be received no later than mid-day on Monday 4 October.

An executive search exercise is being undertaken by Perrett Laver in parallel with the public advertisement of the post. Perrett Laver will assist the Selection Committee in the discharge of its duties, both to assist in the assessment of candidates against the requirements of the role and to identify the widest possible field of candidates.

Applicants are asked to provide suitable daytime and evening telephone contact details. After the closing date, Perrett Laver will meet with the Search Committee, and a shortlist of candidates will be drawn.

The appointment will be made subject to a number of conditions, including satisfactory references.

The University is a diverse and international institution which is strongly committed to equality of opportunity and to selection on merit. Currently, women are under-represented in professorial positions. Accordingly, applications from women are particularly welcome.

Informal inquiries about the post should be directed to:
Perrett Laver
Tel: +44 (0)20 7659 7936
E-mail: qub@perrettlaver.com
http://www.qub.ac.uk/jobs

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Perrett Laver
Tel: +44 (0)20 7659 7936
E-mail: qub@perrettlaver.com
http://www.qub.ac.uk/jobs