



Research Unit	School of Electronic Engineering
Research Lab	Radio and Optical Communications Lab
Post Title	Postdoctoral Researcher
Level on Framework	Level 1
Post Duration	Up to 2-Years Fixed Term Contract

Research Career Framework

As part of this role the researcher will be required to participate in the DCU Research Career Framework <http://www.dcu.ie/hr/ResearchersFramework/index.shtml>. This framework is designed to provide significant professional development opportunities to Researchers and offer the best opportunities in terms of a wider career path.

Background

Dublin City University (DCU) is one of the largest universities in Ireland. Its student population is approximately 13,000, including 500 research postgraduates and over 1,800 taught postgraduate students, plus around 3,000 distance education students. DCU is a research-led university which has developed its own research specialists, established internationally recognized centres of excellence that have substantive collaborative links with leading universities and industrial partners.

The Radio and Optical Communications Laboratory.

The Optical Communications Lab in Dublin City University was established in 1998. Upon the formation of the Rince Institute in 1999, the Optical Communications Lab and the Radio Lab merged to form the Radio and Optical Communications Group. This group now forms one of the main research laboratories within the School of Electronic Engineering. The main goal of the Radio and Optical Communications Group is to focus on the design, simulation and demonstration of new technologies for future broadband photonic communication systems.

The Project

This research project is in the area of high-speed photonic switching systems and optical networking for next generation datacentre networks and forms a key part of a major international research collaboration funded by Science Foundation Ireland, the Department for Employment and Learning, Northern Ireland and the National Science Foundation in the US. The participating institutions are Dublin City University (Radio and Optical Communications Laboratory), where this position is based, the University of Arizona (UA), Columbia University (CU), University of California San Diego (UCSD), University of California Berkeley (UCB), and Caltech (CT) in the US, as well as Irish research partners Tyndall Lab/University College Cork (UCC), Trinity College Dublin (TCD) and University of Ulster (Ulster) Coleraine. During the course of their work, the successful candidate will have the opportunity to collaborate with and visit a number of these flagship US and Irish research institutes.

The research area will address key engineering challenges associated with the design, deployment, management and resilience of future communication networks that will support highly distributed applications and services requiring the high capacity and low latency of photonic networking in and between future data centres. The project's objective is to efficiently unify the intra- and inter-data centre networks at the optical layer. The networks inside and between data centres will be transformed from an electronically switched bottlenecked

architecture to one with wavelength capacity on-demand and improved flexibility and scalability. A new optical networking architecture will be investigated that uses optical sources with very fast wavelength agility together with advanced modulation techniques to realise agile delivery of bandwidth-demanding cloud services that can support beyond exa-scale computing.

The Postdoctoral Researcher will specifically work on investigating and designing new intra- and inter-datacentre hybrid optical/electronic network topologies and architectures, using network simulation modelling and network optimisation methods. Methods for modelling datacenter network traffic and for optimally scheduling workloads onto these new network architectures will also be investigated.

Principal Duties and Responsibilities

The primary focus of the Postdoctoral Researcher (PDR) will be performing research on the SFI-funded project as described above; however PDR's activity will be broader and the PDR is expected to:

- Conduct a specified programme of research under the supervision and direction of the Principal Investigator
- Engage in appropriate training and professional development opportunities as required by the Principal Investigator, School or University in order to develop research skills and competencies
- Gain experience and contribute to grant writing with the support of and under the supervision of the Principal Investigator
- Engage in the dissemination of the results of the research in which they are engaged, as directed by, with the support of and under the supervision of the Principal Investigator
- Acquire generic and transferable skills (including project management, business skills and postgraduate mentoring/supervision)
- Engage in the wider research and scholarly activities of the research group, School or University
- Interact closely with postgraduate research students associated with the same research group and possibly have an agreed role in supporting these students in their day to day research in conjunction with an academic supervisor
- Take leadership and contribute to generation of papers, reports and funding proposals
- Actively publish research findings in high impact journals and at key conferences as part of the research group effort to disseminate research outputs
- Carry out administrative work to support the programme of research where required, including regular funding agency reports and internal reports etc...
- Carry out additional duties as may reasonably be required within the general scope and level of the post
- Contribute to costing research grant proposals and assist in the financial management of a research project
- Support collaboration with industry in areas relevant to the research group
- Liaise with different DCU units such as STEP, RIS, Finance, Registry in aspects related to the research activities performed
- Contribute to broader outreach and engagement activities such as organising technical meetings, outreach to schools and other interested parties etc...

Criteria

- A PhD qualification is normally required, preferably in an area related to computer networks and/or telecommunications engineering
- Appropriate technical competence and research experience in areas related to communications network design, modelling and performance analysis, such as:
 - Optically switched networks, e.g. OPS, OBS, optical WDM circuit-switched networks
 - Layer 2/3 network protocols and IP network architectures
 - Datacentre and HPC network architectures and their performance
 - Network workload modelling and workload scheduling methods and algorithms
 - Discrete-event simulations of networks – familiarity with high-level languages

- (Java/C/C++)
- o Network optimisation methods (mathematical optimisation and/or heuristic algorithms)
- o Mathematical network modelling methods (queueing theory)
- o Software defined networking
- Capability of working within a project team, both locally and with international partners, to achieve group-oriented results, in addition to being able to work effectively on an individual basis to achieve top quality publications
- Experienced in presenting at international conferences and at internal research meetings. Good communication, organisation and interpersonal skills.

Salary Scales:

***Postdoctoral Researcher:** €37,750 - €46,255 per annum

** Appointments will be commensurate with qualifications and experience, and will be made on the appropriate point of the salary scales, in line with current Government pay policy*

Closing Date: 22th February 2016

Candidates will be assessed on the following competencies:

Discipline knowledge and Research skills – Demonstrates knowledge of a research discipline and the ability to conduct a specific programme of research within that discipline.

Understanding the Research Environment – Demonstrates an awareness of the research environment (for example funding bodies) and the ability to contribute to grant applications.

Communicating Research – Demonstrates the ability to communicate their research with their peers and the wider research community (for example presenting at conferences and publishing research in relevant journals) and the potential to teach and tutor students.

Managing & Leadership skills - Demonstrates the potential to manage a research project including the supervision of undergraduate/postgraduate students.

Informal Enquiries to:

Dr. Conor McArdle, School of Electronic Engineering, Dublin City University, Dublin 9, Ireland.

E-mail: conor.mcardle@dcu.ie Tel: +353 (0)1 700 5619

Please do not send applications to this email address, instead apply as described below.

Application Procedure:

Application forms are available from the DCU Current Vacancies (Open Competitions) website at <http://www4.dcu.ie/hr/vacancies/current.shtml> and also from the Human Resources Department, Dublin City University, Dublin 9. Tel: +353 (0)1 700 5149.

Please clearly state the role that you are applying for in your application and email subject line: Job Ref#250: Postdoctoral Researcher

Applications should be submitted by email to hr.applications@dcu.ie or by Fax: +353 (0) 1 7005500 or by post to the Human Resources Department, Dublin City University, Dublin 9.

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