Post Specification

Post Title:	**PhD studentship** in Digital twins for optical networks
Research Group / Department / School:	CONNECT Centre, Trinity College Dublin, the University of Dublin
Location:	Trinity College Dublin, School of Computer Science & Statistics, Trinity College Dublin, the University of Dublin College Green, Dublin 2, Ireland
Reports to:	Prof Marco Ruffini & Prof Dan Kilper
Salary:	The post will pay for an annual stipend of €22,000, based on SFI guidelines in addition to PhD registration fees.
Closing Date:	12 Noon (Irish Standard Time), [21 June 2024]

Post Summary

Novel optical access and metro networks are essential to support fast growing capacity requirement, driven by future applications and services for 6G and beyond. Networks are also evolving to support a large variety of signals across larger access and metro network areas. For these novel scenarios, flexibility becomes an essential feature, driven by the development of flexible components and open networks.
Development of Digital Twins, capable of building dynamic models from information gathered form live networks become essential to manage network requests, while maintaining high availability and optimal resource utilization.

Three PhD studentships are available for work in the **area of Digital Twins for optical networks, making use of intelligent AI-driven control planes**. The work will involve: i) (i) development of network probing algorithms for OSNR/GSNR measurement automation; (ii) development of adaptive ML and critical component analysis, and (iii) development of Automation of ML model and data selection.
The applicants should have knowledge of machine learning and optical networks and willing to engage in testbed-oriented research. The work will be **carried out in the new OpenIreland research infrastructure**, a large-scale testbed for experimentation in open optical, wireless and cloud technologies.

The position will be based in the CONNECT research centre at Trinity College Dublin, Ireland and will be funded under the Science Foundation Ireland Investigators award project. The researcher will have the opportunity to build their research portfolio within a range of projects within CONNECT. The researcher will also be part of the School of Computer Science and Statistics in TCD.
The position will be under the direction of **Prof. Marco Ruffini and Prof. Dan Kilper**

Standard Duties and Responsibilities of the Post

The primary focus will be to perform research on the National SFI project. In addition, the candidate is expected to:

- Conduct a specified programme of research under the supervision and direction 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. (Actively publish research findings in high impact journals and at key conferences as part of the research group effort to disseminate research outputs).

- 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 other funding proposals.
- Carry out administrative work to support the program of research where required, including regular funding agency reports and internal reports etc.
- 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.
- Acquire generic and transferable skills (including project management, business skills and some level of mentoring/supervision).
- Contribute to broader outreach and engagement activities such as organising technical meetings, outreach to schools and other interested parties etc.

Funding Information

The post is funded by Science Foundation Ireland.

Person Specification

The appointable candidate will hold a degree, preferably a masters degree, in a Computer Science, Electronic Engineering or related discipline.

Qualifications

Bachelor or preferably masters degree. The successful candidate will join a team of highly skilled and innovative researchers in next generation optical and wireless networks.

Knowledge & Experience (Essential & Desirable)

- Knowledge of machine learning theory and algorithms.
- Strong knowledge of python programming language.
- Knowledge of optical communications.
- Knowledge of networking both at physical layer and protocols (layer2/layer3).
- Excellent written and oral communication skills
- The ability to work well in a group.

- The ability to collaborate internationally.
- Strong self-motivation and willing to learn attitude.

Skills & Competencies

- Excellent experimental skills working with machine learning applied to experimental data from optical networking testbeds.
- A capability of working within a project team to achieve group-oriented results, in parallel to individual productivity and top-quality publications.
- Good communication, organisation and interpersonal skills.
- A commitment to gaining practical experience working on a research project.

Application Procedure

Applicants should submit a full Curriculum Vitae to include the names and contact details of 2 referees (including email addresses), to:

Marco Ruffini

Email Address: marco.ruffini@tcd.ie

Further Information for Applicants

URL Link to Area	www.tcd.ie
URL Link to Human Resources	https://www.tcd.ie/hr/

Trinity College Dublin, the University of Dublin

Trinity is Ireland's leading university and is ranked 98th in the world (QS World University Rankings 2023). Founded in 1592, the University is steeped in history with a reputation for excellence in education, research and innovation.

Located on an iconic campus in the heart of Dublin's city centre, Trinity has 18,000 undergraduate and postgraduate students across our three faculties – Arts, Humanities, and Social Sciences; Engineering, Mathematics and Science; and Health Sciences.

Trinity is ranked as the 12th most international university in the world (Times Higher Education Rankings 2020) and is also the highest ranked university in Ireland.

The pursuit of excellence through research and scholarship is at the heart of a Trinity education, and our researchers have an outstanding publication record and strong record of grant success. Trinity has developed <u>19 broad-based multidisciplinary research themes</u> that cut across disciplines and facilitate world-leading research and collaboration within the University and with colleagues around the world. Trinity is also home to 5 leading flagship research institutes:
- Trinity Biomedical Sciences Institute (TBSI)
- Trinity College Institute of Neuroscience (TCIN)
- Trinity Translational Medical Institute (TTMI)
- Trinity Long Room Hub Arts and Humanities Research Institute (TLRH)
- Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN)

Trinity is 1st in Europe for Producing Entrepreneurs for the 7th year in a row and Europe's only representative in the world's top-50 universities (Pitchbook University Report 2021-2022).

Trinity is home to the famous Old Library and to the historic Book of Kells as well as other internationally significant holdings in manuscripts, maps and early printed material. The Trinity Library is a legal deposit library, granting the University the right to claim a copy of

every book published in Ireland and the UK. At present, the Library's holdings span approximately 6.5 million printed items, 400,000 e-books and 150,000 e-journals.

With over 120,000 alumni, Trinity's tradition of independent intellectual inquiry has produced some of the world's finest, most original minds including the writers Oscar Wilde and Samuel Beckett (Nobel laureates), the mathematician William Rowan Hamilton and the physicist Ernest Walton (Nobel laureate), the political thinker Edmund Burke, and the former President of Ireland Mary Robinson. This tradition finds expression today in a campus culture of scholarship, innovation, creativity, entrepreneurship and dedication to societal reform.

Rankings

Trinity College Dublin is the top ranked university in Ireland. Using the QS methodology we are ranked 98th in the world and using the Times Higher Education World University Ranking methodology we are 146th in the World.

- Trinity College Dublin is Ireland's No.1 University
  (QS World University Ranking 2023, Times Higher Education Rankings 2022)
- Trinity is ranked 98th in the World
  (QS World University Ranking 2023)
- Trinity is ranked No.1 in Europe for Producing Entrepreneurs for the 7th year in a row
  Pitchbook 2021-2022

Full details are available at: www.tcd.ie/research/about/rankings.

The Selection Process in Trinity

The Selection Committee (Interview Panel) may include members of the Academic and Administrative community together with External Assessor(s) who are expert in the area. Applications will be acknowledged by email. If you do not receive confirmation of receipt within 1 day of submitting your application online, please contact the named hiring lead on the job specification immediately and prior to the closing date/time.

Given the degree of co-ordination and planning to have a Selection Committee available on the specified date, the University regrets that it may not be in a position to offer alternate selection dates. Where candidates are unavailable, reserves may be drawn from a shortlist.

Outcomes of interviews are notified in writing to candidates and are issued no later than 5 working days following the selection day.

The Selection Committee may avail of telephone or video conferencing or in person interview. The University's selection methods may consist of any or all of the following: Interviews, Presentations, Psychometric Testing, References and Situational Exercises.

It is the policy of the University to conduct pre-employment medical screening/full pre-employment medicals. Information supplied by candidates in their application (Cover Letter and CV) will be used to shortlist for interview.

Applications from non-EEA citizens are welcomed. However, eligibility is determined by the Department of Business, Enterprise and Innovation and further information on the Highly Skills Eligible Occupations List is set out in Schedule 3 of the Regulations https://dbei.gov.ie/en/What-We-Do/Workplace-and-Skills/Employment-Permits/Employment-Permit-Eligibility/Highly-Skilled-Eligible-Occupations-List/ and the Ineligible Categories of Employment are set out in Schedule 4 of the Regulations https://dbei.gov.ie/en/What-We-Do/Workplace-and-Skills/Employment-Permits/Employment-Permit-Eligibility/Ineligible-Categories-of-Employment/ . Non-EEA candidates should note that the onus is on them to secure a visa to travel to Ireland prior to interview. Non-EEA candidates should also be aware that even if successful at interview, an appointment to the post is contingent on the securing of an employment permit.

Equal Opportunities Policy

Trinity is an equal opportunities employer and is committed to employment policies, procedures and practices which do not discriminate on grounds such as gender, civil status, family status, age, disability, race, religious belief, sexual orientation or membership of the travelling community. On that basis we encourage and welcome talented people from all backgrounds to join our staff community. Trinity's Diversity Statement can be viewed in full at https://www.tcd.ie/diversity-inclusion/diversity-statement.

Pension Entitlements

This is a pensionable position and the provisions of the Public Service Superannuation (Miscellaneous Provisions) Act 2004 will apply in relation to retirement age for pension purposes. Details of the relevant Pension Scheme will be provided to the successful applicant.

Applicants should note that they will be required to complete a Pre-Employment Declaration to confirm whether or not they have previously availed of an Irish Public Service Scheme of incentivised early retirement or enhanced redundancy payment. Applicants will also be required to declare any entitlements to a Public Service pension benefit (in payment or preserved) from any other Irish Public Service employment.

Applicants formerly employed by the Irish Public Service that may previously have availed of an Irish Public Service Scheme of Incentivised early retirement or enhanced redundancy payment should ensure that they are not precluded from re-engagement in the Irish Public Service under the terms of such Schemes. Such queries should be directed to an applicant's former Irish Public Service Employer in the first instance.

Application Procedure

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Applicants should submit a full Curriculum Vitae to include the names and contact details of 2 referees (including email addresses), to:-

Name

Email Address