

## Post Specification

<b>Post Title:</b>	PhD Studentship in Augmenting and Evaluating the Physical and Digital Infrastructure for CCAM deployment (Augmented CCAM)
<b>Post Status:</b>	Full-time
<b>Research Group / Department / School:</b>	School of Engineering, Trinity College Dublin, the University of Dublin
<b>Location:</b>	School of Engineering, Trinity College Dublin, the University of Dublin College Green, Dublin 2, Ireland
<b>Reports to:</b>	Prof. Bidisha Ghosh (PI) and Prof. Arman Farhang (Co-PI)
<b>Terms &amp; Conditions:</b>	The PhD studentship award will cover EU/non-EU fees and an annual maintenance of €18,500 for three years
<b>Hours of Work:</b>	Full-time
<b>Closing Date:</b>	12 Noon (GMT), 1 <sup>st</sup> November 2022

**NOTE: Applicants must have been resident in an EU member state for 3 out of the last 5 years to be eligible for EU fees**

### Post Summary

General Research Theme of the PhD Project: In Year 2050, vehicles are expected to have 100% real-time connectivity on the relevant road network, in order to allow the greatest possible extension of Automated Vehicles (AVs) Operational Design Domain (ODD) and, at the same time, the maximum benefits for all other connected vehicles, and, finally, through the use of a sharing and actuation enabling service framework, that will connect all road users and will deploy AI sophisticated techniques, the possibility to achieve a holistic situational awareness of the network, thus being able to apply granular traffic management strategies on vehicle and road user level.

The present project aims to understand, harmonise and evaluate in an augmented manner, adapted and novel support concepts of Physical, Digital and Communication infrastructure

(PDI), to advance its readiness for large scale deployment of on Connected, Cooperative & Automated Mobility (CCAM) solutions for all.

*PhD Studentship:* The PhD position is funded for 3 years, including a monthly stipend and a travel budget to present the research outputs at international conferences, workshops and seminars. The studentship will cover 3 years of tuition fees and a stipend of € 18,500 per annum. The successful candidate will be enrolled on the PhD programme in the School of Engineering at Trinity College, The University of Dublin. The successful candidate will write their thesis on topics related to **Augmenting and Evaluating the Physical and Digital Infrastructure for CCAM deployment**, supervised by Prof Bidisha Ghosh and Prof Arman Farhang for the entire duration of their PhD programme.

Each successful candidate will be an integral part of the overall research team in the School of Engineering at Trinity College Dublin. The successful candidate will be prepared to work with the network of collaborators in this project who are among the leading research teams from both academia and industry in the area of CCAM.

In addition to PhD supervision, the successful candidate, where relevant, will benefit from a wide range of training activities, namely,

- i. Summer/winter schools covering both technical, e.g. topics related to connected vehicles within the scope of the PhD project, and a range of transferable skills such as research integrity, research management, entrepreneurship, patents, etc.;
- ii. Overseas research visit(s);
- iii. Short-term industry internship;
- iv. Practical implementation/evaluation of the developed solutions in the available testbeds.

Successful candidate will be fully supported to present their research findings at major international conferences, workshops and seminars within the scope of their research project.

### **Standard Duties and Responsibilities of the Post**

1. Undertake postgraduate research in the area of agreed research project.
2. Work closely with the academic supervisors to ensure that the progress of the individual project is in line with the objectives of the project.
3. Attend and participate in all training events and supervisory meetings.
4. Prepare PhD progress reports.

5. Present and publish research outputs to both academic and non-academic audiences.
6. Attend and participate in academic and non-academic conferences, events and seminars.

As the description of the duties and responsibilities cannot be exhaustive, it is worth mentioning that the PhD students may be required to undertake other duties that are broadly in line with the objectives of their research projects.

### **Funding Information**

The position is funded by the European Commission under the Horizon Europe Programme.

### **Person Specification**

#### **Qualifications, Expected Skills and Competencies**

- PhD applicants must hold at least a first or upper second class honours Bachelors or Master's degree in Computer Science/Engineering or Statistics/Mathematics/Physics or a related discipline; a Master's degree will be preferred.
- Highly proficient in English language skills. Evidence of English language proficiency for non-native speakers based on the requirements at Trinity College Dublin, [here](#).
- Strong mathematical, analytical and programming skills.
- Excellent background in data mining and signal processing. In particular, strong background in computer programming (languages: python and Java/Javascript/C#/C/C++ necessary), machine learning/deep learning, computer simulation is highly desirable
- Excellent written and verbal communication, including presentation skills.
- Excellent organisational skills, attention to details and the ability to meet deadlines.
- Ability to think logically, create solutions and make informed decisions.
- Willingness to work collaboratively in a research environment.
- A strong commitment to their own continuous professional development.

## Application Procedure

Applications must be submitted via e-mail to Prof Bidisha Ghosh, [bghosh@tcd.ie](mailto:bghosh@tcd.ie), and Prof Arman Farhang, [arman.farhang@tcd.ie](mailto:arman.farhang@tcd.ie), in a pdf file with the title “PhD\_Application\_{Applicant’s surname}”.

Applications should include:

1. A cover letter explaining the applicant’s motivation and interest to undertake a PhD in the project topic. Any relevant background and/or experience needs to be mentioned.
2. A Curriculum Vitae that includes the applicant’s educational qualifications and any scientific publications and achievements.
3. Academic transcripts.
4. Two academic references.

Informal enquiries concerning the advertised position, accompanied with the CV, can be made to Dr. Bidisha Ghosh ([bghosh@tcd.ie](mailto:bghosh@tcd.ie)) and/or Dr. Arman Farhang ([arman.farhang@tcd.ie](mailto:arman.farhang@tcd.ie)).

## Further Information for Applicants

URL Link to Area	<a href="http://www.tcd.ie">www.tcd.ie</a>
URL Link to Human Resources	<a href="https://www.tcd.ie/hr/">https://www.tcd.ie/hr/</a>

## **Research Environment**

Prof. Bidisha Ghosh is the Principal Investigator of the Augmented CCAM project. She is the lead of the QUANT research group which constitutes a multidisciplinary team of engineers, computer scientists and physicists researching on a multitude of projects on transportation, traffic emission, renewable energy and remote sensing.

<https://www.tcd.ie/civileng/QUANT/>

Prof. Farhang is the Co- Principal Investigator of the Augmented CCAM project. Both PIs are Research Investigators in the world-leading SFI research centre CONNECT (Research Centre for Future Networks and Communications) which further creates a dynamic research environment for his team with a large amount of exposure to both industry and academia. Prof. Farhang's research team is focusing on design of novel physical layer technologies and advanced waveforms/modulation schemes, low latency and scalability to the wireless networks of the future along with developing new signal processing algorithms through theoretical work. The Augmented CCAM research team will be vibrant consortium involving major industry partners, national research labs and four advanced test-sites across Europe.

## **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 19 broad-based multidisciplinary research themes 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 98<sup>th</sup> in the world and using the Times Higher Education World University Ranking methodology we are 146<sup>th</sup> 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 98<sup>th</sup> 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](http://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 Recruitment Partner 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.

In some instances the Selection Committee may avail of telephone or video conferencing. 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>.

## Application Procedure

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2. A Curriculum Vitae that includes the applicant’s educational qualifications and any scientific publications and achievements.
3. Academic transcripts.
4. Two academic reference letters.



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