Fully Funded PhD scholarship on Cooperative Connected Automated Mobility

Role title:	PhD on the development of framework & service architectures for Cooperative Connected Automated Mobility
School / Department:	School of Civil Engineering and School of Computer Science
Location	Newstead Building, UCD, Dublin 4, Ireland
Award Level	PhD	**Position Type:**	Full time
Supervisor	Dr. Abdollah Malekjafarian Dr. Fatemeh Golpayegani	**Start Date:**	January 2023
Project Title:	Augmented CCAM: Augmented Connected Cooperative Automated Mobility
Research Field/ subcategories:	Civil Engineering/ Transport Engineering/ Computer Science
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Augmented CCAM project:

According to the evolving ERTRAC roadmap on Connected, Cooperative & Automated Mobility (CCAM), in Year 2050, vehicles are expected to have 100% real-time connectivity on the relevant road network. This will allow the maximum possible extension of Automated Vehicles (AVs) and Operational Design Domain (ODD) which will benefit the other connected vehicles. **Augmented CCAM is a research project funded by European Union under Horizon Europe Innovation Action call**. It will bring together 27 partners across the Europe to understand, harmonise and evaluate novel support concepts of Physical, Digital and Communication infrastructure, to advance its readiness for large scale deployment of CCAM solutions. The developed algorithms will be tested in several real-life test set-ups in European countries.

PhD role description:

The PhD role is to contribute to the development of open, resilient and secure technology agnostic framework & service architectures. This will deal with the delivery of an open and parametric service architecture for PDI that can handle the system's and its operational environment complex characteristics and requirements. It will develop an Adaptive Service-Oriented Architecture (ASOA) to allow: (1) the integration of the heterogeneous and distributed components and services, and (2) emerging services to integrate with PDI. This architecture is resilient to various types of change in the environment and including traffic regulations. When such change happens the updated services will integrate within the system using an ontological structure which helps the new service composition and adaptation based on the services pre and post conditions. Furthermore, this architecture will be enriched with Edge-AI capabilities, at least for the novel CCAM services. With access to low latency communication and computation platforms such as IoT, WoT, edge computing Edge-AI will be able to offer the planned novel CCAM services. Distributed, light-weight and collaborative learning mechanism,

such as transfer learning and federated learning will be used to learn from the multi-modal CCAM data, while blockchain will be used to facilitate a trusted interaction between the involved entities.

In-house training and career support will be provided by the research team, along with extensive support through academic and industrial networks in this topic. The member will be working with several researchers on the topic of CCAM, in a multi-disciplinary and multi-cultural and international environment.

Essential qualifications/skills knowledge:

- Candidates must have an honours Level 8 degree in Civil Engineering, Transport Engineering, Computer science or a related discipline.
- Good communication and writing skills.
- Good time management skills.
- Aptitude for multidisciplinary research approaches.
- Fluent in English. UCD Minimum English Language Requirements (http://www.ucd.ie/registry/admissions/elr.html)

Desirable qualifications/skills knowledge:

- Masters in Civil/Transport Engineering or Computer Science with a strong research component or an exceptional undergraduate demonstrating research evidence.
- A strong foundation in Transport simulation, Machine learning, Data analytics.
- Ability to work with transport simulators (e.g., VISSIM, SUMO)
- Background in connected and cooperative systems modeling, Service oriented modeling, Automated decision making.

Behavioural competencies:

- Ability to work as part of a team, including collaboration with other disciplines but also independently.
- Strives for high quality of work and demonstrates commitment to the project.
- Ability to communicate effectively to enable knowledge and technology transfer

Funding:

The scholarship will be awarded for maximum period of 3 years and funding will cover the following elements:

- A stipend of €18,500 per annum
- Travel/ Consumables/Materials budget
- EU Tuition fees for 3 years (non-EU fees in exceptional circumstances)

How to apply: Applicants should submit their applications by filling the following online form: https://docs.google.com/forms/d/e/1FAIpQLSez6IqlF_2z6BUn_WKRUIVVd7AHJ6Zst1hA0J2ytdA2LCafMA/viewform?usp=sf_link

Applications received by email will not be considered (there is no need for submitting a CV).

Deadline: The application should be submitted no later than **24 August 2022.**