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| **Research Centre** | Insight SFI Research Centre for Data Analytics |
| **Post title** | Postdoctoral Researcher In Large-Scale Machine Learning And Optimization For Shared E-Mobility Systems |
| **Level on Framework** | Level 1 |
| **Post duration** | Fixed Term Contract up to 24 months |

**Dublin City University**

Dublin City University (DCU) is a young, ambitious and vibrant university, with a mission 'to transform lives and societies through education, research, innovation and engagement'. Known as Ireland's 'University of Enterprise', DCU is a values-based institution, committed to the delivery of impact for the public good. DCU was named Sunday Times Irish University of the Year 2021.

DCU is based on three academic campuses in the Glasnevin-Drumcondra region of north Dublin. More than 18,000 students are enrolled across five faculties – Science and Health, DCU Business School, Computing and Engineering, Humanities and Social Sciences and DCU Institute of Education.

DCU is committed to excellence across all its activities. This is demonstrated by its world-class research initiatives, its cutting-edge approach to teaching and learning, its focus on delivering a transformative student experience, and its positive social and economic impact. The university continues to develop innovative programmes in collaboration with industry, such as the DCU Futures suite of degrees, which are designed to equip graduates with the skills and knowledge required in a rapidly evolving economy.

DCU's pursuit of excellence has led to its current ranking among the top 2% of universities globally. It is also one of the world's Top Young Universities (QS Top 100 Under 50, Times Higher Top 150 Under 100). In the Times Higher Education University Impact Rankings 2021, DCU ranked 23rd in the world for its approach to widening participation in higher education and its ongoing commitment to eradicating poverty, while it ranks 38th globally for its work in reducing inequality and 89th globally for gender equality.

The university is ranked 23rd in the world and first in Ireland for its graduate employment rate, according to the 2020 QS Graduate Employability Rankings. Over the past decade, DCU has been the leading Irish university in the area of technology transfer, as reflected by licensing of intellectual property.

As part of this role the researcher will be required to participate in the DCU Research Career Framework. 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**
The Insight SFI Research Centre for Data Analytics (http://www.Insight-centre.org) is an SFI funded Research Centre which brings together researchers from University College Dublin, NUI Galway, University College Cork, and Dublin City University, as well as other partner institutions, Trinity College Dublin (TCD), University of Limerick (UL), Maynooth University (MU) and Tyndall National Institute. It creates a critical mass of more than 400 researchers from Ireland's leading ICT clusters to carry out research on a new generation of data analytics technologies in a number of key application domain areas, such as Health and Human Performance, Smart Communities, Internet of Things, Enterprise and Services and Sustainability and Operations.

The €150m Centre is funded by Science Foundation Ireland and a wide range of industry and European Union partners. Insight's research focus encompasses a broad range of data analytics technologies from machine learning, decision analytics and social network analysis to linked data, recommender systems and the sensor web. Together, with more than 220 partner companies, Insight researchers are solving critical challenges in the areas of Connected Health and the Discovery Economy.

**The Project**
This is a two-year SFI funded project with a key research objective to address large-scale machine learning and optimization challenges in the context of shared e-mobility systems, including shared e-scooters, e-bikes, and e-cars. This project not only aims to investigate how data collected from these shared e-mobility tools can be effectively modelled, but also to provide novel solutions to optimally orchestrate these objects, by means of large-scale applied machine learning algorithms and mathematical optimization methods, to maximise personalised benefits for each commuter in their daily lives in the mobility as a service ecosystem. Real world mobility data will be collected and accessed through the Smart DCU programme under the necessary approval and agreements.

**The Role**

This position is for a postdoctoral researcher who will be recruited on a fixed term contract basis to be responsible for research design, model, algorithm, prototype development, performance evaluation and experimental validation of the machine learning systems and optimal strategies to be developed over the course of the project. The postdoctoral researcher will be working closely with a full-time research assistant who will also be recruited for the whole cycle of the project. Both researchers will collaborate deeply with the PI for the specified research tasks.

**Principal Duties and Responsibilities**

Specific duties include:

- Develop machine learning models and algorithms for some specific research tasks.
- Validate algorithms and models on the available datasets from different scenarios.
- Develop a system prototype to demonstrate the benefits of the algorithms and models.
- Provide support and advice to the students working on similar topics.
- Assist the Principal Investigator (PI) in demonstrating research outcomes.
- Produce top quality journal and conference publications, in collaboration with the PIs.
- Participate in Insight Centre activities, including industry showcases, annual reviews and industry and agency visits to the Insight labs.
- Carry out administrative work associated with the programme of research as necessary
- Liaise with both external and internal stakeholders, including academics, undergraduate and postgraduate students, external supervisors, and host placement schools.
- Preparation of project outputs, interim and final reports as required by the project schedule.
- Deliver research outputs according to project schedules.
- Other tasks relevant to successfully implementing the assigned research programme.
- Attend and present results at project progress meetings.

**Qualifications, Skills and Experience Required**

The ideal candidate will have a PhD in electronic engineering, mechatronic engineering, applied mathematics, computer science, or related discipline with strong software and programming skills and relevant experience in mathematical modelling, data analytics and applied machine learning.

**Skills**

- Excellent written and oral proficiency in English (essential).
- Excellent written and verbal communication and interpersonal skills.
- Proven ability to prioritize workload and work to strict deadlines.
- Ability to work in a team and to take responsibility to contribute to the overall success of the team.
- Strong problem-solving abilities.
- Proven programming skills in using MATLAB/Simulink and Python.
- Experience in processing and analysis of large-scale datasets/systems.
- Good knowledge of machine learning, deep learning, reinforcement learning techniques, packages, and frameworks.
- Good knowledge of combinatorial optimization algorithms and techniques (preferable).
- Previous R&D experience in the ICT, automotive & e-mobility Industry (preferable).

**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 students

**Essential Training**
Training required for the role should be entered here. At a minimum, the following should be entered in addition to other applicable, role specific mandatory training:

The postholder will be required to undertake the following essential compliance training: Orientation, Health & Safety and Data Protection (GDPR). Other training may need to be undertaken when required.