University College Dublin

School of Computer Science

Guide For Applicant

Expression of Interest

MSCA Postdoctoral Fellowship 2025

Table of Contents

1. Purpose of the EoI Call **2**

2. Msca Postdoctoral Fellowship **2**

Overview 2

Eligibility 3

Fellowship Award 4

3. Online Application Form **4**

4. Template EoI **5**

Personal Statement 5

Curriculum Vitae 5

Short Project Description 6

5. Academics and Project Topics 2025 ..... **6**

Dr Aidan Murphy 7

Dr Alzubair Hassan 8

Dr Anca Jurcut 9

Dr Avishek Nag 10

Dr Brian Mac Namee 11

Dr Claudette Pretorius 12

Dr Deepak Ajwani 13

Dr Gavin McArdle 14

Dr Georgiana Ifrim 15

Dr Hadi Tabatabaee 16

Dr Helard Bacerra 17

Dr Liliana Pasquale 18

Dr Madhusanka Liyanage 19

Dr Mark Matthews 20

Dr Nhien-An Le-Khac 21

Dr Nima Afraz 22

Dr Przemyslaw A. Grabowicz 23

Dr Simon Caton 24

Dr Soumyabrata Dev 25

Dr Tahar Kechadi 26

1. Purpose of the EoI Call

The School of Computer Science at University College Dublin hosts over one thousand students and more than 150 researchers and data scientists working on the latest topics in computer science including AI, Security, human-computer interaction, Computational Biology, and Quantum Computing. Faculty members have deep connections with the Irish public sector and companies based in Ireland, and together, work on new technologies.

The School always welcomes new passionate researchers who wish to work with us on new projects. The call for Expression of Interest (EoI) is directed to ambitious researchers who have a research interest that would like to develop with the help of our faculty staff into a competitive proposal for the MSCA Postdoctoral Fellowship 2025 call.

Submit an EoI application if you have a research idea that you would like to discuss with a staff member of the school. All applications will be checked for eligibility as outlined in the MSCA postdoctoral fellowship call and we will keep in touch with you after the deadline.

Key Dates	
EoI Application Deadline	09 May 2024 at 17:00 (Irish Time)
EoI Selection result	16 May 2024
MSCA Application Deadline	10 Sept 2025 at 17:00 (Brussel Time)
Outcome MSCA Application	February 2026
MSCA Fellowship Starts	Anytime between April 2026 - March 2027

2. Msca Postdoctoral Fellowship

Overview

The MSCA Postdoctoral Fellowship is a funding opportunity issued by the European Union under the Horizon Europe funding framework.

The scheme invites researchers to work on innovative projects and encourages collaboration with other sectors (e.g.: academia, public sector, and industries). The standard duration of these fellowships is between 12 and 24 months and, during this period researchers can undertake a secondment in other institutions if the collaboration is relevant to the research project.

Secondment during the fellowship period
Researchers may opt to include a secondment in any country worldwide as part of their project within the overall duration of the fellowship. The secondment phase can be a single period or be divided into shorter mobility periods and cannot be more than ⅓ of the duration of the fellowship.

Placement in the non-academic sector
In addition to the secondment, researchers can spend at the end of the project an additional period of up to six months to work on R&I projects in an organisation from the non-academic sector established in an EU Member State or Horizon Europe Associated Country.

Eligibility

The call is open to researchers of any nationality who wish to engage in R&I projects by either coming to Europe from any country in the world or moving within Europe.

The researcher cannot have resided or carried out their main activity (work, studies, etc.) in Ireland for more than 12 months in the 36 months immediately prior to the call deadline.

The researcher must be in possession of a doctoral degree or have successfully defended their doctoral thesis before call deadline 10 Sept 2025. The successful defence must be unconditional (no further requirements/corrections that need to be addressed).

Researchers must have Maximum 8 years from the date of award of the (first) doctoral degree.

This limit can be extended (in days) for the following reasons:

- Maternity leave (18 months – i.e. 548 days per child born after the PhD award date, or the exact duration of maternity leave taken, whichever is longest);
- Paternity leave (exact duration per child born after the PhD award date);
- Compulsory national service;
- Time spent not working on research;
- Long-term sick leave (periods > 30 days);
- Research in a non-associated TC (only for nationals or long-term residents of MS or AC, wishing to reintegrate in Europe);

Fellowship Award

Postdoctoral Fellow unit contribution Per person-month					Institutional unit contribution Per person-month	
Living * allowance	**Mobility allowance**	**Family ** allowance**	*Long-term ** leave allowance*	*Special need allowance***	**Research training & networking contribution**	**Management and Indirect Contribution**
€5,080	€600	€660	€5,080 x % covered by beneficiary	Requested unit x (1/number of months)	€1,000	€650
Figures are gross amounts * Living Allowance is corrected by a country correction coefficient. ***if applicable*						

3. Online Application Form

The online application form consists of

1. An administrative section to assess the eligibility of the applicant: applicant's citizenship, current and past place of residence in the last 36 months, date of award of the doctoral degree, and cases of special extension.
2. An Expression of Interest (EoI) uploaded on the application form as a PDF file. It is recommended that the candidate use the **template format provided in Section.4**
3. Names of one or two academics that you would like to discuss your project. Faculty members available this year to work with you are listed in Section "5. Academics and Project Topics"

The online application does not have a "save and return" option and a submitted application cannot be edited. The applicant is advised to prepare the application offline and when fully satisfied to copy the answers and submit the online form.

4. Template EoI

All sections of the template must be completed. Incomplete applications not complying with the instructions will not be considered.

Personal Statement

Tell us your research interests, experience and technical expertise, and why UCD School of Computer Science can help you to achieve your career goals. In particular, address how the postdoctoral position may enhance your career perspective and point out any additional training and skills that you would like to acquire during the fellowship in light of your career goals. (Max ½ page)

Curriculum Vitae

The CV should include the standard academic and research record. Any research career gaps and/or unconventional paths should be clearly explained. (No page limit).

At a minimum, the CV should contain:

a) The name of the researcher;
b) Professional experience (most recent first, with exact dates in format dd/mm/yyyy);
c) Education, including PhD award date.* (most recent first, with exact dates in format: dd/mm/yyyy).

*Applicants who have successfully defended their doctoral thesis but who have not yet formally been awarded the doctoral degree must clearly indicate the date of the successful PhD defence ("viva"). To be eligible for the MSCA Postodoctal fellowship, the successful defence must be unconditional (no further requirements/corrections that need to be addressed) and take place before the call deadline.

Applicants who have not defended successfully the Viva yet should indicate the expected date of when they will defend their doctoral thesis.

The CV should include information on:

- Publications in peer-reviewed scientific journals, peer-reviewed conference proceedings, and/or monographs (they are expected to be open access either published or through repositories) and other outputs such as data, software, and algorithms significant for your research path (they are expected to be open access in appropriate repositories to the extent possible; they should be accompanied by a very short qualitative assessment of their scientific significance and not by the Journal Impact Factor);
- Invited presentations to internationally established conferences and/or international advanced schools.
- Organisation of international conferences, including membership in the steering and/or programme committee;
- Research expeditions led by the researcher;
- Granted patent(s);
- Examples of participation in industrial innovation;
- Prizes and Awards;
- Funding received so far;
- Supervising and mentoring activities;
- Other items of interest.

Short Project Description

Provide a short description of a project idea that you would like to elaborate further with us. In particular address the key concept of the proposed research and describe how your project goes beyond the state-of-the-art, and the extent to which it is ambitious. Provide an overview of the methodology and expected outcomes of the project. (Max 2 page)

5. Academics and Project Topics 2025

Dr Aidan Murphy

https://people.ucd.ie/aidan.murphyh

Dr. Aidan Murphy is an Assistant Professor at University College Dublin. His research interests span several cutting-edge areas, including bioinformatics, evolutionary computation, human-in-the-loop explainable AI (XAI), and the genetic improvement of software. He is particularly focused on developing algorithms that combine machine learning with human expertise to improve the interpretability and trustworthiness of AI systems, especially in complex domains such as healthcare and education. His work in evolutionary computation explores how genetic programming and other evolutionary techniques can be used to solve real-world problems, from peptide generation tools for biologists to personalized learning systems for educational purposes.

Research topics of Interest for the MSCA Postdoctoral Fellowship

Peptide Generation Using Evolutionary Computation Techniques.

Leveraging Genetic Programming for Explainable AI.

Human-in-the-Loop Approaches in AI with Large Language Models.

Ensuring Safe and Responsible AI Utilization in Educational Technology for Personalized Learning Environments.

Genetic Improvement of Software through Genetic Programming and Large Language Models.

Keywords

- Genetic Programming
- XAI
- Human-in-the-Loop
- Machine Learning
- Software Testing
- Software Quality
- Bioinformatics

Dr Alzubair Hassan

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Dr Alzubair Hassan received his B.S.c. in Computer Science from the University of Kassala in 2010. He received his M.Sc. in Mathematical Science from the University of Khartoum in 2013. He received his Ph. D. in computer science and technology from the University of Electronic Science and Technology of China in 2018. Currently, he is an assistant professor at the School of Computer Science, University College Dublin. In addition, he was a postdoctoral researcher at the School of Computer Science and Cyber Engineering at Guangzhou University. Furthermore, he was a research scientist at the School of Computer Science, University College Dublin. He was also a researcher at Lero - the Irish Software Research Centre, as part of the CyberSecurity4Eroupe Project. His research interests include cryptography, network security, privacy-preserving in machine learning, and adaptive security. Alzubair is currently supervising 2 PhD students.

Research topics of Interest for the MSCA Postdoctoral Fellowship

- Engineering Adaptive authentication in adaptive system.
- Privacy preserving in ML/federated machine learning/LLM
- Verifiable Computation over encryption data.
- Intrusion detection systems (IDS) in autonomous vehicles (AVs)

Keywords

- Privacy Preserving
- Adaptive Security
- Authentication
- Homomorphic signature/encryption
- Autonomous vehicles

Dr Anca Jurcut

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https://dnsresearchlabs.ucd.ie/

Dr. Jurcut is a tenured **Assistant Professor** in **Cybersecurity** at UCD, leading the DNS Research Labs and serving as an **Expert Reviewer for the European Commission**. Recognized globally, she has been included in the Stanford/Elsevier **World's Top 2% Scientists List** for her significant contributions to cybersecurity research. She has successfully supervised four PhD students to completion and mentored multiple postdoctoral researchers, including two MSCA-PF fellows. Currently, she supervises six PhD students, one MSCA-PF fellow and several research assistants. Dr. Jurcut has secured over €1 million in research funding from the EU, Science Foundation Ireland (SFI), and the Irish Research Council, driving advancements in AI-based attack detection, IoT security, quantum-resistant security, and the design and formal verification of security protocols.

Research topics of Interest for the MSCA Postdoctoral Fellowship

- ✓ **AI-Driven Intrusion Detection and Threat Intelligence**
- ✓ **Security of AI Assistants and Autonomous Systems**
- ✓ **Security and Resilience of the Internet of Things (IoT) and Edge Computing**
- ✓ **Blockchain for Security and Privacy-Preserving Applications**
- ✓ **Securing Future Networks** *including Software-Defined Networking (SDN), Multi-Environment Networks and 5G/6G Security*
- ✓ **Formal Verification and Secure Protocol Design**
- ✓ **Quantum-Resistant Security and Cryptographic Protocols**
- ✓ **Securing Critical Infrastructure** *(e.g., Water Systems, Power Grids, and Industrial Control Systems)*

Keywords

- AI & Cybersecurity
- AI Assistant Security
- Post-Quantum Security
- SDN Security
- Blockchain Security
- Formal Verification
- IoT Security

Dr Avishek Nag

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Dr Avishek Nag's research focuses on applying ML models as tools for data-driven optimisation in telecom networks. Telecom networks are generally complex, with several inter-dependent parameters and constraints. Optimum allocation of bandwidth according to the dynamic demands generated by various applications like streaming video, voice, data, etc., is a challenge. Regular mathematical optimisation is sometimes non-scalable and intractable for an extensive telecom network with several nodes and links. So, my research intends to translate these optimisation problems into ML models that learn from the network data and produce optimum decisions regarding network resource allocations. Another aspect of my research involves optimising ML models to be deployed on low-power edge devices for specific edge applications. Dr Nag has supervised two PhD students and mentored six master's theses.

Research topics of Interest for the MSCA Postdoctoral Fellowship

Topic 1: Energy-Efficient Digital Twin for Wireless Networks: This project focuses on developing a wireless network-specific Digital Twin to reduce energy consumption. The approach involves creating a proof-of-concept Digital Twin by emulating network behaviour and implementing Software Defined Networking (SDN) using testbeds like Fed4Fire and emulators like Mininet.

Topic 2: QROUTE: A Game-Changing Capacity-Aware Routing Scheme for Quantum Communication Networks: This research aims to develop a routing algorithm that optimally utilises the quantum channel capacity, considering the quantum entanglement and superposition phenomena. By doing so, the algorithm seeks to revolutionise the efficiency, security, and reliability of quantum communication networks, a crucial area of research in your field of expertise.

Keywords

- Digital Twin
- Emulation
- Testbeds
- Optimisations
- Quantum Communication
- Quantum Error Connections
- Quantum Networks

Dr. Brian Mac Namee

https://people.ucd.ie/brian.macnamee

Brian's research focuses on interactive machine learning methods that place people, and their expertise, at the centre of the model training process as well as applications of machine learning in diverse fields including agriculture, space, medicine, and virtual reality. As well as leading his personal research group, Brian is also UCD Site Director at the Research Ireland Insight Centre for Data Analytics and Co-Director of the Research Ireland Centre for Research Training in Machine Learning (ML-Labs).

Brian has supervised 19 PhD candidates to completion and more than 20 postdoctoral researchers on a collection of different projects.

Research topics of Interest for the MSCA Postdoctoral Fellowship

Interactive machine learning methods for training robust models

Model distillation methods for machine learning deployment in extreme environments – e.g. space

Interactive machine learning (such as active learning) methods for health applications.

Keywords

- Artificial intelligence
- Machine learning
- Active learning
- Interactive machine learning

Dr Claudette Pretorius

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My research focuses on understanding and improving the mental well-being of young people in the digital age. Specifically, I investigate: Online Help-Seeking: How young people utilize online resources and platforms to seek mental health support; Human-AI Collaboration in Mental Health: Exploring the development and evaluation of AI-driven tools that can augment human support in mental health interventions; and Youth Digital Mental Health: Examining the impact of digital technologies on young people's mental health and developing evidence-based digital interventions.

I am currently supervising a PhD student investigating how AI tools can support adults with ADHD, and I am actively involved in the EU Kids Online research network and the Youth Digital Mental Health COST action, providing rich opportunities for collaboration and knowledge exchange.

Research topics of Interest for the MSCA Postdoctoral Fellowship

- Utilising AI for Early Intervention and Prevention
- The development and evaluation of AI-powered chatbots or virtual assistants for youth mental health support.
- The ethical considerations and implications of using AI in youth mental health interventions.
- The role of social media and online communities in promoting or hindering young people's mental well-being.
- Developing and evaluating online interventions designed to increase mental health literacy for young people.

Keywords

- Digital Mental Health
- Online help-seeking
- AI
- Human Computer Interaction
- Human-AI collaboration

Dr Deepak Ajwani

https://people.ucd.ie/deepak.ajwani

Dr. Ajwani is an Assistant Professor (tenured) in the School of Computer Science with more than 20 years of research experience in the areas of algorithm design and engineering, machine learning and combinatorial optimisation. His research is driven by the vision of creating novel machine learning techniques that integrate algorithmic insights to effectively solve hard combinatorial optimisation problems. He has extensively published in top venues in these areas.

He is a funded investigator with the SFI CRT on Machine Learning (ML-Labs). He has supervised two PhD students to completion and is currently supervising four PhD students that focus on developing machine learning techniques for optimisation problems. Prior to his current role in UCD, he worked at Nokia Bell Labs where he actively recruited and mentored five Postdoctoral researchers. He was awarded his PhD degree from Max Planck Institute for Informatics, Germany in 2008 and he completed his B.Tech and M.Tech from the prestigious Indian Institute of Technology, Delhi.

Research topics of Interest for the MSCA Postdoctoral Fellowship

I am interested in the design of neural network architecture and representations to solve discrete optimisation problems, such as those arising in the context of graphs and geometry. The representations should ideally generalise the known approximation algorithms for classical problems. My research group has done a lot of work at the intersection of machine learning and combinatorial optimisation and the MSCA proposal can build on this research.
Example of other topics I am interested in (but not limited to):

- Learning-augmented Algorithms/ Data-driven algorithm design
- Integrating algorithmic insights into Graph Neural Networks for solving harder instances of optimisation problems on graphs
- Learning techniques to discover combinatorial structures of interest

Keywords

- Combinatorial Optimisation
- Graph Algorithms
- Learning Augmented Algorithms
- Reinforcement Learning
- Graph Neural Networks

Dr Gavin McArdle

https://people.ucd.ie/gavin.mcardle

I am an Associate Professor at University College Dublin's School of Computer Science and Informatics, where I use apply my extensive background in computer science to urban analytics. My research centres on understanding how citizens interact with their spatial environment - exploring human mobility, geovisualisation, and location-based services to uncover meaningful insights about urban dynamics. I have a passion for data-driven urban research, and I have dedicated myself to developing innovative methods that transform complex spatial data into accessible, actionable knowledge.

My work also spans smart city technologies, transport analytics, and dashboard design. I utilize urban data and Earth Observation (EO) data alongside machine learning (ML) and deep learning (DL) techniques to drive innovation. In addition, I integrate digital twins into my research framework to simulate and optimize urban processes, blending theoretical insights with practical applications that contribute to the development of smarter, more sustainable environments.

I have also had the privilege of supervising five PhDs to completion, five postdocs, and several research assistants and visiting scholars.

Research topic proposed for the Postdoctoral Fellowship call

Some potential areas for postdoctoral research:

- Integration of Smart City Technologies with Digital Twins for Disaster Response
- Developing AI-Driven Platforms for Citizen Engagement in Urban Planning
- Digital Twins and Urban Dashboards for Climate Change Mitigation
- Utilizing Earth Observation Data for Urban Analysis

Keywords

- Urban Analytics
- Human Mobility
- Digital Twins
- Earth Observation Data,
- Smart City Technologies

Dr Georgiana Ifrim

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Dr. Georgiana Ifrim is an Associate Professor at the School of Computer Science, University College Dublin and Director of ML-Labs (Research Ireland Centre for Research Training in Machine Learning). She is a Funded Investigator with the Insight Centre for Data Analytics. She was Director of Graduate Research at the School of Computer Science, UCD, a role for which she was twice awarded the GEM School of Computer Science Award. In 2023 she was nominated for UCD Graduate Studies Dean's Award for Excellence in Doctoral Supervision.

Dr Ifrim holds a PhD and MSc in Machine Learning, from Max-Planck Institute for Informatics, Germany, and a BSc in Computer Science, from University of Bucharest, Romania. Her research focuses on effective approaches for large scale sequence learning, explainable AI, time series classification and text mining. She has published more than 50 peer-reviewed articles in top ranked international AI journals and conferences, regularly holds senior positions in the program committees for IJCAI, AAAI, ECAI and ECML-PKDD and is an Action Editor for the Machine Learning Journal, Springer. She was Program Co-Chair for ECML-PKDD 2018 and an ECML-PKDD Steering Committee member from 2019-2022. She was Co-Chair for 5 international workshops co-located with ECML-PKDD and ECAI. She is a member of Women in AI Ireland, an organisation actively involved in promoting more girls and women in STEM and AI.

Research topics of Interest for the MSCA Postdoctoral Fellowship

*Methods and Algorithms for Time Series:
Efficient and interpretable learning algorithms for time series, explainable AI, robust AI. Time series classification, time series regression, scalable algorithms, noise robustness, data reduction, foundation models (LLMs) for time series. New XAI methods for time series, evaluation of XAI methods, actionability of XAI, interaction of data, algorithm and explanation.

*Application Domains of Time Series: health, sports, climate.

Keywords

- Machine Learning/AI
- Time Series
- Classification/Regression
- Explainable AI
- Foundation Models
- Evaluation

Dr Hadi Tabatabaee

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My research focuses on the edge-cloud continuum, exploring how AI-driven applications can be efficiently deployed and orchestrated across distributed infrastructures. This includes optimizing large language models (LLMs) on edge nodes, enabling carbon-aware multi-cloud processing, and sustainable computing. I also investigate service orchestration across serverless applications, multi-access edge environments, and fog computing to improve energy efficiency and system performance.
Research in the edge-cloud continuum, including distributed large language models (LLM), LLMs at edge nodes, sustainable computing, carbon-aware multi-cloud processing, and services orchestration across serverless applications, multi-access edge environment, and fog computing.

I received my PhD in computer engineering-software in 2012. I'm an assistant professor at the School of Computer Science, with previous roles at Trinity College Dublin, Maynooth University, and Shahid Beheshti University. Over the past decade, I've focused on distributed systems research addressing challenges in smart cities, social sensing, and human activity recognition. I have also worked in SFI-ENABLE, one of Ireland's largest research spokes that aims to connect communities with IoT-driven urban environments.

I lead the Sustainable Orchestration in Computing Continuum (SOC2) lab, where I supervise two PhD students and have successfully supervised one PhD to completion in my previous role. I am a Senior IEEE Member and an Associate Editor at IEEE ACCESS. I have contributed to the research community as a technical program committee member for IEEE CloudCom (since 2023) and an organizing committee member in the ICT for Sustainability conferences(ICT4S 2025).

Research topics of Interest for the MSCA Postdoctoral Fellowship

1. Optimized deployment and execution of large language models (LLMs) across edge-cloud infrastructures.
2. Carbon-aware orchestration of AI-driven services in edge-cloud and geo-distributed data center environments.
3. Energy-efficient scheduling and resource provisioning in multi-cloud and multi-access edge (MEC) systems.
4. Sustainable serverless computing for AI and data-intensive applications.

Keywords

- Edge-Cloud Continuum
- Large Language Models (LLMs)
- Sustainable Computing
- Carbon-Aware Orchestration
- Serverless Computing
- Multi-Cloud Resource Management
- Energy-Efficient AI Systems
- Geo-Distributed Data Centers

Dr Helard Becerra

https://people.ucd.ie/helard.becerra

I have conducted extensive research in the field of Human-Computer Interaction. I have been actively involved in developing computer models to measure the perceived quality of multimedia content for streaming applications and have created computational metrics to assess the perceived quality of audiovisual content. Most recently, I participated in a research project with Xperi Inc. that investigated the assessment of dialogue understandability in streamed media.

Additionally, I collaborated on a European project funded by Horizon 2020 (Precise4Q) as the co-lead partner for UCD. This project explored and developed multidimensional, data-driven predictive models for personalized stroke treatment. This is a challenging topic, as it requires close collaboration between data scientists and neuropsychologists from various research centers. We applied explainable AI to ensure a clear interpretation of the predictions.

I'm actively involved in mentoring and assisting in the supervision of undergraduate and postgraduate students.

Research topics of Interest for the MSCA Postdoctoral Fellowship

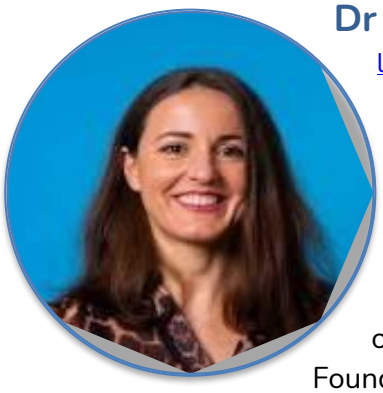
Topic 1: Human perceived quality for multimedia domains (e.g., speech, audio, video). Develop computer models to measure the perceived quality for streaming applications. Special focus on audio and video digital signal interaction.

Topic 2: Explainable AI for health applications. Develop AI-based models for digital health, more specifically speech disorders. Special focus on restructured predictions using explainable AI techniques.

Topic 3: Subjective and objective assessment of GenAI content. Study and explore both subjective testing methodologies and objective metrics for assessing the perceived quality of content generated by Generative AI.

Keywords

- Audio-visual QoE
- Dialogue intelligibility
- Explainable AI
- Personalised medicine
- GenAI QoE



Dr Liliana Pasquale

lili-pasquale.lero.ie

I am an Associate Professor with the School of Computer Science and a Funded Investigator with Lero, the Research Ireland Research Centre for Software. My research focuses on software and requirements engineering, adaptive systems and cyber security, with a particular focus on the use of AI. From 2017-2021, I was the leading PI for the Science Foundation Ireland ForCops project aimed to engineer cyber-physical systems that are forensic-ready and GDPR compliant. From 2019 to 2022, I was the task leader of the adaptive security work package for the CyberSec4Europe European Cybersecurity Competence Centre. I have earned over €3 million in competitive funding during my career. I also serve as the associate editor for the TSE journal and department editor for the "Building Security In" column of the IEEE Security & Privacy magazine.

I am the founder and director of the MSc in Cybersecurity at UCD and a member of the SPARE research group, which spans 4 Irish academic institutions (UCD, TCD, UL and UCC) and brings together researchers with expertise in software engineering, cybersecurity and HCI. I have successfully co-supervised 4 PhD students to completion and 2 Postdoctoral researchers currently employed as Assistant Professors at UCD and TU Dublin.

Research topics of Interest for the MSCA Postdoctoral Fellowship

- Using AI for secure software development
- Hunam-AI collaboration ti support tasks (security monitoring, attack detection and diagnosis)
- Security assurance cases at runtime for highly compositional software (smart home, supply chain).
- Generation and analysis of security logs
- Software regulatory compliance

Keywords

- Security
- AI
- Software Engineering
- Vulnerability Prediction
- Forensic-ready
- Sustainable security
- Threat Model variability

Dr Madhusanka Liyanage

https://www.madhusanka.com/
https://netslab.ucd.ie/

I am an Associate Professor and Ad Astra Fellow (formerly a Marie Curie Fellow), as well as the Director of the Network Softwarization and Security Labs (NetsLab) at UCD, a dynamic research group leading advancements in the security and privacy of next-generation mobile networks, including 5G and 6G.

NetsLab is dedicated to developing innovative solutions to protect critical mobile network infrastructures across various sectors. Our research focuses on network slicing, software-defined networking, and edge computing. We are also pioneering the integration of blockchain and Artificial Intelligence (AI) into network security, redefining how mobile networks are safeguarded against emerging threats. This forward-thinking approach positions NetsLab at the forefront of network security research.

The NetsLab research group comprises 25 members, including 5 postdoctoral researchers and 15 PhD students. Our dynamic team features members from universities across Europe and Asia, fostering a collaborative and diverse research environment. I have successfully supervised 6 PhD candidates to completion and 4 postdoctoral researchers. Three of former postdocs (also my Ph.D. students) are now Assistant Professors (e.g., UCD, IIT-Mandi, Sri Jayewardenepura), and one is a Senior Researcher at VTT, Finland. Three former PhD Students work as research engineers in Ireland, Finland, and Canada.

Research topics of Interest for the MSCA Postdoctoral Fellowship

Mitigating Adversarial Threats from Generative AI and Proactive Fraud Prevention of distributed AI/ML-driven O-RAN for Future Networks
Blockchain-Empowered Dynamic Spectrum Allocation for 6G networks
Poisoning-robust Distributed Machine Learning algorithm for 6G
Privacy Preservation Techniques for Collaborative FL Platforms
Fair and explainable AI methodologies for threat detection and prediction

Keywords

- Security
- Privacy
- 6G
- Federated Learning
- Explainable AI
- Blockchain
- Trust
- IoT
- PQC

Dr Mark Matthews

https://people.ucd.ie/mark.matthews | www.aplayspace.com

My research has 2 focal points: 1) the impact of technology on mental health and 2) the potential of technology to measure and improve mental health.

Over the past 20 years, I have developed and evaluated novel human-centred technologies including therapeutical computer games, the first Mood tracking app, ambient biofeedback systems, and many methods to passively assess human behaviour and mental health. This work has had a high degree of real-world validity and has resulted in multiple patents and 2 successful digital mental health startups: SilverCloud Health (acquired by Amwell) and Health Rhythms, where I served as Chief Technology Officer for 7 years. I have recently returned to full-time academic research and I am currently supervising 1 PhD student on using financial data to model mood.

Research topics of Interest for the MSCA Postdoctoral Fellowship

I am looking to recruit a small number of talented researchers who I can work closely with on innovative new research directions. I have ongoing international collaborations with Penn State University, Cornell Tech and University of Washington.

As a former MSCA Postdoctoral Fellow, I have a great appreciation for this program and the scope it offers candidates to establish an independent academic trajectory. I am interested in working with highly motivated candidates interested in a broad range of digital mental health topics including but not limited to the following:

1. financial wellbeing: software tools, models and algorithms to measure and improve financial and mental wellbeing
2. novel mental health assessment technologies: development and validation of novel methods to measure mental health

Keywords

- Mental Health AI
- Human-Centred Computing
- Behavioural Sensing
- HCI
- Playful Computing

Dr Nhien-An Le-Khac

https://people.ucd.ie/an.lekhac
https://scholar.google.com/citations?user=e6nKl6kAAAAJ&hl=en

Assoc. Prof. Le-Khac is the director of UCD ASEADOS lab (https://aseados.ucd.ie/) with 15+ academic staffs, research scientists and PhD students. His research interests span the area of Cybersecurity, AI Security, Digital Forensics, and Security of Machine Learning and Smart IT systems. He is currently the Programme Director of MSc programme in Forensic Computing and Cybercrime Investigation (UCD MSc FCCI).
Under the supervision of Assoc. Prof. Le-Khac, 9 PhD. students were graduated, who are currently permanent university lecturers and senior data scientists in industry. Assoc. Prof. Le-Khac is supervising 6 PhD students through national and international collaboration projects such as NSF-SFI-NI, SFI Ml-Labs. He also supervised successfully 2 postdocs in the EU H2020 CERBERUS €2.4M project, where he is an UCD PI. Besides, Assoc. Prof. LeKhac supervised two research fellows in an Enterprise Ireland commercialisation €495K project, which is recently turned to a start-up run by these research fellows. Recently, his team's start-up project Mirror Security, a cybersecurity platform for GenAI that brings both security and assurance to organisations using GenAI in their operations has been a finalist of UCD Nova Venture Launch Accelerator Programme. Dr. Le-Khac is an author/editor of 3 books and has published 200+ scientific papers with 6 best paper awards recently.

Research topics of Interest for the MSCA Postdoctoral Fellowship

Topic 1: AI for cybersecurity investigation: Building Extraction, Tagging and discovering artefacts using AI/LLM systems.
Topic 2: Security of AI: Identifying the AI generated artefacts in cyber investigations like evidence planting, fake as a service use-cases (such as text, image, audio and video and cyber artefacts)
Topic 3: Robust and Secured Framework addressing the vulnerabilities of AI/GenAI systems to discover and mitigate regulatory violations, and AI attack vectors (such as model extraction/distillation...)
Topic 4: Quantum-safe cryptography approaches for secured and privacy-preserving distributed platforms in analysing and sharing healthcare data
Topic 5: Deep Graph Learning models for analysing of blockchain-based network
Topic 6: Adversarial AI methods and framework for the verification and auditing of AI-generated content in education

Keywords

- Cybersecurity
- Deep Learning
- Digital Forensic
- Deepfake Detection
- Adversarial AI
- Adversarial Drift
- Financial Cybercrime

Dr Nima Afraz

https://people.ucd.ie/nima.afraz

Nima Afraz is an Assistant Professor in the School of Computer Science, at University College Dublin. He is a funded investigator at the CONNECT Research Centre and his research focuses on Open Radio Access Networks, blockchain applications in telecoms, economics of networks and network virtualisation. Nima is a recipient of the government of Ireland postdoctoral fellowship and worked as a postdoctoral fellow to address the challenges in the adoption of blockchain technology in telecommunications. Nima is the vice-chair of the Linux Foundation's Hyperledger telecom special interest group.

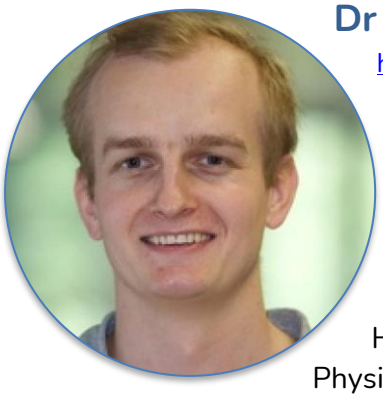
Nima is currently supervising several PhD students and Postdocs that focus on addressing research challenges around open radio access networks, distributed decision-making affecting network performance, and wireless/optical network and network infrastructure sharing. Nima is a co-coordinator of a European MSCA Staff exchanges project addressing network connectivity challenges in multi-modal public transport.

Research topics of Interest for the MSCA Postdoctoral Fellowship

- Intelligent Open Radio Access Networks
- Access-Edge-Cloud Telecom network slicing
- Customisable Multi-Vendor network deployment
- Software Defined Networks and Network Virtualisation
- Network Infrastructure sharing in Multi-Tenant deployments
- Network performance monitoring and Service Level Agreement enforcement
- ML/AI Based network performance prediction and infrastructure provisioning
- Scalable distribution of network control functions in wireless/optical networks

Keywords

- Open RAN
- Wireless/Optical
- Network Sharing
- Network Slicing
- Optical Networks
- Network QoS
- SDN
- NFV



Dr Przemyslaw A. Grabowicz

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Przemyslaw (Przemek) Grabowicz is an Assistant Professor of Computer Science at University College Dublin and an Adjunct Professor of Computer Science at the University of Massachusetts Amherst. Formerly, he was a postdoctoral researcher at the Max Planck Institute for Software Systems. He received his PhD and MSc degrees in Interdisciplinary Physics cum laude in Spain and Poland, respectively.

Przemek leads a transatlantic lab, the Socially Intelligent Media and Systems lab (the SIMS lab), which includes four PhD students nearing graduation at UMass Amherst and newly recruited students at UCD. Przemek's research is focused on computational social science, applied NLP, and responsible AI. His research finds applications in political science, communication science, and digital policy, as it provides insight on important issues such as social media biases ahead of democratic elections in the U.S.A. and Germany. Przemek regularly collaborates and publishes with professors from respective disciplines, including professors from leading universities such as Oxford University, Stanford University, the University of Massachusetts Amherst, University of Illinois Urbana-Champaign, Boston University, and Sapienza University of Rome. Przemek's research has been awarded highly competitive grants from the German Volkswagen Foundation and the U.S. National Science Foundation. His research received two international academic awards and was discussed in Science and top-quality media outlets such as Wall Street Journal, ZDF, Frankfurter Allgemeine Zeitung, El Mundo, Haaretz, and reached the top of Reddit's Science.

Research topics of Interest for the MSCA Postdoctoral Fellowship

Public opinion and public discourse are a cornerstone of decision-making in democratic societies. This project will develop AI and statistical methods to mine, understand or augment public opinion and public discourse. To mine public opinion and public discourse, the project will innovate AI-based systems for extracting representative signals about the public from millions of social media and news media data points. Resulting estimates of public opinion tend to be more accurate than traditional polls, e.g., before the 2024 U.S. presidential election we forecast with groundbreaking low, 1% error, popular support for the candidates by correcting biases in thousands of election polls published on X (see references at socialpolls.org). To better understand the public, the project will study social media and AI systems that influence the public, while helping to identify misinformation, bias, and polarization. For instance, our research of political biases on the social media platform X before the 2025 German federal election was broadcasted by the German public TV channel ZDF during the election week. To augment public discourse, we pioneered fair and explainable AI systems and methods that address biases by aiming for representativeness. This project will involve AI-based systems for analysing millions of news articles, social media posts and users. This research will span the areas of data science, natural language processing, responsible and explainable AI, computational social science, and social computing. The project will involve collaborations with world-class researchers from the U.S. and Europe. It will contribute to making our AI systems and digital media of tomorrow accountable, representative, explainable, and ready to interact with our open world for public good.

Keywords

- Responsible AI
- Applied NLP
- Computational social science
- Data science
- Social media
- News media
- Public opinion
- Public discourse
- Representative-ness
- Biases
- Elections
- Social influence

Dr Simon Caton

https://people.ucd.ie/simon.caton

Dr. Simon Caton's research sits at the intersection of high-performance scientific computing, machine learning and quantum computing collectively in the domain of Quantum AI. I am especially interested in research that explores synergies between quantum computing and machine learning and quantum computing and optimisation as well as hybrid approaches.

At present, I have three quantum-themed PhD students, and have supervised 5 PhDs to completion, with 2 now following academic careers, and 2 postdoctoral researchers. I place a key emphasis on industry collaboration and real-world value in my research. My research is funded by industry collaborators, as well as national and EU awards

Research topics of Interest for the MSCA Postdoctoral Fellowship

Exploring avenues of value in Quantum AI
Understanding how and when to leverage machine learning for and/or with quantum computing is still in a state of flux. Machine learning can be used to optimize quantum algorithms, and quantum computing can be used to develop novel machine learning algorithms. A candidate interested in collaborating with me would want to explore these directions (depending on the interest of the candidate).

Currently, QML is in a state of crisis, as variational approaches (initially expected to perform well) are suffering from severe challenges. For example, the barren plateau problem making models hard/impossible to train, and the need for large numbers of system observations to make discernible observations on changes in state in response to parameter adjustments. There are many other challenges too such as: how to prepare data, developing new methods, interpreting the output of the quantum computer, handling error/noise etc. We can make similar comments about the emerging methods of quantum optimisation.

Similarly, when applying machine learning and optimisation methods to quantum problems (e.g. controlling quantum systems, quantum error mitigation etc.) the challenge is to balance a rich understanding of the quantum system(s) with sufficient classical expertise to develop toolkits of value to the domain.

Ultimately, the purpose of this research should be to generate valuable tools and methods to further the understanding of where machine learning and optimisation techniques can benefit quantum computing (and/or the reverse) and identify meaningful application areas.

Keywords

- Quantum Computing
- Machine Learning
- Optimisation
- Variational Methods
- QUBO
- Quantum AI
- QNNs

Dr Soumyabrata Dev

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Dr Soumyabrata Dev is an Assistant Professor in the School of Computer Science, at University College Dublin. He is also an Institute Member of UCD Earth Institute, and an SFI Funded Investigator with ADAPT SFI Research Centre, Dublin. His research interests primarily lie in the area of computer vision, image processing, earth observations, and remote sensing.

Dr Dev obtained his Ph.D. from Nanyang Technological University (NTU) Singapore in 2017. From August-December 2015, he was a visiting doctoral student at Audiovisual Communication Laboratory (LCAV), École Polytechnique Fédérale de Lausanne (EPFL), Switzerland. During his Ph.D., he was a team member of Vision & InterAction Group (Vintage), at Advanced Digital Sciences Center (ADSC), the Singapore-based research center of the University of Illinois at Urbana-Champaign.

Research topics of Interest for the MSCA Postdoctoral Fellowship

For this call, Dr Dev is interested in supervising projects in the broad domains of earth observations, remote sensing, and climate change.

Keywords

- Earth Observation
- Remote Sensing
- Climate Change

Dr Tahar Kechadi

https://people.ucd.ie/tahar.kechadi

The core and central focus of my research is how to manage and analyse very large datasets quickly and efficiently. This brought me to look at the challenges of large-scale data mining in the heterogeneous, complex, distributed environment, Big Data analytics, data warehouses, distributed systems, cloud computing, data privacy and cybersecurity.

I have supervised more than 33 PhDs, 22 MScs by research to completion, and 18 post-doctoral research fellows. All the PhD students and post-docs I have supervised and trained are employed in academia or hold senior positions in the industry.

I have been a visiting professor in many Universities, including the University of Liverpool, where I was involved in developing CERN data analysis and organising events data; the University of Artois, the University of Fuzhou, where I am currently an adjunct professor, I delivered summer schools and organised an international conference on Spatial Data Mining in 2015. I am currently a visiting professor at the Dalian University of Technology, where I developed a strong collaboration in Cyber-Physical Systems (CPS).

Research topics of Interest for the MSCA Postdoctoral Fellowship

Indicate project topics that you would like to work on with prospective candidates

Organisations nowadays face significant privacy and security challenges due to the extensive collection and sharing of personal information. Unauthorised access, whether by external attackers or trusted insiders, can lead to identity theft, financial loss, and data exploitation. Traditional security strategies often fail to prevent insider threats and breaches. This highlights the urgent need for a robust data privacy management system that enforces strict access controls, prevents malicious activities, and safeguards data confidentiality.
We identify key issues and propose efficient analytical methods tailored to use cases. For example, we created lightweight distributed algorithms to process data during collection to minimise warehouse size and protect individual privacy. After collection, data is processed on mobile devices, allowing insights to be gathered while discarding the collected data. However, this method doesn't fit all applications, thus demanding more innovative techniques for large-scale privacy-preserving data analytics.

Keywords

- Data privacy
- Data analytics
- Big Data analytics
- Secure data analytics
- Secure DW
- Data privacy at scale
- Adversarial ML