SHIELD: Reliable Distributed Learning and Smart Contract assisted Digital Ecosystems

Fully Funded 3-Year PhD Position
[School of Computer Science and Statistics](), [Trinity College Dublin]()

Overview: Smart contracts are transforming how we can enhance automated public services and how the services are executed and controlled in digital ecosystems. Distributed artificial intelligence (AI) is a new AI paradigm that uses distributed device computing resources to improve data privacy. The combination of smart contracts and distributed AI has the potential to address challenging research issues, including data privacy, security, and network scalability, thus fostering efficient and responsible actions for reliable digital transformation ecosystems. Although promising, there is no high-level reference framework for designing novel smart contract driven distributed AI solutions and a lack of benchmarking testbeds for essential use cases and scaling their implementation internationally.

Focus and role: The successful applicant for the position will investigate innovative approaches using smart contracts and distributed learning to improve public digital services in smart cities and 6G. The research will primarily focus on developing 1) reliable distributed AI models for optimising resource allocation and misbehaviour detection in connected applications, 2) decentralised AI solutions to improve security protection and privacy preservation of interconnected smart cities, and 3) personalised learning solutions for hyperconnected digitalization systems (including 6G). Of particular interest is the demonstration of the developed solutions in O-RAN and Hyperledger-based 6G networks.

Position: The position is fully funded for 3 years. The successful applicant will receive:
- an annual stipend of €22,000 (tax-free, for 3 years), and
- an annual PhD fee of €5,500 fee to pursue a PhD in Computer Science.

Requirements: The applicants should have completed a MSc degree in Telecommunications, Computer Science, or cognate disciplines, or will complete it by Aug. 2025. Applicants with a BSc degree (minimum II.1 honours grade or equivalent) and exceptional track records will also be considered.

Host Institutions: The successful candidate will join the [structured PhD programme]() in the School of Computer Science and Statistics (SCSS) at Trinity College Dublin (TCD). TCD is the sole constituent college of the University of Dublin, a research university in Dublin, Ireland. TCD is ranked 1st in Ireland and 87th in the world. The School is the No 1 ranked School of Computer Science on the Island of Ireland, one of the leading Schools in Europe and ranked 91st in the World in 2023 (QS Rankings). Notably, the School leads a number of nationally funded large-scale research centres, such as ADAPT and CONNECT.

Application: Candidates should submit a single PDF document, including 1) a complete CV with the names and contacts of two referees, 2) scholastic transcripts, 3) English language certificate, and 4) a motivation letter. Applications will be reviewed in a rolling basis with a deadline of **28th Feb. 2025** for those who wish to start the PhD programme in Sept. 2025. A track record of publications in top-tier venues or early completion of the application will significantly strengthen your case.

Applications and informal queries about the position can be submitted via **email to Dr. Viet Quoc Pham** ([viet.pham@tcd.ie]()) with the email subject "**PhD-SHIELD**." For more details about the Supervisor's research, see the website [www.scss.tcd.ie/viet.pham]()