Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

AI Engineering
Funded 4-Year PhD Positions
School of Computer Science and Statistics, Trinity College Dublin,
https://www.scss.tcd.ie/

AI Engineering emerges from a fundamental shift in how we build software systems. Modern applications increasingly embed AI/ML components that generate substantial business value and/or ensure the correct operation of critical systems: Recommendation engines driving e-commerce revenue, LLMs powering intelligent interfaces, computer vision enabling medical diagnosis, predictive models informing financial decisions, and autonomous systems used in safety-critical environments like transportation and healthcare.

Unlike traditional code, where behavior is explicitly specified through programmed logic, these AI components learn patterns from data, making their behavior emergent rather than programmed. This fundamental difference introduces new engineering challenges around uncertainty, interpretability, and robustness. The complexity intensifies when multiple models are combined, or multiple AI agents collaborate to achieve intended system objectives, a scenario increasingly common in real-world deployments. Some examples of potential research areas include:

- **Software Engineering for AI-enabled systems:** Adapting traditional techniques to handle the inherently different nature of AI/ML components—including requirements engineering for uncertainty, AI-aware software design, testing probabilistic systems and agentic AI systems, and ensuring reproducibility across evolving pipelines.
- Particular challenges arise when engineering approaches need to consider **recent developments in AI**, which are also under heavy demand in current industry practice, e.g., model refresh, continual learning, trustworthiness of AI, agentic AI, and agents pursuing long-term objectives.
- **Optimisation and Metaheuristics:** Multi-model, multi-agent, and whole-pipeline optimization, balancing accuracy with computational costs, and systematically exploring high-dimensional configuration spaces to discover non-obvious solutions.
- **Model and System Evolution:** Detecting and managing data and model drift, triggering appropriate retraining, and developing specialized CI/CD pipelines with statistical validation and rollout/rollback strategies.
- **Systems Engineering:** Taking a whole-systems perspective that considers interactions across data collection, training, inference, and monitoring—including multi-agent coordination, conflict resolution, and system-level guarantees despite individual agent uncertainty.

We offer:

- €25K stipend/year + EU fees x 4 Years
- A stimulating, supportive, and interdisciplinary environment at SCSS, Trinity College Dublin
- Access to state-of-the-art computational infrastructure and facilities
- Opportunities to collaborate with leading industry partners and international research groups
- Comprehensive training in research methods, academic and technical skills, and professional development

Essential:

- A bachelor's degree (minimum II.1 honours grade or equivalent) in computer science, computer engineering, mathematics, or a closely related discipline.
- Strong foundations in either software engineering or artificial intelligence/machine learning
- Excellent written and oral communication skills in English

Desirable:

- A Master's degree in a relevant field
- Research or industrial experience in AI/ML, software engineering, or optimization
- Publications or significant project work demonstrating research potential

The successful candidate will join the structured PhD programme in the School of Computer Science and Statistics at Trinity College Dublin, working with a vibrant community of over 150 PhD students. TCD is the top-ranked institution in Ireland and one of the leading institutions in Europe for the study of computer science.

Application Instructions

Please submit a single PDF document including

1. **Cover letter (one page)** addressing your motivation and how your qualifications, experience, and background would make you a suitable candidate
2. **Curriculum vitae**, and
3. The names and contact details of two **referees**.

Applications and informal queries about the position should be submitted to Goetz Botterweck (botterwg@tcd.ie). Use the subject
"[PHDAIE] Your Name"

Deadline: Rolling basis, with a deadline of **31 January 2026** for applicants who wish to begin before September 2026.