

Industrial Ph.D. student position in AI-Driven Optimization of Concrete Production for Reduced CO₂ Footprint and Cost Savings

At the **Danish Technological Institute (DTI)**, we specialize in providing innovative technological consultancy to advance sustainable construction practices. Our expertise includes pioneering work in optimizing concrete production, enhancing durability, and reducing environmental impact. We are seeking a candidate who is passionate about developing their qualifications in artificial intelligence and concrete technology.



The Ph.D. Study

This 3-year industrial Ph.D. program is a collaboration between **DTI, the Technical University of Denmark (DTU), Unicon** and **The Danish Road Directorate**, supported by the **Innovation Fund Denmark**. You will be employed by DTI, and enrolled in a Ph.D program at DTU in Lyngby. The industrial Ph.D. offers flexibility in your work location and your time will be divided, roughly equally, between DTI and DTU. During the study, visits and shorter stays at Unicon and the Danish Road Directorate are also expected.

The position is full-time and the preferred starting date is the latest September 1, 2025.

The industrial Ph.D. study will focus on AI-driven optimization of concrete production for reduced CO₂ footprint and cost savings. You will work on:

- **Developing and implementing AI models** (e.g., neural networks, support vector machines, random forests) for predicting concrete properties based on historical production data.
- **Applying multi-objective optimization algorithms** (e.g. NSGA-II, PSO, ACO, BAS) to balance CO₂ emissions, production costs, and material performance.
- **Integrating incremental learning algorithms** to ensure models adapt to new production data without extensive retraining.
- **Correlating concrete mix designs with long-term performance data** from real-world structures to enhance durability predictions.
- **Collaborating with industry partners** to validate models and facilitate technology transfer.
- **Disseminating research findings** through high-impact journals and international conferences.

EURES ESPAÑA. Síguenos en:



This project is funded by

After the Ph.D.

Upon successful completion of the industrial Ph.D. program, you have a chance to continue your career at the Concrete Centre at DTI in Taastrup. Here, you will collaborate with experienced colleagues on client projects and relevant R&D projects.

Qualifications

We are looking for a candidate who meets the following criteria:

- You have a master's degree (or will obtain one by summer) in fields such as computer science, mathematics, materials science, mechanical engineering, or related disciplines.
- You have extensive experience with machine learning.
- Knowledge of concrete technology from coursework or thesis projects is an advantage.
- Your academic qualifications meet the requirements of being approved as a Ph.D. student at DTU.
- You are a team player who works ambitiously and purposefully with your tasks and wishes to be part of a group where professional integrity and an informal working atmosphere characterize everyday life.
- You communicate fluently in English, both in writing and speaking.

About the Danish Technological Institute

You will be based at the Concrete Centre within the Building & Construction division of the **Danish Technological Institute (DTI)** in Taastrup. The Concrete Centre is a nucleus of expertise in research and development, certification, testing, and consultancy for infrastructure and construction projects. It provides the ideal environment to work on AI-driven optimization of concrete production.

At the Concrete Centre, you will have access to state-of-the-art laboratory facilities and cutting-edge tools essential for analyzing and developing innovative concrete solutions. These resources include advanced equipment for testing and evaluating building materials, automated concrete mixing systems, and digital tools for data-driven optimization. The Centre's expertise spans areas such as sustainable concrete mix design, durability assessments, and the integration of new technologies like 3D concrete printing and alternative binders for low-CO₂ concrete.

About the Technical University of Denmark (DTU)

DTU is a leading technical university globally recognized for the excellence of its research, education, innovation and scientific advice. DTU offer a rewarding and challenging job in an international environment. DTU strive for academic excellence in an environment characterized by collegial respect and academic freedom tempered by responsibility.

DTU Civil and Mechanical Engineering develops and utilizes science and technical knowledge for the benefit of society and sustainable development. They undertake research, education, innovation, and scientific advice of the highest quality within building design and processes, building construction and safety, building energy and services, solid mechanics, fluid mechanics, materials technology, manufacturing engineering, engineering design and thermal energy systems.

Contact

If you have questions about the position, you are welcome to contact Consultant from DTI **Simon Fjendbo** at SIFJ@teknologisk.dk or Senior Researcher from DTU **Navid Ranjbar** at NARAN@dtu.dk.

Application Procedure

The application deadline is April 23, 2025, and the first round of interviews is expected to take place ultimo April 2025.

Send your application by clicking on the "Apply for position" button on the right (the DTI's webpage). **Apply [via the link](#)**

We encourage you to also record and upload a video (max 2 minutes), describing your scientific interests, previous research experience and why you are interested in this position.

Your application must include:

- A motivated cover letter explaining your interest in the position and how your qualifications align with the project.
- Curriculum vitae, including educational background and any relevant experience.
- Grade transcripts and BSc & MSc diplomas (in English) including an official description of the grading scale.
- Contact of at least two reference persons.
- Scientific publications (if any).

As part of the assessment process, your application will be shared with the supervisors at DTU.

Join us in revolutionizing the concrete industry through AI and contribute to a sustainable future. We look forward to receiving your application.

At Danish Technological Institute our employees are our greatest resource, and we are always looking for new colleagues who are innovative and driven to create value in a collaboration with our customers and partners. We strengthen Danish companies with the help of ground-breaking technologies and the professional expertise of more than 1,000 colleagues. We create strong results and value for businesses in an international collaboration with companies and universities. Our equipment and laboratories are world-class and with many professional skills gathered in one place. We develop applied knowledge, technologies, methods and products for a better future.

<https://www.dti.dk/>

EURES ESPAÑA. Síguenos en:



This project is funded by