

Post Doctoral Researcher in Digital Twins CO₂-to-Protein production in collaboration between the Department of Electrical and Computer Engineering and the Novo Nordisk Foundation CO₂ Research Center (CORC)

In the intersection between combatting climate change and world hunger, a new technology has emerged that enables food (protein) to be made from air (CO₂) using nature's own principles. The novel bio-technology has the potential to produce meat or milk replacement while reducing land use by over 90% and it can be done on non-fertile lands like deserts to provide food in the most desperate regions of the world, and at the same time impact the climate positively utilizing CO₂ as raw material.

To be launched into scaled solutions, the technology needs to be optimized through leveraging digital twinning for production and process optimization. A first-of-its-kind pilot factory is now based at Aarhus University (AU Viborg), and has been equipped with about 200 sensors and a production management system with an open source data structure. The setup is ready for development of digital twins to improve and scale the technology to offer the world a new pathway to sustainable proteins.

In a collaboration between the Department of Electrical and Computer Engineering and the Novo Nordisk Foundation CO₂ research center, Aarhus University, we aim to address this opportunity by developing digital twins and models of the biochemical processes and production system to feedback to the researchers how to improve the processes while optimizing the production system, and showing venture capitalists how to build the first full scale factory that can be cost-efficient. Current challenges are the cost of the technology in terms of lost energy through endothermic reactions, and the need for hydrogen to enable the biochemical reactions. There is both potential in improvement through retaining thermal energy, process improvements, and choosing more efficient biochemical pathways.

The project will involve close cross-disciplinary analysis, modeling, and development of continuous improvement loops that advise researchers of possible solution pathways. At AU, a digital twin platform software called the Digital Twin as a Service ([DTaaS](#)) has been developed, which will be available for data integration with the CO₂-to-Protein dataflow, and on top of which the digital twin will be established. The project will be part of a mission enabler programme under CORC, where other modelling activities will run in parallel to support and be supported by the findings of the digital twin solution.

This innovative ambition is shared with other CORC partner universities such as Tübingen University, Stanford University, and the Technical University Denmark, among others. The project aims to establish new knowledge of applying the emergent digital twin technologies into production environments for continuous and radical optimization. The project benefits from the unique open-source data availability of the production system, and the findings will move the field of digital twins and modelling within biotech production and fermentation.

We are therefore looking for a postdoctoral researcher, who will specialize in the intersection between sustainability/biotech production and engineering digital twins, and whose contributions will affect not only the aforementioned project, but also support other ongoing CORC projects.

Expected start date and duration of employment

This is a 3-year position from November 2025 or as soon as possible.
This is a fixed-term position to end at the latest on December 2028.

Job description

The appropriate candidate will play a central role in the development and deployment of a digital twin of the CO₂-to-protein pilot factory. The main tasks to be carried out include:

1. Domain Analysis and Ontology Development: Conduct a systematic analysis of the pilot factory and establish a data architecture based on the available data structures in the production management system, including identification of the critical variables for production improvement.

Application Deadline:
26 September 2025

Institute/Faculty:
Department of
Electrical and
Computer Engineering

Faculty:
Faculty of Technical
Sciences

Academic contact person:
Peter Gorm Larsen
Professor
pgl@ece.au.dk
+4541893260

Vacant positions:
1

Number of months:
36

Hours per week:
37

Expected date of accession:
01/11/2025

2. Explore, build and validate a low fidelity digital twin including more advanced high fidelity configurations critical for scaling and improvement.
3. Calibrate the models inside the digital twin to obtain more optimal performance of the CO₂-to-protein pilot factory.
4. Collaborate closely with our research partners to create an ontology capturing the biochemical process variables and production variables integrating across domains.
5. Develop appropriate user interfaces for researcher inquiries and feedback.
6. Assist with improvements of the DTaaS platform for ongoing CORC projects.

The candidate will assume technological leadership over the software solutions developed for the above tasks, as well as take on to supervision of PhD and master students on the same topics.

Your profile

- A Ph.D. degree in Computer Science primary, or related field (in the latter case, special emphasis will be placed on assessing programming proficiency).
- Comprehensive background in modelling, simulation and establishing digital twins.
- Experience with software development, and optionally digital twin platforms.
- (Optional) Strong publication record in relevant conferences and journals.
- Fast learner with interest in multidisciplinary research.
- Excellent communication skills.
- Ability to collaborate effectively within a multidisciplinary and multicultural team.
- Inclusive and open minded.

About the Departments

The Novo Nordisk Foundation CO₂ Research Center (CORC) was established in 2022 and is a mission-oriented international research center with headquarters at Aarhus University. The center's purpose is to develop novel science and early technologies for carbon capture and conversion for utilization. The Center comprises 15+ research groups at Aarhus University, Stanford University (US), University of Tübingen (DE), University of Copenhagen (DK) and Technical University of Denmark (DK). In total, the center encompasses 80-100 researchers. You will be part of the CORC Researcher teams at Aarhus University, primarily researchers at the CORC Partner Department of Biochemical Engineering (BCE) in close collaboration with the Department of Electrical and Computer Engineering (ECE). See more on www.corc.au.dk

ECE is one of four engineering departments at the Faculty of Technical Sciences at Aarhus University. Our vision is to be a world-leading department for research, education and innovation in electrical and computer engineering, creating a positive and visible impact on society and the environment through interdisciplinary collaboration, excellence and diversity. Many of our research and development activities are based on the specific innovation needs or specialist application areas of specific companies. We collaborate closely with the public sector and private companies to ensure that the knowledge and technology generated in the department's research environments has a clear anchoring in reality and benefits society as a whole. For more information about the ECE Department, please visit <https://ece.au.dk/>. See more about our activities on LinkedIn: <https://www.linkedin.com/company/au-ece/>

What we offer

- a well-developed research infrastructure, laboratories and access to shared equipment
- an exciting interdisciplinary environment with many national, international and industrial collaborators
- a research climate encouraging lively, open and critical discussion within and

across different fields of research

- a work environment with close working relationships, networking and social activities
- a workplace characterised by professionalism, equality and a healthy work-life balance.

Place of work and area of employment

The place of work is Finlandsgade 22, 8200 Aarhus N, Denmark, and the area of employment is Aarhus University with related departments. Some work will take place at the CO2-to-Protein factory based at AU Viborg in Foulum.

Contact information

For further information, please contact: Associate Professor and COO of CORC, Anita Friis Sommer tlf: +45 93517771 and/or Professor Peter Gorm Larsen (pgl@ece.au.dk).

Deadline

Applications must be received no later than 26 September 2025.

Application procedure

Shortlisting is used. This means that after the deadline for applications – and with the assistance from the assessment committee chairman, and the appointment committee if necessary, – the head of department selects the candidates to be evaluated. All applicants will be notified whether or not their applications have been sent to an expert assessment committee for evaluation. The selected applicants will be informed about the composition of the committee, and each applicant is given the opportunity to comment on the part of the assessment that concerns him/her self. Once the recruitment process is completed a final letter of rejection is sent to the deselected applicants.

Letter of reference

If you want a referee to upload a letter of reference on your behalf, please state the referee's contact information when you submit your application. We strongly recommend that you make an agreement with the person in question before you enter the referee's contact information, and that you ensure that the referee has enough time to write the letter of reference before the application deadline. Unfortunately, it is not possible to ensure that letters of reference received after the application deadline will be taken into consideration.

If you wish to add a referee **after** you have submitted your application, you must send this person's details (name, job title, place of work, and email address) as well as the name of the position you have applied for to: HR.Nattech@au.dk

Formalities and salary range

Technical Sciences refers to the [Ministerial Order on the Appointment of Academic Staff at Danish Universities under the Danish Ministry of Science, Technology and Innovation](#).

The application must be in English and include a curriculum vitae, degree certificate, a complete list of publications, a statement of future research plans and information about research activities, teaching portfolio and verified information on previous teaching experience (if any). Guidelines for applicants can be found [here](#).

Appointment shall be in accordance with the collective labour agreement between the Danish Ministry of Taxation and the Danish Confederation of Professional Associations. Further information on qualification requirements and job content may be found in the [Memorandum on Job Structure for Academic Staff at Danish Universities](#).

Salary depends on seniority as agreed between the Danish Ministry of Taxation and the Confederation of Professional Associations.

Aarhus University's ambition is to be an attractive and inspiring workplace for all and to foster a culture in which each individual has opportunities to thrive, achieve and develop. We view equality and diversity as assets, and we welcome all applicants.

Research activities will be evaluated in relation to actual research time. Thus, we

encourage applicants to specify periods of leave without research activities, in order to be able to subtract these periods from the span of the scientific career during the evaluation of scientific productivity.

Aarhus University offers a broad variety of services for international researchers and accompanying families, including relocation service and career counselling to expat partners. Read more [here](#). Please find more information about entering and working in Denmark [here](#).

Aarhus University also offers a Junior Researcher Development Programme targeted at career development for postdocs at AU. You can read more about it [here](#).

The application must be submitted via Aarhus University's recruitment system, which can be accessed under the job advertisement on Aarhus University's website.

Aarhus University

Aarhus University is an academically diverse and research-intensive university with a strong commitment to high-quality research and education and the development of society nationally and globally. The university offers an inspiring research and teaching environment to its 38,000 students (FTEs) and 8,300 employees, and has an annual revenues of EUR 935 million. Learn more at www.international.au.dk/