

Title

PhD scholarship in Sustainability Assessment of Single Cell Proteins – DTU Biosustain

The FrameBio PhD candidate will address a key knowledge gap by systematically quantifying the economic, environmental, and social sustainability performance of alternative protein products based-on biotechnological conversion processes.

PhD Description

If you are motivated to guide innovation by developing novel methods, frameworks and tools for sustainability assessment of bio-based products and, by doing so, to contribute to a sustainable transition, you have it right here. As an internationally reputed elite university, DTU is at the forefront of innovation related to “the sustainable transition.” At the Novo Nordisk Foundation Center for Biosustainability (DTU Biosustain), we are specifically looking for new ways to support the sustainable production of bio-based products, and that is why we need you and all your good process simulation and sustainability assessment skills.

The FrameBio PhD project, is part of prestigious Marie Skłodowska-Curie Actions (MSCA) Doctoral Network, a collaboration between 16 partners in the EU, aiming to close a critical knowledge gap by quantifying the economic, environmental, and social sustainability of bio-based products for future food security and offering advantage over conventional agriculture-based alternatives. This project will pioneer the development of a high-resolution assessment framework that will revolutionise biotechnology by developing comprehensive computational modules that simulate microbial production of SCP and quantifying its resource dependencies across various scales.

Responsibilities and Qualifications

The project will contribute to a comprehensive, cradle-to-grave understanding of biotechnology sustainability, with a focus on developing open-source frameworks to predict the production schemes of host-feedstock-product combinations. The specific aim being development of Data-driven production process enumeration framework for SCP production, to benchmark economic, environmental and socio-economic performance.

The PhD candidate will

- Develop an adaptable process simulation framework to bridge experimental outcomes with enumerated production schemes.
- Develop conceptual bioprocess schemes for feedstocks suitable for direct use in biotechnological production.
- Build detailed mass and energy inventories for fermentation-based systems (solid-, liquid-, and gas-state) to enable accurate and systematic sustainability assessments.
- Rank the generated schemes based on sustainability performances.
- Develop an automated workflow to generate conceptual process parameters for Gas-based and Liquid State production schemes to produce SCPs.
- Deploy a comparative assessment of model performance at various TRLs
- Tested performance difference between modes of production (solid and liquid) in terms of Gate-to-Gate, sustainability impacts.

This development will offer a unique opportunity for international collaboration (with planned secondments at labs and pilot plant facilities) in the fields of bioprocess engineering and quantitative sustainability assessment.

Our expectations of you

- You must have a two-year master's degree (120 ECTS points) or a similar degree with an academic level equivalent to a two-year master's degree in chemical engineering, biochemical engineering, environmental engineering or related disciplines.
- Strong analytical and quantitative skills.
- Experience (via master's project or/and experience) with Techno-Economic Analysis (TEA) and Bioprocess Modeling (Conceptual process simulations) is a major requirement for this position.
- Familiarity with both GUI-based process simulation tools (e.g., Aspen Plus, SuperPro Designer), and Open-Source Python-based tools such as BioSTEAM and Brightway LCA Software are required.
- Excellent communication skills in English, and willingness to work in an international, interdisciplinary team.
- Openness to research visits and collaboration with partner institutions in Mexico.
- Ideal candidate must have outstanding communication skills with ability to present results to multiple expert and non-expert stakeholders.

Approval and Enrolment

The scholarship for the PhD degree is subject to academic approval, and the candidate will be enrolled in one of the general degree programmes at DTU. For information about our enrolment requirements and the general planning of the PhD study programme, please see DTU's rules for the PhD education.

We offer

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

Starting date is 1st April 2026 (or according to mutual agreement). The position is a full-time position.

The appointment will be based on the collective agreement with the Danish Confederation of Professional Associations. Furthermore, the PhD salary will be based on the Marie S. Curie compensation scheme conditions and according to the grant agreement. The period of employment is 3 years. Based on seniority the candidate will receive a minimum of DKK 29.701,83 (base salary) and 1551,00 (PhD supplement). In addition, DTU will also pay pension consisting of 18,07%. Finally, it is possible to apply for family allowance.

You can read more about [career paths at DTU here](#).

Your New Team - Sustainable Innovation Office

At DTU Biosustain, you will work in the Sustainable Innovation Office with support from a supervisor team from other DTU departments (Senior Researcher, Carina Loureiro da Costa Lira Gargalo) and Consortium partners (<https://cordis.europa.eu/project/id/101227645>). Our focus is to guide innovation at an early stage by assessing the benefits (society, economic and environmental) of developed bio-based technologies. We aim to develop computational tools

that provides insights to guide the research community in DTU and beyond to assess the sustainability of bio-based products. Our work environment is informal and characterised by knowledge sharing, respect, trust, and room for having an enjoyable time together – naturally balanced with creating tangible results. Now, we are just looking forward to welcoming you to the team.

If you would like additional information about the position, please contact supervisor and Hiring Responsible, Sumesh Sukumara via email, susu@biosustain.dtu.dk. You can read more about “the Department” at www.biosustain.dtu.dk

If you are applying from abroad, you may find useful information on working in Denmark and at DTU at DTU – Moving to Denmark. Furthermore, you have the option of joining our monthly free seminar “PhD relocation to Denmark and startup “Zoom” seminar” for all questions regarding the practical matters of moving to Denmark and working as a PhD at DTU.

Application procedure

Your complete online application must be submitted no later than 22nd December 2025 (23:59 Danish time).

Applications must be submitted as one PDF file containing all materials to be given consideration. To apply, please open the link "Apply now", fill out the online application form, and attach all your materials in English in one PDF file. The file must include:

- A letter motivating the application (cover letter)
- Curriculum vitae (highlighting relevant projects)
- Grade transcripts and BSc/MSc diploma (in English) including official description of grading scale
- If you are mentioning previous experience with python code-based simulations, please provide link to your repositories.

You may apply prior to obtaining your master's degree but cannot begin before having received it.

Applications received after the deadline will not be considered.

All interested candidates irrespective of age, gender, disability, race, religion or ethnic background are encouraged to apply. As DTU works with research in critical technology, which is subject to special rules for security and export control, open-source background checks may be conducted on qualified candidates for the position.

The Novo Nordisk Foundation Center for Biosustainability (DTU Biosustain)

Recent progress in our ability to read and write genomic code, combined with advances in automation, analytics and data science, has fundamentally changed the scope and ambition of harnessing the potential of biological systems. Big data approaches and analysis of biological systems are key research instruments at the Center. DTU Biosustain utilizes these advances for microbial cell factory design to foster sustainable lifestyles in relation to three application areas: Sustainable Chemicals, Natural Products, and Microbial Foods.

Technology for people

DTU develops technology for people. With our international elite research and study programmes, we are helping to create a better world and to solve the global challenges formulated in the UN's 17 Sustainable Development Goals. Hans Christian Ørsted founded DTU in 1829 with a clear mission to develop and create value using science and engineering to benefit society. That mission lives on today. DTU has 13,500 students and 6,000 employees. We work in an international atmosphere and have an inclusive, evolving, and informal working environment. DTU has campuses in all parts of Denmark and in Greenland, and we collaborate with the best universities around the world.