



© Aarhus University

Perspectives from Poul Nissen

Professor at Aarhus University
Director of DANDRITE
Chairman of the DANEMO steering group
EMBO Member

You have been an EMBO Young Investigator. How has this influenced your career?

I have been one scientist in the first cohort of EMBO Young Investigators and became an EMBO Member two years later. The experience was fantastic; it really opened the world for me. When I returned to Denmark and started my laboratory after postdoctoral research in the US, being introduced to great people from Europe was very nice. I met many people I still know and interact with, so it was a good start.

As a founding member of the EMBC, Denmark has been supporting life scientists throughout Europe since 1970. Could you talk about this long-term commitment?

It is widely recognized that Denmark is a co-founder. Today the EMBC membership is strongly supported in our ministry and research agency, and Denmark is seen as an active player that needs to move for the future. EMBO, and EMBL, have always been present, but in certain fields more strongly than in others. I am the founding director of the DANEMO initiative, which was launched last year.

It promotes the Danish membership of EMBC and EMBL and tries to ensure that all life science communities make best use of the opportunities.

What are the current trends in the life sciences landscape of Denmark?

Over the last 15 years, there has been a large growth and internationalization of the communities, and a self-recognition of their strength - coming from a 'small country attitude' with proud traditions in certain areas and now being a big player in general. That is very important mentally for confidence and ambition level. Integration of data is also high on the agenda. We have a lot of activities in genomics, bioinformatics and parts of structural biology and cell biology, and these fields really want to integrate now.

Are there any challenges?

The challenge, like for everyone, is the competition for great ideas and great questions to pursue, so recruitment is key. Language is a barrier for any small country with a unique language. It is not a large issue, because everyone speaks English, but undergraduate teaching is typically in Danish, which can scare some, and attracting talent is perhaps easier for institutions in the US or UK. We also have some unique structures at our universities with very little, if any, base funding. There is a lot of research funding available here, but scientists do not get it with their position and must apply for external grants. This also means that our universities cannot offer much besides a position.

What opportunities are available for life scientists in Denmark?

Denmark is a big life science research nation. There are many programmes to support scientists establishing groups, and the country is very attractive to set up a research programme or academic career. It also has a lot of life science industry, so it is attractive for startups. People see starting a company or industry research as another career path. We have a lot of career opportunities on offer down the road.

We do a lot in genomics and registry-based research, which now clearly invites integration with various 'omics'. We have a strong tradition in biotechnology, a field in which many of the biggest companies in the world are Danish, and biochemistry. We have a big pharma industry. Structural biology is strong in Aarhus and also in Copenhagen. I cannot point to a field that is not well-represented, because the community is big - in part, because many large companies are owned by foundations that support society through funding schemes for the life sciences and other areas of research.

What role does EMBO have in supporting researchers in the country?

Its role is increasing. Previously, it was a bit difficult to attract people to Denmark for EMBO Postdoctoral Fellowships. Now the fellows get salaries, and not stipends, and that has made the programme more attractive. We do use the scientific exchange grants a lot. They expose Danish students to opportunities in other countries and bring technology back to our laboratories. Through DANEMO we also hope to strengthen the visibility of the young investigator programme and that some of the group leaders we attract can join this fantastic network. The EMBO Workshops are important, too. Having the EMBO stamp is helpful for organizers.

What advice would you give to an early-career scientist starting in Denmark?

Have an open mindset about how you continue your career. The academic path is only one way of having great fun in research. There is also fantastic research in startups and industry, with opportunities for group leaders, postdoctoral researchers and students. Research, in particular in the life sciences, is not only about publishing in high impact journals, but also about making an impact on society by new solutions and applications in green technologies and medicine.

Meet scientists from the EMBO communities



Giulia Fabbri Finding support and inspiration in Copenhagen

PhD student at the University of Sassari, Italy | EMBO Scientific Exchange Grantee at the GLOBE Institute at the University of Copenhagen

Giulia Fabbri's PhD project focusses on the genetic make-up of wild boar and wolf populations on Sardinia and in mainland Italy. "I want to understand why these populations are genetically very different from all other populations in Europe," she explains. "One theory we have is occasional mixing and breeding with individuals of their domesticated forms, i.e. pigs and dogs. We are looking for evidence of this in the genomes of the wild forms." Her group's research in Italy aims to inform conservation measures.

At the GLOBE Institute, where she is an EMBO Scientific Exchange Grantee, Fabbri has been taking a deeper dive into her data to explore the evolution of the populations. "I have realized I am really interested in genome assembly and the evolution of these populations. Being in Copenhagen has



Susanne Mandrup Nature, balance and connectivity

Professor and Director of the Center for Functional Genomics and Tissue Plasticity and the Center for Adipocyte Signaling | Head of the Functional Genomics & Metabolism Research Unit at the University of Southern Denmark | EMBO Member

Susanne Mandrup says she appreciates the excellent Danish healthcare and social system and the respect for family life. "We're a bit spoilt!" she says. She also loves being close to the sea: "I couldn't imagine living far from the coast. It's relaxing and humbling to walk by the sea."

opened up new possible future research directions." Coming from a small group in Italy, Fabbri is also enjoying the support and sense of community she has found. The weekly lab meetings in which challenges are discussed have been particularly helpful. She is keen to keep in touch once she heads back to Sardinia: "We have so many ideas on the table we want to develop!"



Particularly characteristic of Danish research is the significant funding contribution from private foundations, says Mandrup: "This a great asset to Danish research." This contribution has increased considerably over the last decade or so, she adds, especially in biomedicine. Mandrup, an EMBO Member since 2017, says EMBO events have been some of her favourites: "EMBO Courses & Workshops are always just the right size, very interactive and with a highly international crowd."

Mandrup's lab at the University of Southern Denmark in Odense studies how transcriptional networks drive adipocyte differentiation and control adipose tissue plasticity. "We want to determine adipocyte function in the complex tissue context and understand how molecular changes in adipocytes impact human health," she explains. Interdisciplinary collaboration is a hallmark of Mandrup's research; as director and initiator of several centers and research units, her group works with academic and clinical groups across Denmark and beyond.



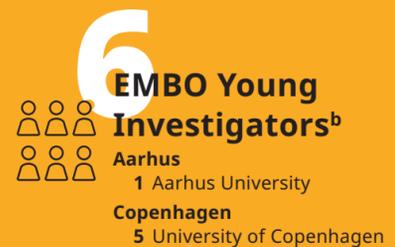
Nicolás Nieto Moreno At the heart of the action

EMBO Postdoctoral Fellow at the University of Copenhagen

Nicolás Nieto Moreno studies the mechanisms of transcription during DNA damage. "When a transcribing RNA polymerase II runs into a bulky DNA lesion, such as those induced by UV light, it gets stalled," he explains. "I am exploring whether RNA polymerase II stalling signals global changes in transcription." In his lab at the University of Copenhagen, he can learn techniques that were not available in his previous lab in Argentina, such as genome-wide analyses and mass spectrometry. "It's great that I can widen my skill set," he says.

In Denmark he feels at the centre of the research world, from faster delivery time for supplies to building collaborations across Europe. "I meet people I only knew from names on papers!" he says. His lab is part of one of several university research centres. Joint seminars encourage exchange. Nieto Moreno, who moved from Buenos Aires with his partner in 2020, says the move has been a big but positive change: "Copenhagen is small, but it has everything, and we bike everywhere. We're very happy here." The international network of the university and EMBO have been a great support too: "Argentina is far away. The relocation allowance from EMBO was crucial."

Denmark and EMBO in numbers



EMBC Delegates

Kaare Teilum
Associate professor, University of Copenhagen

Michael Sandgreen
Head of Section, Danish Agency for Higher Education and Science

The EMBO Programmes are funded by the European Molecular Biology Conference (EMBC), an inter-governmental organization that comprises 30 Member States. Denmark is a founding member.



^a working in Denmark
^b current programme member, working in Denmark
^c 2016–2020

Opportunities in Denmark

EMBO Postdoctoral Fellowships

fund scientists to carry out research for a period of up to two years. International mobility is a key requirement. Applications open all year around.

EMBO Scientific Exchange Grants

support new, international collaborations, enabling the transfer of expertise unavailable in the applicant's laboratory. They fund research visits of up to three months. Applications open all year around.

EMBO New Venture Fellowships

help early career scientists to explore topics outside their current area and prepare to enter a new research direction. They fund research visits of up to three months. Application deadline: 2 May 2022.

EMBO Core Facility Fellowships

support training for staff of core facilities that provide services to research institutions or universities. They fund international exchanges of up to one month. Applications open all year around.

The EMBO Young Investigator Programme

supports group leaders in the early stages of setting up their independent laboratories for a period of four years. Networking is a key aspect of the programme. Application deadline: 1 April.

EMBO Practical Courses

provide training in new techniques for researchers and core facility staff. Application deadlines: 1 March and 1 August.

EMBO Workshops

bring together scientists to present and discuss their latest discoveries. Application deadlines: 1 March and 1 August.

The EMBO Gold Medal

is awarded annually to young scientists for outstanding contributions to the life sciences in Europe. Awardees receive 10,000 euros and a hand-crafted medal. Nomination by EMBO Members; deadline: 1 February.

EMBO Press

publishes five journals that serve the global life science community: *The EMBO Journal*, *EMBO Reports*, *EMBO Molecular Medicine*, *Molecular Systems Biology*, and *Life Science Alliance*, which is published in partnership with Rockefeller University Press and Cold Spring Harbor Laboratory Press.

embo.org
Information as of January 2022
Contact: communications@embo.org
Cover: Original image courtesy of Ronald Wong

Facts and figures

Gross expenditure on research and development in Denmark is around 3% of GDP², about two thirds of which come from the private sector². The life science industry accounts for more than 50,000 jobs and around 22% of the Danish product export, making it one of the country's largest export industries⁸.

Life science clusters, such as the Danish-Swedish Medicon Valley, bring together universities, clinics and companies, and allow access to the large-scale research infrastructures MAX IV and European Spallation Source in nearby Lund, encouraging innovation and cross-disciplinary research in biomedicine and biotechnology⁹. Denmark carries out more clinical trials per capita than any other OECD country¹⁰. In a recently published strategy for life science, the Danish government reiterated the dedication to the sector with concrete initiatives to, for example, enhance sustainable growth and strengthen partnerships⁸.

Denmark has a high level of employment and secondary education attainment with 81% of adults having completed secondary school¹¹. It has 38 higher education institutions, including eight universities and seven university colleges⁶, and more than 600 courses taught in English¹². The University of Copenhagen is one of the largest research and education institutions in Scandinavia⁶. Teaching and learning in Danish higher education institutions emphasizes innovation and collaboration¹³. Higher education is free for students from the EU. Annual fees of around 6,000–16,000 euros apply for students coming from outside the EU, however, a limited number of scholarships is available, too¹⁴. Approximately 11% of students come from outside Denmark⁵.

Sustainability is also a large part of Danish life: The country has a national bike path network of 12,000 km¹⁵, 50% of the energy comes from renewable

sources¹⁶, and the Danish government launched an ambitious green research and innovation strategy in 2020¹⁷.

Key figures

Population: 5.8 million¹

R&D spending: 3% of GDP²

Patents: 2,404 in 2020³

Researchers: 86,743⁴

International students: 11%⁵

Universities: 8, and 7 university colleges⁶

Horizon 2020 funding:

2,892 projects, 188 ERC principal investigators⁷

References

1. Statistics Denmark: Population figures <https://www.dst.dk/en/Statistik/emner/borgere/befolkning/befolkningstal>
2. Statistics Denmark: Research and development <https://www.dst.dk/Site/Dst/Udgivelser/GetPubFile.aspx?id=28924&sid=dkinfigures2019>
3. European Patent Office: Press release 16.3.2021 <https://www.epo.org/news-events/press/releases/archive/2021/20210316.html>
4. Statistics Denmark: R&D employees <https://www.statbank.dk/RDCP0129>
5. Danmarks videnhandelsbalance https://ufm.dk/publikationer/2020/tiler/2020-03-videnhandelsbalance-sammenfatning-final_www.pdf
6. Study in Denmark: Higher Education Institutions <https://studyindenmark.dk/study-options/danish-higher-education-institutions#universities>
7. H2020 Country Profile: Denmark <https://webgate.ec.europa.eu/dashboard/sense/app/a976d168-2023-41d8-acec-e77640154726/sheet/0c8a38b-b73c-4da2-ba41-73ea34ab7ac4/state/analysis/select/Country/Denmark>
8. Agreement on a strategy for life science <https://www.healthcaredenmark.dk/media/67609/agreement-on-a-strategy-for-life-science.pdf>
9. Work in Denmark: Life Science <https://workindenmark.dk/life-science>
10. Healthcare Denmark <https://www.healthcaredenmark.dk/life-science/denmark-a-life-science-nation/r-d-and-innovation-key-to-future-healthcare/easy-access-to-clinical-trials/>
11. OECD Better Life Index <https://www.oecdbetterlifeindex.org/countries/denmark/>
12. Study in Denmark: Study in English <https://studyindenmark.dk/why-denmark/excellence-in-education-1/study-in-english>
13. Study in Denmark: High academic standards <https://studyindenmark.dk/why-denmark/excellence-in-education-1/high-academic-standards>
14. Study in Denmark: Tuition fees <https://studyindenmark.dk/study-options/tuition-fees-scholarships>
15. Denmark.dk (Ministry of Foreign Affairs): Quick Facts about Denmark <https://denmark.dk/quick-facts>
16. Denmark.dk (Ministry of Foreign Affairs): Pioneers in clean energy <https://denmark.dk/innovation-and-design/clean-energy>
17. Ministry of Higher Education and Science: Green research strategy <https://ufm.dk/forskning-og-innovation/indsatsomrader/gron-forskningstrategi>

Focus on Denmark

