Perspectives from Marja Makarow

Director of Biocenter Finland
Former EMBC President,
former Finnish EMBC and EMBL Delegate

You are a molecular cell biologist and have taken up several roles in research policy or governance, including at the EMBC. What was your motivation for this path?

After my PhD at the University of Helsinki, I got an EMBO Fellowship for postdoctoral research in cell biology with Kai Simons at EMBL. I learned that an international community with diverse ideas and backgrounds, state-of-the-art infrastructure and flat hierarchies supports quality research. I had the opportunity to model the EMBL concept when I was in charge of establishing the Institute for Molecular Medicine Finland (FIMM), one of the Nordic EMBL partnership institutions.

While being a PI and member of the Medical Research Council in Finland, I was appointed as Finnish scientific Delegate to EMBL Council as well as EMBC, and later I became EMBC President. I started to see something else than just my research domain and became interested in this wider view. When I became Vice President for Research of the University of Helsinki I started to learn about research cultures in different disciplines. It was like a wakeup call. I decided I will not go back to the bench and my professorship, but serve the entire scientific and scholarly community. Afterwards, I was Chief Executive of the European Science Foundation (ESF) in Strasbourg. As ESF funded research and coordinated across 30 member countries, I got a European view of all disciplines.

Then I came back to Finland and was appointed Vice-President of the Finnish Research Council – Academy of Finland. In July 2016 I started my five-year position as Director of Biocenter Finland where I focussed on life sciences again. I was in the Prime Minister's Research and Innovation Council where we directly affected legislation and decisions on targeting of funds. I was also on the advisory boards of the Commissioner of Research and the European Innovation Council of the EU. It is inspiring, and a privilege, to be able to influence, but it also carries a lot of responsibility.

You are currently Director of Biocenter Finland. Can you explain more about it?

Biocenter Finland is an umbrella organization owned by the six Finnish universities with life science and medical faculties. We operate 15 technology platforms with expensive instruments and highly trained staff. They are openly accessible to the entire life sciences community of 17,000 researchers. I would say all frontier molecular biologists use them, including half of Finland's ERC grantees. We have a fantastic adviser: Professor Heldin, Chairman of the Board of the Nobel Foundation and former Chair of the EMBO Council, is the chair of our scientific advisory board.

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

One important trend is the move to translation of findings from fundamental research to benefit society. The research council has traditionally not funded translation. But over the past few years, it has also been taken into consideration how research findings can be applied.

Has this created new opportunities for life scientists?

A good example is the Flagship programme. The applicants must describe how they translate their findings into benefits for society. The programme has ten Flagships including several in the life sciences. Technology Academy Finland (TAF) awards the one million euros Millennium Technology Prize for research-based groundbreaking innovations every two years. Chairing the board of TAF has given me a global insight into the community of researcher-innovators.

Are there any challenges?

The budget of the research council is foreseen to be seriously cut. But even when we had a relatively good level of funding, the research infrastructure budget always was too small. This challenge relates to the EMBC and EMBL membership of Finland: As we don't have everything, we depend on partnerships and access to infrastructure elsewhere. Therefore, the fantastic EMBL infrastructure and the EMBO fellowships, that give people access to infrastructure where they carry out postdoctoral research, are so important.

Another challenge is that we have a high number of PhD graduates every year. We have to ask: What are the environments beyond academia that can absorb them? Too many want to stay in academia, though we should also be able to absorb them into the public and private sectors.

What role does EMBO have in supporting researchers in Finland?

EMBO grants are truly important for life scientists in Finland to get the essential experience in a foreign environment. Young Finnish life scientists should be more interested in going abroad and in applying for an EMBO grant. More scientists could take up these opportunities, but whether they grasp them is an individual choice.

Meet scientists from the EMBO communities

Johanna Ivaska
International and interconnected

Cancer Researcher and Professor of Molecular Cell Biology, University of Turku, and EMBO Member

Asked what she likes most about being a researcher in Finland, Johanna Ivaska points to a great working environment, international connections, and stunning nature. "Finland is small, but it is very collaborative – the level of science and core facilities are excellent," says Ivaska, who is Professor at the University of Turku Bioscience Center and a native Finn. "Things also function well, you can have a great work-life balance and Finland is amazing in every season – many foreign researchers end up staying for years."

Ivaska leads a multidisciplinary team of 17 researchers that studies how integrins contribute to cancer. "We want to know how cancer cells interact with their environment," she explains. "Cancer progression involves intense cross-talk between tumours and surrounding tissue, affecting every aspect from initiation to spread and drug sensitivity. We carry out both fundamental and translational research. It's exciting to combine unexpected discoveries with learning how drugs are developed."

Elected an EMBO Member in 2015, Ivaska benefited from being an EMBO Postdoctoral Fellow and EMBO Young Investigator in the past. "These were some of the most important experiences in my career, connecting me with excellent peers and providing great visibility," she says. "EMBO fellowships have also been pivotal in bringing scientists to my team and enabling team members to collaborate with other groups."

Yilin Kang
From bench to bedside

Postdoctoral Research Fellow, University of Helsinki, and EMBO Postdoctoral Fellow

EMBO Postdoctoral Fellow Yilin Kang says passion, positivity and a life-long ambition to work in both fundamental and translational research guided her decision to move from Australia to Finland. "My research always focused on mitochondria, the powerhouses of cells – I became interested in their role in innate immune defense," says Kang, who is a postdoctoral researcher in the lab of Anu Suomalainen-Wartiovaara, an EMBO Member. "Mitochondrial disease manifests in different ways and life stages, we still do not completely understand how and why. When I met Anu at a conference, I heard how her group is exploring and translating fundamental research into diagnoses, therapies, and counselling for patients. I leapt at the chance to come here."

Kang's fellowship provides skills and connections that will benefit her science long into the future. "The EMBO Postdoctoral Fellowship enabled me to move across continents, follow my passions, and expand my network," Kang says. "It was also important to find a group leader who is an inspiring mentor. Anu has a constant positive energy that keeps her students motivated, and my group is really supportive and diverse. In Finland, I see many women in leadership roles. The country has a superb scientific environment and social welfare system. It's great to be here."

Ankur Gadgil
New directions

Visiting PhD Student, University of Eastern Finland, and EMBO Short-Term Fellow

A fruitful exchange of ideas led EMBO Short-Term Fellow Ankur Gadgil's research from neurological disorders to cancer, connections he is now exploring at the University of Eastern Finland. "My project is focused on how genetic mutations in FUS proteins affect the function of ribonucleoprotein complex which contributes to amyotrophic lateral sclerosis (ALS)," says Gadgil, who is a PhD student at Adam Mickiewicz University in Poznan, Poland. "I met a postdoctoral researcher from the University of Eastern Finland during a poster session. We wondered if similar mechanisms might also contribute to prostate cancer and put together a project proposal."

Gadgil settled quickly into life in Kuopio, where he is spending three months. "I am in a growing team. If I want to go into industry or start a lab, I will really benefit from my experiences here. I am making a lot of international connections – EMBO does a fantastic service to life sciences. It's been an amazing opportunity. Apart from my scientific ambitions, another dream is to build a school in India – the Finnish education system is amongst the best in the world and I want to see how they do things and take inspiration."

Finland and EMBO in numbers

25 EMBO Members[a]

Helsinki
18 University of Helsinki
1 Wihuri Research Institute

Turku
1 Abo Akademi University
1 Center for Biotechnology
1 University of Turku

Oulu
1 University of Oulu

Tampere
1 Tampere University

1 Retired

3 EMBO Young Investigators[b]

Helsinki
2 University of Helsinki

Turku
1 Centre for Biotechnology

4 EMBO Courses & Workshops[c]

2 Practical courses
2 Conferences

401 Participants
359 Finnish nationals attended EMBO Courses & Workshops throughout Europe

12 EMBO Postdoctoral Fellowships[c]

2 Coming to Finland
from Germany, Australia

10 Going abroad
to US, Austria, France, Netherlands, Switzerland, Denmark, Spain

29 EMBO Scientific Exchange Grants[c]

16 Coming to Finland
from Norway, Hungary, Turkey, UK, Italy, India, Spain, Germany

13 Going abroad
to Germany, Austria, UK, Sweden

EMBC Delegates

Johanna Myllyharju
Professor at Biocenter Oulu and Faculty of Biochemistry and Molecular Medicine, Oulo

Sirpa Nuotio
Senior Science Adviser at Academy of Finland, Helsinki

The EMBO Programmes are funded by the European Molecular Biology Conference (EMBC), an inter-governmental organization that comprises 30 Member States. Finland has been an EMBC Member State since 1977.

a working in Finland
b current or former, working in Finland
c 2015–2019

EMBO opportunities

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: 1 June 2021.

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 provides funding and assists event organizers in promoting events and creating webpages. Lecture and childcare grants are also available.

EMBO Practical Courses

provide practical 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.

EMBO|FEBS Lecture Courses

cover topics in biochemistry, molecular biology and related areas. They are jointly funded by EMBO and FEBS. Application deadline: 1 March.

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.

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Focus on Finland

EMBO

Facts and figures

Finland has a world-renowned education system[1], with no tuition fees up to postgraduate level. A large proportion of Finland's labour force holds a tertiary education degree[2] and there is a high number of doctoral graduates[3].

Finland is home to around 17,000 life scientists[4]. The country is especially strong in fields such as neuroscience, cancer, structural biology, bioinformatics, and genetics. Scientists benefit from a network of public organizations that works closely with research institutions and the private sector.

Gross expenditure on research and development (GERD) in Finland in 2019 was 2.8% of GDP[5]. Business enterprise financed 54.3% of GERD expenditure, the Finnish government's share was 27.8%, and 15.5% was funded from abroad[6]. Researchers based in Finland have been successful in obtaining funding, through Horizon 2020 projects, European Research Council grants and Marie Skłodowska-Curie Actions[7], and from EMBO[8]. Initiatives such as Biocenter Finland open up access to technology platforms to researchers across the country.

In 2020, the European Patent Office granted 1,565 patents with first patentees residing in Finland[9]. Finland has one of the world's largest prizes for science-based innovations, the Millennium Technology Prize, awarded every two years by the Technology Academy Finland.

The government has set out an ambitious roadmap to increase GERD to 4% of GDP by 2030[10]. This includes targets to attract international talent and funding.

Key figures

Population: 5.5 million[11]

R&D spending: 2.8% of GDP[5]

Life Scientists: ~ 17,000[4]

Foreign researchers: 12% of researchers employed in Finland[2]

Patents: 1,565[9]

Universities: 13 with 153,000 students annually[12]

Universities of Applied Sciences: 22 with 145,000 students annually[12]

Horizon 2020 funding: 3,208 organizations and 595 SMEs involved in H2020 projects[7]

144 ERC Principal Investigators[8]

241 Marie Skłodowska-Curie Actions funded researchers[7]

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