

Press release

Excluded from Horizon Europe

Are these the last ERC grants for ETH?

Zurich, 10 January 2022

In the last application process for the sought-after ERC Starting Grants, the European Research Council made 11 awards to ETH researchers worth about CHF 17 million. Due to Switzerland's non-association, however, the researchers will not receive these grants. The funds will now be provided by the State Secretariat for Education, Research and Innovation (SERI).

An ERC Starting Grant from the EU Research Council (ERC) is one of the best things that can happen to a young researcher. Researchers whose projects are selected in the ERC's highly competitive procedure receive not only international recognition, but also substantial funding for their project. A total of 11 ETH researchers succeeded in convincing the jury with their projects in 2021 (see brief descriptions below). However, they will now no longer receive the funding from the ERC. This is because one of the conditions of application for the grants is that the researchers must work at a university that belongs to the ERC's European Research Area. Due to the failed framework agreement, Switzerland is excluded from the Horizon Europe research programme until further notice.

Choosing ETH

"We are now starting to see the direct effects of our exclusion from Horizon Europe. The first to be affected are the highly talented researchers at the beginning of their research career," says Detlef Günther, Vice President for Research at ETH Zurich. In addition to ERC Starting Grants for young researchers, Switzerland will in future also be denied access to other EU funding and ERC grants that support established researchers. As things currently stand, almost all the researchers who had been awarded grants have decided to stay at ETH or come to ETH in spite of everything. This is due not least to the excellent facilities and good conditions that ETH can offer, says Günther. He emphasises: "We very much appreciate the work of the European Research Council and our involvement in the European research network so far – for example, in the EU Quantum Flagship and the IDEA League – and would love to see it continue. For us, it's clear that we would like to maintain our close connection with the European Research Area."

SERI takes over the funding

However, the researchers will still receive the funding, as the State Secretariat for Education, Research and Innovation (SERI) has decided to replace the ERC Starting Grants, at least financially, with its own payments. “We are very grateful to SERI for its unbureaucratic response in enabling researchers here in Switzerland to benefit from the funds that would have been provided by the ERC. It is a great relief in this difficult situation and helps ETH to keep these talented researchers in Switzerland.”

Nevertheless, Günther points out: “The future is uncertain, and it remains to be seen whether researchers will be deterred from coming to Switzerland if they know from the outset that their research proposals will no longer be considered by the ERC Research Council and that they will be excluded from European research funding.” The fact that the Swiss National Science Foundation is extending grants of equal value is important, but these cannot replace international competition. The primary goal, says Günther, must be for Switzerland as a research location to quickly re-establish its full association with European research funding.

All projects at a glance

Is the main difference between humans and machines that humans understand and seek justice, while machines don't? For lawyer, economist, and ETH professor **Elliott Ash**, this view is too limited. Rather, he assesses that artificial intelligence technologies can be used to better understand the human concept of justice and to make judicial decisions fairer. Human judges, for instance, can be biased or influenced by political pressures. Transparently designed machine systems can help detect and mitigate such biases. In his project, Ash will develop new measurements of fairness based on artificial intelligence systems. These measurements could support judges in their decision-making.

Certain environmental exposures can affect not only directly exposed individuals but also their children and grandchildren. This is known as epigenetic inheritance. Researchers have so far mainly investigated mechanisms that are related to chemical markers on the DNA and RNA molecules that are passed from sperm to egg during fertilisation. In the now funded project, **Katharina Gapp** aims to investigate another theoretically possible epigenetic mechanism: stress receptor proteins that interact with DNA in sperm and can influence the next generation. The ETH scientist plans to investigate and describe this mechanism in mice in detail. This could lead to a better understanding of the inheritance of stress-induced neuropsychiatric diseases and, in the longer term, to new therapeutic approaches.

Mechanical engineer **Andreas Güntner** is specialised in the development of nanotechnology-based sensors that measure volatile molecules, even at low concentrations. He was a research group leader at ETH Zurich and is now working at the University Hospital Zurich and in the ETH Zurich spin-off Alivion, which he co-founded. In the project now being funded, he aims to explore new manufacturing methods and materials to develop a new generation of highly sensitive sensors that can be integrated into smartphones or other portable devices. This would enable users, for instance, to monitor their metabolism via volatile compounds in their breath or to detect toxic substances in the ambient air or food.

Bacteria are able to take up DNA from the environment and integrate it into their genome. Molecular biologists call this phenomenon natural transformation. In this way, microorganisms can acquire resistance to antibiotics from other bacteria, for example. Although the phenomenon was discovered

almost 100 years ago, its molecular mechanisms remain largely unknown. In the now funded project, ETH professor **Manuela Hospenthal** will decipher the mechanisms of natural transformation and the three-dimensional structure of the proteins involved. She will accomplish this using cryo-electron microscopy and other techniques.

Political scientist **Matthias Leese** investigates the data quality in databases of European law enforcement and border control authorities. These databases – which include the Europol and Schengen information systems – are important for security in Europe. However, if the data stored in them are inaccurate or out of date, this can have severe implications for operational effectiveness and the fundamental rights of citizens. Leese's project will explore the data handling practices of security organisations as well as their awareness of data quality issues. He will use his findings to develop data handling recommendations for practitioners.

Thermoelectricity uses temperature differences to generate electricity. Today's thermoelectric generators require materials that simultaneously have high electrical conductivity and low thermal conductivity. However, these requirements are usually mutually exclusive. In his project, **Mickael Perrin** will develop a novel thermoelectric generator that overcomes these limitations by decoupling the electrical circuit from the thermal one. Perrin, currently a research associate at Empa, will move to ETH Zurich as an assistant professor and will use both ETH Zurich and Empa facilities for his research.

Paolo Sossi, SNSF Ambizione Fellow at ETH Zurich, seeks to understand how the Earth and other planets formed. He combines experimental, spectroscopic and theoretical approaches to study the growth of planets from dust grains into complex bodies. In his project, he will link the composition of planets in our Solar System to the composition of their atmospheres. To this end, he will simulate miniature planets and their atmospheres in the laboratory by making spheres of magma that float on gas streams. The aim is to assess the uniqueness of Earth in the ever-growing kaleidoscope of exoplanets and to determine the conditions under which life can arise on planets.

Computer scientist and ETH professor **Julia Vogt** is exploring machine learning at the interface of its theoretical foundations and its applications in medicine. In her project, she will develop new machine learning methods and applications that are highly trusted by physicians and are therefore used more frequently than current systems. Many of today's systems function as a "black box" and are therefore deemed as lacking in trustworthiness by medical professionals. Two concrete applications that Vogt would like to realise in her project are systems to detect heart defects in newborns and to predict diabetes in children at an early stage.

AI is being used in more and more areas of our lives. **Ce Zhang**, assistant professor at the Department of Computer Science, wants to make these technologies easily accessible and trustworthy for everyone. The challenge is that many current applications do not meet the requirements of trustworthy AI. At the same time, many findings about trustworthy AI relate to individual subsystems, although in everyday life AI systems are often embedded in complex data-centric environments. Zhang wants to extend trustworthy AI to include these complex real-world scenarios in his project. In addition to theoretical foundations, he will also work with industry partners to develop practical methods for system optimisation.

The mathematician and ETH professor **Pierrick Bousseau** has also successfully obtained an ERC Starting Grant in which he will investigate mathematical conjectures from theoretical physics. However, he will not be doing this at ETH Zurich, but will move to the Laboratoire de Mathématiques d'Orsay at the CNRS in France.

Materials scientist **Mengxia Liu** was working as a postdoc at the University of Cambridge until the end of 2021. She has successfully obtained an ERC Starting Grant with the support of ETH Zurich. However, she is now taking up a professorship at Yale University, which is why she will forgo the funding for her ERC project.

Further information

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