

Press Release

Five ERC Advanced Grants for ETH Researchers

First-class ETH researchers with a strong European image

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In its latest awarding process for the prestigious ERC Advanced Grants, the European Research Council (ERC) has selected five ambitious projects being conducted by ETH Zurich researchers who have been at the top of their respective fields for many years. As a result, ETH will receive approximately 12.5 million euros in research funding.

As part of the call for the prestigious ERC Advanced Grants launched in 2018, five experienced professors from ETH Zurich have been selected – Andy Jackson (Geosciences), Ilya Karlin (Aerothermochemistry), Dirk Helbing (Sociology) and Erick Carreira and Peter Chen (Organic Chemistry). As previously, we can also confirm that ETH researchers have been extremely successful with their applications for funding. Seven of the fourteen proposals made it through to the second round. Five applications were ultimately successful, which equates to a success rate of just under 36 percent. Each of these researchers will receive 2.5 million euros for their respective projects through these grants. This result is also impressive when compared with the number of successful entries from across Switzerland, as ETH provided five of the eighteen successful proposals put forward from Switzerland, i.e. more than a quarter.

Chemistry, geosciences and sociology

This time, three of the funded projects being carried out at ETH Zurich will focus on basic chemical research, the findings of which could be key for the development of new molecules and materials. In addition, one project will focus on how cities can be designed with the help of their residents in the future and another project will conduct research into planetary magnetic fields.

In this round, the ERC received 2052 proposals from all over Europe. A total of 222 researchers were awarded a grant, which equates a mere 11 percent of the submitted proposals. The successful candidates can now look forward to receiving a great deal of support, with the ERC handing out over half a

billion euros in Advanced Grants. In its media release, the ERC revealed that it expects this round of grants to help create up to 2000 new jobs.

A barometer for the quality of ETH research

Detlef Günther, ETH Vice President for Research and Corporate Relations, is extremely impressed that ETH scientists from a wide range of fields regularly demonstrate that they carry out first-class research in Europe. “My colleagues have repeatedly secured ERC Grants in an extremely competitive international environment. This remarkable success speaks for the relevance and strength of the entire spectrum of ETH research.”

In order to maintain this high level, however, researchers from Switzerland still needed the full support of politics and society as well as unhindered access to the European Research Area, emphasised the ETH Vice President: “This is why the country’s position towards EU politics which Switzerland is currently discussing is so important. The debate is also focussing on the significance of cutting-edge research for the country and the openness of Switzerland as a centre of education, research and innovation – and thus the country’s future.”

The five projects at a glance:

With his ERC project, geophysicist **Andy Jackson** aims to investigate dynamo mechanisms: mechanisms that generate magnetic fields in the cores of rocky planets and gas giants. To simulate these processes, which are not yet fully understood by earth scientists, Jackson wants to develop a new computer model that will be less complex and therefore well-suited to researching the mechanisms. This will help him to investigate reversing dynamos, as found on Earth, and the processes that underlie this phenomenon. He also wants to gain a better understanding of the energy requirements of such dynamo mechanisms and how quickly planet cores cool down. Furthermore, he wants to be able to predict the future development of the Earth’s magnetic field more precisely.

The digital revolution and sustainability requirements are changing the way cities are organised. One approach to this is smart cities. In his research project, **Dirk Helbing** and his Computational Social Science team are now investigating what is needed to make smart cities more efficient, sustainable and resilient. The researchers focus on the benefits and risks of greater democratic participation in smart cities. They are asking how a decentralised, participatory approach can be more efficient and sustainable than a fully centralised approach. For Dirk Helbing, this is the second ERC Advanced Grant after 2013.

For biology and medicine, the fact that two mirror-image chemical molecules do often not have the same properties plays an important role. **Erick Carreira**, a professor of Organic Chemistry, is investigating how chemical reactions can be controlled so that only one of two theoretically possible mirror-image molecules is formed. In his ERC project, he aims to develop new chemical reactions with which he can attach functional groups to feedstock molecules – in a way that controls asymmetry. These groups enable chemists using the molecules for further elaboration in particularly sustainable processes. Scientists will benefit from such conveniently accessible molecules to generate compounds such as medicines and smart materials.

Ilya Karlin is adjunct professor and group leader at the Aerothermochemistry and Combustion Systems Lab. In his research, he is interested in the dynamics of liquids and gases. Using his 2011 ERC Advanced Grant, he established powerful computational methods for the simulation of turbulent flows that can be observed in phenomena like fast-flowing rivers and storm clouds. With his new Grant, Karlin and his team will expand this approach to high-speed flows that can be applicable to situations such as a space capsule reentry into the planetary atmosphere, where enormous speeds and temperature variations typically occur. Precise simulations of this process could help to make space travel safer.

Peter Chen is a professor of physical-organic chemistry and investigates the interactions between atoms and between individual molecules. His ERC project aims to use ion trap mass spectrometry to investigate in detail, and quantitatively, a specific interaction that is important in chemistry – the London dispersion force that acts between two polarizable molecules. Essential parts of the project are the construction and operation of this state-of-the-art instrumentation and the development and synthesis of molecules with which this interaction can be investigated. The results of the project will help to understand how complex chemical molecules interact in three-dimensional space – an important aspect when it comes to designing new molecules.

Further Information

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Benchmark for top researchers: ERC Grants

ETH researchers have been successfully applying for EU funding – ERC Research Grants – since 2007. In addition to the Advanced Grants, the European Research Council also annually awards Starting Grants to young researchers at the beginning of their careers and Consolidator Grants to successful researchers looking to establish their own group. What's more, the large number of ERC Proof of Concepts produced by ETH Zurich (funds for drafting feasibility studies and business plans) shows that fundamental research often leads to market innovations with corresponding benefit for the entire economy. The European Research Council (ERC) is part of the EU Research and Innovation programme Horizon 2020 (2014-2020). Switzerland was readmitted as a full participant in Horizon 2020 on 1 January 2017.