

## Press Release

Great success with ERC Consolidator Grants

# Five ETH projects funded

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Five ETH Zurich researchers receive one of the coveted Consolidator Grants from the European Research Council (ERC). Their projects will be funded with around two million Swiss francs each.

Swiss universities have once again been very successful in the competition for the prestigious funding from the European Research Council. In the current Consolidator Grant, Switzerland, a comparatively small country, comes fifth in Europe – with 19 of a total of 329 award-winning projects. Five of these projects come from researchers at ETH Zurich. Detlef Günther, Vice President for Research and Economic Relations, is delighted with this success: "We encourage and support young researchers in their efforts to apply with their projects and strive for the award. The fact that we were so successful in this assignment means we are on the right track."

### **Almost half succeeded**

That ETH Zurich researchers submitted no less than eleven projects this year shows that these efforts have been productive. "The Consolidator Grant sets high requirements. Researchers must provide a promising track record, but must not yet belong to the long-established research community," explains Detlef Günther. Just having so many potential candidates at ETH Zurich is quite an achievement. The fact that almost half of these were successful is simply magnificent, in the Vice-President's view. The international comparison speaks for itself: for the rest of Europe, the average success rate for the Consolidator Grants is only around thirteen percent.

### **Excellent investment**

With this success, ETH Zurich researchers garner a total of over 12 million Swiss francs. This acquisition of third-party funding is important for the university, but not the only goal: "Without a doubt, creative research needs sufficient funds to evolve fully. However, it is particularly important for us to see that our researchers are able to assert themselves successfully in the highly competitive European research environment. I am convinced that every franc is an excellent investment," says Detlef Günther.

### **Alphabetical overview of the projects:**

Many applications rely on affecting wave propagation in materials, from sound insulation to information processing in quantum computers. **Sebastian Huber**, Assistant Professor of Condensed Matter Theory, researches design principles for materials whose behaviour can be explained using the quantum Hall effect. All existing studies in this area have been limited to two-dimensional structures. Huber is now aiming to overcome this limitation in the course of his ERC project: he will design new three-dimensional materials on the drawing board and examine them experimentally. The results may enable the construction of new waveguides that can be used under extreme conditions.

**Dennis Kochmann** is a professor in the Department of Mechanical and Process Engineering. He works at the intersection of mechanics and materials and investigates how complex material behavior can be predicted and controlled. In his ERC project, he will develop new computational tools that can be used to simulate the behavior of metallic materials with extreme accuracy (down to the level of atoms) – applicable to significantly larger length and time scales than what is currently feasible with atomistic accuracy. These simulations will improve our current understanding of what happens to metals when they are severely deformed or how failure occurs by corrosion. In addition, the new tools can aid in the development of novel materials.

**Siddhartha Mishra**, ETH Professor of Applied Mathematics, undertakes research in the fields of applied mathematics, numerical analysis and computational science. For his second ERC project, after receiving the ERC Starting Grant, he wants to develop and analyse statistical solutions for nonlinear partial differential equations. His focus is specifically on equations that model fluid flow, as statistical solutions offer a promising description of complex phenomena such as unstable and turbulent flows. Mishra is currently combining mathematical theories and methods with efficient algorithms and massively parallel computing hardware. Potential applications include use in climate modelling.

**Salvador Pané i Vidal** is a senior scientist at the Institute of Robotics and Intelligent Systems and an expert in micro- and nanorobots. His goal is to one day use tiny robots in the human body, where – remotely controlled using sound waves or magnetic fields – they will be able to move around and dispense medication in precisely the right part of the body. In his ERC project, Pané i Vidal aims to develop porous nanorobots that can be remotely instructed to produce electrical fields. These fields could then be used to open molecular nanovalves in the pores of the robots (to release medication, for example) or to electrically stimulate neurons or other cells. In future, these microrobots could be used in the spinal cord or the optical nerve. Pané i Vidal already received an ERC Starting Grant for the development of microrobots four years ago.

The elementary processes involved in chemical reactions and biological transformations take place incredibly quickly: when chemical bonds break or reform, it happens in attoseconds (10<sup>-18</sup> s). Electrons in atoms, molecules, solids and liquids move on this time scale. **Hans Jakob Wörner**, ETH Professor of Physical Chemistry, is a pioneer in the field of attosecond spectroscopy, and holds the world record for the shortest ever laser pulse. In his latest ERC project – Wörner is already the recipient of an ERC Starting Grant – he now wants to further develop X-ray spectroscopy methods so that electron movements can also be directly examined on attosecond time scales in complex molecules and during the aqueous phase. One potential application is in solar cells.

## Further Information

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### ERC Consolidator Grant

The European Research Council (ERC) has several funding programmes. For example, the ERC Starting Grant for talented young researchers and the ERC Advanced Grant for established top-level researchers exist. The Consolidator Grant is intended to support young researchers who have seven to twelve years of experience after completing their doctorate, have a promising track record and want to consolidate the work of their already successful research group. The projects are selected on the basis of their scientific excellence and will receive up to 2.35 million Swiss francs over a period of five years.

[ERC Consolidator Grant](#) →