



Nicola Spaldin, Körber award winner 2015

Nicola Spaldin is professor of materials theory at ETH Zurich. In 2015, she won the Körber European Science Prize worth 750,000 euros. The British chemist and SNSF grantee is known for her pioneering research on multiferroics, a chemical compound consisting of different metals and oxygen. It reacts to both electric and magnetic fields. Multiferroics have the potential to transform information technology: they could replace silicon in microchips, thereby making it possible to manufacture very small and energy-efficient computers and smartphones.

“I hope that young researchers won’t heed the usual advice”

A passion for research and finding answers – even for seemingly impossible problems: Nicola Spaldin describes how she successfully strayed from the accepted academic career path.

I was recently taken aback when I realised that I seem to have reached a point in my career where young people have started asking me for advice. My pragmatic side tells me that I should tell students what I had been told myself: do some good work in an established research field and make sure to publish a lot! That is how you make a name for yourself and gain recognition in your community. Keep the risky stuff till later when you are well established.

But deep down I hope that young researchers won’t heed the usual advice. I hope that they find a gripping question that for them becomes the most important question in the world and to which they passionately try to find an answer, thereby starting their own scientific revolution.

“When I work, I always think about developing new equipment and technologies.”

Nicola Spaldin

This is what happened to me with multiferroics. In the 1990s, people thought that magnetic ferroelectrics – a multiferroic material – were an impossible proposition. Nobody believed that they could become reality. But I wanted to know if this was really the case, threw my career blueprint into the bin and started looking for an answer. Two things were on my side: the theory was sufficiently advanced so that I could study virtual materials using computer models, and I got a grant from the Swiss National Science Foundation.

I had my breakthrough in 2003: together with Ramamoorthy Ramesh, who now teaches in Berkeley, I succeeded in creating the multiferroic material that is most common today: bismuth ferrite. I will never forget that moment: the impossible had become reality. Since that day, I have continued to search for materials with properties that don’t exist as yet or are considered impossible. My team and I develop these materials on the computer before we develop them in the lab with colleagues from the Paul Scherrer Institute to study their properties.

When I work I always think about developing new equipment and technologies. One of my aims is to develop a superconductor that conducts electricity without resistance at room temperature. One day I will succeed.”

Naturalisation promotes integration

Feeling at home in Switzerland

The naturalisation of immigrants is a catalyst for integration. It is particularly beneficial for foreigners who are part of a marginalised immigrant group at the time of naturalisation, such as migrants from Turkey or former Yugoslavia. This is the conclusion reached by a study funded by the Swiss National Science Foundation. The researchers interviewed almost 800 people whose applications were either narrowly accepted or rejected. They asked questions such as: are you involved in politics? Do you read Swiss newspapers? Are you a member in a club or association? Do you feel discriminated against? Do you plan to spend your retirement in Switzerland? "The earlier a person receives citizenship, the greater the positive effect", says Dominik Hangartner, political scientist at the University of Zurich and the London School of Economics. This should be a wake-up call for Switzerland, he adds, where migrants have to wait twelve years for naturalisation, a long time compared to other European countries.

"The earlier a person receives citizenship, the greater the positive effect."

Dominik Hangartner, University of Zurich



Laurent Keller

The ant whisperer

Laurent Keller is a world-renowned expert on ants. For almost 30 years, the passionate evolutionary biologist has been studying the social and cooperative behaviour of ants. He has made important theoretical and experimental contributions towards a better understanding of natural selection and social behaviour in groups of animals. Based on his findings, he has drawn conclusions about human social behaviour when it comes to dealing with stress and ageing, for example. He was also able to show that robots can be used more efficiently if they are programmed to replicate the behaviour of ants. Laurent Keller is happy to communicate his findings in the press and in books to reach out to the general public. He is Director of the Department of Ecology and Evolution at the University of Lausanne and member of the Research Council of the SNSF. Professor Keller has won numerous prizes, including the Marcel Benoist Prize in 2015.

Mapping glaciers

Climate change and mudslides

Is there a link between climate change, glacier movements and the erosion of rock underneath the ice? According to Frédéric Herman of the University of Lausanne, mountains are vulnerable to climate change: the risk of mudslides increases if alpine rivers carry more sediments. Supported by the SNSF, his research group explored the Franz Josef Glacier in New Zealand, which is over ten kilometres long and perfectly located to answer his research question. "Using a new spectroscopic method, I was able to analyse 4,000 samples in two weeks and create an accurate map of the glacier. In the past, this work would have taken years", explains master's student Mattia Brughelli excitedly. The study was realised in cooperation with the French National Museum of Natural History, the Californian Institute of Technology and the Institute of Geological and Nuclear Survey Science in New Zealand.

