

Building bridges and unlocking synergies

Interdisciplinary research is becoming ever more important. However, technical and interpersonal communication can be a challenge in such projects. But when communication functions properly, groundbreaking findings can result.

Interdisciplinarity has been a ubiquitous buzzword in science for many years now. Politicians and academics alike are unanimous that research disciplines need to work together more closely, not least because the pressing issues of our age – from digitalisation and antibiotic resistance to migration – are extremely complex and affect a wide range of academic fields.

Sinergia programme promotes integration

For all the discussion about new processes and structures, it is ultimately the researchers working on real-life projects who create added value from interdisciplinarity. This is precisely the approach adopted by the SNSF's Sinergia funding programme. It finances collaboration between two to four research groups from various disciplines and institutions if there is a likelihood of it generating groundbreaking results. "It's very much a tangible way of driving forward the integration of different scientific fields," explains Dirk van der Marel of the SNSF's Research Council, who is Vice President of the Specialised Committee on Interdisciplinary Research. "It uses two of the strengths of Swiss research – a firmly embedded bottom-up culture and the willingness to collaborate."

Thinking the big picture

In practice, however, projects of this kind are a major challenge for researchers. According to Gunter Stephan, an economist at the University of Bern, just explaining and understanding each participating group's approaches and terminology at the outset of the project is a challenge in itself. He worked on a Sinergia project with hydrologists, meteorologists and political scientists

Relationship of stress and physical activity with psychological and physiological health in young children

p3.snf.ch/project-147673



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from various universities, investigating how Switzerland can prepare for future extreme weather incidents. In the course of their investigations, the researchers considered the uncertainty of forecasts, the wide range of potential adaptation strategies and the political feasibility of measures. "When economists talk about efficiency, they mean something different than environmental scientists," says Gunter Stephan, "so the first thing we had to do was develop a shared vocabulary."

Just as important during the project design phase was establishing what the researchers could achieve together, and what they could not. During this process, Gunter Stephan was surprised by his fellow project managers' genuine willingness to find and use synergies. "Everyone literally insisted on achieving more together than every discipline could on its own."

Mathew Magimai-Doss, a computer scientist at the Idiap Research Institute in Martigny, had the same experience. Working with researchers from the University of Applied Sciences in Special Needs Education in Zurich and the University of Surrey in the UK, he is developing a system that automatically recognises and understands Swiss German sign language. It will also provide a template for other sign languages. "We systematically worked towards an integrated project right from the initial planning phase," says Mathew Magimai-Doss. "That's essential to prevent the entire project subsequently disintegrating into separate workstreams that each institution carries out largely in isolation."

With tolerance and respect

It does not go without saying that scientists will be willing to venture into the unfamiliar waters of an interdisciplinary project. "Autonomy is generally very much encouraged in research," says Jardena Puder, an endocrinologist at Lausanne University Hospital. "However, it's not always conducive to collaboration." This is why she felt that good communication with potential project participants in an atmosphere of tolerance and respect was crucial. And she wanted to be

"A project of that kind won't 'fly' unless people get on with each other."

Jardena Puder

Scalable multimodal sign language technology for sign language learning and assessment

p3.snf.ch/project-160811



Mathew Magimai-Doss, computer science, Idiap Research Institute, Martigny



Richard Bowden, vision, speech & signal processing, University of Surrey



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“When there are important decisions, you have to meet in person.”

Mathew Magimai-Doss

able to count on her fellow researchers remaining committed to their shared goal not only during project submission, but throughout the entire research phase.

Working with psychologists, movement scientists and paediatricians at four university hospitals, Jarden Puder investigated the effects of stress and lack of exercise on children's health – specifically their cognitive functions, psychological well-being, weight and motor skills. “A project of that kind won't ‘fly’ unless the people working on it get on with each other,” she says.

Face to face

Both Gunter Stephan and Mathew Magimai-Doss second that statement unreservedly. However, personal interaction requires effort, especially if the researchers work at locations that are far apart and have never met, as is the case with the project that Mathew Magimai-Doss is working on. “E-mail, phone and Skype are obviously our primary methods of communication,” he says, “but when there are important decisions to be made, you have to meet in person and discuss them face-to-face.” In Gunter Stephan's view, good personal relations are essential not least as a basis for dealing constructively with criticism or even offering it in the first place. He says this is essential in science.

However, Sinergia projects do not just involve the heads of the research groups at each institution, they also involve doctoral students, undergraduates and other specialist staff members. “Maintaining good interdisciplinary collaboration across all these levels demands a lot of time and determination,” says Jarden Puder. She says that practical or conceptual challenges often arise unexpectedly, and then it becomes clear how firmly embedded everyone is in their particular discipline.

Answers to complex questions

“It is clear to us that interdisciplinarity can be a challenging undertaking in real life,” says Dirk van der Marel, “and we're deliberately encouraging it in the Sinergia projects for precisely that reason.” Both the researchers themselves and their findings confirm that it's worth it. Interdisciplinary projects come up with answers to the complex issues of the world we live in.

94.3

million CHF in approved funding

42

new projects

SNSF's Sinergia funding programme 2018

Climate change extremes and adaptation strategies considering uncertainty and federalism

p3.snf.ch/project-154404



Gunter Stephan, economics, University of Bern



Karin Ingold, political science, University of Bern



Frank Krysiak, environmental economics, University of Basel



Philippe Thalmann, environmental economics, EPFL



Rolf Weingartner, hydrology, University of Bern

“Everyone literally insisted on achieving more together.”

Gunter Stephan



At the professional education centre in the capital of Laos, Vientiane, young women receive basic training in industrial sewing (left). In the country's largest clothes factory, seamstresses earn 250 francs a month for an eight-hour day (bottom left). Principle investigator of the research project in Laos is Professor Bounseng Khammounty (on the right) from the National University, pictured here with a scientific collaborator, Houamboune Keonakhone (bottom right).

→ How effective is professional education?

“Developing countries are hoping that professional education will become a driver of economic growth. Switzerland, too, is financing such initiatives. We are identifying the factors on which their success depends. The study is being conducted in six Asian and African countries in interdisciplinary collaboration with locally based researchers. In particular, we want to know what is most effective in reducing poverty: providing training for low-skilled jobs or for higher professional qualifications?”

Markus Maurer, education scientist, University of Teacher Education in Zurich

→ p3.snf.ch/project-169470 (SNSF/DEZA)





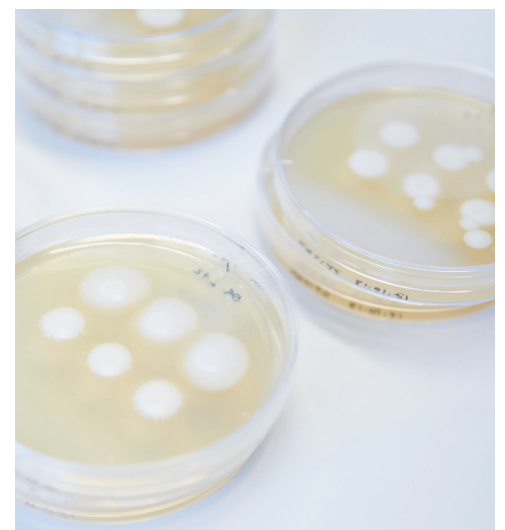


→ The fight against yeast fungus

“*Candida albicans* is a common cause of fungal infections. It poses a major health risk, particularly for people with a weak immune system. Together with researchers in Lausanne and Paris, we are analysing natural genetic variants of the fungus. To what extent do the differences between them determine whether a person gets infected? The results will help to prevent and fight illnesses.”

Salomé LeibundGut-Landmann, immunologist,
University of Zurich

→ p3.snf.ch/project-173863



The virulent properties of *Candida albicans* can be observed in Petri dishes, for instance the growth of cell threads (above). Immune resistance against the fungus is tested in mice. Kontxi Martinez de San Vicente (on the left) and Christina Lemberg check on their state of health (left). The pathogenicity of yeast fungus is reflected in its connection to epithelial cells, which Anne-Céline Kohler is studying with the aid of microfluidics (top left).

