A Vision Becomes Reality

A Look Back at the Development of the Nano Study Program

The SNI's founding father, Professor Hans-Joachim Güntherodt, stood for many aspects of research. One of these was interdisciplinarity: Collaboration between the various disciplines across the boundaries of institutions. He was not the only one in Basel who wanted to firmly anchor interdisciplinary research at the University. Professor emeritus Andreas Engel, structural biologist in the Biozentrum for more than 25 years, had a vision of implementing interdisciplinarity in teaching, too. In 2002, with support from his colleagues at the National Center of Competence in Research Nanoscience, he established the degree program in nanosciences. Today, this challenging program is optimally integrated at the University of Basel and continues to enjoy immense popularity among committed young people with a general interest in the natural sciences.

A good time for something new

The founding of the National Center of Competence in Research Nanoscience (NCCR Nano) gave Professor Andreas Engel the idea not only to conduct interdisciplinary research, but also to provide young scientists with an interdisciplinary education. On the one hand since there are many young people whose broad interest in the natural sciences makes it difficult for them to choose a subject after leaving school. And on the other hand because an interdisciplinary education is the ideal route into the world of nanoscience, where the boundaries between the different disciplines dissolve. "So I thought it seemed ideal to create a degree program in which we would begin by training students in biology, chemistry, physics and mathematics and specialize later," Engel recalls. Also, 2002 seemed like the ideal time to start something new: "The NCCR Nano had just started and the University was transitioning to the Bologna system," adds Andreas Engel.

Constructive collaboration

His colleagues Professor Ueli Aebi (Biozentrum) and Professor Hans-Joachim Güntherodt (Department of Physics) were immediately receptive. Other professors in the Departments of Physics and Chemistry were also convinced and became supporters and advocates for the nano study program. After green light was given by the Faculty and Professor Gian-Reto Plattner, then Vice Rector for Research at the University of Basel, the work began. The newly founded committee for nanoscience studies compiled the relevant courses from the existing programs for biology, chemistry and physics. Together with the mathematicians, they considered what format a lecture could take that was developed specially for nanoscience studies. Although the nanoscience students were to receive less instruction in mathematics than physics students, they should still be able to specialize in physics topics at a later point. "We worked very constructively with our colleagues and found a good solution," comments Andreas Engel.

Joint events to ensure solidarity

For Andreas Engel, it was important from the outset to create a feeling of solidarity between the nanoscience students and to offer events especially for their degree program. From the very first semester, he organized visits to companies in Northwestern Switzerland that tackle nanoscience questions. These field trips continue to this day. The list of companies is constantly extended to give students the broadest possible insight into industrial research. In addition, the students on the bachelor's program particularly value the block courses in which they spend entire days working in various research groups in the SNI network. "We did not have these block courses back in the first semester," Engel recalls. "It was an idea that came from the Biozentrum and was not initially

compatible with the timetables for chemistry and physics." However, the block courses soon became a key component in the bachelor's nano degree program.

Working in research groups

From the outset, working in various research groups was also to play an important role in the master's degree program. At the beginning, it was established that students on the master's program would have to complete two project and one master's theses. To ensure a broad, interdisciplinary education, the students had to choose two different disciplines for their project theses.

First Swiss university with a nano program

Once the framework was defined for nanoscience studies, Andreas Engel and his team really had to get down to work. "We travelled through Switzerland, from school to school, advertising the new study program." And with success! In Fall semester 2002, the first nano students began their course, making the University of Basel the first university in Switzerland to offer bachelor's and master's degree programs in nanosciences.

Ongoing expansion

At the moment, around 40 students enroll in the nanosciences course in Basel each year. This comparatively small group is full of highly motivated and dedicated young people. Most of them know that they have chosen a demanding degree program. An excellent atmosphere of solidarity helps them to overcome the challenges of a degree program in which they study three disciplines at the same time. The program is constantly being expanded to improve what is on offer. In 2014, for example, a seminar was held for the first time on the subject of media competence and the students used what they learned to produce a radio program.

More than a decade of nanoscience studies in Basel has shown that graduates receive an outstanding education and will therefore be welcome additions to the workforce at a range of laboratories and companies. Dr. Mohammed Ibn-Elhaj, Head of New Technologies at Rolic, confirms: «Since several years, Rolic Technologies is in contact with nano students from the University of Basel as they regularly visit the labs at Rolic. The education during the nanocurriculum in Basel is excellent and offers insights into different aspects and applications of nanomaterials. Rolic is always happy to welcome young nano scientists from Basel as new members in our teams.»

Nano Study Program in Brief

The University of Basel was the first Swiss university to establish a nanoscience program back in 2002. Students receive an interdisciplinary and practice-oriented education and can graduate with both bachelor's and master's degrees. In 2014, 91 students were enrolled in the bachelor's degree program and 23 students took master's courses. Seven students finished their bachelor's degree and six completed their master's degree with a pleasing overall average score of 5.72. In 2014, the University of Basel welcomed five Erasmus students from Spain to the nanoscience program. Students from Basel also completed their project work or master's theses abroad (Tennessee, Massachusetts and Dublin). By participating in various research groups, they broadened the experiences gained in their studies.

Students on the bachelor's degree program particularly value the block courses and company visits. The range on offer is constantly being extended. At the moment, students can choose from 30 block courses held in the Departments of Physics and Chemistry, the Biozentrum, the Department for Biosystems Science and Engineering at the Federal Institute of Technology (ETH) Zurich in Basel, the University of Applied Sciences Northwestern Switzerland, the Paul Scherrer Institut and the Adolphe Merkle Institute.

Eight companies from Northwestern Switzerland opened their doors to nanoscience students, allowing them to gain an insight into applied research early in their education. The nanoscience curriculum is regularly optimized by those responsible. In 2014, nanoscience students attended the Nanoscience Media Competence lecture for the first time. During this event, students learned a great deal from the media professionals in attendance and subsequently produced their own radio show.