SNI SWISS NANOSCIENCE INSTITUTE
EINE INITIATIVE DER UNIVERSITÄT BASEL UND DES KANTONS AARGAU

SNI update August 2014

Words from the Editor

While we were busy writing this *SNI update*, we received the sad news that our SNI founding father Professor Hans-Joachim Güntherodt has passed away. All who knew him are deeply moved by his sudden death. Without Hans-Joachim Güntherodt, who was fondly called «Gü», nanoscience at the University of Basel and in all of Switzerland would not be where it currently stands. There would have been no NCCR Nanoscale Science and no SNI at the University of Basel. During his career, Hans-Joachim Güntherodt has not only inspired many students, PhD students and PostDocs, he has also convinced colleagues, politicians and interested people from all disciplines of the chances and opportunities in nanoscale sciences. We have lost an outstanding scientist, an excellent networker and a great person. He leaves a big gap.

After this sad news, it is difficult to return to everyday business. The low rain clouds today match the mood. Actually, July and August are relaxing and quiet months. For me, this is always the time I dedicate to writing grants and proposals in addition to my family vacation. For applied Argovia projects, we have just opened the next call. So some of you will probably also think about an application. I am already looking forward to seeing all the new project proposals.

The Argovia projects SINAPIS, PATCELL and Nano-Trench MOSFETs, which were launched earlier this year, are topics we cover in this issue of *SNI update*. We also present Professor Bert Müller of the Biomaterials Science Center at the University of Basel who headed interesting Argovia projects in the past. We highlight examples of his exciting research and compiled a short profile of him.

His group is one of those which has benefitted from the one-time S*mall Investment Program* of the SNI. With the completion of the NCCR Nano, we still had university funds that, according to a decision of the Board of Directors, could be used for the purchase of laboratory equipment. I am very pleased that so many colleagues have made use of this program and that we could support your work without bureaucracy.

Among others, we were able to finance new microscopes within this program. Maybe we will see the first images of these in this year's *Nano Image Award*? As in previous years, we will honor the best nano images. So do not forget to submit your best nano photos!

Pictures of a different kind kept our communications team busy in the last few months. Together with Voltafilm from Lucerne, we have produced two videos that introduce the SNI and show a few examples of our research. The two videos can be seen on YouTube. Please share the link with your colleagues and use the movies when you present SNI activities.

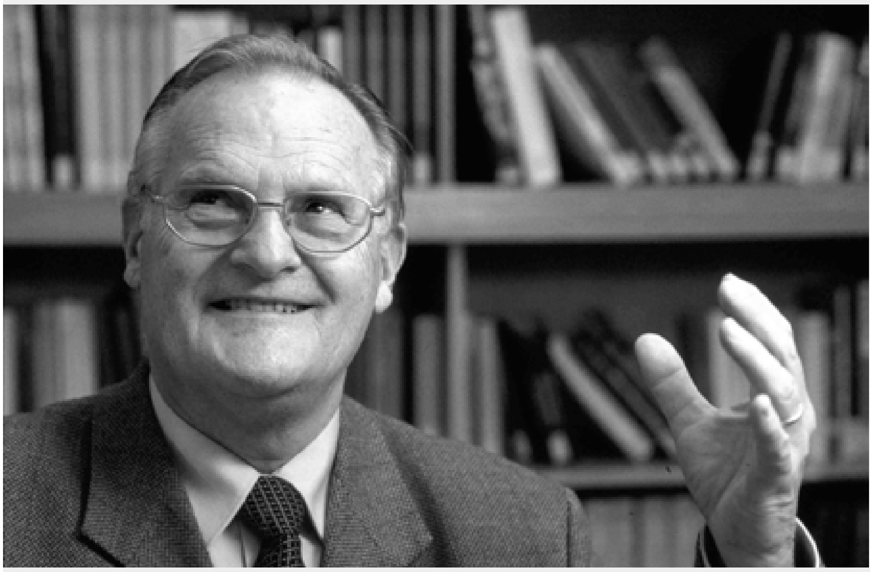
In the beginning of July, Audrey Fischer who was responsible for SNI finance, personnel and much more, left the SNI to join the newly founded NCCR Molecular Systems Engineering. I would like to thank Audrey for all her efforts and her enthusiasm in recent years. On 1st September, we will greet Claudia Wirth as her excellent successor. We are very glad to soon welcome her to our team.

Now, I wish all of you a great summer holiday and I am already looking forward to seeing many relaxed faces during our Annual Event at Lenzerheide in September.

Best regards

Director Swiss Nanoscience Institute, University of Basel

The Swiss Nanoscience Institute bids farewell to Professor Hans-Joachim Güntherodt



Hans-Joachim Güntherodt is the founding father of our Nanocenter. He was a pioneer of nanoscience and nanotechnology and has decisively influenced Swiss research in this area.

The invention of a microscope at the IBM Research Laboratory that could be used to see atoms fascinated Hans Güntherodt. From then on, his research was devoted to this subject and over the years nanotechnology has evolved, as we know it today. Many significant contributions came from Basel. This has highlighted the relatively small Physics Department of the University of Basel and thus has made a huge contribution to the visibility of our Alma Mater. Hans-Joachim Güntherodt was not only a researcher, but also an entrepreneur. He inspired many of his young students to follow a career in industry and showed them the various opportunities that exist outside university.

Through his strong commitment and excellent networking capabilities, he opened many doors. He had access and listeners at all levels of society - it made no difference whether he talked to a technician in the workshop, a Nobel Prize winner or a politician. In his general lectures on nanotechnology, he also shared his enthusiasm with the general public.

Hans has done a lot for us. Through his initiative, the Swiss Nanoscience Institute was founded in Basel. He initiated several other research programs in Switzerland, that he partially also directed himself. The most important was the NCCR Nanoscience, a Swiss network, which was led from Basel. We appreciate his accomplishment immensely - in the hour of parting even more than we have always done. Thank you, Hans, we will miss you!

Cover Story

Using physics to solve medical problems

What do artificial sphincters, self-opening nanocontainers, carious teeth and micro-cantilevers have in common? They are all research topics of Professor Bert Müller and his team at the Biomaterials Science Center at the University of Basel. And they are projects that evolved because a physician approached the physicist Bert Müller with a specific problem hoping to obtain a smart solution from him and his colleagues.

Adaptability is the goal

Professor John Hubert of the University Hospital in Zurich was interested in solving the problems of incontinent patients and contacted Müller. Artificial sphincters are available for patients who are heavily affected by their incontinence. They close the urethra quite well, but also exert a constantly high pressure on the surrounding tissue, which over time results in tissue damage. Additionally, these systems are not adaptable. Whereas in healthy people the tension adjusts to the activity and filling of the bladder, the pressure of the artificial sphincters always remain the same. Müller and his colleagues want to address these two problems by developing a novel adaptive system.

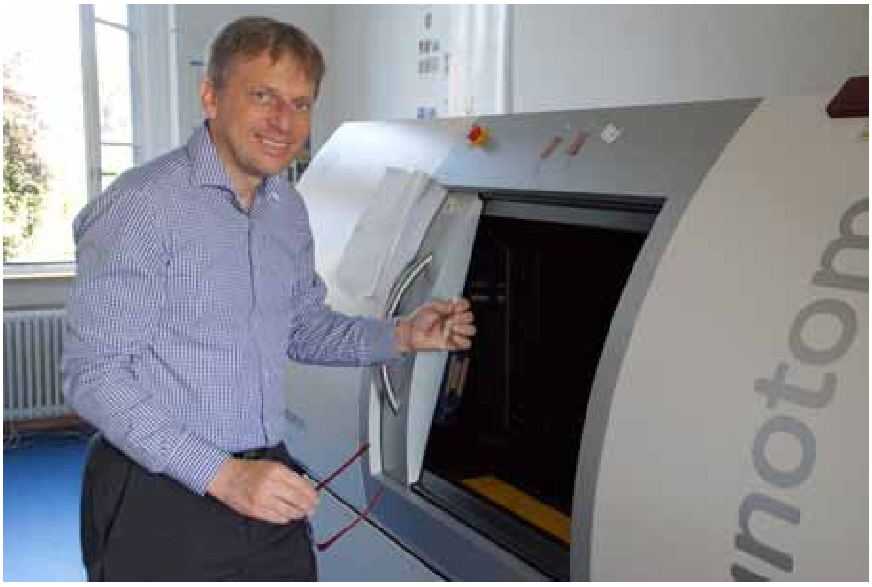
The team of Bert Müller uses this device to simulate coughing and to test the adaptability of the artificial spincters.

One way to reduce the pressure is already applied in existing models, in which two annular artificial muscles work alternately. It is challenging to build the system so that patients can regulate the pressure themselves and so that it adapts quickly when necessary, for instance when the patient is coughing. The researchers approach this problem by producing an artificial muscle out of thousands of nanometer-thin polymer films that are activated by electrical voltage. An integrated microprocessor controls the system. It allows the patients to control fluid flow themselves. Additionally, the polymer films act as pressure sensors that detect a pressure increase and enable the system to respond quickly to special situations.

Müller's research on artificial sphincters began in 2004 with a diploma thesis that he supervised. While this thesis and subsequent work covered urinary incontinence, his latest project called *SmartSphincter* deals with fecal incontinence. In 2013, his team received funding of 2.2 Million Swiss Francs for four years within the Nano-Tera.ch initiative. By now, it is not only Müller`s group that is involved in the research. The collaboration includes researchers from the University of Bern, the Empa, the Inselspital Bern, the hospitals in Schaffhausen and the company MyoPowers.

Shear forces are the solution

In another major project of the Biomaterials Science Center, the intensive care physician and internist Dr. Till Saxer from Geneva approached Bert Müller to discuss an innovative treatment of atherosclerosis. These deposits in the blood vessels are of great importance, since in Switzerland alone 20,000 deaths per year are linked to atherosclerosis. Vasodilating drugs, like nitroglycerine, are used for the treatment of clotted blood vessels and improve the blood flow in the affected arteries. However, they act in the whole body and not only at the narrowed areas of the vessel, resulting in an undesired drop in blood pressure. The team led by Bert Müller has now used physical properties in the narrowed blood vessels to achieve a drug release predominantly at these desired areas. «The blood flow at the narrowed sites of the vessel differs from that in healthy parts. The resulting shear forces are one order of magnitude higher,» explains Müller. These shear forces are now used to selectively open tiny nanocontainers that are loaded with a drug. The chemist Professor Andreas Zumbühl of the University of Freiburg came up with the idea to produce lens-shaped nanocontainers. At the lens equator, they possess a predetermined breaking point that opens under the influence of shear forces. In healthy vessels the nanocontainers are not affected and the active ingredients inside are not released. The Müller team has already demonstrated that the principle works in an artificial model system, published in *Nature Nanotechnology*.


Bert Müller uses the Nanotom to obtain precise three-dimensional images.

Visualization is an important step

However, before this system can be applied in humans, many questions remain to be answered. It is important to know at what grade of narrowing a treatment is indicated and how the morphological conditions of the blood vessels can be determined. Again, the scientists are exploring new territory. Currently, the acute treatment occurs when an artery is clotted. With the currently available visualizing techniques, some of the deposits can be imaged but the vessels cannot be differentiated from the surrounding muscle tissue. Together with colleagues from France, Germany and Switzerland, Müller has developed a new method to measure the narrowed blood vessel. This technique that was recently published in *Nature Protocols* provides relevant data that can be used to simulate blood flow in the model system. The researchers use this model to determine the threshold of shear forces that should enable the opening of the nanocontainers. Before clinical trials can be started, scientists additionally need to clarify how the containers are degraded in the human body and what happens to these products. Initial studies have already begun. Until 2015, the Swiss National Science Foundation will support the participating teams from Basel, Geneva and Freiburg. The project called *NO-stress* is part of the National Research Program 62 *Smart Materials*.

Active in the Argovia program

Müller's working group, currently consisting of about 25 third party funded scientists, investigates many other interesting projects in which scientists of various disciplines work on medical questions. In the past, the team also participated in Argovia projects at the Swiss Nanoscience Institute (SNI). Müller was Co-Principal Investigator of the *Nanocure* project that studied an innovative method for the early treatment of dental caries. Müller also led the *DICANS* project on the preparation and application of a disposable cantilever test system for the diagnosis of genetic material and medically relevant metal ions. In the project, the scientists proved that the developed polymeric cantilevers can be used in the same manner as the established single-crystalline silicon systems. However, it is easier to apply a surface structure, they are more sensitive and less expensive to manufacture. In addition to funding the Argovia projects, the SNI recently supported the team with the acquisition of an atomic force microscope that also measures mechanical properties. We are curious to see how the SNI will be able to further promote the innovative approaches of Bert Müller where he as a physicist provides solutions to medical questions.

We introduce…

Bert Müller is professor for Materials Science in Medicine at the University Hospital and the University of Basel. For several years, he has also led projects at the Swiss Nanoscience Institute. He is a physicist, but mainly gets the inspiration for his research from physicians. His research topics are diverse, as were the positions Bert Müller held before accepting his Thomas Straumann professorship at the University of Basel in 2006. During his career, he not only passed through various posts, he often had different positions simultaneously. Recently the International Society for Optics and Photonics awarded the grade of *Fellow of the Society* in recognition of his distinguished and valuable contributions to the field of optics and photonics again demonstrating that he masters this approach perfectly.

Double education

Bert Müller, who was born in Berlin 1962, initially completed an apprenticeship as a mechanical engineer. Simultaneously, he went to school and completed his high school diploma. After gaining some work experience as an electrical fitter, he decided to study physics in Dresden. While at school, he was more enthusiastic about chemistry, but the possibilities available for physicists fascinated him. As English is very important for natural scientists, it made sense for him to study English in parallel. So he finished his education in 1989 not only with a physics diploma, but also with a degree in English translation in physics and mathematics. Subsequently, he conducted research at the Paul Drude Institute for Solid State Physics in Berlin before joining the team of Professor Martin Henzler at the University of Hannover - first as visiting scientist and later as research assistant. His PhD thesis on electron diffraction was honored with the Morton M. Traum Award by the American Vacuum Society in 1994.

The interview for this article took place during the CLINAM-conference, where the SNI PhD school was presented as well.

The next stop for Müller was a PostDoc position at the University of Paderborn. «My friends made jokes about my «rise» from Berlin via Hannover to Paderborn,» Müller laughs. However, he has fond memories of this time and sees no major differences in scientific quality, equipment and training between the three German universities he got to know.

Moving to Switzerland

In 1995, Müller started to become acquainted with various technical universities in Switzerland. First, he obtained a scholarship from the Humboldt Foundation at the EPF Lausanne. In 1997, he became group leader for thin organic layers in the physics department of the ETH Zurich. Here he finished his habilitation on nanostructured materials. In mid 1998, he moved to the Empa to study chiral molecules and to visualize biocompatible materials. He quickly realized that the work environment at the university suits him better, so in 1999, he returned to the ETH Zurich. In his new role as Head Assistant in the group of the surgeon Professor Erich Wintermantel for Biocompatible Materials Science and Engineering, he was confronted more and more with medical questions. This contact with scientists from other disciplines increased in the following years. In 2001, he became General Manager of the NCCR Co-Me (computer-aided and image guided medical interventions). In this interdisciplinary program, physicians, computer scientists and physicists got together and had to learn to speak the same language. «That was not easy,» remembers Müller. «For example, if a physicist talks about a sample, he means something entirely different than a physician. However, with openness, respect and a lot of time, it is possible to learn and benefit from each other - so that at the end the output is bigger than the sum of individual contributions.» During this time as General Manager, Müller conducted his own research outside of the NCCR Co-Me, as he wanted to keep his research interests as neutral as possible. In addition, he gave lectures at the ETH Zurich.

Interdisciplinary environment

In 2006, Müller was elected as Thomas Straumann Chair of Materials Science in Medicine and in this role currently heads the Biomaterials Science Center at the University of Basel. Here, his versatility and experience in interdisciplinary work are elementary. In many cases, medical professionals contact the physicist Müller hoping to get a solution for their problems. For example, Professor Hubert John from the University Hospital in Zurich contacted him because many of his patients suffer from incontinence and he was not satisfied with the currently available artificial sphincters. Initially, Müller supervised a diploma thesis to tackle this problem. Later a CTI project and a grant from the Swiss National Science Foundation followed. Currently, Nano-Tera finances a group in Müller's laboratory to develop the basis for an adaptive system in the next three years (see cover story).

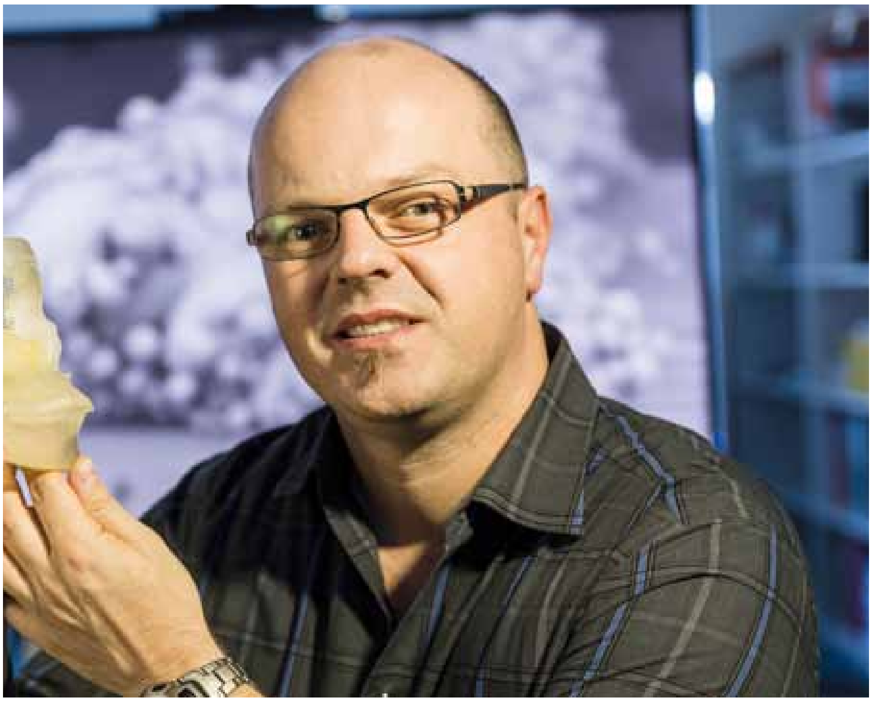
Müller's team of about 25 people consists of physicians, dentists, chemists, physicists, engineers, computer and materials scientists. For almost two years, two postdoc positions were open that could not be filled easily, as young researchers with the necessary ambition and skills are difficult to find. «For a physicist, it is not always easy to work in the medical field,» comments Müller. «In physics, we are used to exactly defined parameters. In medicine, that is not always the case.» As an example, he explains how the biocompatibility of a substance does not only depend on the material but also on the location where the material is applied. «Titanium dioxide, for example, is biocompatible for bone, but not for the liver.» In addition, standards are not always consistent in the medical field.» The tests necessary to determine biocompatibility are changing. So a material that today is classified as being biocompatible with blood, might not fulfill the criteria next year, as the tests have changed,» explains Müller. He advises young people who are not discouraged by these uncertainties and would still like to enter this exciting research area, to first complete a sound basic education. «It's important to know where you come from and to get a solid knowledge base,» he notes.

Submit your Argovia proposals

The Swiss Nanoscience Institute Basel (SNI) offers funding for projects in applied Nanoscience and Nanotechnology within the Nano-Argovia program. Researchers from Northwestern Switzerland can now submit their applications together with their industry partners until 30th September 2014.

More information at:
www.nanoscience.ch/nccr/argoviaProgram

Bert Müller has this - without a doubt. And as in previous years, it does not bother him to do multiple things in parallel. So in addition to his work at the University of Basel, he has still continued his teaching position at the ETH Zurich. With his family, he lives near Zurich but he also has an apartment in Basel. And we conducted the interview that served as the basis for this article during a break of the CLINAM conference (European Foundation for Clinical Nanomedicine) where Müller successfully presented his various projects.



Ralf Schumacher is project leader of the Argovia project SINAPIS.

New Argovia projects

In the *SNI update* of April 2014, we introduced four new Argovia projects. The three following projects also have started at the beginning of the year. Interestingly, two of them deal with the improvement of implants. While one group is aiming to achieve a better durability, the other team plans to structure the implants so that they are easily resorbed when a fracture is healed proberly.

Longevity thanks to structure

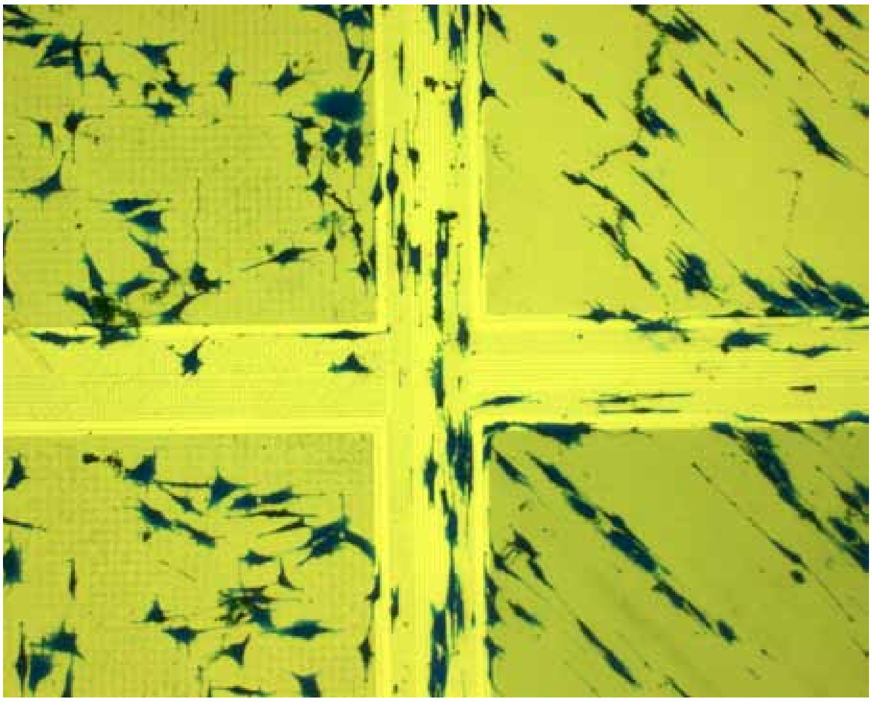
In the Argovia project SINAPIS, scientists under the lead of Dipl.-Ing. Ralf Schumacher of the University of Applied Sciences Northwestern Switzerland (FHNW) investigate the improvement of bone implants. In their research approach, they functionalize and structure the contact surfaces of the implants with various nano- and microparticles to achieve a better durability and an optimized integration of bone tissue.

Today, the replacement of knee and hip joints by prostheses is a surgical routine. In Switzerland alone, 20,000 hip prostheses and 16,000 artificial knee joints are implanted per year (siris-implant.ch). Despite the successful use of these implants, it is desirable to extend the durability of the implants and to optimize the integration by bone tissue. To achieve this, the project team plans to use a technique that was originally designed for cleaning hard surfaces. But instead of removing particles, the researchers specifically apply various combinations of nano- and microparticles by a so-called slurry injection. Thereby, a low-pressure water jet is moved across the surface. It functions as carrier for different particles that are incorporated into the surface by the treatment. The SINAPIS team will study various particle combinations with different hardness grades and additionally, will examine how the water-jet pressure influences the incorporation of particles. The scientists aim to use this technique to equip the material with antibacterial properties, to optimize the growth of bone tissue into the implant and to minimize the abrasion rate during the daily movement of the joint.

The team of the SINAPIS project includes besides Ralf Schumacher Professor Michael de Wild from the FHNW and Dr. Olivier Braissant of the University of Basel and Matthias Straubhaar of the company Waterjet Robotics in Oftringen.

Improved biocompatibility through structured polymer surfaces

In the Argovia project PATCELL, screws and plates for fracture fixation are optimized so that they are initially better integrated by the host tissue and are finally resorbed without complications after a successful healing process. To achieve this goal, the team around project leader Professor Per Magnus Kristiansen from


Depending on the surface structure, cells behave differently.

the Institute of Polymer Nanotechnology (INKA) at the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) investigates the effect of surface structures on different length scales on the cell response to polymer implants.

For bone fractures or bone surgery, screws and plates are needed to fix the affected area. For facial restorations, surgeons use resorbable implants in only 5% of these surgical interventions, as resorbable implants often do not have the required mechanical properties and complications during the implant degradation have been reported. The research team in the project PATCELL now combines micro- and nanostructures on the surface of polymer implants to improve the cell attachment and therefore the biocompatibility. The scientists have to take into account that different parts of the implant interact with different cell types in the body. One side of the implant comes into contact with bone tissue and bone-forming osteoblasts should be able to integrate easily. The other side of the implant ideally possesses a surface structure that ensures easy adhesion and interaction with soft tissue producing fibroblasts. The researchers investigate different manufacturing processes for patterned tooling surfaces, which allow replication of functional surface structures onto implant materials. Preselected structures are then examined with respect to the interaction with various cell types and a first attempt of up-scaling is planned at the end of the project.

Next to Professor Per Magnus Kristiansen his FHNW colleagues Dr. Ronald Holtz and Dr. Joachim Köser, Dr. Sonja Neuhaus and Christian Rytka as well as Dr. Vitaliy Guzenko and Konrad Vogelsang from the Paul Scherrer Institut and Dr. Stefan Beck from DePuy Synthes GmbH participate in this Argovia project.

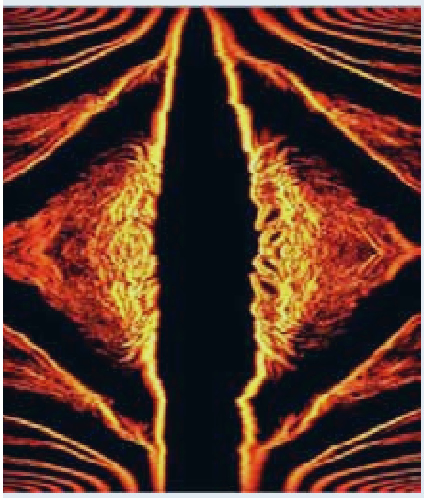
Microscopic Trenches Promise Improvements

In the project Nano-Trench MOSFETs, a team of scientists under the leadership of Dr. Marc Schnieper and Dr. Nenad Marjanović from the CSEM in Muttenz study a novel type of transistor that meets the different requirements of increased energy demand in the modern digital computing and global mobility age. Scientists from the groups of Professor Jens Gobrecht from the Paul Scherrer Institut and Professor Ernst Meyer from the University of Basel are involved as well as Dr. Renato Minamisawa and Dr. Holger Bartolf from the Corporate Research Center of ABB Switzerland.

Today’s increasing energy consumption requires the development of new and efficient systems for power generation and distribution. The ABB Corporate Research Center (CRC) in the canton of Aargau is active in this field and develops high power electronics, which is capable of «smart-handling» of high currents and voltages. In the heart of each power system, power semiconductors ensure that sinusoidal signals assimilate the frequency of the individual application. At the moment, Silicon-based devices presently dominate the market and applications (HVDC, traction, renewable energy conversion, automotive drives and electrical vehicle chargers, etc…). So called Silicon Carbide (SiC) based MOSFETs (metal-oxide semiconductor field effect transistors) are becoming more and more important. Due to their superior material properties, these power devices can be operated at very high frequency. Therefore SiC-based power semiconductors have the potential to tremendously change the topologies of the electronic circuits that serve as the heart of each power system. This property makes SiC-MOSFETs ideal candidates for future applications, such as the efficient integration of renewable energies into the grid. However, the design of conventional planar MOSFETs makes it difficult to increase the current densities. Swiss researchers are now investigating MOSFETs with microscopic U-shaped electronic channels. The trench-layout of the MOS-injectors for electrons first of all enables the increase of the injector-density. Secondly, all the electrons are injected into the vertical power device. Therefore it is not necessary to force the electrons with a voltage between anode and cathode into the vertical direction (as it is the case for the planar MOS-layout).

The scientists in the project study and optimize the manufacturing process of these specially structured MOSFETs, which is much more complex and expensive compared to planar MOSFETs. They characterize the new transistors and compare their properties with those of planar MOSFETs. Thanks to the great experience of the participating scientists, a final analysis will result in an evaluation of the market potential of these novel transistors.

Who made the best nano picture?



The Nano Image Award 2014 of the SNI will honor the best images of the nanoworld with a prize of 1000 Swiss Francs in total. We will present the best pictures on our website and will announce the winners in the next issue of *SNI update*.

Please submit your photos together with a title, a short description and scale of the image until 31st September 2014 to c.moeller@unibas.ch.

News from the SNI

SNI membership

Recently, the SNI management has decided to introduce a SNI membership in order to clearly define who belongs to the SNI network. SNI members have the chance to participate in SNI events including the SNC und in SNI research programs like the Argovia and the PhD doctoral program. SNI members will be named in the annual report and on the SNI website, and can get support in communication activities. All researchers from partner institutions of the SNI like the University of Basel, the Paul Scherrer Institut, the FHNW, the CSEM in Muttenz or the D-BSSE of the ETH in Basel can become SNI members. Scientists who participate in SNI projects will automatically receive the SNI membership.

More information at:
www.nanoscience.ch/nccr/about_us/sni_membership

SNI video on YouTube

In recent months, the SNI communications team together with Voltafilm (Luzern) has produced two videos that are now available on Youtube. The first video gives an insight into the SNI and shows the various SNI activities. In the second video, four research projects are introduced that demonstrate the diversity and fascination of nanoscience at the SNI.

If you watch the two 3 minute-long videos, it may not be obvious how much time the team invested in this

The film team wants to know more about Rodrick Lim`s research.

A short portray of Heidi Potts was recently published in the Tagesanzeiger.

project. After the preparation that included selecting the film crew, writing of the script and planning of the shooting, three long shooting days took place in Basel in February. Over 60 working hours and the five hours of footage were reduced to 7 minutes. Two days of work were invested by the specialists to incorporate titles and effects, a sound engineer additionally worked for 2 days on music and sound. After countless emails and phone calls between Lucerne and Basel, the project was completed in May. From the more than 500 gigabytes of raw material around 900 megabytes have remained, which can now be seen on YouTube. The SNI is currently planning a third video on the nano studies and the SNI PhD school.

Please have a look, and please feel free to use the videos and share them among interested people: http://www.nanoscience.ch/nccr/media/video

In the media

SRF, May 21, 2014 Aargau is important for nanoscience in Switzerland

The University of Applied Sciences in Brugg-Windisch is currently the Mecca of nanoscientists from around the world. On Wednesday and Thursday, about 350 researchers exchange their experiences with nanoparticles at the Congress «Swiss Nano Convention». The Aargau wants to be a center for nanotechnology.

More at: http://www.srf.ch/news/regional/aargau-solothurn/der-aargau-ist-wichtig-fuer-die-nano-wissenschaft-in-der-schweiz

Tagesanzeiger, June 30, 2014. Young, enthusiastic and successful

Women in technical professions are rare. Nevertheless, many young women begin nano studies at the Swiss Nanoscience Institute (SNI) at the University of Basel. One of these students is Heidi Potts. In 2008, the 25-year-old German citizen began her studies in nanoscience.

More at: nanoscience.ch/nccr/media/press_coverage_data/press_coverage_items/press_item_355/press_item_355.pdf

Additional media coverage at: nanoscience.ch/nccr/media/in_the_media

Recent press releases and uninews from SNI members

Basel, 15.07.2014. Smallest Swiss Cross – Made of 20 Single Atoms
The manipulation of atoms has reached a new level: Together with teams from Finland and Japan, physicists from the University of Basel were able to place 20 single atoms on a fully insulated surface at room temperature to form the smallest "Swiss cross", thus taking a big step towards next generation atomic-scale storage devices. The academic journal Nature Communications has published their results.

Basel, 09.07.2014. Basel, 09/07/2014. The University takes leave of Hans-Joachim Güntherodt.
Hans-Joachim Güntherodt, emeritus professor of experimental physics and former Rector of the University of Basel, died last weekend at the age of 75 years.

Basel, 26.06.2014. High-Precision Nanosensors: Physicist Implement 10 Year old Theoretical Proposal
Scientists at the Swiss Nanoscience Institute at the University of Basel were able to show that specifically modified diamonds could work as high precision nanosensors. The researchers used single crystal diamond cantilevers with embedded defects in their crystal lattice structure. In these so-called nitrogen-vacancy centers the spin of single electrons can be observed and manipulated. The researchers thereby implemented an experiment that was suggested in theory 10 years ago. The results were published in the renowned scientific journal Physical Review Letters.

Basel, 24.06.2014. Nanoscale Velcro used for Molecule Transport
Biological membranes are like a guarded border. They separate the cell from the environment and at the same time control the import and export of molecules. The nuclear membrane can be crossed via many tiny pores. Scientists at the Biozentrum and the Swiss Nanoscience Institute at the University of Basel, together with an international team of researchers, have discovered that proteins found within the nuclear pore function similar to a velcro. In Nature Nanotechnology, they report how these proteins can be used for controlled and selective transport of particles.

Basel, 20.06.2014. De Vigier-Foundation supports Mimedis, a start-up company in Basel
The start-up company Mimedis in Basel received a foundation award of 100›000 Swiss Francs from the W.A. de Vigier-Foundation. The company, a spin-off of the University of Applied Sciences Northwestern Switzerland (FHNW) and the University Hospital Basel produces individualized patient- friendly bone implants und artificial joints. SNI member Dipl.-Ing. Ralf Schumacher (FHNW) is one of the founding fathers of Mimedis.

Basel, 23.05.2104. Mapping Atherosclerotic Arteries: Combined Approach Developed
A new method allows calcified and constricted blood vessels to be visualized with micrometer precision, and can be used to design containers for targeted drug delivery. Within the project "NO-stress", materials scientists from the Medical Faculty of the University of Basel combined cutting-edge-imaging techniques to visualize and quantify the constrictions caused by atherosclerosis.

Full press releases and uninews can be found at: nanoscience.ch/nccr/media/recent_press_releases

Your feedback is important

Please provide feedback and share your news and ideas with c.moeller@unibas.ch.