Editorial
Dear Biozentrum Alumni,

42 years ago the Biozentrum came into being. Since then, 1800 undergraduate students, PhD students and postdocs have studied, carried out research and worked here, jumping for joy over successes and brooding over setbacks. For some, the Biozentrum provided an initiation into the world of science, for others it has been a launching pad for their career. Many still feel closely connected to the Biozentrum. Therefore, the ALUMNInews wants to let you again actively share in the life at the Biozentrum. Twice a year, this newsletter will report on new appointments, retirements, awards, honors, publications and much more.

We are also looking further afield. What has become of alumna X or alumnus Y? ALUMNInews delivers interviews with different alumni – today profiling Tom Walz, Professor at the Harvard Medical School, and Christian Itin, CEO of the biotech firm Cytos. We are also looking up in the current issue: A tower of over 70m in height will be the new home of the Biozentrum. The fate of the old, familiar Biozentrum is still open. But more to that towards the end of this issue. We wish you interesting and entertaining reading.

Prof. emeritus Hans-Peter Hauri, President of the Biozentrum Alumni Board
Prof. Erich Nigg, Director of the Biozentrum and Member of the Alumni Board
A worldwide alumni net.

In January, 2013, it was initiated; the concept for an alumni association of previous members of the Biozentrum spread throughout the whole world. Meetings were held, activities defined, interviews conducted, articles written, data imported and a website created, so that here today we can present to you the new Biozentrum Alumni association, its benefits and networks, as well as the Biozentrum Alumni Board.

… first stop in Basel to study or write a thesis. Then as a postdoc to Canada followed by the U.K. Finally accepting an appointment in the USA …

Many of the Biozentrum’s alumni are modern nomads. Almost 1000 of the 1800 Biozentrum’s alumni live abroad. And not much will change in this respect in the future: The current about 30 Master’s students and 130 each of both PhD students and postdocs have found their way to the Biozentrum from 45 countries. From here, at some time, the road will continue for many into other regions of the world.

The net of the Biozentrum’s alumni, covering the whole world, has been growing continuously for over 40 years. However, the contacts once made disappeared again over the great distances. Therefore, the Biozentrum Alumni is creating the possibility for the former members of the Biozentrum to meet or at least hear from old colleagues again.

Bringing the network to life

But who’s career has taken them to where? Using the platforms linked to the Biozentrum Alumni internet, the alumni can now network with each other: It’s easy to find former colleagues who are members of AlumniBasel with the alumni online Who-is-who. Or search on the Biozentrum’s LinkedIn group for other members or members in a region, to create, for example, a new Alumni subgroup for local activities. Over and above, future Alumni events will provide an additional platform for personal dialogue.

Alumni benefits

Biozentrum Alumni members will automatically also belong to AlumniBasel and immediately enjoy its alumni, campus and outside benefits - whether it be for learning a new language, improving one’s fitness, buying the newest English bestseller or wine from Cyprus. But there is more, of course, for Biozentrum Alumni: the online ALUMNInews, reporting twice a year from what was once “home”, the website www.biozentrum.unibas.ch/alumni with its comprehensive information as well as special events.
Becoming a member
All who have studied, researched, taught or worked in another function at the Biozentrum are warmly welcome to the Biozentrum Alumni. There are three types of membership available: Standard Membership, Trial Membership and an Introductory Membership for new graduates who are still enrolled. The membership fee is 50 Swiss francs per annum. Members living abroad pay a reduced rate of 25 francs per year, as they cannot profit from the campus and outside benefits. You can register on the Biozentrum Alumni website here.

Alumni Board
The future of the Biozentrum Alumni lies in experienced hands: Prof. Hans-Peter Hauri, President of the association, carried out research and taught for 27 years at the Biozentrum. Prof. Urs A. Meyer and Prof. Markus Affolter also look back on a proud 25 years and Prof. Urs Jenal on 17 years of work at the Biozentrum. The century mark is actually exceeded with the rest of the members from the more recent history of the Biozentrum, Prof. Erich Nigg, and Dr. Monika Gessler along with Evi Sonderegger. » Home

Alumni Board

Prof. Dr. Markus Affolter
Markus Affolter came to the Biozentrum as a postdoc in 1988. In 2000, he became an Assistant Professor and, in 2005, Professor of Developmental Biology.

Prof. Dr. Hans-Peter Hauri, Emeritus, President Alumni Board
Hans-Peter Hauri was at the Biozentrum from 1983 until 2010, first as an independent group leader and from 1992 until 2010 as Professor of Cell Biology.

Dr. Monika Gessler
As Head of Scientific Affairs, Monika Gessler is in charge of projects regarding the strategic and scientific development of the Biozentrum since 2010.

Prof. Dr. Urs Jenal
Urs Jenal began his research at the Biozentrum, in 1996. Since 2002, he holds a professorship in both of the focal areas of Infection Biology and Growth and Development.

Prof. Dr. Urs A. Meyer, Emeritus
Urs A. Meyer was Professor of Pharmacology at the Biozentrum from 1983 to 2008. He was also Acting Chairman of the Biozentrum.

Prof. Dr. Erich Nigg
Erich Nigg is the Director of the Biozentrum and Professor of Cell Biology. He was a Director of the Max Planck Institute for Biochemistry in Martinsried, Germany, before he joined the Biozentrum in 2009.

Evi Sonderegger
As Head of Communications, Evi Sonderegger together with her team, is in charge of public and media relations for the Biozentrum since 2011.
What is a shogun doing in a laboratory?

Shogun, in the history of Japan, was the title applied to a military general leading an army of samurais. Today, a certain shogun and his samurais seem to play an important role in the laboratory of Biozentrum alumnus Thomas Walz, Professor of Cell Biology at the Harvard Medical School. ALUMNINews asked him about his academic career, his roots at the Biozentrum and of course his relationship with the Japanese culture?

ALUMNINews What’s the Japanese way of the Walz lab all about that you presented for probably over a decade on your website?

Tom Walz My PhD supervisor, Prof. Andreas Engel, gave me the opportunity to work for several months in Prof. Yoshinori Fujiyoshi’s laboratory in Japan. This was the beginning of my lasting fascination with Japan, the Japanese people, and the Japanese culture that is so different from ours.

AN What is your current topic of research?

TW I use molecular electron microscopy to determine the structure of membrane proteins in their native environment, the lipid bilayer and to study how macromolecular complexes perform their function.

AN Why did you become fascinated by electron microscopy?

TW During a block course at the Biozentrum, we looked at T4 viruses in the electron microscopy. I was amazed by how proteins can assemble themselves into such complex machines, and I was hooked on electron microscopy, which allowed me to see these intricate structures.

AN Was there a specific moment in which you decided to become a researcher?

TW I always wanted to become an explorer and to see things nobody has seen before. As I grew older, I realized that becoming an explorer was not a realistic option. I therefore made the decision to study biology at the Biozentrum. In a way, as an electron microscopist, I now do see things nobody has seen before.

AN What made you decide for an academic career and have you ever thought about working in industry?

TW I never thought about anything else than academic research. My interests have always been in very basic science. In recent years, however, I have become more interested in ways to translate basic knowledge to the development of cures, and I am now in the process of starting my first collaboration with a biotechnology company.

AN Have you ever faced unforeseen obstacles in your research career?

TW In virtually every research project one encounters unforeseen obstacles. For me it is the greatest fun of academic research to find imaginative ways to overcome the problems and to arrive at the correct answer.
**AN** Are you the planner of your professional career or has it developed rather by chance?

**TW** I can definitely say that my career developed completely by chance. The only conscious decision I ever made was to stay in Europe. But that did not exactly work out as planned.

**AN** Fourteen years ago you moved to Boston. What do you appreciate most about the USA and what do you miss?

**TW** I most appreciate the scientific freedom and complete independence I had from the very beginning but I miss the cultural variety of Europe.

**AN** The USA is one of the most attractive places for researchers worldwide. Why is this so?

**TW** What makes the USA attractive to me is that in places like Boston, San Francisco and New York, the research community is simply amazing, both in size and quality.

**AN** What experiences have you taken on your way from the Biozentrum into the wider world?

**TW** My education at the Biozentrum instilled in me the value of having a broad and solid basis of knowledge and of thinking clearly and working hard. I still benefit from what I learned during my time at the Biozentrum over two decades ago.

**AN** You left the Biozentrum more than 15 years ago. As an alumnus how do you feel about the Biozentrum and which are your best memories of that time?

**TW** I still feel connected to the Biozentrum, which will always remain the starting point of my scientific career. I particularly enjoyed my time in Andreas Engel’s group, which was full of enthusiastic and highly motivated people. They made it fun to work late into the night.

**AN** Do you still have many contacts to other Biozentrum alumni?

**TW** Unfortunately, I only have contact with few other Biozentrum alumni, probably because we all live in different parts of the world and work in diverse research areas.

**AN** Would you mind telling us a special anecdote from your earlier days as PhD at the Biozentrum?

**TW** I ended up in Andreas Engel’s group because I lost a coin flip for a PhD position in a different group. My career is built almost exclusively on such chance events and this particular loss probably turned out to have been my biggest win. 

---

Thomas Walz is Professor of Cell Biology at the Harvard Medical School (USA) and director of its two electron microscopy facilities, as well as selected investigator of the Howard Hughes Medical Institute. He graduated at the University of Basel and received his PhD in biophysics at the Maurice E. Müller Institute at the Biozentrum in 1996. As a PhD student he participated in solving the structure of membrane proteins, in particular aquaporins, under the mentorship of Prof. Andreas Engel. He then went on to postdoctoral research at the Krebs Institute at the University of Sheffield (UK) and joined the faculty of Harvard Medical School as an Assistant Professor in 1999. In 2007, he was promoted to full professor, one year later he was selected as an investigator of the Howard Hughes Medical Institute. The structural biologist uses advanced techniques of electron microscopy as a powerful tool to study the structure of a variety of biological molecules.
A Swiss globetrotter.

He is a scientist, founder of a company, businessman and currently CEO of the biotechnology company Cytos. He lives in Switzerland, the USA and Germany. The Biozentrum alumnus Christian Itin leads the life of a globetrotter. ALUMNI news was interested to find out whether and how he remains connected to Basel and the Biozentrum.

The Biozentrum alumnus Christian Itin is CEO of the biotechnology company Cytos in Schlieren (CH), since November, 2012. Subsequent to completing his studies in Biology at the University of Basel, he carried out his PhD thesis in the Department of Pharmacology at the Biozentrum under the guidance of Prof. Hauri. Following postdoctoral fellowships at both the Biozentrum and in the Department of Biochemistry at Stanford University (USA), he became a co-founder of the company Zyomyx. In 1999, he joined Micromet (DE/USA), taking on various management functions and headed the company as CEO from 2004 until its acquisition by Amgen in 2012. Born in Basel, he currently lives as a weekly commuter in Zurich, his family lives in Munich (DE).

ALUMNI news You travel much professionally. Where do you feel at home?

Christian Itin Where you grow up has a big influence on your perspectives and values, values you take along on your way. A big part of what defines home for me though is family and friends, I met along the way. Today I feel at home when I am in California, in Munich or in Zurich.

AN Why do you travel so much?

CI The biotechnology business is very international. People we work and share ideas with are spread throughout the world. There are many first class academic and company research and development centers in the USA along with a particularly high concentration of investors supporting the industry.

AN What does the biotech company Cytos produce and what are your tasks as CEO?

CI We develop our lead product candidate to help patients better control their asthma using an immunological approach. As CEO of this small biotech firm, I am closely involved with the projects. One of the most exciting things for me, is to be able to move between so many levels – from research and clinical development across to finance and company strategy.

AN What is your daily routine?

CI I don’t have a routine in the real sense of the word. The question that I must ask myself each day is: What can I do today to ensure future success of the company?

AN What does it take to head a company? Where does one learn this?

CI There are a few simple but essential things. As a company leader you have to clearly define the focus of the company. In biotech this is typically the development of innovative new medicine. New mechanisms of action are typically at the heart of innovation and carry a lot of uncertainty. Any new data from experimental work, or from clinical trials require a re-examination of the approach taken and potentially changes to adapt to the new situation. We need a data-driven culture and build on scientific excellence to succeed. Equally important we have to realize that we do not only lead by setting goals, but how we personally interact and work within the company. Successful R&D is built on team work. Being part of such a team is fun, challenging and a great opportunity to learn from each other.
What keeps you connected to research?
A lot, it is the foundation of what we do. Our lead product has been completely developed by Cytos. We carried out research in the fundamental biology and mechanisms of action here in our labs. Currently we are at the stage of clinical trials. At this point we are a development team with a focus on clinical research and development. At Micromet, where I worked before, we had built a fully integrated research and development team. Our focus was on a new class of therapeutic antibodies, T cell engaging BiTE antibodies, for the treatment of various cancers. We developed a completely new and highly potent mechanism of action and worked from basic biology to successful clinical studies. At the time of acquisition by Amgen last year, we were grown from a private German company to a public US company with 240 employees in Munich, Germany and Rockville in Maryland.

In what research were you involved at the Biozentrum?
I was a graduate student in the early 1990’s, in the Department of Pharmacology in Hans-Peter Hauri’s group. We were working on the early secretory pathway between the endoplasmic reticulum and the Golgi apparatus.

Why did you choose a career in industry after you completed your postdoc?
I eventually realized that building a company fascinated me more than continuing on the academic track. The entrepreneurial environment of Silicon Valley certainly facilitated the decision. What got me comfortable to take this decision was the realization that what I could learn on this path, I couldn’t learn anywhere else…

...that’s why you started the company Zyomyx, in California 15 years ago?
We were a group of four postdocs who founded the company in 1998. It was an amazing learning experience. We started out without any relevant experience on how to build a business and had to get on a very steep learning curve. What was terrific about starting in the San Francisco Bay Area was the easy access to people, who had successfully built biotech companies. The advice we got was incredibly valuable.

How did the company develop and why did you leave Zyomyx?
The company focused on developing protein chips for analytical and diagnostic purposes, a new approach at the time. My passion though was always on developing new therapeutics and, if possible, working through immune-based mechanisms. I had met the future chief scientist of Micromet when he still was working in the Bay Area and that personal relationship was the trigger for me joining Micromet end of 1999.

How straightforward did your career develop?
Looking back careers typically look straightforward and logical. But I can assure you I did not have a master plan starting out. Important for me was to be open for opportunities and act upon them. The one thing I knew was that I wanted to build and shape a company, creating an environment for innovation.

What setbacks did you have to accept in your career?
The biotech business while overall successful is marked by setbacks. Research and development are very complex and there is always something that does not go according to plan. You have to learn to deal with these situations. Focus on the data and what they tell you. Keep your eyes on the goal and work with your team to resolve the issues.

How was the time you spent at the Biozentrum significant for your career?
There was a very strong emphasis on scientific excellence, working on fundamental questions and a will to be a world class institute. This drive was also reflected by its international appeal. Having had the opportunity to work as a student with colleagues with international backgrounds was important to me.

Have you kept in contact with the Biozentrum or with former research colleagues?
Now and again, I have met other Biozentrum alumni at conferences. On occasion, I gave a talk at the Biozentrum. Over the years, I had regular contact with my PhD advisor. Establishing an alumni organization is a great idea. The Biozentrum alumni organization can become an important networking platform for new and former students alike.

Is there a particular anecdote from your time at the Biozentrum that you fondly remember?
I think it was for the Biozentrum’s 25th Anniversary celebration. The whole department performed a rap together. It was pretty cool and great fun for all of us.
Farewell Joachim and Anna Seelig-Löffler.

Last year, Prof. Joachim Seelig and his wife Prof. Anna Seelig retired from their positions at the Biozentrum. Their departure marked the end of the founding generation, which has led the Biozentrum to its worldwide recognition. By Gottfried Schatz

The international reputation of these two scientists was reflected in the farewell symposium, “Frontiers in Structural Biology and Biophysics,” which was held on March 22 at the Biozentrum. Speakers from Denmark, Sweden, Germany and the USA, matched by an impressive cast of past and present Biozentrum members, reported on their own work and also paid tribute to the fundamental contributions Joachim and Anna Seelig have made to their respective fields.

The concluding remarks by this successful husband and wife team were examples of typical Basel understatement, even though Joachim Seelig hails from Cologne. Today, however, his feet rest firmly on the soil of the city he chose as his home in 1970 and where he soon after married the chemistry student Anna Löffler, whose family has been highly respected in Basel for generations.

Joachim Seelig was one of the star PhD students of Nobelist Manfred Eigen at the Max Planck Institute in Göttingen, where he investigated dielectric effects on synthetic peptides. After two years as a postdoc with Harden M. McConnell at Stanford University, he moved to Gerhard Schwarz’s group at the Institute for Physical Chemistry at the University of Basel. He was the youngest of the “Göttingen Mafia,” which along with Schwarz also included Jürgen Engel and Kaspar Kirschner. It did not take long for Seelig’s groundbreaking work on the spacial organization of membrane lipids to make headlines worldwide, to establish him as one of the foremost membrane biophysicists of his generation, and to secure him several international awards. He was also one of the first to recognize the medical importance of magnetic resonance imaging, introducing this new method to the hospitals in Basel. His talents as an organizer and research manager were soon in high demand in Basel as well as elsewhere. The Swiss National Science Foundation used him for over 12 years in their Research Council, much of this time as Head of the Division of Biology and Medicine; in 1991, he inaugurated the successful “Marie Heim-Vögtlin Program,” which helps female researchers in their return to scientific research after an extended family leave. Important input for this program was undoubtedly provided by his wife Anna, who had done her PhD work with Gerhard Schwarz and, as a mother of three children, understood the problems of a career break only too well. All their children have found their way – the physicist Georg, as an assistant professor at the University of Washington in Seattle, Johannes, also a physicist, as an independent researcher at the Janelia Farm Research Campus of the Howard Hughes Medical Institute, and the physician Eleonora at the University Hospital of Basel. And their mother Anna, too, succeeded in carving out a career as an independent researcher at the Biozentrum. Her work on the interactions of peptides with biological membranes and the mechanism of multidrug resistance has recently received wide recognition and established her as a much sought-after congress lecturer and consultant to the pharmaceutical industry.

Both have contributed substantially to the recognition of the Biozentrum and Joachim’s activities as a highly effective Biozentrum “Obmann” will still influence the Institute for many years to come. His legacy includes the more than 20 professors he recruited; the “Werner Siemens Graduate Program” which he created; the extra millions of research money which he secured for the Biozentrum with great dedication but always without fanfare; and the decade of his life in which he successfully protected “his” Biozentrum from countless challenges from outside. Those who are aware of his many achievements will not forget him. Anna and Joachim Seelig’s departure leaves a large void and closes an impressive chapter of Basel’s scientific history.
The founding of the Maurice E. Müller Institute at the University of Basel by Ueli Aebi in 1986 was a milestone for structural biology and the nanosciences. This groundbreaking success story, which resulted from the pairing of strong financial sponsorship with visionary scientific leadership, has today led to major breakthroughs in the life sciences and medicine. The goal of the Institute was to investigate biomacromolecules and their supramolecular assemblies at the nanometer scale, in order to better understand their physiological function and dysfunction and to advance pre-symptomatic diagnostics.

The Maurice E. Müller Foundation donated over 45 million Swiss francs to the Biozentrum for the establishment and running of the Institute. This gift provided important support for the advancement of research in the field of structural biology and nanobiology, thereby strongly contributing to the success of the Biozentrum. The generous financial support will be recognized and acknowledged by naming the science lounge in the “new” Biozentrum after Maurice E. Müller.

As Professor of Structural Biology from 1986 to 2011, Ueli Aebi published over 300 articles, which have been cited more than 18,000 times. In his research, Aebi’s main area of focus was to investigate the structure and function of the cell’s cytoskeleton and the nuclear pore complexes that mediate the molecular transport into and out of the cell nucleus. In addition, his pioneering work led to the development of new applications of atomic force microscopy that, in turn, have opened the doors to nanomedicine, particularly in the diagnostics of soft tissue disorders, such as articular cartilage defects (e.g. osteoarthritis) and breast cancer.

Ueli Aebi was a member of the Swiss Nanoscience Institute and the NCCR “Nanoscale Science”, and he is still active in numerous scientific organizations including the European Molecular Biology Organization (EMBO) and the Academy of Europe. Among others, Ueli Aebi has been honored with the Gregor Mendel Medal from the Czech Academy of Sciences, the Arne Engström Lecture Award from the International Union of Pure and Applied Physics, the Carl Zeiss Lecture Award from the German Society for Cell Biology and the Distinguished Scientist Award for the Biological Sciences by the Microscopy Society of America. Furthermore, he has received an honorary doctorate from Charles University in Prague.

At the beginning of 2012, more than 25 Swiss and internationally renowned scientists gathered in Basel to celebrate Ueli Aebi’s research work and pioneering achievements in the life sciences. Amongst the guest speakers were the Nobel Laureate Prof. Werner Arber (Biozentrum, University of Basel), Prof. Tom Pollard (Yale University), Prof. Wolfgang Baumeister (Max Planck Institute for Biochemistry) and Prof. Hans-Joachim Güntherodt (Swiss Nanoscience Institute).
Infection biologist Guy Cornelis says goodbye.

How do bacteria protect themselves from being destroyed by the immune system? Over decades, this has been the central question for the research undertaken by Prof. Guy R. Cornelis. In his research career, he has been able to find many answers.

Guy Cornelis, a Belgian, was Professor of Molecular Microbiology at the Biozentrum from 2001 to 2012 and dedicated his research life to the elucidation of complex mechanisms of action in bacterial infectious diseases. Already, more than two decades ago, Cornelis began investigating how pathogens can successfully sabotage the immune defense of their host organism.

Guy Cornelis gained international recognition with the discovery of the so-called bacterial “type III secretion system”. Pathogens, such as bacteria which cause gastroenteritis and the Black Death plague have developed this infection apparatus during the course of evolution, with which they can switch off the immune cells of the host organism and secure their own survival. It is made up of a complex nano-syringe which the pathogen uses to inject a cocktail of cell toxins into the immune cells, thus interfering with the communication within the cells. The type III secretion system, present in many animal and plant pathogens, appears to be one of the most sophisticated virulence mechanism and is now largely described in microbiology textbooks. In researching the manifold interactions between the host and pathogen, Cornelis, took on a pioneering role. His discoveries do not only contribute to the fundamental understanding of infectious diseases but also provide new approaches for combating pathogens.

Guy Cornelis’ lifework in science has been honored by several distinctions and over 170 publications or editorials in leading journals, including Nature and Science. Cornelis originally studied pharmacy at the University of Louvain in Belgium. In 1974, at the Dunn School of Pathology (Oxford), he completed his PhD thesis on β-lactamases as a stipend awardee from the “Belgian National Science Foundation”. After working internationally, Guy Cornelis returned to the University of Louvain and investigated the pathogenesis of Yersinia enterocolitica, an agent of gastroenteritis but also a close relative of Yersinia pestis and a safe model to study the pathogenesis of Y. pestis. In 2001, he followed a calling to the University of Basel, where he took on the duties of Ordinary Professor in the area of Infection Biology at the Biozentrum and headed this focal area of research from 2004 to 2011.

Guy Cornelis is one of the most cited scientists worldwide and member of various advisory boards and scientific associations including the European Molecular Biology Organization (EMBO) and the American Academy for Microbiology. In the past year, the infection biologist was awarded the coveted “ERC Advanced Investigator Grant” from the European Research Council, supporting his research into bacterial infectious diseases over the next five years. And so, it is obvious that Guy Cornelis, after his farewell in summer 2012, was not to rest in retirement. With his family, this high level scientist returned to his homeland and continues his research activities at the “Université de Namur”, in Belgium. » Home

Yersinia injectisome.
New professors

A passion for research.

He earned his PhD at the Biozentrum in the laboratory of Prof. Guy R. Cornelis, followed by four-years of postdoctoral research at Stanford University. In January, Prof. Petr Broz started as an independent research group leader in the focal area of Infection Biology. Since studying biology, he has been fascinated by the struggle between the host and pathogens in infectious diseases.

ALUMNInews What is the subject of your research?

Peter Broz My research is focused on innate immunity, which protects the host against invading microbes before the onset of adaptive immunity. We are particularly interested in the inflammasome, a cytosolic multi-protein signaling complex that is assembled following the recognition of intracellular pathogens or cellular damage. The inflammasome serves as an activation platform for inflammatory caspases, which promote the release of pro-inflammatory cytokines and proteins involved in tissue repair or induce cell death of the infected cell.

AN Can you reveal to us one hypothesis on which you would like to work here at the Biozentrum?

PB Our data indicate that distinct sub-types of inflammasome complexes can be formed. We hypothesize that these inflammasome sub-types differ in terms of their protein composition and structure and that this results in selective activation of different downstream signaling pathways.

AN What prompted you to come back to the Biozentrum?

PB I chose the Swiss National Science Foundation (SNSF) professorship at the Biozentrum, because I believe the strong focus on infection biology combined with the expertise on cellular signaling and structural biology at the Biozentrum offers an ideal environment for the questions I want to address.

AN What did you appreciate most while you were abroad and what did you miss?

PB Stanford University is at the heart of the Silicon Valley and I was impressed by the entrepreneurial spirit, the ease of collaborations between academia and industry and the overall can-do attitude. What I missed at Stanford was that as postdocs we did not have the opportunity to engage in undergraduate teaching at the university and I am pleased to interact more with students in Basel.

AN You are establishing your own research group for the first time. What is important for you?

PB For starting my own research group, a supportive and stimulating research environment is essential. In addition, finding motivated co-workers with whom I can share my enthusiasm for innate immunity is very important as well.

AN After your PhD you worked for a pharmaceutical company. What made you ultimately decide to pursue an academic career?

PB Although working for a pharmaceutical company was a very interesting experience, I soon realized that I missed the freedom that I had enjoyed working at the University and that my passion lies in academic research.

AN Many people at the Biozentrum remember you as PhD student. How was it to come back?

PB I was looking forward to returning to the Biozentrum as an assistant professor. Since I left, the institute has changed and many new research groups have been added, opening new possibilities for collaborations.

AN Apart from your work, do you also find time for your hobbies?

PB I have always enjoyed sports, hiking and traveling. I also enjoy spending time with my wife and our son.

Petr Broz was born in 1977 in Prague, Czech Republic. After studying biology at the University of Basel he completed his PhD at the Biozentrum. In 2008 he joined the Stanford School of Medicine (USA) as a postdoctoral assistant where he investigated the role of the inflammasome in infectious diseases. Broz is married and the father of a son.

ALUMNInews
Double works better.

Prof. Sonja Hofer and Prof. Thomas Mrsic-Flogel have some things in common. Since many years, they have been carrying out research together in the same field: Neurobiology. In the same city: London. And in the same lab. They love to discuss things with each other – about science. But this is not all that they have in common. They are a couple. Married. Since February, they are both professors at the Biozentrum. They are still in London, but will soon be making their way to Basel. To the Biozentrum. Each in their own lab. To do research together.

**ALUMNInews** What is your research all about?

**Thomas Mrsic-Flogel** Our research is focused on how the brain perceives stimuli in the world around us. The process of sensation or perception relies on the interaction between brain cells. We would like to uncover the principles which guide these interactions. To understand how information is relayed from one part of the brain to the next, we first need to know how neurons connect. We also want to understand the communication within a particular brain area because this is what gives rise to neuronal computations that extract different features of the sensory world. We are particularly attracted by the visual system because it's the best studied system so far with more than 60 years of intensive research.

**Sonja Hofer** What I am most interested in is how specific brain circuits and interaction between neurons change when an animal learns. What are the mechanisms of learning and plasticity in neuronal networks? How does interaction within a circuit and between different brain areas change when new information is integrated? And how does experience and activity set up and modify specific connections between neurons when the brain develops that enables, for example, circuits in the visual system to analyze visual input? Therefore, our research is complementary and overlapping.

**ALUMNInews** How did you end up in this field of research?

**TM** When I was sixteen, I wanted to know what animals perceive and therefore to study their behavior. I realized very quickly that if I want to understand their behavior I have to explore how their brains work. That’s how I ended up in neuroscience.

**SH** Well, Tom, you have almost stolen my words. For me it was quite similar – perhaps a bit later. When I studied Biology in Munich, I was always very interested in why animals have certain behaviors; why they do what they do. And of course the answer lies in the brain. So our interest in neuroscience came very much from the behavior side – for both of us.

**ALUMNInews** Where did you get your biggest influence from?

**SH** I think in science you are influenced most by your direct supervisors, the people who teach you how to do research. In my case these were Georg Klump as an undergraduate, and Mark Huebner and Tobias Bonhoeffer as a PhD student. Also of course Tom. They all very much influenced the way I think about scientific problems and results and my general research interests.

**TM** My first supervisor was Andrew King at Oxford University. At that time, I was very young (aged 22), arrogant, naive, and largely ignorant. He tried to teach me how to focus my ideas, convert them into practice, and how to be patient. He was extremely kind to everybody, and that is what I would like to emulate. Then I moved to Munich as a postdoc, where I was influenced by how Mark Huebner and Tobias Bonhoeffer run their lab – with plenty of liberty to carry out my own research and explore new ideas, stimulated by many creative discussions. At the same time, under their subtle jostling, I was slowly developing the responsibility to manage my own projects and develop fruitful collaborations with other lab members.
members. Without that experience, I would not have been able to start my own lab. I have to admit that I made most of these realizations in hindsight!

AN What is your biggest scientific success?
TM For me it’s having established a harmonious and productive lab with a good balance of positive atmosphere, creative thinking and hard work. I still think that this is the hardest thing to achieve, as there is no perfect model, and much harder than, for example, publishing a paper in a high-profile journal.
SH Perhaps starting to develop preps which allow us to follow neurons, their activity and their synapses over time in the living animal, so that we can basically watch the brain change, is the most exciting part of my research. But by applying these techniques to answer important questions about the mechanisms of learning and memory formation, my biggest successes are hopefully still to come.

AN Why did you choose the Biozentrum?
SH We just felt that Basel at this stage of our career is the best option. The community at the Biozentrum is very exciting, varied and offers many opportunities for collaborations, the support is extremely good and also the wider neuroscience community in Basel is exceptional, therefore the environment in Basel is very well suited for the work we want to do in the future.
TM And the support we have received so far was great. For example, in the past, I have often experienced the following: if an administrative problem emerges, our administrative colleagues would say: “This won’t be possible” or “I am not sure I can help.” The attitude in Basel was: “This might be tricky but we’ll find a solution.” That is quite refreshing.

AN What will you miss from your time in London?
TM London is an amazing and unique city. I will obviously miss the immediacy of close friendships with a number of wonderful people. I will also miss early morning cycling to work when the traffic is sparse and the city awaking; there is time to observe and reflect on life in London’s diverse neighborhoods and its people. It is a thought-provoking experience during which one feels the pulse of a big city.
SH I think I will miss the diversity of people from all over the world, its restaurants and theaters. London has this specific energy which we definitely will miss – but which also makes it stressful and often inconvenient to live in London. We are very much looking forward to experiencing a different life in Basel.

AN So, what are your goals for the future?
SH To gain a better understanding of how different brain circuits process sensory information and how these circuits change during learning. We still know surprisingly little about the detailed mechanisms of these brain functions. But with all the powerful new methods that have been developed in our research field over the last few years, we can now start to combine techniques such as animal behavior, imaging methods with cellular and even synaptic resolution, genetics and molecular methods to answer questions that have been impossible to address directly before.
TM The ultimate goal is to understand how different brain networks give rise to particular computations or perception. Many neuroscientists are extremely excited about forging this very close link between brain activity, perception and behavior.

AN And what about your free time? Do you then still have your labs in mind or don’t you touch this topic at all?
SH Yes, this is the one thing that is difficult. Research is always present. But we are working on improving our work-life balance. Possibly.
TM We do try to avoid talking about work and the lab in the evening or over weekends. Sometimes it works, sometimes it doesn’t. At least we have something to talk about for the rest of our lives… » Home
In the last years, the Biozentrum has focused on the establishment of technology platforms to support its research groups. They provide the research scientists with an enormous advantage: The access to highly specialized instruments and the corresponding know-how. In the meanwhile, the Biozentrum benefits from nine core facilities. ALUMNInews will introduce you to these platforms and their areas of competence in the coming issues. The Imaging Core Facility is the first.

The Imaging Core Facility exists at the Biozentrum since 2011. It provides the research scientists with access to a wide range of highly specialized light microscopes and hence insights into living organisms. Oliver Biehlmaier is the head of this unit. His group provides a comprehensive service, ranging from selecting the appropriate microscope to recording and analyzing the complex sets of microscopy data. “Particularly the new research groups profit from our service. The know-how and technical equipment is ready and available, enabling the groups to begin with their research projects without any delay that acquiring new instruments can cause,” explains Biehlmaier.

In the meantime, the Imaging Core Facility boasts five point-scanning confocal microscopes, two spinning-disk confocal microscopes, a wide-field microscope and also, since recently, a super-resolution microscope. “With this range of light microscopes, images are possible that were not imaginable 10 years ago,” says Biehlmaier. Since then, the technical possibilities in light microscopy have dramatically improved. With the help of green fluorescent protein (GFP), a fluorescent protein marker, the spatial and temporal distribution of proteins in living cells, tissues and organisms can be directly displayed. Even the smallest cell structures can be observed, no longer only as seen under the electron microscope in the “non-living” state, but also “live” and living with super-resolution light microscopes. In addition, the progress in computer technology makes the analysis of ever growing volumes of image data and the automation of image acquisition possible.

“The boost in innovation is amazing. At the same time it faces us with new challenges” points out Biehlmaier. To adequately and safely store the increasing volumes of image data is one of the main tasks confronting the Image Core Facility. Together with the facility Research IT, they have established an image data base (OMERO), which enables direct saving of the recorded data. By the fall, the research groups should have direct access to the saved images together with all relevant information. Furthermore, the image data are also saved for the long term. In this way, in the future, the images made by the Biozentrum’s former scientists should no longer become lost but rather be made available to those scientists who follow.

Already in 2008, Oliver Biehlmaier decided against a career in biological basic research to concentrate on the technical side of research. “I have always had a weak spot for photography and technology. I find it very satisfying to work with an image on the computer till it is perfect,” explains Biehlmaier. His interest in photography also plays a part in his private life. In his free time, he is an enthusiastic hobby photographer. He was just a hair’s breadth away from making photography his profession. And one could be forgiven for saying he has done exactly that – in his own way. » Home

Oliver Biehlmaier was born in Stuttgart, Germany, in 1972. He studied biology in Tubingen (DE), and completed his doctorate in the field of neurobiology investigating the zebrafish. After 10 years in fundamental biological research, he decided, in 2008, to specialize in the field of light microscopy, and to work for a technology platform at the ETH in Zurich. Since 2011, he works at the Biozentrum, where he heads the Imaging Core Facility (IMCF), the center for light microscopy. He lives with his wife and two young sons in Zurich.
Biozentrum to get a 70m research tower.

The Biozentrum is bursting at the seams. It is also not the youngest anymore. That’s why, in 2017, it will move into a new home – a tower of steel and glass, with the charisma of modern urban development. It will house 550 researchers and 800 students. However, it is not only its height that characterizes this new structure, costing around 300 Million Swiss francs. Also the modern infrastructure along with the many meeting zones promoting scientific exchange make it most attractive.

For a long time there has been a large, gaping hole behind the Biozentrum. And it will soon become much larger: One quarter of the future Biozentrum will be constructed underground and this even though the building will stand over 70 meters in height. For the owner of the property, the financing Cantons of Basel-Stadt and Basel-Landschaft, as well as for the University, it is one of the largest building projects in their history. The groundbreaking ceremony is planned for August. The construction is scheduled to take three years and, in 2017, after a phase of setting up, it will be officially opened. Subsequently, excavation will begin in surrounding areas. By around 2025, a completely new Life Sciences Campus will have been created, bringing together at one spot the presently 40 scattered sites. The “old” Biozentrum will also become a part of this. Its fate is still undecided, as investing in its renovation is only justifiable if another 40 years of service is guaranteed. Otherwise it will have to make way for a new construction.

58 teams participated in the architecture competition in 2009. Andreas Ilg and Marcel Santer, from Zurich, emerged as the winners. The Biozentrum tower will have 19 floors. There is practically no reference project for high-rise laboratories. Therefore, the planners as well as the users were particularly challenged in the pre-project and building planning project phases. Ten of the floors will be available for research work, each offering space for four research groups. Adjacent floors will be joined through an open staircase and a meeting zone benefitting scientific exchange. The paths of the scientists should also cross thanks to the core facilities. These are distributed over all the floors, encouraging interdisciplinary and informal dialogue.

The planning of the underground floors was also highly complex: Not only the lecture theaters, workshops, building services, parking and logistics will be housed there but also a number of highly sensitive scientific installations, notably the Center for Cell Imaging and Nano Analytics (C-CINA) and nuclear magnetic resonance spectroscopy. The concept for the building’s installation with its vertical cable shafts on the facade is relatively uncommon and, not least of all, a huge construction site in the middle of the city also poses various challenges in regard to logistics, traffic management and safety.

Many employees of the Cantons Basel-Stadt and Baselland, the University and the Biozentrum, along with 100 external experts, have driven the building planning project forward and brought it to a close in mid 2012. “From the Biozentrum, about 40 persons were involved in task forces for the planning of the new building in addition to their normal daily workload: Everything ranging from the floor plan to the technical systems, the water connections and the power points that a lab requires, was recorded in detailed data lists. The effort was enormous, the time short. Altogether, the building planning project fills 36 large A4-sized folders,” explains Roger Jenni, Head of Organization and Logistics at the Biozentrum and the person responsible for representing the Biozentrum in this project.

The new 300 million Swiss francs construction will be funded equally by the Cantons Basel-Stadt and Basel-Landschaft. The excavators are rearing to go. It will then be a little louder at the Biozentrum but the anticipation for the new building is great. After all, instead of cramped space and an aging infrastructure, a modern, light and well equipped new home is very attractive. » Home
New insights into the signaling network of the vital protein mTOR
The protein mammalian target of rapamycin (mTOR) controls fundamentally important processes such as cell growth and metabolism. Dysregulation of the finely-tuned mTOR signaling network is causally involved in the development of serious diseases such as cancer, cardiovascular diseases and diabetes. Because of the central role of mTOR in the cell, scientists suspect that many proteins and processes remain to be discovered. Using quantitative phosphoproteomics, the research group of Prof. Michael N. Hall has now been able to identify more than 300 new mTOR target proteins. Detailed investigations showed that the protein complex mTORC1 stimulates, amongst others, the formation of nucleotides and thus controls the growth and proliferation of cells. The first steps in the biosynthesis of nucleotides are mediated by the CAD enzyme. mTORC1 enhances the association of multiple CAD enzymes to form oligomers and thereby stimulates CAD activity and the production of nucleotides. » More

New biophysical model predicts regulation by microRNAs
Small ribonucleic acid molecules called microRNAs are essential for organism development and function and are also involved in the development of diseases such as cancer and metabolic disorders. They are important cellular regulators that control the gene expression. The way each microRNA selects its targets from among all mRNAs is still poorly understood. Current methods for predicting microRNA targets rely on a number of ad hoc assumptions. For example, almost all target predicting methods assume that the first seven or eight nucleotides of microRNAs are decisive for mRNA binding. But binding sites that do not comply with this “canonical” paradigm, continue to emerge. The research groups of Prof. Mihaela Zavolan and Prof. Erik van Nimwegen have now developed a new biophysical model that predicts the binding strength of any microRNA to any given mRNA more accurately. » More

Bacterial signaling molecule couples proteins
The colonization of surfaces by microorganisms presents a serious medical problem. Many bacteria grow as biofilms on catheters, implants and in internal organs. Pathogens living in this multicellular community are highly resistant to the defense mechanisms of the host as well as antibiotic substances and can cause severe chronic infections. Biofilms consist of microorganisms embedded in a sticky matrix of sugar compounds. Its formation is centrally controlled by the bacterial messenger cyclic di-GMP (c-di-GMP). Prof. Urs Jenal and his team have now been able to demonstrate in the bacterium Escherichia coli that c-di-GMP steers the production of long-chain sugar compounds through uniting two proteins in the cell membrane to become an active unit. These two proteins are individually inactive and must first join before they can produce long sugar chains. “In our study we showed that c-di-GMP directly binds to both proteins,” explains Jenal. “This results in an active enzyme complex and the synthesis of sugar polymers.” » More

Feeling the force of cancer
Breast cancer is the most common form of cancer in women. Despite major scientific advancements in our understanding of the disease, breast cancer diagnostics remains slow and subjective. Important clues may be hidden in how metastasis is linked to specific structural alterations. This forms the motivation behind ARTIDIS (“Automated and Reliable Tissue
Disorder of neuronal circuits in autism is reversible

About one percent of all children develop an autistic spectrum disorder. Individuals with autism may exhibit impaired social behaviour, rigid patterns of behaviour and limited speech development. Autism is a hereditary developmental disorder of the brain. Numerous mutations in over 300 genes may cause autism including neuroligin-3, which is involved in the formation of synapses. Mice lacking the gene for neuroligin-3 develop behavioural patterns reflecting aspects observed in autism. In collaboration with Roche, the research groups of Prof. Peter Scheiffele und Prof. Kasper Vogt could show an increased production of a specific neuronal glutamate receptor in these mice. An excess of the receptors inhibits the adaptation of the synaptic signal transmission during the learning process, thus disrupting the development and function of the brain in the long term. Of major importance is the finding that the impaired development of the neuronal circuit in the brain is reversible. When the scientists reactivated the production of neuroligin-3 in the mice, the nerve cells scaled down the production of the glutamate receptors to a normal level and the structural defects in the brain typical for autism disappeared. » More

Michael N. Hall awarded 2012 Marcel Benoist Prize

Prof. Michael N. Hall was honored with the 2012 Marcel Benoist Prize by the Swiss Federal Councillor Alain Berset. He received this award in recognition of his outstanding work on cell growth and carcinogenesis. The Marcel Benoist Prize is considered to be Switzerland’s most prestigious science award – a prize sometimes called the “Swiss Nobel Prize”. In the 1990’s, Hall discovered the key protein TOR (target of rapamycin), which regulates both cell growth and size. In TOR, he found a key protein in cellular communication, whose pharmacological inhibition blocks uncontrolled cell growth. Hall’s research contributes to a deeper understanding of the most fundamental processes of life: cell division, growth and death. His discoveries are now considered part of basic scientific knowledge in biology. Hall has published his work in more than 160 scientific journal articles. » More

Simon Bernèche granted “Credit Swiss Award for Best Teaching”

For their outstanding lecture series about bioenergetics, Prof. Simon Bernèche and his team have been granted the “Credit Swiss Award for Best Teaching”, worth 10’000 Swiss francs. Investing much personal effort, Bernèche redesigned the “Bioenergetik I” lecture course which is part of the curriculum studies in Nanoscience, taking advantage of recent developments in the fields of structural biology of membrane proteins and molecular mechanics simulation. The course alternating between classical lectures and practical work aims at better understanding the link between the function of a protein and its structure and dynamics. From the students’ point of view, the intensive support in the practical work contributed greatly to their learning success.» More
Awards and honors.

**Urs Jenal honored with “ERC Advanced Investigator Grant”**

Prof. Urs Jenal has been awarded the prestigious “ERC Advanced Investigator Grant” by the European Research Council. His research addresses the formation of microbial communities – the biofilms. These help bacteria to survive under adverse living conditions and are also considered to be a primary cause of chronic bacterial infections. In 2004, Jenal’s research group discovered that the messenger cyclic di-GMP (c-di-GMP) coordinates the development of biofilms and regulates the transition between chronic and acute infections. In his ERC project, funded with three million Swiss francs, Jenal wants to find out exactly how the synthesis and the degradation of c-di-GMP is coordinated in time and space and which effector proteins are involved in this process. His goal is to better understand the dynamics of the signaling network and thus how the bacteria adapt so rapidly to their environment. Furthermore, the analysis may identify new targets for combating chronic infections.

**ERC Starting Grant for Mihaela Zavolan**

Mihaela Zavolan, Professor of Computational & Systems Biology, has been awarded an “ERC Starting Grant” from the European Research Council (ERC). The grant promotes the independent and creative research work of young high-profile scientists. In the project supported by the ERC with 900’000 Swiss francs for three years, Zavolan aims to characterize the mechanisms through which microRNAs regulate gene expression, particularly in relation to transcription factors. Although discovered only relatively recently, microRNAs play an important regulatory role and they are necessary for organism development and function. Moreover, it has been shown in the past year that a handful of microRNAs are sufficient for reprogramming somatic cells into induced pluripotent stem cells. Zavolan aims to uncover the regulatory program through which microRNAs and transcription factors cooperate to bring about changes in cell identity. A deeper understanding of these fundamental processes would open new avenues for tissue engineering and manipulation.

**Anne Spang receives Sinergia SNSF contribution**

As part of the Sinergia program promoted by the Swiss National Science Foundation (SNSF), the multidisciplinary research project entitled “Regulation of early to late endosomal traffic” led by Prof. Anne Spang received a contribution total of 1.5 million Swiss Francs. In collaboration with Prof. Ari Helenius of the ETH Zurich and Prof. Jean Gruenberg of the University of Geneva, the research team will be working over the next three years on the detailed elucidation of the transport process called endocytosis, with particular emphasis on the maturation of endosomes. The results will also be of great interest especially to infection biologists dealing with host-pathogen interactions. The elucidation of how pathogens take advantage of host cells using cellular endocytosis mechanisms, will reveal not only possible routes of infection but also open up new therapeutic possibilities. The Sinergia program promotes collaborative research between three to six research groups and allows researchers to jointly address complex scientific questions.