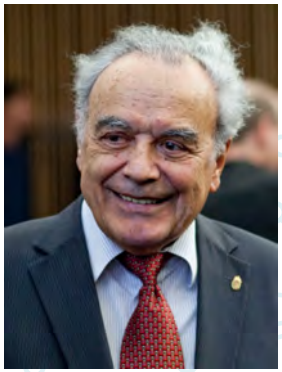
Life Sciences
Newsletter 15
Soft Matters
February 2012

11th Hermann Staudinger Lecture with Nobel Laureate Werner Arber

On January 19th Werner Arber visited FRIAS for the 11th Staudinger Lecture. The emeritus and former rector of Basel University received the Nobel Prize in 1978 for the discovery of restriction enzymes.


Werner Arber

After an enjoyable afternoon at FRIAS, where Arber and FRIAS fellows discussed the scientific focus of LifeNet and the economic and time pressure of current young scientists, Werner Arber gave a one hour lecture at the newly renovated anatomy lecture hall. He outlined the roots and development of molecular genetics and evolution and gave insights into his work on transposons in bacteria and bacteria phages.
His hand-written slides took the fascinated audience on a time travel from Darwin and Mendel in the 19th century over Watson and Crick, who discovered the double-helical structure of DNA, to modern 'omics' approaches. Werner Arber's discovery marked the beginning of a new era: molecular genetics approaches are nowadays routinely performed in almost every biological lab and are indispensable.

Junior Fellow Tom Michoel Accepts Offer from Edinburgh

Junior Fellow Tom Michoel accepted a permanent position at the Roslin Institute in Edinburgh, an institute established in 1993 as a wholly owned but independent institute of the Biotechnology and Biological Research Council. The Roslin Institute antecedents go back to 1919 and are closely linked to animal genetics research at the University of Edinburgh. Tom Michoel will leave FRIAS after just one and a half years for this group leader position, a unique chance "that would not have been possible without the independent junior fellow status I held here at FRIAS".

Greenovation – A Company for Molecular Biotechnology in Plants

In 1999 Internal Senior Fellow Ralf Reski – together with his colleague Gunther Neuhaus, currently dean of the Faculty of Biology – founded the biotechnology company Greenovation Biotech GmbH in Freiburg.
Initially, emphasis was put on a wide range of potential applications in plant biotechnology, including the famous *Golden Rice*. Since then, the company has acquired considerable amounts of venture capital and during this process focused on the production of therapeutic proteins in the moss *Physcomitrella patens*, a bryophyte, as the most promising technology in the originally diverse portfolio.
The first years were characterized by the development of new "bryo"-technologies, such as the culturing of mosses in controlled photobioreactor systems, the establishment of single- and double-knock-out moss strains, and the generation of a fast track process for scalable protein production in moss.
Equipped with these biotechnological tools Greenovation now produces recombinant proteins as biopharmaceuticals, and as a result moved from a purely biotechnology company towards being a partner for major pharmaceutical companies.
Parallel to this, Ralf Reski set up the International Moss Stock Center (IMSC) at the University of Freiburg as a central storage location for deep-frozen mosses, which can be brought back to life even after decades of cryopreservation. Last year IMSC and Greenovation agreed that the company will store their economically significant production lines as Master Cell Banks in the Freiburg cryobank and thus, scientist, engineer and entrepreneur Reski combines all his passions for innovation in one city, the Green City.

DNA Origami

An international group lead by School of Soft Matter Research's external senior fellow Osamu Tabata, successfully applied the DNA origami technique to realize a 1D arrangement of gold nanoparticles for a potential nanophotonic building block. The 400 nm long DNA nanotube was fabricated from a single DNA scaffold strand folded by numerous small DNA staple oligonucleotides in a programmable self-assembly process.


Osamu Tabata

The two master students Toshiyuki Akishiba (Kyoto University, Department of Micro Engineering, NMS Laboratory) and Sebastian Kiss (University of Freiburg, IMTEK, Laboratory for Simulation) investigated during their stays at Kyoto and Freiburg University the decoration of DNA origami nanotubes by gold nanoparticles and the specific binding of DNA origami structures to single strand DNA modified silicon dioxide surfaces. The predictable attachment of nanoparticle decorated DNA nanotubes to standard microelectronic substrates is a key towards promising applications, e.g., as for optical waveguides below the diffraction limit or for single-molecule sensing.

Rounding-up a very successful 2011, Jan G. Korvink Receives ERC Advanced Grant for an Inter-School FRIAS Project

Prof. Dr. Jan G. Korvink, Director of the School of Soft Matter Research and Chair of Simulation in the Department of Microsystems Engineering (IMTEK) at the University of Freiburg, has been awarded an Advanced Grant for fundamental research from the European Research Council (ERC) amounting to 3.4 million Euros. Together with the group of Prof. Dr. Ralf Baumeister, fellow of the FRIAS School of Life Sciences – LifeNet and professor of bioinformatics and molecular genetics at the Institute of Biology III, Korvink will use the five-year funding to develop a microsystems platform which will open up entirely new possibilities for systems biology research. Microsystems engineer Jan Korvink and biologist Ralf Baumeister first met at FRIAS where they developed the idea for this research project – the first major inter-school FRIAS project to be financed with European funds.
Behind the project entitled "A modular micro nuclear magnetic resonance *in vivo* platform for the nematode *Caenorhabditis elegans*" lies a cost-effective, microfluidic, high-throughput chip with an integrated nuclear magnetic resonance detection device (NMR device), which is used to study the nematode *C. elegans*. This unique platform aims to facilitate research on living worms using MRI scanners and encompasses all the steps necessary for breeding a large population. The platform will be able to deliver molecular NMR data for each individual worm, opening up entirely new prospects for systems biology research.


Jan G. Korvink

Overall, 2011 has been a very successful year for Jan G. Korvink: he won the Freiburger Universitätslehrpreis 2011 (University of Freiburg Teaching Award) endowed with 10,000 Euro. This prize is awarded for outstanding teaching and for innovative teaching strategies. Furthermore Korvink and his team were awarded a prestigious 2011 RedDot design award for the development of a high-tech helmet for magnetic resonance imaging (MRI). Unlike conventional devices, the award-winning helmet is equipped with over 500 sensor nodes, enabling it to deliver images more quickly and in higher resolution. At the same time the helmet is comfortable and pleasing to the eye, factors which help patients accustom themselves to the daunting technology.

FRIAS
FREIBURG INSTITUTE FOR ADVANCED STUDIES
ALBERT-LUDWIGS-UNIVERSITÄT FREIBURG

Soft Matters

February 2012

Life Sciences

Newsletter 15

School of Soft Matter Research Fellows and Scientists

School of Life Sciences - LifeNET Fellows and Scientists

Review of Excellence Initiative Evaluation Committee Site Visit on January 10th

On January 10th and 11th the long-awaited site-visit of the evaluation group of the German Research Council took place. For this event a committee of international scientists visited the University of Freiburg to assess whether or not the university should receive further funding for the next phase of the excellence initiative (2012-2017) and thus remain as one of Germany's twelve Excellence Universities.

FRIAS as the central component of the University's institutional strategy was evaluated on the first day of the site visit. To this end, the four schools were asked to showcase their work and achievements during interviews with the fellows and a poster session in the afternoon.

The preparation for this assessment exercise had required a number of weeks of planning and all participants were aware of the importance of this poster presentation. Most fellows and project-associated PhD candidates and postdoctoral scientists of the natural sciences schools, as well as members of the FRIAS interdisciplinary research groups and university based young researchers, gathered on the first and second floors of the ZBSA to present their work.

Text continues on next page >>>

Despite the fact that the majority of people had previously met in different sub-groups during various FRIAS events, the scientists had rarely had such a good opportunity to meet as a group, so when the evaluators arrived they found the fellows in animated conversation, creating a lively atmosphere.

After a short introduction by Hermann Grabert, the committee members took their time to discuss the projects with the scientists. While some evaluators were seen to immediately head for specific posters or familiar scientists, others dove into more general discussions with subgroups of the fellow or with Nobel Laureate Jean-Marie Lehn, honorary member of the School of Soft Matter Research, who supported the school during the afternoon poster session.

The committee members - despite coming from quite different backgrounds - took considerable interest in the work of the FRIAS natural sciences schools and left the impression that they found this event informative and enjoyable.

So, after months of preparation for the site visit there now will follow months of waiting for the outcome of this site visit which will be announced on June 15th… let's keep our fingers crossed!

EVENTS TO COME

March 5-8, 2012
NEMS 2012: *7th International Conference on Nano/Micro Engineered and Molecular Systems*, Kyoto / Japan

March 14-18, 2012
Black Forest Focus on Soft Matter Research 7
"*Multidimensional Optical Spectroscopy and Imaging*", Saig/Titisee

March 18-22, 2012
Interdisciplinary Workshop on "*Topological States of Matter*"
FRIAS Seminar Room

May 2-4, 2012
A Discussion Meeting "*Challenges and Prospects of Polymer Chemistry*"
Hotel Vier Jahreszeiten, Schluchsee
Registration required.

FRIAS
FREIBURG INSTITUTE FOR ADVANCED STUDIES
ALBERT-LUDWIGS-UNIVERSITÄT FREIBURG

www.frias.uni-freiburg.de/softmatter-events

EVENTS TO COME

February 22-24, 2012
Conference: *International Meeting on Rare Diseases - Mechanisms and New Therapeutic Approaches.* University of Freiburg and FRIAS
Registration required.

March 8, 2012
Nils Blüthgen: "*Using mathematical modelling to dissect complex feedback regulation in EGFR signalling: Towards tailored interference strategies*", FRIAS Seminar room, 13:15h

April 19-20, 2012
Symposium: "*Mechanisms of Embryogenesis and Organogenesis*"
FRIAS and SFB 592

September 15-20, 2012
EBEC 2012: *The 17th European Bioenergetics Conference*
University of Freiburg
Registration required.

www.frias.uni-freiburg.de/lifenet-events