Universität Bielefeld

CeBiTec
Center for Biotechnology

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In this Issue

Obituary for Prof. Dr. Erwin Flaschel

Erwin Flaschel studied chemistry at the Technical University Carolo–Wilhelmina, Braunschweig, Germany, and received his PhD for research into continuous reaction engineering with soluble enzymes from the Technical University Hanover, Germany, in 1976. In 1977, he was appointed as a research assistant at the Institute of Chemical Engineering, Swiss Federal Institute of Technology Lausanne, Switzerland. He held a number of different positions at this institute including lecturer and senior assistant. In 1990, he joined the newly established Faculty of Technology of the University of Bielefeld as chair for microbial fermentation technology. His research mainly focused on fermentation technology and enzyme technology as well as downstream – processing and recombinant strain engineering. He was holding the position of Dean of the Faculty of Technology from 1992 to 1993.

Erwin Flaschel was a member of the CeBiTec since its foundation in 1998 and belonged to the Institute of Biochemistry and Bioengineering (BioChemTech) until his retirement in July 2014.

He was a member of the editorial board of Engineering in Life Sciences and a member of the Biotechnology Processes group of DECHEMA (Society for Chemical Engineering and Biotechnology) Germany, being the chairman from 2003 to 2009 and becoming a board member of the biotechnology section of DECHEMA in 2009.

Erwin Flaschel died end of October 2014 after a long and courageous fight against a serious illness. He always kept his optimism. We have lost not only an enthusiastic researcher and academic teacher, but also an outstanding person that was highly appreciated by colleagues, coworkers and students.

Team Bielefeld-CeBiTec wins gold medal at iGEM – Biofuel from CO_2 impresses jury

On November 3, 2014, ten Bielefeld Master's degree students were rewarded for their hard work in the laboratory over the past six months. At the iGEM (International Genetically Engineered Machine Competition) in Boston, USA, the team received a gold medal for their project The Transformers – from CO_2 to Biofuel. The students impressed the expert jury with their project to produce a biofuel using electrical energy and carbon dioxide. The iGEM Competition, which started out as an internal competition at the Massachusetts Institute of Technology (MIT), celebrated its 10th anniversary this year. Teams from Bielefeld University have been participating for 5 years.

"The atmosphere at the Giant Jamboree and the international exchange on Synthetic Biology was beyond compare. There were a lot of innovative projects and exciting ideas," said team member David Wollborn. "All that hard work during the summer months paid off, and we are thrilled to receive a gold medal," added team member Janina Tiemann.

Current climate problems were the incentive behind the students' theme: there is insufficient infrastructure in the world to be able to store or transport renewable energies. CO_2 emissions are increasing and oil threatens to become scarce. The Bielefeld students took *E. coli* bacteria and re-engineered them so that they produced economically important products, e.g. a biofuel. A positive side effect of this process is that CO_2, a chemical compound considered to be one of the major causes of global warming, is bound and removed from the air in this way. The bacterium cleans the air, so to speak, makes it healthier for people and at the same time helps to protect the environment. Academics from Bielefeld University's Faculty of Biology and Faculty of Technology supported the students. Apl. Prof. Dr. Jörn Kalinowski from the CeBiTec is the team's supervisor.

Besides the work in the laboratory, the competition involves the students' presenting their project to the public, reflecting on possible applications, and looking for sponsors. At the NRW Day (North Rhine-Westphalia Day) in Bielefeld, for example, the students had a booth where they offered different experiments for children and had posters explaining synthetic biology and their iGEM project to visitors. They also developed possible application scenarios in detail during their cooperation with the European initiative SYNENERGENE. The initiative promotes dialogue between scientific research, the public and industry.

The iGEM Competition is an international competition in the field of synthetic biology, and is aimed at student teams. Every year, young scientists from around the globe come together in Boston, USA, to present their projects. Among the 230 teams taking part this year from all over the world, 11 were from Germany. In 2013, the Bielefeld team was First Runner Up in the world final.

iGEM Bielefeld Website: http://2014.igem-bielefeld.de/overview.php

Distinguished Lecture by Eddy Rubin, DOE Joint Genome Institute

On the invitation of Prof. Dr. Thomas Noll and Dr. Alexander Sczyrba, Eddy Rubin, MD PhD, Director of the Department of Energy Joint Genome, Walnut Creek (USA) visited the CeBiTec on December 18, 2014. Dr. Rubin gave a talk in the CeBiTec Distinguished Lecture Series entitled "Microbial Dark Matter". In the plenary hall of the Center for Interdisciplinary Research (ZiF) of Bielefeld University he reported about how genome sequencing enhances our understanding of the biological world providing blueprints for the evolutionary and functional diversity that shapes the biosphere. Dr. Rubin described the use of large-scale metagenomics and single-cell genomics to explore uncultivated archaeal and bacterial cells from multiple diverse habitats. These analyses have significantly increased the genomic representation of the tree of life as well as provided a systematic step towards a better understanding of biological evolution on our planet.

A new project addressing grapevine: Novel viticulture systems for sustainable production and products – NoViSys

The Genome Research group (head: Prof. Dr. Bernd Weisshaar) of the CeBiTec got a project funded from the BMBF program "Innovative Plant Breeding within the Cultivation System (IPAS)". The new project is coordinated by Bernd Weisshaar, but managed together with people from the group of Prof. Dr. Reinhard Töpfer at the JKI in Siebeldingen (Institute for Grapevine Breeding Geilweilerhof). The NoViSys project aims at the investigation of innovative new growing systems in viticulture.

High quality, fungus resistant grapevine cultivars (*Pilzwiderstandsfähige Rebsorten – PIWI*) are the biggest innovation in viticulture since more than 100 years. These cultivars or varieties are the answer to the environmental concerns of the public regarding the extraordinary high input of fungicides in both conventional and organic viticulture. Combining the use of resistant cultivars with the novel cultivation method of the "minimal pruning of trellis trained grapevines – MPTS" enables a grapevine production which is environmental friendly, economically beneficial and adapted to the on-going climatic changes.

To analyse new resistant grapevine cultivars in such an advanced production system a transdisciplinary consortium was formed. We integrated a high level of expertise for all important fields of the wine sector. This includes grapevine breeding, plant protection, visual and sensor based screening, application engineering, physiological and molecular analyses, analytical and sensorial evaluation of grape must and wine, business management, wine marketing, and social economy. The goal of NoViSys is to evaluate the behaviour of different grapevine cultivars in the most common vertical shoot positioning in trellis-system (TS) and compare this to MPTS cultivation. In addition, the biodiversity in the vineyards and the quality of resulting wines will be evaluated and compared. We intend to unravel the cause of ripening delay upon viticultural treatments, and to develop the technological basis for a broad introduction of the new cultivation system into viticultural practice. Our comprehensive investigation will empirically and functionally address field studies where new cultivars are raised in the new cultivation concept. We will generate validated information for the wine growers to demonstrate benefits and risks. In addition the economical advantages as well as supporting marketing to improve consumer acceptance will be investigated.

The Initiative for the Critical Assessment of Metagenome Interpretation (CAMI)

In just over a decade, metagenomics has developed into a powerful and productive method in microbiology and microbial ecology. The ability to retrieve and organize bits and pieces of genomic DNA from any natural context has opened a window into the vast universe of uncultivated microbes. Tremendous progress has been made in computational approaches to interpret this sequence data but none can completely recover the complex information encoded in metagenomes. A number of challenges stand in the way. Simplifying assumptions are needed and lead to strong limitations and potential inaccuracies in practice. Critically, methodological improvements are difficult to gauge due to the lack of a general standard for comparison. Developers face a substantial burden to individually evaluate existing approaches, which consumes time and computational resources, and may introduce unintended biases.

The Critical Assessment of Metagenome Interpretation (CAMI) is a new community-led initiative lead by Prof. Dr. Alice McHardy of the University of Düsseldorf, Prof. Dr. Thomas Rattei of the University of Vienna, and Dr. Alexander Sczyrba of Bielefeld University. It will host a competition designed to allow researchers to evaluate computational methods in assembly, binning and taxonomy for metagenomes without bias. The data sets to be used are based on unpublished microbial genomes contributed by a number of international organizations. The results of CAMI will provide exhaustive quantitative measurements of tool performance to serve as a guide to users under different scenarios, and to help developers identify promising directions for future work.

The competition is scheduled to open by end of January 2015. Results will be presented and discussed in a workshop a few months after the competition. For all reproducible contributions with permissions provided, a joint publication of the generated insights together with all CAMI contest participants and data contributors is planned.

CAMI Info Website: http://www.cami-challenge.org
Twitter: @CAMI_challenge

Continuation of the CeBiTec Students Academy Synthetic Biology/Biotechnology for a further three years

From 2012 through 2014 the CeBiTec organized a total of three courses of the CeBiTec Students Academy Synthetic Biology/Biotechnology. The Students Academy is a joint project of the CeBiTec, the District Council Detmold as well as the Familie-Osthushenrich-Stiftung which provides the essential financial support. The one-week course consists of a theoretical and an experimental part and is held at the CeBiTec. The theoretical part is composed of lectures presented by members of the CeBiTec, the Faculty of Biology as well as the Faculty of Technology. The academy is directed towards gifted and talented students from Ostwestfalen-Lippe of Northrhine-Westfalia preparing their graduation in a secondary school, the general qualification for university entrance. The organizers Honorary Prof. Dr. Walter Arnold, Prof. Dr. Alfred Pühler, and Dr. Werner Selbitschka are happy to announce that the CeBiTec Students Academy will be continued for a further three years period. In particular, the Familie-Osthushenrich-Stiftung provides the financial support necessary to run the Students Academy in the years 2015, 2016 and 2017. The CeBiTec is looking forward very much to continue this type of academy during the next three years.

3rd CLIB Graduate Cluster Symposium – Challenges and Perspectives in Communicating Biotechnology

Because of the connections of biotechnological products to everyday life, public acceptance is a prerequisite to commercial success and public benefits. However, key technologies like genetically modified organisms, are still highly controversial and might be accepted for one application and completely rejected for another. An early focus on scientific communication can help to anticipate and understand the public opinion on new applications and start a constructive dialogue.

The symposium will bring together communication researches from the National Academy of Science and Engineering, from Delft (Netherlands) and Linz (Austria) University with representatives from the Nature and Biodiversity Conservation Union (Naturschutzbund Deutschland – NABU) and Bayer Crop Sciences. The goal of this symposium is to increase awareness for this topic among young scientists and to foster a greater understanding of its importance for the adoption of biotechnological products and successful research. The CLIB-GC Symposium will be held at the CeBiTec, on March 12, 2015. Attendance is free of charge, but your registration is required.

10th CeBiTec Symposium – Bioinformatics for Biotechnology and Biomedicine

The topic of the upcoming 10th anniversary conference, which will take place at the Center for Interdisciplinary Research (ZiF), Bielefeld University, from March 23 to 25, 2015, is dedicated to bioinformatics playing a dominant role in biotechnology and biomedicine. In particular, bioinfomatics tools will be presented which facilitate the handling of big data generated by Omics technologies. The conference programme consists of plenary lectures, short oral presentations and poster presentations. A Distinguished Lecture concentrating on humane proteoms will be presented by Prof. Dr. Bernhard Küster from the Technische Universität Munich, Germany.

It is of special importance that young scientists are asked to submit abstracts for the poster sessions, the most outstanding ones will be selected for short oral presentations. Furthermore, a Special Issue of the Journal of Biotechnology will be organized, which is open to all contributions presented at the 10th CeBiTec Symposium. Another focus of the symposium highlights the official start of the German Network for Bioinformatics Infrastructure (de.NBI) supported by the German Federal Ministry for Education and Research. The de.NBI initiative consists of eight service centers covering different bioinformatics aspects of biotechnology and biomedicine. All eight service centers will present their activities. Connected to the de.NBI session is a Distinguished Lecture by Dr. Rolf Apweiler from Hinxton, UK who will summarize the European situation concerning bioinfomatics infrastructure for life sciences.

Upcoming Events

- January 26, 2015, 17 c.t. | G2-104, CeBiTec Building, Bielefeld University
  CeBiTec Colloquium, Prof. Dr. Jörg Nickelsen, Biozentrum der LMU München, AG Molekulare Pflanzenwissenschaften, Botanik: Biogenesis and Biomedical Utilization of Photosystem II
- March 12, 2015 | G2-104, CeBiTec Building, Bielefeld University
  3rd CLIB Graduate Cluster Symposium – Challenges and Perspectives in Communicating Biotechnology
- March 23–25, 2015 | Center for interdisciplinary Research (ZiF), Bielefeld University
  10th CeBiTec Symposium – Bioinformatics for Biotechnology and Biomedicine
- September 20–23, 2015 | Center for interdisciplinary Research (ZiF), Bielefeld University
  International CeBiTec Research Conference – Advances in Industrial Biotechnology: Targeted Delivery of Cytotoxic Agents

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CeBiTec (p 1)
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Eddy Rubin (p 3)