

CeBiTec – Quarterly

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10th CeBiTec Symposium – Bioinformatics for Biotechnology and Biomedicine



The year 2015 marks the 10th anniversary of a series of annually held international conferences organized by the CeBiTec. The Symposium entitled “Bioinformatics for Biotechnology and Biomedicine” took place at the Center for Interdisciplinary Research (ZiF) of Bielefeld University from March 23 to 25, 2015. The conference attracted nearly 170 attendees, most of them affiliated with German Universities. The symposium's programme consisted of two distinct parts. The first part which comprised the first two days of the symposium covered a wide range of bioinformatics topics concerning organisms with relevance in biotechnology and biomedicine whereas the second part, i.e. the last day of the symposium was entirely devoted to the presentation of the de.NBI initiative.

In the opening session, the conference participants were welcomed by Prof. Dr.-Ing. Gerhard Sagerer, Rector of Bielefeld University. Thereafter, Prof. Dr. Thomas Noll, Scientific Director, introduced the CeBiTec which belongs to the most important central academic institutes of Bielefeld University. The first session “Genomics of Microbes Relevant in Biotechnology and Biomedicine” summarized the bioinformatics approaches to unravel the lifestyle of *Corynebacterium jeikeium*, an opportunistic human pathogen or to predict the potential of actinobacteria for secondary metabolite production based on bioinformatics tools. In the session “RNA-Seq as a Tool in Biotechnology and Biomedicine” up-to-date bioinformatics tools were presented suitable for processing gene expression data of microbes relevant in biotechnology and biomedicine. The third session entitled “The German-Canadian Graduate School in Genome Bioinformatics” addressed the genomics of human cancer cells as well as future perspectives for the therapy of human diseases. The first day of the conference concluded with a distinguished lecture presented by Prof. Dr. Bernhard Küster of the TU Munich. In his talk on “Human Proteomes: From Basic Science to Understanding Drug Action” B. Küster presented his landmark study of the mapping of the human proteome and some conclusions drawn for drug development.

The second day of the symposium started with “Bioinformatics for Metagenomics and Single Cell Analysis”. The talks focussed on bioinformatics tools to process data arising from metagenomics experiments of samples taken from various environmental habitats. The session “Data Processing in Proteomics/Metabolomics” addressed topics such as the use of databases for the computational proteomics for biomedical research or the identification of metabolites by fingerprint search in molecular structure databases.

Finally, in the session “Modelling and Simulation” metabolic fluxes and also plasmid production were modelled in *Escherichia coli* host cells. A further talk addressed genome-scale metabolic models in *Enterococcus faecalis*. From a total of nearly 50 posters which were shown at the conference, six of the most competitive posters were selected for oral presentations in the session “Short contributions of Young Scientists”. The short talks addressed bioinformatics tools applied to organisms ranging from prokaryotes such as *Escherichia coli* to lower eukaryotes such as yeast and finally to Chinese Hamster Ovary (CHO) cells. The second distinguished lecture entitled “EMBL-EBI and ELIXIR: Providing Bioinformatics Research Infrastructure for Life Sciences” was held by Dr. Rolf Apweiler, EBI Hinxton, UK and concluded the second day of the conference. R. Apweiler presented ongoing European activities in the field of establishing a bioinformatics infrastructure for the handling of “big bioinformatics data”.



Finally, the last day of the symposium was used as a kick-off meeting to start the BMBF project “German Network for Bioinformatics Infrastructure”. More details on this last day are presented in a separate article of this CeBiTec News – letter.

The German Network for Bioinformatics Infrastructure successfully started

The CeBiTec hosts the coordination and administration unit of the German Network for Bioinformatics Infrastructure – de.NBI. The de.NBI project financed by the Federal Ministry of Education and Research (BMBF) is scheduled for five years with a mid term evaluation after a three years’ period. The de.NBI project represents a collection of eight service centers well known for the handling of bioinformatics data collected in the field of life sciences. The tasks of the network comprise service and training for researchers actively engaged in biotechnology and biomedicine.



CeBiTec researchers supporting the de.NBI Infrastructure: Dr. Alexander Szczyrba (BiGi), Dr. Stefan Albaum (BiGi), Dr. Tanja Dammann-Kalinowski (de.NBI Administration Unit), Prof. Dr. Alfred Pühler (de.NBI Coordinator), Prof. Dr. Andreas Tauch (Head of the Administration Unit).

The de.NBI coordination and administration unit is run by two members of the CeBiTec. Prof. Dr. Alfred Pühler serves as network coordinator and apl. Prof. Dr. Andreas Tauch is the head of the administration unit. In addition, the “Bielefeld-Gießen Center for Microbial Bioinformatics – BiGi” is also associated with the CeBiTec. Here, Prof. Dr. Jens Stoye is responsible for the coordination of the BiGi center.

The kick-off meeting of the de.NBI project was incorporated into the 10th CeBiTec Symposium on “Bioinformatics for Biotechnology and Biomedicine” which took place at the Center for Interdisciplinary Research (ZIF) from March 23 to 25, 2015. In particular, the two Distinguished Lectures of the Symposium were organized by de.NBI, and the last day of the Symposium was dedicated to the de.NBI community. A special session presented contributions from the leaders of the eight service centers. Following the closure of the Symposium, a plenary session for all de.NBI members was

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organized. This plenary session informed about the structure and the tasks of de.NBI and also about the first steps which were carried out since the de.NBI start. The plenary session was very well attended. Altogether more than 60 participants from the eight service centers could be counted. With this “kick-off” meeting the de.NBI project was successfully started.



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

On March 12, 2015, this year's CLIB-Graduate Cluster Symposium took place in the CeBiTec with the topic “Challenges and Perspectives in Communicating Biotechnology” and how to communicate Biotechnology. Specifically, 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 goal of this symposium was thus 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.

To this, the symposium brought together communication researchers from the National Academy of Science and Engineering (Dr. Marc-Denis Weitze), from Delft and Linz University (Prof. Dr. Maarten van Sanden and Prof. Dr. Nicole Kronberger, respectively) with representatives from the *Naturschutzbund Deutschland e.V.* (Dr. Steffi Ober) and Bayer Crop Sciences (Dr. Günther Eberz). As a first speaker, Nicole Kronberger talked about recent studies concerning lay people's reactions to new technologies. She worked out three main points: First, people need to know “what is it” (informative), second, “what is it for” (pragmatic) and third, “Is it how I want to live?” (values). In the following talk, Maarten van der Sanden introduced the concept of science communication design for innovation. His keyword was “social learning” consisting of three main points: engagement, imagination and alignment. As we learn math, we also have to learn “socially”, e.g. how to collaborate and how to convince people. The third talk was held by Marc-Denis Weitze, who presented the background and results of a recent large-scale study from acatech. He gave specific guidelines for successful science communication, and finally closed his talk with an application example about “artificial photosynthesis”. Günther Eberz continued with a presentation dissecting the importance of research for society. In brief he concluded that trust is a crucial point, and in regard to this it is important to distinguish risk (calculate-able, estimate-able) from uncertainty (lack of information, theory). The last presentation was given by Steffi Ober, who presented a critical view of Bioeconomy. In summary, she was very positive towards the concept of Bioeconomy itself, yet criticized its communication, i.e. the mediated promises and vision. The Symposium was finalized with an interesting panel discussion, in which the organizing team and especially also the audience could ask their questions to the experts.

High school teachers receive a full day training in Synthetic Biology/Biotechnology

For the third time, a full day education for high school teachers in Synthetic Biology/Biotechnology was held at the CeBiTec on February 6, 2015. The event is jointly organized by the CeBiTec (Honorary Prof. Dr. Walter Arnold, Prof. Dr. Alfred Pühler, Dr. Werner Selbitschka) and the District Council Detmold. The teacher training series is closely connected to a Students Academy week annually held at the CeBiTec since the year 2012. The Students Academy is designed for students one year before finishing their Abitur, the general qualification for university entrance. It is directed towards gifted and talented pupils within Ostwestfalen-Lippe of North Rhine-Westfalia.

The first call for the full day training was offered to teachers who had contributed to the Students Academy week by writing recommendation letters. A second call opened the event to teachers who had visited with their classes the Teutolab Biotechnology located at Bielefeld University. The lectures addressed various aspects of modern biotechnology, i.e. (i) industrial biotechnology, (ii) modern plant breeding, (iii) industrial production of pharmaceuticals, as well as (iv) synthetic biology. Moreover, up-to-date developments in “-omics” technologies and the bioinformatics procession of huge data sets were explored. Last-but-not-least, the CeBiTec's successful activities in the field of the iGEM (Genetically Engineered Machines) competition were demonstrated. The topics were presented by lecturers of the Faculty of Biology and the Faculty of Technology. In particular, Prof. Dr. Volker Wendisch (Genetics of Prokaryotes) and Prof. Dr. Bernd Weisshaar (Genome Research) of the Faculty of Biology as well as Dr. Heino Büntemeyer (Cell Culture Technology) of the Faculty of Technology contributed to the training day. The CeBiTec members involved in teaching were Prof. Dr. Alfred Pühler (Genomics of Industrial Microorganisms), apl. Prof. Dr. Jörn Kalinowski (Technology Platform Genomics) and Dr. Stefan Albaum (Bioinformatics Resource Facility). Finally, Nils-Christian Lübke and Timo Wolf (iGEM members) contributed to the event.

5th International CeBiTec Research Conference – Drug Conjugates for Directed Therapy

The 5th International CeBiTec Research Conference, which will take place at the Center for Interdisciplinary Research (ZiF), Bielefeld University, from September 20 to 23, 2015, is dedicated to Drug Conjugates for Directed Therapy. It is being organized by the Marie Skłodowska-Curie European Training Network (ETN) MAGICBULLET (coordinator Prof. Dr. Norbert Sewald; www.magicbullet.de), which is currently being funded by the EU in the Horizon 2020 Framework Programme for Research and Innovation. The scope of the CeBiTec Research Conference will include Antibody-Drug Conjugates, Peptide-Drug Conjugates, Targets and Specificity, New Drugs, Linker Technologies, Applications, and Process Development.

Upcoming Events

- June 29 to July 3, 2015 | CeBiTec building, Bielefeld University
4th CeBiTec *Schülerakademie*
- August 20–21, 2015 | Evangelische Akademie Loccum
CeBiTec Retreat
- September 20–23, 2015 | Center for interdisciplinary Research (ZiF), Bielefeld University
5th International CeBiTec Research Conference – Drug Conjugates for Directed Therapy

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