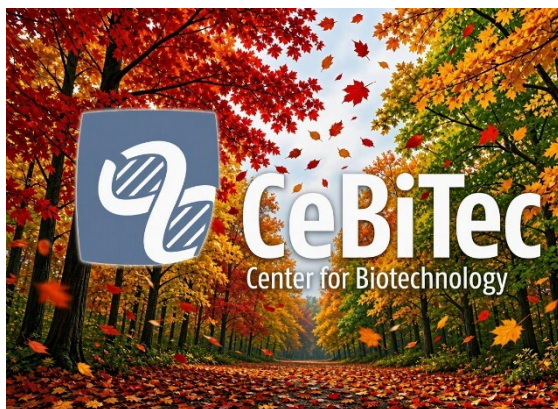


CeBiTec – Quarterly

Autumn 2026



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15th International CeBiTec Research Conference on “From Metabolic Design to Biomanufacturing: Bridging Scales and Data”

The [15th International CeBiTec Research Conference \(ICRC 2026\)](#) on Advances in Industrial Biotechnology was held from September 28 to 30, 2026, at the Center for Interdisciplinary Research (ZiF) at Bielefeld University. Under the topic “From metabolic design to biomanufacturing: Bridging scales and data,” the conference brought together researchers from academia and industry, including many early-career scientists. The chairs Prof. Dr.-Ing. Katrin Rosenthal and Prof. Dr. Johann Kufs as well as the co-chairs Prof. Dr.-Ing. Till Tiso and Prof. Dr. Volker F. Wendisch welcomed more than 60 international participants.

Four thematic sessions from metabolic enginee-



Participants of the 15th ICRC. ©K. Rosenthal

ring for natural product biosynthesis and bridging scales in bioprocess development to data-driven biocatalysis and industrial perspectives on the path from lab to impact, focused on the interfaces between these research areas.

The first day centered on bioprocess development across scales. Presentations covered continuous biocatalytic processes, acyl transfer biocatalysis for amide synthesis and CO₂ conversion, and the transcriptional evaluation of oxygen transfer in chemostat processes with *Corynebacterium glutamicum*.

Speakers also discussed how much knowledge about the cell is needed to develop scalable and robust bioprocesses and presented biosensors for monitoring intracellular pH and population heterogeneity as well as microfluidic pick-and-place sorting for image-guided screening. The second day highlighted the role of data and computation in biocatalysis and metabolic analysis. Topics included experimental and computational approaches to developing biocatalytic reactions, web-based tools for proteomics-supported metabolic modeling, AI-based protein space visualization for enzyme discovery, and the interpretation of RNA-seq data using transcriptional robustness and ATP-cost estimates. The special lecture held by Dr. Laura Helleckes (Imperial College London, London, UK) in the Early Career Female Scientists series showed how lab automation and AI can be combined for self-driving bioprocesses. Further talks addressed the computational stabilization of enzymes, enzymatic halogenation in reaction cascades, and continuous biocatalysis with *ex situ* crystallization using spatial membrane separation. Industrial perspectives from Novartis, Evonik, and AGAIN covered enzyme engineering, thermophilic acetogenesis as a platform for carbon-to-chemicals, and the translation of biotech innovation into real-world impact.

The final day turned to natural products and metabolic engineering. Presentations ranged from natural products to the engineering of microalgae for astaxanthin production, the inference of fragment structures from tandem-MS data, the valorization of bacterial biomass using recombinant amoebae, and the engineering of the anthocyanin pathway in yeast.

Poster presentations, discussion sessions during coffee breaks, and the conference dinner provided participants with an opportunity to exchange ideas and discuss the latest findings. The lively discussions made the conference a valuable opportunity to make new contacts and discuss potential collaborations.

(Katrin Rosenthal for the organizing team)

EU project HENIPROTECT develops inhalable antibodies against henipaviruses – the CeBiTec at Bielefeld University plays a central role in the production using microalgae



How can medicines to treat dangerous viral diseases be produced more quickly, cost-effectively and on a larger scale in future?

This is the question being addressed by the new European research project **HENIPROTECT** (HENIpavirus PROTECTION via inhaled antibody solution), in which Bielefeld University's Center for Biotechnology (CeBiTec) is participating as a partner. The aim is to develop an inhalable antibody therapy against the highly dangerous Nipah and Hendra viruses.

Contribution to European pandemic preparedness

The HENIPROTECT project (GA No. 101286662), funded by the European Union under Horizon Europe, launched on 1 September 2026. It is coordinated by the French research institute INSERM and comprises a total of 18 partners from

the fields of research, medicine and industry. The 'Algal Biotechnology and Bioenergy' group at the CeBiTec is taking on a special role in this project, focusing on the biotechnological production of humanised antibodies in green microalgae.

Antibodies against a virus with high pandemic potential

Nipah and Hendra viruses belong to the Henipavirus group and can cause severe illness with a high mortality rate. HENIPROTECT is pursuing a novel approach to their treatment: a combination of neutralising antibodies is to be administered directly via the respiratory tract to mark the viruses and render them harmless. An initial humanised antibody candidate is to be further developed up to the first clinical trial in humans. In addition, a second antibody is intended to target a complementary site on the virus in order to reduce the risk of the virus evading treatment through mutations. HENIPROTECT also aims to establish production and development structures that can be rapidly adapted and efficiently deployed in the event of future pandemic outbreaks. In addition to antibody development, this includes the establishment of new production processes and cost-effective methods of administration.

Microalgae as a production platform for therapeutic antibodies

Antibodies for therapeutic applications are currently often produced using mammalian cell cultures, in particular CHO cells. These processes are highly efficient, but complex and cost-intensive. HENIPROTECT is therefore investigating whether eukaryotic microalgae could represent a cost-effective and scalable alter-

native for the production of certain antibodies.

The focus of Bielefeld University's contribution is the development of humanised antibody production in the green alga *Chlamydomonas reinhardtii*. This microalga grows through photosynthesis, is classified as safe for humans and has a wide range of applications.



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Prof. Olaf Kruse and Dr Thomas Baier, as project leaders, are initially developing suitable genetic tools that will enable microalgae

to be used for the production of the desired antibodies. The performance of this process will then be demonstrated in scalable and mobile bioreactors (up to 30 litres). Prof. Olaf Kruse's research group brings proven expertise in microalgae development and bioproduction to this project and builds on successes from European research projects aimed at integrating microalgae biotechnology into industrial value chains.

The overall project is being carried out under the HORIZON-HLTH-2025-01 call for proposals and is funded with 16.32 million euros from European funds over a period of 72 months.

Project duration: 1 September 2026 to 31 August 2032

Total funding: 16.32 million euros

Funding programme: Horizon Europe

(T. Baier and O. Kruse)

CeBiTec at the Innovation Festival Bielefeld

The [Innovation Festival](#) returned for its second edition on 15th and 16th September 2026. Around  700 participants attended the event on the Bielefeld campus, where they had the opportunity to attend over 70 presentations, workshops, guided tours and activities. The event provided a valuable opportunity for networking and learning about research. The subjects discussed included artificial intelligence, digital business models, automated production, and medicine, nursing, and health.



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University

The CeBiTec was also represented at the event. For instance, the OMICs Core Facilities opened their doors and provided participants at the Innovation Festival with insights into modern molecular biology research. In addition, biotech research was [presented by Nora Junker](#). She explained how targeted changes to metabolic pathways in bacteria can be achieved through genetic modifications, which not only enables the production of important products but can also be used to combat climate change. Specifically, Nora explained that (genetically optimized) bacteria can be used to convert CO₂ into building blocks for valuable products, including for example sustainable polyamide plastics. This approach combines active CO₂ reduction with climate-friendly plastic production, thereby addressing a key lever on the path to EU climate neutrality by 2045.

(N. Junker)

EnzymeML finds a new home in Bielefeld

7th EnzymeML Workshop in Rüdesheim

Prof. Dr.-Ing. Katrin Rosenthal (Bielefeld University), together with Dr. Carsten Kettner (Beilstein Institute) and Prof. Dr. Jürgen Pleiss (University of Stuttgart), organized the 7th EnzymeML Workshop. It took place from September 15 to 18 at the Hotel Jagdschloss Niederwald in Rüdesheim am Rhein. About 30 participants gathered in person to engage in informal discussions about standardized data in biocatalysis.



Participants of the 7th EnzymeML Workshop in Rüdesheim.

©K. Rosenthal

EnzymeML is a standardized data format for data on biocatalytic reactions. It links information on proteins, small molecules, experimental conditions, and measurement data within a uniform structure that is stored as JSON or XML. This makes it easier to exchange and reuse reaction data, contributing to FAIR data. It also provides the structured foundation required for machine learning approaches.

The program began with two hands-on workshops, integrating EnzymeML with electronic lab notebooks and transitioning from measurements to kinetic modeling. Subsequent workshops featured presentations on ongoing projects, including standardized HPLC and NMR

workflows, and covered reporting and modeling of enzyme reactions. The concluding workshop looked beyond enzyme reactions to databases, machine learning, bioinformatics, process design, and ontologies. Topics included the STRENDa Biocatalysis Guidelines and a round-robin study on enzyme-catalyzed reactions.

Looking ahead, the organization and further development of EnzymeML will be hosted by the Bioprocess Engineering group led by Katrin Rosenthal.

(K. Rosenthal)

Karl-Josef Dietz appointed honorary member of the DBG



©K.-J. Dietz

The general assembly of the German Society for Plant Sciences ([Deutsche Botanische Gesellschaft, DBG](#)) appointed Karl-Josef Dietz as honorary member of the society. He has

been a member of CeBiTec since its very beginning. The honorary membership is the DBG's highest award, with currently only 14



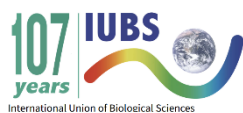
laureates. The laudation appreciated both the

eminent scientific contributions of Karl-Josef Dietz to several research fields in plant sciences, in particular in photosynthesis, redox regulation and plant stress acclimation and his societal



engagement in the section of Plant Physiology and Molecular Biology, as

president of the DBG from 2012-2019, as president of the German Life Science Association ([VBIO e.V.](#)) and as president of the [International Union of](#)



[Biological Sciences](#). Karl-

Josef Dietz received national and international hon-

ors and is a member of the [German Academy of Sciences Leopoldina](#). For more information, click [here](#).

(K.-J. Dietz)

Biotechnology and Biomedicine: 13th CeBiTec Student Academy

The 13th CeBiTec Student Academy “Biotechnology and Biomedicine” once again gave 16 highly motivated upper-secondary students from the Ostwestfalen-Lippe region a unique opportunity to experience cutting-edge research at Bielefeld University firsthand. Throughout the one-week program, participants explored current developments in biotechnology and biomedicine through lectures, hands-on laboratory work, study orientation activities, guided tours, and a final symposium.

The lecture program covered a broad spectrum of topics and featured contributions from researchers and experts of Bielefeld University representing diverse fields. As in previous years, Prof. Dr. Volker Wendisch introduced industrial biotechnology, Dr. Jan Mussnug provided insights into algal biotechnology, and Prof. Dr. Tilo Grosser presented translational pharmacology. For the first time, Dr. Tobias Busche contributed a lecture on medical genomics, while Prof. Dr. Annette Dufner and PD Dr. Jörg Wegener led a discussion on CRISPR/Cas technology. A new topic was provided by Prof. Dr.-Ing. Katrin Rosenthal's lecture “Enzymes in Action”, which highlighted the potential of biocatalytic

processes. The program was further enriched by two external speakers: Dr. Robert Kulis-Horn, who addressed molecular genetic diagnostics in laboratory medicine, and Dr. Almut Mentz, who offered insights into molecular pathology.



Participants of the 13th CeBiTec Student Academy. @teutolab-biotechnologie

Following the tradition of previous years, the practical component comprised three laboratory projects. Participants investigated the diagnosis of cardiovascular diseases by dissecting pig hearts and analysing lactate dehydrogenase activity (teutolab-biotechnology), employed nanopore sequencing to generate sequencing data and reconstruct bacterial genomes using bioinformatic approaches (Omics Core Facility NGS), and conducted microbiological identification tests, including Gram staining, catalase and oxidase assays, and antibiograms (teutolab-biotechnology).

A particular highlight of the academy was the final symposium at the end of the programme. For the first time, family members and teachers were invited to attend. During this event, the students presented and discussed the results of their laboratory projects with this extended audience, providing an authentic opportunity to communicate scientific findings beyond the academy cohort.

The evaluation of the academy was very positive. Participants particularly valued the independent laboratory work, the exchange with like-minded peers and the opportunity to engage directly with researchers and students. They reported substantial learning gains, a strengthened interest in the natural sciences and valuable impulses for their future study and career choices. The newly opened final symposium was also received positively, as students appreciated being able to present what they had learned to parents and teachers. This innovation goes back to the ideas of the new organising group: for the first time, Prof. Dr. Tilo Grosser and Prof. Dr. Volker Wendisch joined Prof. Dr. Norbert Grotjohann as organisers, and their collaboration proved to be an inspiring basis for the academy week.



We thank the Osthusenrich-Stiftung for financial support of the 13th CeBiTec Student Academy. Furthermore,

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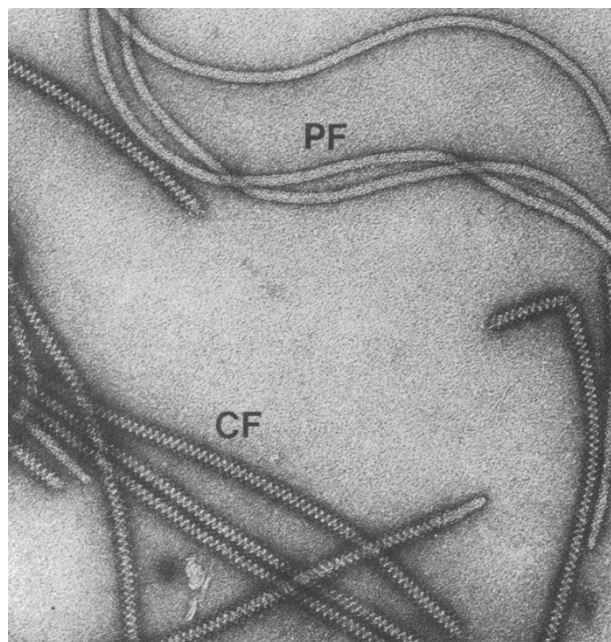
extend our deepest gratitude to all active contributors for their outstanding support.

(K. Röhlke)

Space Research at the CeBiTec: Genome Sequencing of a Bacterial Isolate from the International Space Station

More than 50 years ago, my former institute, the Institute of Microbiology at Friedrich-Alexander-Universität Erlangen-Nürnberg, studied a soil

bacterium then known as *Pseudomonas rhodos*. Although I was not directly involved, my colleague at the time, Rüdiger Schmitt (now a long-standing professor emeritus at the University of Regensburg), studied the flagellar structure of this soil bacterium. Interestingly, this strain produces both "plain" and "complex" types of flagella. These findings were published in the following paper: R. Schmitt *et al.*, "Plain and Complex Flagella of *Pseudomonas rhodos*: Analysis of Fine Structure and Composition", *Journal of Bacteriology* 117, 844–875 (1974). The image of a plain (PF) and a complex (CF) flagellum shown in the present article is taken from that study.



Plain (PF) and complex (CF) flagella of *Methylobacterium ajmalii* (modified from Schmitt *et al.* 1974). ©JB

Using NTG mutagenesis, researchers isolated two mutant strains, each expressing only one flagellar type. I have maintained close contact with Rüdiger Schmitt over the years; he informed me that these mutant strains had been revived from a culture collection and were now available for advanced analysis, specifically, genome

sequencing. I agreed to perform genome sequencing at the CeBiTec and arranged to have samples of the two mutant strains sent to me.

The genome sequences confirmed the earlier findings, revealing that the two genomes were identical except for structural rearrangements and SNPs (single nucleotide polymorphisms). Subsequently, at the University of Regensburg, Patrick Babinger used proteome analysis to identify the gene regions responsible for forming the plain and complex flagella. We found that distinct gene regions at separate loci in the genome produce the plain and complex flagella. This is a significant finding in itself. However, to our surprise, we found that the two mutant strains were not *Pseudomonas rhodos*, but rather *Methylobacterium ajmalii*, a bacterial species recently isolated from the International Space Station (ISS). Researchers believe a strain of *M. ajmalii* made its way to the space station from Earth and participated in the mission.

The complete genome of the ISS isolate had previously been unknown; only a fragmented genome sequence consisting of numerous contigs was available. Consequently, Tobias Busche and Christian Rückert-Reed at the CeBiTec sequencing facility obtained an ISS isolate sample and sequenced its genome. Using nanopore sequencing, they obtained the complete genome of the ISS isolate in a single run. The genome comprises a circular chromosome of 6,831,516 base pairs and two plasmids.

At this point, the CeBiTec sequencing facility's exceptional capabilities deserve special mention. Nanopore sequencing enabled the generation of long nucleotide sequences that could be assembled into a complete genome immediately.

The assembly of the complete bacterial genome also relies heavily on bioinformatics. CeBiTec is known for the close interaction between genome sequencing and bioinformatics within the institute. The Helmholtz Association recently responded to this by establishing a branch of the Jülich Research Center, dedicated to "Computational Metagenomics", at Bielefeld University. Andreas Schlüter participated in the research project through this branch department.

The ISS isolate genome sequence is currently being prepared for submission to an internationally accessible gene bank. Future work involving the ISS isolate will reference this submission, thereby documenting CeBiTec's successful involvement in microbiological space research.

(A. Pühler)

12th CeBiTec Retreat at Haus Düsse

The 12th CeBiTec Retreat took place from September 7 to 8, 2026, at Haus Düsse. Fifty-nine participants attended, and 26 intriguing scientific talks covered a diverse array of topics from CeBiTec's three research fields. Talks were presented by 17 distinct CeBiTec research groups, including the new CeBiTec groups "Rosenthal", "Tiso" and "Grosser", whose members participated with talks or poster contributions for the first time.



Participants of the 12th CeBiTec Retreat. ©O. Kruse

(L. Wobbe)

Impressum

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