



## → Contact

Universität Bielefeld



### Center for Biotechnology

CeBiTec is one of the largest faculty-spanning central academic institutions at Bielefeld University. Its purpose is to bundle the biotechnological activities and research projects at the university, to foster cross-linking of research approaches and technologies from different research fields and to develop innovative projects. The availability of comprehensive technological infrastructure as being provided by CeBiTec's Technology Platforms is crucial for a successful scientific work. The Graduate Center creates an inspiring interdisciplinary environment for high-level academic training of graduates. Furthermore, the CeBiTec considers itself as a central communication platform and a 'think tank' of the university with respect to initiatives and activities with a dedicated biotechnological perspective.

### Bielefeld University

The university was founded in 1969 with an explicit research assignment and a mission to provide high-quality research-oriented teaching. Today it encompasses 13 faculties covering a broad spectrum of disciplines in the humanities, natural sciences, social sciences, and technology. With about 24,000 students in 113 degree courses and about 2,750 staff members (including 264 professors and lecturers as well as 1,380 academic staff) it is one of Germany's medium-sized universities.

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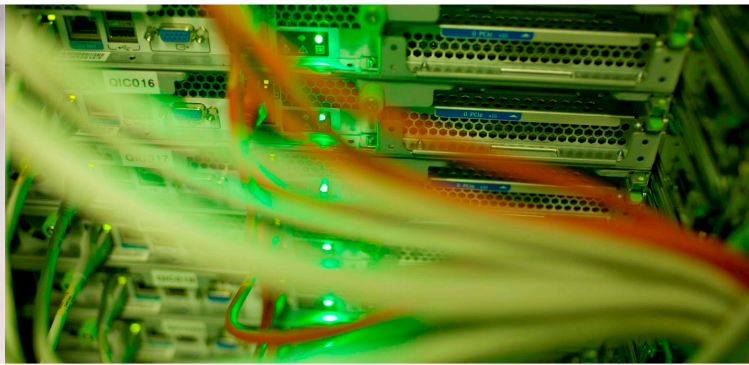
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## Center for Biotechnology

The CeBiTec conducts research with the aim to provide comprehensive solutions for sustainable key biotechnologies in the future within its two main research areas:

- Large Scale Genomics and Big Data Bioinformatics
- Metabolic Engineering of Unicellular Systems and Bioproduction



## research

### Large Scale Genomics and Big Data Bioinformatics

Functional genomics at the CeBiTec focuses on bacteria, cultured eukaryotic cells and crop plants. The unifying topic is biotechnology, including production systems for simple and complex compounds, research on bacteria relevant for agriculture and the environment, as well as decoding genomes of microalgae and crop plants. Complex microbial communities are studied in metagenomic analyses. State of the art bioinformatics methods are applied to transform huge genomics and post-genomics data sets into meaningful information. Bioinformatics algorithms are developed addressing new research challenges.

### Metabolic Engineering of Unicellular Systems and Bioproduction

Microorganisms, unicellular algae, and mammalian cell lines are applied for the production of a broad spectrum of valuable products. These include the sustainable production of bioproducts with microorganisms (monomers for biopolymers, secondary metabolites, amino acids and proteins, especially enzymes), the production of recombinant therapeutic and diagnostic proteins in animal cell lines, studies of plant growth and development, the optimisation of the sunlight-to-biomass conversion in phototrophic microorganisms, the production of biofuels with heterotrophic and phototrophic organisms, and the protein production and secretion as well as the synthesis of hydrocarbon compounds. Biocatalysis is being employed in selective chemical reactions and cascade processes that are otherwise difficult to perform or require hazardous reaction conditions. In a system biotechnology approach – based on a combination of 'omics' experiments with bioinformatics analyses – a molecular and systems understanding of production organisms is realized for rational strain design.

### Technology Platforms

The availability of comprehensive technological infrastructure as being provided by CeBiTec's technology platforms is crucial for a successful scientific work.

#### Genomics

The Technology Platform Genomics supports genome and post-genome research by high-throughput technologies. These technologies include genome sequencing, transcriptome analysis by sequencing or by microarray hybridisation, as well as targeted and shotgun proteome or metabolome research. For this, a state-of-the-art suite of machines and techniques has been assembled at the Technology Platform Genomics and the technology is applied to a broad spectrum of organisms, including bacteria, yeasts, fungi, algae and other plants as well as animals. Recent developments also include application of these techniques on symbiotic systems (plant-bacteria, lichens, corals) as well as on complex communities (microbiomes).

#### Bioinformatics

The Technology Platform Bioinformatics consists of two groups. The Bioinformatics Resource Facility (BRF) operates a complex and highly specialized hardware and software infrastructure which forms the basis for the academic and scientific activities within CeBiTec. The Bielefeld University Bioinformatics Server (BiBiServ) provides a collection of bioinformatical tools including cloud based services.

#### Fermentation and Bioenergy

Within the Technology Platform Fermentation and Bioenergy the optimization of microorganisms and cell culture fermentation and enzymatic reactions is the focus of the fermentation unit whereas the BioEnergieTechnikum (BET) is a technical center for bioenergy research. The infrastructure allows interdisciplinary research projects to be conducted and scaled-up to a technically relevant size.

### Conferences and Symposia

The CeBiTec as the focal point for biotechnology research at Bielefeld University plays a key role as a communication interface in biotechnology. To achieve this goal, the CeBiTec fosters scientific exchange in the form of conferences and colloquia. The annual CeBiTec Symposium highlights current research trends in the field of biotechnology with a particular focus on omics and bioinformatics. Advances in Industrial Biotechnology take center stage in the International CeBiTec Research Conference (ICRC) which is held annually and mostly covers research on metabolic engineering and bioproduction. The CeBiTec honors outstanding research achievements by internationally renowned scientists in the format Distinguished Lectures. For intramural scientific exchange, but also to foster (international) networking and visibility of the CeBiTec and its research activities, colloquia and retreats are organized.

### Education in Biotechnology

The CeBiTec contributes to education in biotechnology at Bielefeld University ranging from pupils and teachers (courses funded by a private foundation) to PhD students. CeBiTec researchers are participating in the MSc programmes Genome-based Systems Biology, Molecular CellBiology, Molecular Biotechnology, Bioinformatics and Genome Research, Informatics for the Natural Sciences, Chemistry, and Biochemistry. Dedicated practical courses highlight hands-on experience of selected equipment of the technology platforms and MSc students may contribute to research at CeBiTec during their thesis work. The CLIB-Graduate Cluster Industrial Biotechnology, a joint initiative of Bielefeld,



Düsseldorf and Dortmund universities, is a structured doctoral programme for excellent German and international graduates in the areas of bioinformatics, biology, chemistry, biochemistry, biotechnology, biological or chemical engineering.