

PRESS RELEASE

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Plants for pharmaceutical industry 4.0

The Fraunhofer IME presented a living exhibit and its digital twin at the joint Fraunhofer booth "Future Factory" on the Hanover Trade Fair 2018.

The living exhibit attracted many visitors at the Hanover Trade Fair from 23rd to 27th April. For most, the use of plants to produce protein-based pharmaceuticals was new territory. In Germany, Fraunhofer IME is one of the pioneers in research on "Plant-made Pharmaceuticals". Plant biotechnologists transform plants into protein factories whose cells produce the desired proteins - simply, quickly and safely. Among other things, tobacco plants are particularly suitable as biofactories, as they produce biomass and thus also product rapidly, i.e. in a matter of days.

Federal Minister for Education and Research Anja Karliczek visited the pavilion of the Fraunhofer-Gesellschaft in Hall 2 on the very first day of the fair. The Minister had Fraunhofer-President Prof. Reimund Neugebauer explain the details of some Fraunhofer exhibits, including the "Big data analytics in life sciences" exhibit of the Fraunhofer IME.

The living exhibit displayed the cultivation of tobacco plants at the age of two, four and six weeks under LED lighting. Via a tablet computer, various versions of the so-called digital twin of the plants, a virtual image of the growth process, were visualized to the visitors. The trade fair presentation demonstrated according to Dr. Dr.-Ing. Johannes Buyel, Head of Integrated Production Platforms at Fraunhofer IME, how the production of biopharmaceuticals in tobacco plants can be improved by digital monitoring. Since plant growth is determined by many factors, such as light or temperature, and at the same time influences the quality parameters important for medical products, such as stability and effectiveness, a good understanding of the process is required. The basis for this understanding is formed by data-derived models, which allow a model predictive control of the cultivation conditions for each batch.

The presence of the Fraunhofer IME was embedded in the presentation of the High Performance Center "Networked, Adaptive Production" founded in 2016. Since then, the competences of the three Fraunhofer institutes IPT, ILT and IME in Aachen have been bundled and developed for the systematic introduction and use of modern digitization technologies for sustainable, industrial production systems and value chains in the sense of an "Industry 4.0".

Editorial notes

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FRAUNHOFER INSTITUTE FOR MOLECULAR BIOLOGY AND APPLIED ECOLOGY IME

On the third day of the fair, the High Performance Center celebrated the opening of the “International Center for Networked, Adaptive Production”. The Fraunhofer IME scientists Prof. Dr. Carsten Claussen and Dr. Dr.-Ing. Johannes Buyel explained to the audience in the lecture “From the plant to the finished drug - Big Data Analytics for automated plant breeding” how they imagine the transfer of quality control and process control from humans to the machine. In the lecture, they set out an important basis for interdisciplinary work. When engineers, pharmacists, plant and molecular biologists, computer scientists and data scientists, as well as technicians and gardeners work on a project, we need “one language - one understanding”. The High Performance Center meets this challenge by providing a hub for young researchers from various disciplines at an early stage.

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Exhibit “Big data analytics in life sciences”.

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Exhibit detail “Digitaler Twin”

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Fraunhofer-Präsident Prof. Reimund Neugebauer explaining the Fraunhofer IME exhibit “Big data analytics in life sciences” to the Federal Minister for Education and Research Anja Karliczek.

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The Fraunhofer-Gesellschaft is the leading organization for applied research in Europe. Its research activities are conducted by 72 institutes and research units at locations throughout Germany. The Fraunhofer-Gesellschaft employs a staff of more than 25,000, who work with an annual research budget totaling 2.3 billion euros. Of this sum, almost 2 billion euros is generated through contract research. Around 70 percent of the Fraunhofer-Gesellschaft’s contract research revenue is derived from contracts with industry and from publicly financed research projects. International collaborations with excellent research partners and innovative companies around the world ensure direct access to regions of the greatest importance to present and future scientific progress and economic development.