

## Healthcare industry BW

# Kilian Hennes - unusual ideas and a pragmatic approach

**"People with know-how must bear responsibility," said the microbiologist Dr. Kilian Hennes, who lectures bioprocess engineering at Constance University of Applied Sciences (HTWG). Teaching is one of the major challenges for the experienced scientist and practitioner, in particular because his discipline is seen as somewhat exotic by future process engineers and requires a different way of looking at things. But this is what makes his job truly interesting for him.**

Students have relatively little previous knowledge and initially, we have to teach them the basics, said Dr. Kilian Hennes who is nevertheless astonished by his students' interest in the unusual topic. "They are truly surprised to find about the ground where microbiology and process engineering meet," said Hennes. Despite seeming so different at first sight, the two disciplines have more in common than it appears, for example in both areas care must be taken to exclude troublesome biological factors from the production process, in the food and pharmaceutical industries for example, but also in the production of medical products.

## Not stirred but shaken

In order to develop processes and construct machines that meet specific hygienic and process-kinetic requirements, students have to understand bacterial growth in detail as well as how and where contaminations can occur. For example, obtaining purity and effectiveness of biotechnologically produced drugs is problematic. The cleaning of a facility and necessary validation could become so complex that it might in some cases be wiser to use disposable techniques.

The entire culture reactor is shaken to mix the contents. This requires the application of a completely different technology and hence the designer has to come up with a completely different solution to the problem. Procedural facilities in cleanroom settings are subject to strict requirements. Technical know-how alone is not sufficient; the technician also requires profound microbiological knowledge.

The integration of bioprocess engineering into the process and the bachelor's course in environmental technology is an important step, said Dr. Kilian Hennes because this strengthens the field of biotechnology at Constance University of Applied Sciences. The engineering and natural sciences are complemented with aspects from the fields of microbiology, genetic engineering, bioprocess kinetics, bioreactors, sterile technology and biochemical sensor technology. This means that seminal process and environmental technology courses are well adapted to the rapid developments in modern biology; and it also means that engineers from the University of Applied Sciences with an understanding of biotechnology are sought-after experts.



Microbiologist Dr. Kilian Hennes teaches bioprocess engineering at Constance University of Applied Sciences.  
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Production is like an ecosystem



Dr. Kilian Hennes collects a sample from a production plant.  
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Dr. Kilian Hennes has a wide range of interests. He began by studying water biology but soon found that this was too theoretical and interrupted his studies to go and work in an engineering company. Then he re-started his studies with a biology course, complementing this with philosophy courses and opting for science theory as a minor module. During a trip on a research vessel across the Antarctic Ocean he came to the decision that he would best serve his career by being his own boss and he decided to set up his own business.

And because Dr. Kilian Hennes was not the sort of person to put something off, he began purchasing the first instruments and temporarily storing them at the university even before he had actually finished his doctorate. His university colleagues considered this to be very foolhardy, but the microbiologist was convinced that it was the right thing to do and he was more than prepared to take a risk. "People with know-how have to bear responsibility," said Hennes.

And so his laboratory for biological analyses was born. However, his interest in his clients' production processes and the context of production gradually grew. He often met engineers who were aware of the existence of particular laws and requirements to conform to existing norms and standards, but who nevertheless ended up designing products that could not be sold because they were not up to the requirements. "Production is like an ecosystem," explained Dr. Kilian Hennes. One needs to look at the whole picture, including machines, rooms, employees and processes. Detailed process analysis and knowledge of the interactions leads to fewer problems.

# Combining theory and application

Dr. Kilian Hennes has in the meantime sold his analysis laboratory in order to tackle new challenges and new responsibilities. Besides his teaching activities, he has established his "Agency for Industrial Hygiene Management" and audits and advises laboratories and production departments in the pharmaceutical and medical device sector. He also assesses quality management systems as sustainable hygiene policies improve product quality and safety.

In addition, the microbiologist has also initiated a ProInno II research project, in which he works with the University of Constance on the development of a cell-based rapid test. "This is based on a very unusual idea and a pragmatic approach," explains Dr. Kilian Hennes who considers it particularly important to work with Constance University, a mainly basic research-based university, and the University of Applied Sciences, which is an applied research-based university. He sees great potential in cooperative high-level research and development projects. However, the required organisational structures have to be developed first.

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