

# Institute of Aerospace Medicine

## Institute Seminar, February 19, 2019, *Abstract*

---

**Prof. Dr.-Ing. Vera Meyer**

Department Applied and Molecular Microbiology, Institute of Biotechnology,  
Technische Universität Berlin, Berlin, Germany

---

### **Systems and synthetic biology approaches to understand and reprogram the cell factory *Aspergillus niger***

Fungal biotechnology is currently undergoing a renaissance with important implications for its role as platform technology for the sustainable production of products, goods and drugs. Allied to this are the recent advances in fungal systems and synthetic biology which can be seen as two complementary approaches to investigate the complexity of biological systems including fungi. Whereas systems biology analyses cellular systems in an iterative cycle of high-throughput generation of omics data and modelling, synthetic biology takes a constructive approach to reengineer biological networks and to design novel biological parts and circuits with non-natural function.

Our goal is to understand and rationally rewire the industrial cell factory *Aspergillus niger*, an industrially exploited cell factory which has been used for a century for the production of citric acid and for many decades for the production of enzymes. Our goals: to make more of its products; to genetically trim *A. niger* to become a multipurpose cell factory; to fully exploit the metabolic potential of this fungus. My talk will summarize different systems and synthetic biology tools which we developed for *A. niger*. By combining these efforts, we have not only successfully improved *A. niger* as a producer of proteins, new natural products or even new-to-nature compounds, but also pioneered a new era in *A. niger* biology: the movement from descriptive to predictive biology.