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(*27.01.1976, married, three children: 2009, 2017, 2017)
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Working group vision and contribution to catalaix

The chair of Biochemical Engineering pursues the mission of advancing the science of biochemical engineering for a sustainable future. We use our knowledge to develop biobased production processes for platform and fine chemicals. We optimize overall production concepts where all processing steps, i.e. pretreatment of raw materials, fermentative synthesis and purification of the product, are integrated into one overall process. Our core competence is the design and operation of bioreactors. We can contribute to Catalaix by

- Identifying which polymer degradation products can be used as raw materials in a biological production process
- Identifying which biological production process could be possible (i.e. which monomers could be produced biologically)
- Developing novel fermentation concepts
- Setting up overall production concepts and optimize it towards economical feasibility and energy and CO2 efficiency

Current & Previous Positions

Since 2023	Full university professor, Biochemical Engineering, RWTH Aachen University/Germany
2021-2023	Strategic Program Management Lead CGT, Bayer AG/Germany
2017 - 2021	Head of Bioprocess Technology, Bayer AG/Germany
2009-2017	Project Engineer and Project Manager Technology Development, Bayer AG/Germany…

Education

2002 – 2005	**PhD** in Biochemical Engineering, Research Centre Jülich/Germany
1998 – 2002	**Master** of Chemical Engineering, University of Manchester/England

Contributions to the science system

Since 2023	Member of DECHEMA
Since 2023	Member of the working group for the National Strategy for Gene and Cell Therapy in Germany
Since 2013	Member of the Biophorum Operations Group (BPOG)
Since 1998	Associate Member Institution of Chemical Engineers (AMIChemE)

Selected Projects

2011 – 2014:	Projekt Lead “Bioaniline” at Bayer (fermentative production of aniline)
2014 – 2017:	Projekt Lead “MoBiDiK” at Bayer (continuous production of monoclonal antibodies)

2020: Co-lead of the Strategic Initiative for Gene Therapy at Bayer

Most important scientific contributions

The following two papers and my PhD thesis resulted from my PhD. They describe the analysis of the biosynthesis pathway for the amino acid valine in a microbial strain with the aim of metabolic engineering to optimize the production.

- Magnus, JB, Hollwedel D, Oldiges, M, Takors, R. 2006. Monitoring and Modelling of the Reaction Dynamics in the Valine/Leucine Synthesis Pathway in Corynebacterium glutamicum. Biotechnol Prog. 22(4): 1071-83
- Magnus, JB, Oldiges, M, Takors, R. 2009. The Identification of Enzyme Targets for the Optimization of a Valine Producing Corynebacterium glutamicum Strain Using a Kinetic Model. Biotechnol Prog. 25(3): 754-762
- Magnus, JB.: 2007. Metabolic Engineering of the Valine Pathway in Corynebacterium glutamicum – Analysis and Modelling. PhD Thesis. Forschungszentrum Jülich GmbH Verlag

The following paper describes the new production technology that Bayer developed for the continuous production of monoclonal antibodies. The project had a budget of more than thirteen m€ and ran over seven years. I was project manager for this project for three years and later became project manager for the GMP implementation of the technology in a real production for another two years (budget 25 m€). I was corresponding author for this paper which is the only publication Bayer made of this technology.

- Klutz, S. Magnus, J. Lobedann, M. Schwan, P. Maiser, B. Niklass, J. Temming, M. Schembecker, G. 2015. Developing the biofacility of the future based on continuous processing and single-use technology. J Biotechnol 10(213): 120- 130

The following book chapter gives a general overview on how to develop microbial production processes in industrial biotechnology. This sums up the learnings from the large project to develop a production process for biobased aniline which I initiated in 2010 and lead until the beginning of 2014. A paper with Prof Lars Blank at the RWTH Aachen also resulted from this work.

- Magnus, JB. 2016. Development of Processes for the Production of Bulk Chemicals by Fermentation at Industrial Scale – An Integrated Approach. RSC Green Chemistry 45. 362 – 390
- Kuepper, J. Otto, M. Dickler, J. Behnken, S. Magnus, J. Jäger, G. Blank, L.M. Wierckx, N. 2020. Adaptive Laboratory Evolution of Pseudomonas putida and Corynebacterium glutamicum to Enhance Anthranilate Tolerance. Microbiology 166(11):1025-1037

The following paper resulted from work with the Biophorum Operations Group on design of biopharmaceutical production facilities:

- Bevan, N. Corbidge, T. Estape, D. Hovmand Lyster, L. Magnus, J. 2021. Risk-Based Selection of Environmental Classifications for Biopharmaceutical Operations. PDA Journal

Patents

WO 2015124686 A1 (first inventor). Production of Aniline via Anthranilate

WO 2015124687 A1 (first inventor). Recombinant strain producing o-aminobenzoate and fermentative production of aniline from renewable resources via 2-aminobenzoic acid

The two aniline patent applications describe the overall process of producing anthranilic acid from a renewable resource by fermentation, converting it to aniline and then purifying aniline to the degree needed as raw material for polymers. The first patent focuses on the process while the other focuses on the production strain.

WO 2014076113 (first inventor). Method for producing phenol from renewable resources by fermentation

The phenol patent application describes the fermentative production of phenol from renewable resources.

US 20150017716 (co-inventor). One-way separator for retaining and recirculating cells
The patent describes a device for cell retention used in continuous cultivation