

Special UniCat Lecture

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Lecturer: **Dr. Bettina Nestl**, Head of Biocatalysis, Institute of Technical Biochemistry, University of Stuttgart

Work Title: ***Chemistry-Based Enzyme Engineering in Biocatalysis***

Abstract: The use of enzymes as catalyst for the preparation of novel compounds as alternative to traditional metallo- and organocatalysts has received a steadily increasing amount of attention over the past 10 years. High demands placed on the identification of new biocatalysts and the catalysis of more aspirational reactions reflect the high expectations people have of this field of research.^[1] Protein engineering technologies helped to extend the substrate range of enzymes to allow the synthesis of more complex, non-natural chemical and pharmaceutical intermediates. Several enzyme engineering strategies are available to optimize and redesign the properties of enzymes, such as altered substrate specificities, improved or reversed selectivities and higher stabilities in terms of temperature and performance in organic solvents.^[2] By harnessing the catalytic machinery of known enzymes in a chiral environment, we postulate that the pool of biocatalytic reactions can be greatly expanded, bearing in mind the large diversity of reactions catalysed, for example, by Brønsted acid catalysts in synthetic organic chemistry.^[3,4] To test this hypothesis, molecules were designed which address not only substrate promiscuity (non-natural substrates) but also catalytic promiscuity (non-natural reactions). A few selected examples from our studies will be presented in this workshop to demonstrate our chemistry-based enzyme engineering approach.

[1] B. M. Nestl, B. A. Nebel, B. Hauer, *Curr. Opin. Chem. Biol.* **2011**, *15*, 187.

[2] U. T. Bornscheuer, G. W. Huisman, R. J. Kazlauskas, S. Lutz, J. C. Moore, K. Robins, *Nature* **2012**, *485*, 185.

[3] A. G. Doyle, E. N. Jacobsen, *Chem. Rev.* **2007**, *107*, 5713.

[4] M. Rueping, B. Nachtsheim, W. Ieawsuwan, I. Atodiresei, *Angew. Chem. Int. Ed.* **2011**, *50*, 6706.

Date: **Monday, July 23, 2012**

Time: **5:00 pm - around 6:30 pm**

Location: **TU Berlin, Institute of Chemistry
Straße des 17. Juni 115, 10623 Berlin
Building C, Lecture Hall C 264**

Organizer: **Jennifer Jaitzig (TUB) and Lars Lauterbach (HUB)**

Coffee and tea will be served thirty minutes prior to the lecture start.
Guests are cordially invited to attend!

Prof. Dr. Matthias Driess, Chair of the Cluster of Excellence UniCat