Sabine Lahja Flitsch

MIB & School of Chemistry
University of Manchester
131 Princess Street
Manchester M1 7DN, UK
tel: + 44 161 306 5172/+ 44 7881846932
e-mail: sabine.flitsch@manchester.ac.uk

Place of Birth: Muenster, Germany.
married, two children
Professional Qualifications:
DPhil MA DipChem CChem FRSC

Education and Qualifications:

1989	MA, The University of Oxford
1985	DPhil, The University of Oxford
1982	Diplom in Chemistry, WWU Münster, Germany(1st class)

Appointments

Oct 2004-	Professor of Chemical Biology, The University of Manchester, UK
1998-2004	Professor of Protein Chemistry, The University of Edinburgh, UK
1995-1998	Reader in Organic Chemistry, The University of Edinburgh, UK
1989-1995	University Lecturer in Organic Chemistry, Oxford University, UK Tutorial Fellow in Chemistry at St. Hilda's College, Oxford, UK
1988-1989	Departmental Demonstrator, University of Exeter, UK
1985-1988	Postdoctoral Fellow, Massachusetts Institute of Technology, USA Topic: Structure-Function Studies of Bacteriorhodopsin (Prof. H. G. Khorana)

Awards, distinctions, external appointments, project management experience

2015-	Director of spin-out company Bio-Shape Ltd.
2015-	International Advisory Board, University of Bielefeld, Germany
2014-	Elected member of RSC Council
2014	RSC Interdisciplinary Award
2014-	Honorary member of Oxford Glycobiology Institute
2014-2018	PI of IBCarb (BBSRC funded NIBB)
2013	Member of Norwich Research Park Science Advisory Board
2012	Panel member German Excellence Initiative
2010-	Deputy Head of Department, School of Chemistry
2008,2014	Member of Chemistry Panel RAE2008, REF2014
2007-2012	Royal Society Wolfson Merit Award
2007	Chair of the EuroGlycosciences Forum
2006-	Editorial Board of Chemistry Central Journal, Beilstein Journal (since 2009)
2005-2013	Chair of the International Advisory Board, Leibnitz Institute IPB, Halle, Germany
2003-2006	Chair of the Carbohydrate Group, Royal Society of Chemistry
2001-2004	BBSRC Fellowship
1997	Glaxo Wellcome Award for Innovative Chemistry
1997-2002	Member of the Editorial Board of the Journal of the Chemical Society, Perkin Trans1
1996	Zeneca Research Award
1994-1995	Special Lecturership at Oxford University
1985-1987	Postdoctoral Fellowship from the German Academic Exchange Service (DAAD)
1982-1985	Michael Wills Scholarship

Current Funding: SLF has received in excess of £8.8M in research funding in the last 5 years £3.2M as PI-led projects and £5.6 for collaborative research, networks and translation awards. Funding is from a range of sources in particular: European Commission, BBSRC and Innovate UK. Notable examples include: Director of BBSRC Network in Industrial Biotechnology and Bioenergy www.ibcarb.com £0.73M, project coordinator of FP7 GlycoBioM £1.2M (UoM), £5.1M (consortium total), project coordinator of IBCatalyst early stage translation award (InnovateUK/BBSRC), £1.2M (UoM), £3.4M (consortium total).

Research Interests 1: Development of New Synthetic and Analytical Tools in Glycobiotechnology
Carbohydrates provide the largest biomass on Earth and are central to many aspects of biotechnology with applications in biofuels, biomaterials, food and medicine. Carbohydrates are complex biomolecules and there is an urgent need to develop robust synthetic and analytical methodologies to fully exploit opportunities presented by glycobiotechnology. We have developed a toolbox for the synthesis and analysis of complex carbohydrates and their function with a focus on (i) chemoenzymatic synthesis of glycoconjugates such as glycopeptides, (ii) glycoarrays to study glycoenzyme activity and discover carbohydrate-protein interactions and (iii) ion mobility mass spectrometry for high resolution structural analysis of carbohydrates and (iv) mass spectrometry for the label free identification of carbohydrate-binding proteins.

Research Interests 2: Enzyme Cascades for the Stereoselective Synthesis of High Value Chemicals
Enzymes are increasingly applied as biocatalysts in organic chemistry, in particular for reactions that require a high degree of chemo-, regio- and stereo-selectivity. An additional advantage of biocatalysis is that reaction conditions are very similar in terms of temperature, pressure, pH and solvent. Both the selectivity and the compatibility of biocatalysts enable the design of multistep reaction cascades, as seen in many biosynthetic pathways in Nature. The toolbox of diverse biocatalysts that have become available to the organic chemist is now rapidly expanding due to *in vitro* evolution and genomic data-mining techniques. As a result, the scope for assembling multi-enzyme pathways by linking diverse biocatalytic steps guided by considerations of organic retrosynthesis is feasible.

We have developed several examples of multienzymes cascades that can generate high value compounds in one pot reactions either *in vitro* or in whole cell systems. Examples include biomimetic cascades for the synthesis of complex glycopeptides containing *O*-mannosyl tetrasaccharides, cascades that accomplish formal stereoselective C-H aminations at non-functionalised carbon centres and cascades that generate chiral nitrogen heterocycles from oxo-carboxylic acids.

5 Selected Publications:

- P. Both, H. Busch, P. P. Kelly, F. G. Mutti, N. J. Turner and S. L. Flitsch. *Whole-cell biocatalysts for stereoselective C-H amination reactions* **Angewandte Chemie**. 2016; 55, 1511-1513.
- P. Both, A. P. Green, C. Gray, R. Šardzík, J. Voglmeir, C. Fontana, M. Austeri, M. Rejzek, D. Richardson, R. A. Field, G. Widmalm, S. L. Flitsch and C. E. Eyers. *Discrimination of epimeric glycans and glycopeptides using IM-MS and its potential for carbohydrate sequencing* **Nature Chemistry**. 2014; 6(1): 65-74
- G. Noble, F. Craven, J. Voglmeir, R. Šardzík, S. L. Flitsch and S. J. Webb. *Accelerated Enzymatic Galactosylation of N-Acetylglucosaminolipids in Lipid Microdomains* **JACS.** 2012; 134(31): 13010
- R. Šardzík, A. Green, N. Laurent, P. Both, C. Fontana, J. Voglmeir, M. Weissenborn, R. Haddoub, P. Grassi, S. Haslam, G. Widmalm, and S. Flitsch. *Chemoenzymatic Synthesis of O-Mannosylpeptides in Solution and on Solid Phase* **JACS**. 2012; 134(10): 4521-4524
- R. Castangia, M. Austeri, S. L. Flitsch. *Enzymatic Amine Acyl Exchange in Peptides on Gold Surfaces* **Angewandte Chemie**. 2012; 13016–13018