

# COLLOQUIA IN MEMBRANE TRANSPORT

Venue: Medical University Vienna, Center for Physiology and Pharmacology,  
Institute of Pharmacology, Waehringerstrasse 13a, 1090 Vienna, "**Leseraum**".

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Friday	17.01.2014 14:00 s.t.	<b>Fraser MacMillan</b> (host: Th. Stockner)
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## ***"Understanding Movement and Mechanism in Molecular Machines"***

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**Fraser MacMillan** ([fraser.macmillan@uea.ac.uk](mailto:fraser.macmillan@uea.ac.uk))

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### Abstract:

Research in the Henry Wellcome Unit for biological EPR focuses on the architecture and functional dynamics of membrane proteins, many medically relevant with a special interest on transporter systems and their interaction with intra-cellular signalling pathways. There is increasing evidence that membrane proteins do not act alone, but that they are organized as nano-machineries which functions through the concerted action of its individual components with high precision and specificity observed in both time and space. We are seeking to unravel the principles underlying the architecture and dynamics of these protein nano-machineries as well as their function and regulation. Our experimental approach focuses on the use of Electron Paramagnetic Resonance (EPR) techniques in combination with molecular biological, biochemical and other biophysical methods including theoretical approaches. Our expertise lies in the development and application of novel EPR techniques to address these key questions. In this presentation I will introduce the primary concepts of the technique pointing out both its advantages and limitations as well as focusing on very recent method developments which are clearly shifting the focus of this technique away from being considered purely a niche technique towards a more universal structural biological tool. I will use examples from our recent work on multidrug efflux pumps (P-glycoprotein) and bacterial pathogens (PsaA in *Streptococcus pneumoniae*) to demonstrate the power of this technique to provide key mechanistic insight into e.g. how to observe conformational change within P-gp at a molecular level and on the molecular determinants of metal binding by PsaA and the implications for host-pathogen interactions. This research is funded by *The Royal Society*, the Wellcome Trust as well as being embedded within the current EU COST Action CM1306 "Understanding Movement and Mechanism in Molecular Machines".