**Biomolecular Structure Determination by NMR Spectroscopy with Paramagnetic Metal Ions and Probes**

Paramagnetic metal ions offer outstanding opportunities for the study of biomacromolecules by NMR spectroscopy. The paramagnetic NMR effects can be observed over long distances (up to 40Å), create specificity towards the metal labeling site, and provide valuable restraints for the determination of the structure of proteins and their interactions with other biomolecules and small ligands.

I will present our work on using different metal ion labeling strategies to solve diverse biological problems, such as membrane protein structure determination, elucidation of flexible protein-ligand interactions and characterization of large protein complexes. Furthermore, I will show our developments of the Rosetta software to use paramagnetic NMR restraints for structure calculation and present strategies for using lanthanide ions for site-directed dynamic nuclear polarization to achieve NMR signal enhancement. I will also talk about latest experiments using soluble paramagnetic PROXYL probes and novel calix[4]are-based lanthanide tags.