Insights into complex systems using tailored biochemical and NMR-based approaches

In general, structure and function of biomolecules can be strongly influenced by their environment. This is in particular true for membrane (associated) proteins and soluble proteins inside a densely-packed cell. Modern structural biology therefore requires advanced biochemical tools to generate adequate complex environments as well as techniques that can be used in these environments and still report on structural details with high resolution.

In the last years our research has contributed to both aspects and recent advancements will be addressed, in particular:

1. The use of adequate environments including the potential of the lipid bilayer nanodiscs system for NMR-based structural studies of membrane proteins [1-4] and protein-membrane interactions as modulators in signaling or protein aggregation [5,6].
2. The usage of most suitable NMR techniques including the effective use of the available magnetization in challenging systems [7] and the possibility to selectively hyperpolarize a target protein in a cellular context [8].