

# **NMR Spectroscopy: structure and dynamics of small molecules**

Nuclear magnetic resonance spectroscopy is a versatile tool for the characterization at the molecular level of structure, dynamics and local interactions of small molecules, macro-molecules and biological systems. The strength of the NMR technique comes from the local nature of the underlying interactions, which can be observed with high selectivity on materials in the liquid, crystalline-amorphous solid or gel phase. Several 1D and 2D experimental methodologies are equally applicable to organic, inorganic and complex multicomponent systems to study their local structure, intermolecular interactions and translational dynamics. Moreover, numerical methods of data analysis play an increasing role in the determination of species dynamics in the liquid or gel phase. Combining NMR parameters such as chemical shifts, relaxation rates and diffusion coefficients with data analysis enables structure refinement and multiscale investigation of the motion regime of small molecules for drug delivery and battery materials.

I will present the basic principles and methods of high resolution and high resolution-magic angle spinning (MAS) NMR along with an overview on the latest technological developments and exciting applications.