National Magnetic Resonance Facility At Madison

NAN Network for Advanced NMR

Complex Carbohydrate Research Center UNIVERSITY OF GEORGIA

Solution NMR Structural Biology Workshop

June 19-24, 2022 at NMRFAM, Madison, WI
Presented jointly by NMRFAM (UW-Madison) and CCRC NMR Facility (UGA)
To register: 2022 Registration Form

This workshop will cover important considerations in sample preparation and experimental design for protein solution NMR and provide hands-on training in assigning resonances to specific nuclei in the protein for site-specific interpretation of NMR data and analysis of chemical shift perturbations.

Topics include:

•Introduction to the new Network for Advanced NMR.

•What can NMR do for you? What is NMR good for in the modern era of structural biology?

•Overview of NMR workflows – where do you start and what are the steps to take if you're interested in structure, dynamics, molecular interactions or other applications of NMR?

•Hands-on assignment of the protein backbone. Amide HSQC or TROSY spectra are the standard fingerprint spectrum in protein NMR. Backbone assignment is the first step in structure determination, and amide resonance assignments are commonly used to map site-specific ligand interactions or monitor protein dynamics with site-specific resolution. Automated and manual methods

•Hands-on structure-based assignment of ILV methyl-labeled proteins using NOESY data. Methyl groups provide better sensitivity and resolution for larger systems, and are used to map site-specific ligand interactions or monitor protein dynamics with site-specific resolution. This process also provides experimental validation of your structural model (homology model, structure prediction from Alpha Fold, etc.).

•Assignment of sparsely-labeled eukaryotic proteins. Isotopic labeling of a reduced set of amino acids provides a cost-effective route to NMR studies of proteins that are produced in eukaryotic cells, including glycoproteins. Assignment of these sparse labels is also structure-based using NOESY, RDC, PCS and PRE data, and provides markers that can be used to monitor structure, dynamics, and interactions in such systems.

•Introduction to mapping ligand-protein and protein-protein interactions with chemical shift and paramagnetic perturbations.

•Poster session – share your project and how you are using or planning to use NMR. Network with other participants and get feedback from expert NMR staff.