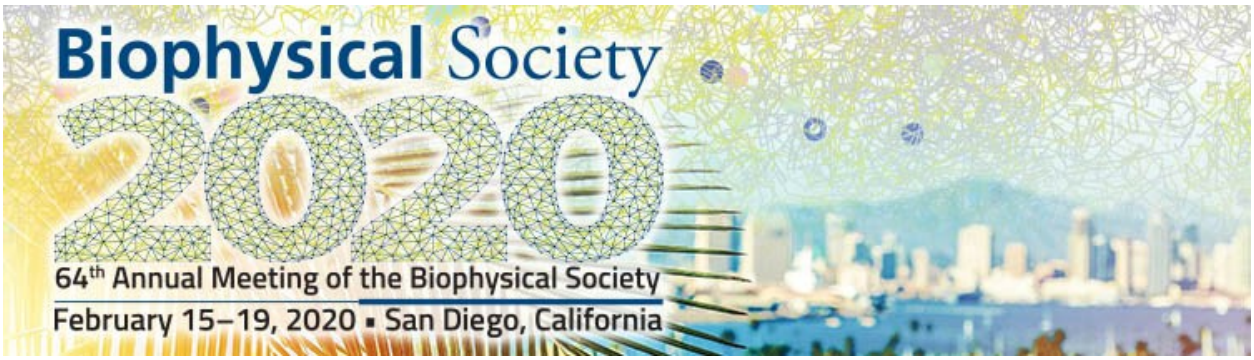

Monday, February 17
10:30 AM – 12:00 PM
Room 33C
Bruker Corporation

Using NMR (Nuclear Magnetic Resonance) and EPR (Electron Paramagnetic Resonance) in Biophysics
Magnet Resonance offers many insights into how biological systems function. The two techniques shed light on the identity of species, dynamics, and structures of proteins, peptides, nucleotides, and lipids. The speakers will present an overview of these techniques and applications for people who may be new to the field and wish to incorporate them in their studies.

NMR has long been a valuable tool for the determination of structures, the study of dynamic processes and the investigation of interactions in biological molecules. To conduct these studies on larger molecules higher magnetic fields are required. Bruker BioSpin has successfully installed a 1.1 GHz NMR system in a customer laboratory and the delivery of the first 1.2 GHz system is imminent. To complement the higher magnetic fields Bruker Biospin has also introduced several new probes for liquid and solid state NMR.

NMR has recently been used successfully for the characterization of large proteins such as monoclonal antibodies. The statistical analysis of NMR spectra allows the detection of changes in the high order structure of these molecules.

Another growing area is the use of 19F in bio-molecular NMR. Both the introduction of new accessories and method permit more widespread use of this nucleus in NMR studies.

EPR detects unpaired electrons in free radicals and transition metal ions. One electron transfer reactions result in unpaired electrons. Examples of paramagnetic species encountered in biology are; ROS (Reactive Oxygen Species), RNS (Reactive Nitrogen Species), amino acid radicals such as tyrosine and tryptophan radicals, paramagnetic intermediates in photosynthesis, and metalloenzymes.

In addition to these naturally occurring paramagnetic species, spin labels can be incorporated into a number of biomolecules via SDSL (Site Directed Spin Labeling). Applications and techniques are; motional dynamics of proteins, peptides, and nucleotides via linsehape analysis, accessibility studies in membrane proteins or peptides via saturation measurements, and distance measurements (2-8 nm) via DEER (Double Electron-Electron Resonance) to complement other structural methods such as X-ray, NMR, CryoEM and FRET.

Speakers
Clemens Anklin, Vice President, NMR Applications & Training, Bruker Corporation
Ralph Weber, EPR Applications Manager, Bruker Corporation