



NMR User Training for Industry



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Global Research & Development



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Focus Areas

- Basic Concepts
- Sample Preparation
- Experiments
- Interpretation

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Basic Concepts (B.S./M.S.)

- Superconducting magnets; field strengths
- Basic one-pulse expt
 - RF pulse, excitation, relaxation, FID, FT
- Most common NMR active nuclei
- General block diagram of a spectrometer
- Understand tune, lock and shim
- When to use NMR
 - structural elucidations; used w/ MS, IR, etc.

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Sample Preparation (All)

- Sensitivity compared to other techniques
- Purity requirements
- Quantity vs. solubility (for liquids)
- Effect of residual solids or salts (for liquids)
- Sample volume
 - effect on sensitivity
 - effect on shimming
- Ph.D. only: SSNMR sample requirements

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Experiments (B.S./M.S.)

- Required:
 - Set parameters, acquire & process 1D proton and carbon data
 - Set parameters, acquire & process 2D homonuclear proton data
 - Archive and retrieve data
- Recommended:
 - Set parameters, acquire & process 2D heteronuclear data (inverse detection)
 - Lock and shim manually

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Experiments (Ph.D.)

- Required:
 - Set parameters, acquire & process 2D gradient heteronuclear inverse expts
 - Understand symmetrization, digital filtering, linear prediction, apodization
 - Familiarity w/ other nuclei (^{19}F , ^{15}N , ^{31}P)
- Recommended:
 - Perform linear prediction, apodization & baseline correction
 - Perform spectral simulations

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Interpretation (B.S./M.S.)

- Required:
 - Proton chemical shifts, multiplicity, scalar couplings, integration
 - nOe & homonuclear decoupling
 - Carbon chemical shifts, coupling to other nuclei (^1H , ^{19}F), relative peak intensities
 - DEPT, APT, quantitative carbon
 - 2D homonuclear correlation

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Interpretation (Ph.D.)

- Required:
 - 2D short-range and long-range heteronuclear correlations
 - Appropriate selection of experiments to address specific questions
- Recommended:
 - Chemical exchange
 - T_1 relaxation