

NAME: _____

RESEARCH INTEREST QUESTIONNAIRE

Please rank three of the following major areas in order of preference (1-first preference, 2-second, etc.).

_____ Analytical
_____ Organic
_____ Biochemistry

_____ Inorganic
_____ Physical
_____ Chemical Education

Below is a list of the research interests in our department. Please check the specialty areas which you feel may be of interest to you and return this form with your application.

Analytical Chemistry

- application of multidimensional-NMR to characterization of organic materials, polymers and supramolecular structures
- application of NMR nuclear Overhauser effect to the study of metal ion binding to large molecules
- assessment of the proton and metal ion binding sites in biomolecules and polar polymers.
- charge permutation reactions in the gas phase and their use for structure elucidation
- development of new FT-NMR techniques
- development of triple multidimensional resonance NMR methods
- development and use of NMR and isotopic labeling to solve structure and mechanism
- GULC method development
- GC/MS
- intrinsic chemistry of ionic and neutral intermediates of importance in atmospheric environmental, and biological chemistry
- magnetic resonance spectroscopy
- mass spectrometry and tandem mass spectrometry: development and applications to biomolecules and polymers.
- passive sampling techniques
- pattern recognition
- stable isotope dilution
- biomedical applications of molecular imaging techniques
- application of solid-state NMR to the study of polymers.
- conducting polymers

Biochemistry

- antiviral biopolymers
- antiviral nucleosides
- active site-mapping of enzymes
- bioactive synthetic polymers
- control release of bioactive agents
- design and synthesis of enzyme inhibitors
- enzyme reaction mechanisms
- iron and peroxide in reperfusion tissue injury
- mechanisms of wound healing
- model studies of enzyme reactions
- novel polymers
- structure function relationships in enzymes
- nitric oxide biochemistry drug design
- enzyme structure by NMR
- synthesis and characterization of thin films on metal-oxide surfaces

Inorganic Chemistry & Organometallic

- characterization by multinuclear NMR, and X-ray crystallography
- chemistry of the group 13 and 14 elements
- mechanistic investigation of lithium induced alkyne cyclization reactions
- models of the active sites in transition-metal catalysts

- oligomers and polymers with inorganic backbones
- synthesis of high temperature polymers
- synthesis of non-linear optical materials
- synthesis of organometallic molecular conductors & conducting polymers
- X-ray structural characterization of inorganic, organic & organometallic compounds

Organic Chemistry

- application of enzymatic reactions or organic synthesis
- chemistry of trivalent iodine
- enzyme reaction mechanisms
- mechanisms of organosulfur & organo phosphorus reactions
- new synthetic methods
- reaction mechanisms
- stereoselective metal reductions
- structure elucidation by x-ray
- synthesis of antiviral compounds
- synthesis of heterocyclic compounds
- synthesis of natural products
- synthetic methods
- total synthesis of natural products
- synthesis of dendritic macromolecules
- time resolved spectroscopy
- laser spectroscopy of ultrafast reactions
- photoinduced electron-transfer reactions
- artificial photosynthesis
- supramolecular design and synthesis of molecular sensors
- nano-fabrication of implantable biosensors
- molecular electronics and spintronics
- polymer core-shell nano particles

Physical Chemistry

- development of multiple laser spectroscopies
- theoretical chemistry
- fast kinetic methods, including stopped-flow spectrophotometry and pulse radiolysis
- free radical reaction mechanisms
- high resolution infrared spectroscopy
- intermolecular interactions and charge transfer in excited states
- laser spectroscopic probes of ultrafast phenomena
- nonlinear optical materials.
- photophysics of polymers and biopolymers
- radiation less transitions
- spectroscopy of atmospheric molecules relevant to ozone depletion & global warming
- structure and spectra of electronically-excited molecules
- vibrational dynamics of polyatomic molecules
- surface enhances optical spectroscopy of organic and bio-molecules on metal surfaces
- polymer structure and dynamics by solid-state NMR
- physical properties of hypervalent iodine compounds