Biochemical Science Division

- Human Identity Testing
- Surface-Enhanced Raman Spectroscopy of Biomolecules
- Structure-Function Relationships of Biological Macromolecules Using X-Ray Diffraction Techniques
- Thermodynamics of Protein-Ligand Interactions and Conformational Changes in Biomolecular Systems
- Oxidative Stress/DNA Damage and DNA Repair
- Membrane Protein Matrices
- Extracellular Matrix Proteins: Thin Films for Engineering
- Quantitative Microscopy for Cell Biology
- Redox Enzyme Biocatalysis
- Metrology for Molecular Diagnosis of Genetic Diseases
- Diagnostics and Biomarker Validation
- Organic Synthesis for Biotechnology Studies and Applications
- Mitochondrial Research and Genetic Toxicology
- Protein and DNA Crystallography
- DNA Mutation Detection by Capillary Electrophoresis
- Bimolecular Nuclear Magnetic Resonance Spectroscopy, RNA Structure, and RNA-Protein Interactions
- Tissue Engineering: Development of Advanced Tools for QA/QC Monitoring
- Biomarkers, Molecular Cytogenetics, and Cytometry Systems
- Computational Molecular Evolution and Bioinformatics
- Mycobacterial Adenylyl Cyclases—Role in Pathogenicity
- Biopharmaceutical Stabilization
- Redox Equilibria in Biological Systems
- Inorganic Nanoparticles as Biological Contrast Agents
- Biocatalysis in Non-Aqueous Media
- Detection and Quantification of Biotechnology-Derived Crop Material in Matrices
- Enzymes for Industrial Biocatalysis
- Photophysical and Photochemical Properties of Fluorophores
- Affinity Materials for the Capture and Detection of Bacteria and Viruses
- Counting Molecules to Develop Improved Standards for Biological Threats
- Multiplex Assay Development
- Metrology for Microarrays
- Image Analysis, Data Base Management, and Bioinformatics Issues for Quantitative Automated Microscopy
- Functional Cryopreservation of Cellular Systems/Cell Banking
- Structural Bioinformatics
- Protein Sciences—Development of Measurement Tools and Standards
- The Effect of Two- and Three-Dimensional Collagen Fibril Environment on Cellular Response
- Cell Biosensor for the Detection of Small Molecule Biomarkers
- Toward Quantitative Measurements Using Protein Microarrays
- DNA Measurement Methods
- Instrument Performance Standards for Raman Spectroscopy
- Process Analytical Applications of Infrared/Near-Infrared/Raman Spectroscopy
- Data Interchange Standards for Analytical and Clinical Chemistry
- Standards and Applications for Luminescence-Based Assays and Detector Technologies
- Development of Biotechnological and Clinical Fluorescence Assays for Quantitative Chemical Analysis
- Materials Using Quantitative Nuclear Magnetic Resonance Spectroscopy

Process Measurements Division

- Aerosol Particle Generation and Characterization
- Optical Determination of Transport Properties in Compound Semiconductors
- Optical Diagnostics in Chemical Vapor and Atomic Layer Deposition Reactors
- Reacting Flow Simulations
- Quantitative Spectroscopic Measurements for Trace Gas Analysis
- Spectroscopic Methods for Quantitative Trace Gas Measurements
- Molecular Electronics
- Spectroscopic Detection on Trace Gases
- Self-Assembled Monolayers for Diagnostics and Sensing
- Studies of Chemical Sensing Materials, Mechanisms, and Microdevices
- Microfluidics
- Microviscometers
- Diagnostics in Semiconductor Processing Plasmas
- Low-Temperature Thermometry Research
- Research in Industrial Thermometry
- Development of Robust, High-Accuracy Thermometers
- Thin-Film Thermal Sensor Research Noise Thermometry
- Improvements in High-Pressure Metrology
- High-Accuracy Measurements of Pressure and Gas Density
- Fluid Flow and "Energy" Measurement
- Quantum Mechanical Standards for Pressure, Temperature, and Viscosity
- Novel Acoustic Resonators for Measuring Transport Properties of Gases
- Acoustic and Microwave-Resonance Measurements
- Rheology Near Critical Points
- Acoustic Analysis to Measure Flow Rates of Difficult Gases
- Properties of Gases Used in Semiconductor Processing
- Cavity Ring-Down Spectroscopy of Surfaces and Condensed Media
- Surface and Microanalysis Science Division
- Microbeam Mass Spectrometry
- Particle Metrology
- "3D STEM" or Three-Dimensional Chemical Imaging in the Scanning Transmission Electron Microscope
- Electronic Structure of Organic Interfaces
- Microwave Evanescent Scanned Probe Microscopy for Materials Characterization
- Near-Field Optical Microscopies and Spectroscopies as Nanoscale Probes of Surface Chemistry
- Measurement Techniques for Molecular Electronics
- Multispectral Evanescent Probe Microscopy for High Throughput Nanoscale Analysis
- Microchemistry in the Environmental Scanning Electron Microscope
- Field Emission Analytical Electron Microscopy/Nanoscale Compositional Mapping
- Nanoscale Crystallographic Analysis and Compound Identification by Diffraction Methods
- Submicroscopic Chemical and Physical Characterization of Materials and Particles
- Electron-Probe Microanalysis/Scanning Electron Microscopy
- Surface Microanalysis by Combined Auger Electron and X-Ray Emission Spectroscopies
- Nonlinear Optical Studies of Surfaces and Interfaces
- Quantitative Surface Analysis by Electron Spectroscopy
- X-Ray Investigations of Thin Films, Surfaces, and Interfaces
- Chemical Imaging
- Chemometrics and the Metrology of Carbonaceous Aerosols
- Microanalysis of Environmental Particles
- Advanced Isotopic Measurements for Source Apportionment of Particulate Matter
- Quantitative Modeling of Complex Microanalytical Problems
- High-Resolution X-Ray Spectroscopy Using Microcalorimeter Detectors
- X-Ray Microscopy of Low-Density Materials
- Development of Two- and Three-Dimensional Analysis Methodology for Determining the Fate of Nanoparticles in Biological and Environmental Systems

Physical and Chemical Properties Division

- Thermodynamic Properties of Condensed Phases
- Thermodynamic Properties for Environmental Geochemistry
- Thermochemical and Kinetic Data for Chemical Reaction Mechanisms
- High-Temperature Gas-Phase Kinetic Studies
- Kinetic Studies in Supercritical Water
- Chemical Kinetics of Complex Processes
- Advanced Optical Studies of Chemical Kinetics in the Gas-Phase and at Interfaces
- Intelligent Chemical Data Bases for Personal Computers
- Variability of MS/MS Spectra
- Predicting Qualitative Chemistry Using Quantum Chemical Isopotential Searching
- Methods and Applications in Ab Initio Thermochemistry
- Vibrational Energy Levels for Non-Harmonic Molecular Potential Energy Surfaces
- Fragmentation Pathways in Peptide Mass Spectrometry
- Computational Chemistry Comparison and Benchmark Data Base
- Quantum Chemical Studies of Chemical Reactivity
- Theoretical Studies of Electron Transport in Molecular Wires
- Development of Theoretical Tools for the Rational Design of Smart Materials
- Fundamentals of van der Waals Interactions in Aromatic Clusters Theoretical
- Condensed Matter Theory
- Surface Properties by Design: Theory of Metal Oxide Surfaces in a Complex Environment
- The Effect of Alloy Chemistry on Metal Properties
- Chemical and Physical Properties of Fluids from First Principles
- Computational Methods for the Accurate Prediction of Binding Free Energies of Small Molecules to Proteins
- Cryocoolers
- Microscale Heat Transfer
- Transport Properties of Fluids—Theoretical
- Thermodynamic Descriptions of Fluid Behavior
- Thermodynamics of Dilute Systems
- Theory of the Solid-Fluid Phase Boundary: Pure Fluids and Mixtures
- Scattering from Nonequilibrium Systems
- Kinetic Theory and Phase Changes of Fluids and Fluid Mixtures
- Thermodynamic Properties of Fluids—Experimental
- Physical and Chemical Properties of Ionic Liquids
- Transport Properties of Fluids—Experimental
- Metastable Fluids and Processes in Microdevices
- Phase Equilibria in Aqueous Electrolyte Systems
- Properties of Supercritical Fluid Mixtures
- Surface Energetics: Fundamental Studies for Materials and Applications Development
- Fundamentals of the Gas Chromatographic Retention Process and Retention Parameters
- Characterization of Alternative Solvents
- Properties for Separation Processes in Natural Gas
- Physical and Chemical Properties of Lubricants
- Viscometry with Torsionally Vibrating Piezoelectric Crystals
- Computer Simulation of Viscosity at Near-Experimental Uncertainty Levels
- Microscale Fluid Flow
- Experimental and Computational Study of Fluid Flow in Coiled Tubes
- Computer Simulation in Liquids in Nonequilibrium
- Vapor-Liquid Equilibria, Coexisting Densities, Surface Tension, and Dew and Bubble Point Pressures
- Development of the Concept for Dynamic Compilation of Thermophysical Property Data
- Thermodynamic Properties: Prediction-on-Demand
- Computational Fluid Dynamics of Near-Critical Fluids Using Accurate Thermophysical Properties
- Thermodynamics of Moist Gas Mixtures
- Microscale Thermophysics

Analytical Chemistry Division

- Inorganic Mass Spectrometry and Elemental Isotopic Metrology
- Basic Studies in Analytical Spectrochemistry
- Research in Glow Discharge Optical Emission Spectroscopy
- Research in X-Ray Fluorescence Spectrometry
- Research in Elemental Speciation of Clinical and Biological Systems
- Analytical Methods Development for the Determination of Anthropogenic Contaminants in the Marine Environment
- Applications of Elemental Analytical Chemistry in Forensic Science
- Analytical Mass Spectrometry for Organics and Biomolecules
- Applications of Organic Analytical Chemistry in Forensic Science
- Investigations of Fundamental Chemical and Physical Processes in Chromatography and Electromigration Techniques
- Novel Analytical Separation Science Methodology
- Separation Science Techniques for Trace Organic Analysis
- Investigations in Chiral Separation Methodology
- Detection and Identification of Chemical and Biological Weapons and Explosives
- Trace-Gas Analysis
- High Accuracy Coulometry
- Primary and Secondary pH Metrology
- Instrument Performance Standards for Raman Spectroscopy
- Process Analytical Applications of Infrared/Near-Infrared/Raman Spectroscopy
- Data Interchange Standards for Analytical and Clinical Chemistry
- Chemometrics
- Microfluidics and Lab-on-a-Chip Technologies
- Standards and Applications for Luminescence-Based Assays and Detector Technologies
- Catching Crooks with Chemistry
- Development of Biotechnological and Clinical Fluorescence Assays for Quantitative Chemical Analysis
- Purity Assessment and Elemental Speciation Determination in Reference Materials Using Quantitative Nuclear Magnetic Resonance Spectroscopy
- Detecting Explosives Terrorism
- Bulk Chemical Analysis and Depth Profiling Using Neutron Beams
- Instrumental, Radiochemical, and Preconcentration Neutron Activation Analysis
- Applications of Nuclear Multi-Element Analyses in Environment Sciences
- Applications of Nuclear Analytical Methods to Homeland Security
- Spectrochemical Methods Applied to Marine and Environmental Samples