Douglas H. Adamson, Associate Professor  
Ph.D. University of Southern California  
www.adamson.ims.uconn.edu

**Polymer Chemistry.** We are a materials synthesis group. Typically these materials are model polymers: well-defined polymers normally synthesized by high vacuum anionic polymerization and well characterized with respect to molecular weight, composition, microstructure and chain architecture. These polymers are produced by a “living” mechanism that allows for the construction of polymers as close to perfect as is possible outside of nature. Well-defined polymers have applications in a large number of research areas and we are particularly interested in bio-mimetic applications. We are also interested in the use of graphene and its derivatives as multifunctional nano-fillers for polymer composites. The unique aspect ratio, chemistry, and conductivity of graphene and graphene oxide make this an exciting material to alter and improve polymer properties.

Alfredo Angeles-Boza, Assistant Professor  
Ph.D. Texas A&M University  
www.angeles-boza.chemistry.uconn.edu

**Biological & Inorganic Chemistry.** We are devoted to the use of synthetic inorganic chemistry as a tool to design and construct new molecules for targeted applications. Our research efforts are centered in two key areas: 1) the development of molecular chemistry of consequence to CO2 conversion to higher-energy products and 2) the design and synthesis of compounds with medicinal properties that take advantage of the important role of metal ions in biological systems. Our approach involves synthesizing novel complexes and characterizing them with an arsenal of physical, chemical and spectroscopic data.

Alexandru D. Asandei, Associate Professor  
Ph.D. Case Western Reserve University  
faculty.ims.uconn.edu/~asandei

**Polymer, Organic & Organometallic Chemistry.** Design, synthesis and characterization of organic and inorganic monomers and polymers; complex, unconventional organic, inorganic, organometallic and polymer synthesis, new concepts, reactions and mechanisms with projects on catalysis, living radical and ring opening polymerizations, complex polymer architectures, fluoro and biodegradable polymers, liquid crystals, self-assembly and nanostructures.

William F. Bailey, Professor  
Ph.D. University of Notre Dame  
www.bailey.chem.uconn.edu

**Organic Chemistry.** Development of new synthetic methodology using main-group organometallic chemistry. Investigation of the synthetic utility of unsaturated organolithiums and related Group 1 organo-metallics. These reactive intermediates, prepared in virtually quantitative yield by low-temperature lithium-iodine exchange between t-butyllithium and an organoiodide, undergo regiospecific and highly stereoselective cyclization upon warming. The high degree of stereocontrol in these anionic cyclizations has led to development of one step, stereoselective syntheses of simple natural products and tandem-cyclization strategies for the preparation of bi- and polycyclic structures.
Ashis K. Basu, Professor  
Ph.D. Wayne State University  
web2.uconn.edu/chemistry2/basulab

**Organic Chemistry & Biochemistry.** Mechanism of action of the antitumor drug mitomycin C. Investigation of the mechanism of mutagenesis and repair of the DNA damages derived from γ-radiation, oxidation, and environmental pollutants such as nitrated pyrenes that are suspected to pose threats to human health. A primary goal of this work is to define the relationship between the structure and three-dimensional effects of a solitary lesion in DNA and the mutagenicity, toxicity, and DNA repair that it may induce. We address various mechanistic details as to how the differences in organisms, DNA polymerases, and repair proteins may influence the biological outcome of a lesion.

Christian Brückner, Department Head, Professor  
Ph.D. University of British Columbia, Canada  
www.bruckner.research.uconn.edu

**Organic & Synthetic Bioinorganic Chemistry.** Development of synthetic strategies toward the step-by-step conversion of one or more pyrrolic units in porphyrins into non-pyrrolic heterocycles. We are studying to which extend the modifications affect their chemical reactivity, conformation, conformational flexibility, coordination, and photochemical properties. These porphyrinoids find use as models for chlorins found in naturally occurring photosynthetic centers. The strongly light absorbing, emitting, and sensitizing properties of these chromophores are utilized as in cancer photodynamic therapy, fluorescence labeling, and chemosensing.

Jose A. Gascon, Associate Professor  
Ph.D. Louisiana State University  
gascon.chem.uconn.edu


Jie He, Assistant Professor  
Ph.D. University of Sherbrooke, Canada  
www.jiehe.lab.uconn.edu

**Polymer and Material Chemistry.** Programmable synthesis of polymer/inorganic hybrid materials using the design of macromolecular architectures, biomimetic self-assembly of hybrid materials at all scales, molecule-mimicking self-assembly of anisotropic colloids in solution, and biomedical applications of hybrid materials and their assemblies.

Amy R. Howell, Professor  
Ph.D. University of Kentucky  
www.howell.chem.uconn.edu

**Organic Chemistry.** New synthetic methodology, preparation and exploitation of 2 alkylidene oxetanes, oxospirohexanes and dioxaspirohexanes; metal mediated approaches to the rapid assembly of diverse β-lactones as tools for proteomic profiling; synthesis of glycosphingolipids for examination of their role in immunomodulation.
Michael Hren, Assistant Professor  
Ph.D. Stanford University  
www.hren.lab.uconn.edu


Rajeswari M. Kasi, Associate Professor  
Ph.D. University of Massachusetts, Amherst

Polymer Chemistry & Materials Science. We seek to synthesize, characterize, and, thereby, achieve a fundamental understanding of new polymer-based organic and hybrid materials comprising tailored architecture and functionality. Development of new synthetic methodologies, modification of existing synthetic routes, multidisciplinary approach to structure-property evaluation, and advanced characterization tools are the overriding factors to rational material design. The general research focus areas will include steroid-based biocompatible polymers, responsive materials composed of ionic polymer organogels, and mono or bimetallic inorganic hybrid materials.

Challa Vijaya Kumar, Professor  
Ph.D. Indian Institute of Technology, Kanpur  
jasmin.chem.uconn.edu/jasminsite/home.html

Biological & Physical Chemistry. Our research focuses on creating a new field of chemistry, Biological Materials. We use standard chemical reactions to modify proteins to create novel and exciting materials. For example, conducting, insulting and semiconducting materials are being created from ordinary proteins. Our methodology is unique in the world, and has potential to create any kind of desired materials. For example, we synthesized protein nanoparticles that can replace quantum dots, polyelectrolytes that replace mineral acids in batteries. We collaborate extensively with other groups, and demonstrated protein-supercapacitors, biological batteries and DNA-LEDs. These biological materials are fully functional, yet degrade rapidly when released into the environment. Other projects include bio-Graphene, DNA/RNA Binders, bio-Solar cells, Nano-armored Enzymes, molecular micelles and wearable biosensors.

Nicholas E. Leadbeater, Associate Professor  
Ph.D. Cambridge University, U.K.  
web2.uconn.edu/chemistry2/leadbeater/

Organic & Inorganic Chemistry. Use of microwaves in synthetic chemistry; organic synthesis in water; metal-mediated organic synthesis; clean synthesis; preparation of biofuels; physical organic chemistry; study of kinetics and mechanisms of organic reactions.
Yao Lin, Associate Professor  
Ph.D. University of Massachusetts, Amherst  
faculty.ims.uconn.edu/~ylin/  

Materials Science & Bio/nanotechnology. The Lin Group studies bio-inspired macromolecules and materials. We are very curious on the mechanisms and implications of such cooperative behaviors, especially at the molecular and macromolecular levels. We believe that understanding the molecular cooperatively, and incorporating the concept into the design of synthetic and hybrid macromolecules will lead to the development of new functional materials with unprecedented collective properties. Our current research involves cooperative supramolecular polymerizations from macromolecules and nanoparticles, folding cooperatively in complex macromolecules containing synthetic polypeptides, multicatalytic enzyme assemblies and protein-polymer hybrids with allosteric controls.

Tomoyasu Mani, Assistant Professor  
Ph.D. University of Pennsylvania  
mani.chem.uconn.edu/  

Physical Chemistry. Our group focuses on photo- and radiation- induced fundamental chemical reactions in condensed phase. The goal of our research program is to understand how to control electronic excited states, charge and exciton transfer, and spin dynamics in molecules and molecular assemblies. Our group is also interested in exploiting new knowledge gained to pursue developments of new biomedical imaging and energy technologies. Our research approach is a seamless transition between synthetic chemistry and physical chemistry. We mainly employ time-resolved optical spectroscopy and pulse radiolysis.

Fotios Papadimitrakopoulos, Professor  
Ph.D. University of Massachusetts, Amherst  

Polymer Nanotechnology Chemistry. The research efforts in my group include a wide range of nanomaterials and devices in the area of the nanosized bio-systems. Much of our expertise is concentrated at the supramolecular assembly of artificial nanostructures and their unique interactions with biological entities (such as redox proteins, DNA, PNA, lipid vesicles and bio-compatible polymers). These endeavors span into the following areas: single wall carbon nanotubes, semiconductor nanocrystals, DNA-assisted solid freeform fabrication manufacture of photonic crystals, and totally implantable wireless glucose sensors.

Mark W. Peczuh, Associate Professor  
Ph.D. Yale University  
www.peczuh.uconn.edu  

Bioorganic & Carbohydrate Chemistry. Our group designs and synthesizes new natural product-like small molecules that are used to investigate biological processes. We are especially interested in characterizing protein small molecule interactions. One active project in the group include the synthesis, conformational analysis, and protein binding activity of seven membered ring sugars called septanoses. Another project is aimed at uncovering the rules by which macrocyclic molecules use point chirality and multi-atom planar arrays to establish their unique shapes. The molecules are also potential antibacterials. Keywords: synthesis and conformational analysis of septanose mono- and oligosaccharides; modulation of protein-carbohydrate interactions; enzymatic glycosylations; design and synthesis protein secondary structure mimics; macrocycle synthesis.
Eugene Pinkhassik, Associate Professor
Ph.D. Institute of Chemical Technology, Prague

**Nanomaterials, Organic and Polymer Chemistry.** We make nanomaterials and nanodevices with new and superior properties. Our motivation is to help solving current problems in energy-related technologies, environmental monitoring, and medical imaging and treatment. The main focus of our research is on organic and hybrid materials made by bio-inspired assembly. We use surfactant and lipid bilayers as scaffolds to create nanometer-thin membranes with uniform nanopores that can be used for building nanoreactors and nanosensors. Recent examples of our work include “nanorattles” containing metal nanoparticles in porous nanocapsules and hybrid materials made by ship-in-a-bottle assembly. Members of our team learn diverse modern techniques, travel to national research facilities, and express their creativity in interdisciplinary collaborative projects.

Rebecca Quardokus, Assistant Professor
Ph.D. University of Notre Dame
www.quardokus.chemistry.uconn.edu

**Physical Chemistry.** Our group focuses on the reliability and engineering of molecules and new materials for next-generation electronics. Scanning tunneling microscopy (STM), with its ability to image individual atoms and molecules, is the primary tool used to investigate surface-confined molecular interactions and two-dimensional materials. One project characterizes the reliability of self-assembled monolayers (SAMs) after exposure to external perturbations. Another project focuses on surface-confined synthesis of two-dimensional materials. Our group is also interested in hierarchical design using nanowires as building blocks for self-assembly, and the manipulation and control of molecular rotors tethered to a surface.

Jessica Rouge, Assistant Professor
Ph.D. University of Colorado
www.rougechem.org

**Analytical, Biological, and Organic Chemistry.** Our group seeks to understand how enzymes and nucleic acids can be used in new ways to engineer highly specific and targeted responses in chemical and biological systems. We are specifically interested in developing new chemical strategies for assembling catalytic RNA sequences at nanoparticle surfaces for sensing, diagnostic and therapeutic applications.

James F. Rusling, Professor
Ph.D. Clarkson University
web2.uconn.edu/rusling/

**Bioanalytical Chemistry.** Our research focuses on novel advances in bioanalytical chemistry, biocatalysis, nanobiotechnology, and medical diagnostics. Our philosophy is to apply our knowledge of chemistry and biology to the solution of some of the problems of our society. We pursue new approaches to medical diagnostics, environmental health, and drug technologies. We have ongoing projects in nanoparticle-based arrays for in vitro toxicity screening and DNA oxidation, LC-MS/MS studies of damage to tumor suppressor genes, automated 3D-printed arrays for biomarker proteins aimed at early cancer detection, and new nanomaterials for energy devices and bioanalysis.
**Thomas Seery**, Associate Professor  
Ph.D. University of Southern California

**Polymer Chemistry.** Polymer synthesis at surfaces and physical chemistry of polymers in solution. We initiate chain growth polymerizations from particle surfaces to prepare nanocomposites. These surface initiated polymerizations provide opportunity to control all degrees of structural complexity in a polymer brush. Our research efforts include the development of new methodologies in light scattering to be applied to light absorbing species and interacting polymeric systems. Study of hydrophobically associating hydrogels where the composition of hydrophobic and hydrophilic regions controls drug uptake and release.

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**Michael B. Smith**, Professor  
Ph.D. Purdue University  
www.orgchem.chem.uconn.edu/home/mbs-home.html

**Organic Chemistry.** Our current research involves total synthesis, drug design and the use of conducting polymers in green chemistry. We have synthesized an indocyanine green fluorescent dye that is linked to a nitroimidazole unit. This compound targets cancerous hypoxic tumors in mice, allowing the tumor to be imaged by a fluorescence detector. This work is done in collaboration with Professor Quing Zhu in the Department of Electrical and Computer engineering. In collaboration with Professor Frank Nichols at the UCONN Health Center, we are studying a series of lipids obtained from the dental pathogen Porphyromonas gingivalis, which are responsible for inflammatory responses in periodontal disease, and also trigger multiple sclerosis in mice. We have synthesized the various chiral diastereomers and biological assay will determine which dihydroceramide compounds are responsible for the biological effects. A medicinal chemistry study will follow to determine the structure-activity relationships of these compounds. In collaboration with Professor Gregory Sotzing (Chemistry) we are studying the role of additives with conducting polymers.

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**Gregory A. Sotzing**, Professor  
Ph.D. University of Florida  
www.sotzingresearchgroup.uconn.edu

**Polymer Chemistry.** Electrochromic Polymers: polymers that change color as a function of adding or removing charge. Development of these materials is underway involving organic, analytical, and device fabrication. Design of polymers that allow various color transitions such as blue to colorless, red to colorless and green to colorless, without sacrificing polymer processability. Electrochromic solid-state fabric has been made for a host of applications. DNA Nanomaterials: white light emitting DNA nanofibers have been prepared via electrospinning and proper choice of donor and acceptor for Förster resonance energy transfer. Electrically conductive polymers as coatings for smart textiles. Materials Genome - research and development of dielectric polymers for high energy density as the synthetic effort in collaboration with Professor Rampi Ramprasad and Professor Yang Cao.
**Steven L. Suib**, Board of Trustees Distinguished Professor  
Ph.D. University of Illinois, Urbana-Champaign  
wp.suibgroup.uconn.edu/

**Inorganic Chemistry.** Our research involves the synthesis by molecular design of environmentally friendly catalysts, surfaces, ceramics, adhesives and other materials. Characterization of the structural, surface, bulk, optical, magnetic, electronic, morphologic and thermal properties of these materials is also a vital part of this work. Synthesis, characterization, and catalytic studies of porous transition metal oxide materials is being pursued. Redox catalytic cycles can be developed based on changes in oxidation states of these materials. Some of the catalytic reactions include activation of CO₂, water splitting, selective oxidation of hydrocarbons, gas oil cracking, Fischer Tropsch, biomass conversion, and others. Microwave heating is being used to make novel nano-size materials as well as to drive catalytic reactions. Other applications include adsorption, sensors, and battery materials. All of this work involves new ways to make materials and carry out applications in an environmentally sound manner.

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**Gaël Ung**, Assistant Professor  
Ph.D. University of California, San Diego  
www.ung.chem.uconn.edu

**Organic and Inorganic Chemistry.** We are a synthetic inorganic, organometallic and organic group interested in the development of new small molecules and ligands. We want to pursue the chemistry of the unusual, exploring less charted territories such as the main group elements and the lanthanides. Our interests include: the fluorination of small organic molecules, the defluorination of harmful chemicals, small molecule luminescence and photochemistry and the synthesis of persistent radicals for polymerization.

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**Xudong Yao**, Associate Professor  
Ph.D. University of Maryland Baltimore County  
www.yaogroup.chemistry.uconn.edu


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**Jing Zhao**, Assistant Professor  
Ph.D. Northwestern University  
www.zhao.chem.uconn.edu

**Analytical Chemistry.** Our group focuses on various optical spectroscopies of semiconductor and metallic nanoparticles, and analytes that are in the close proximity of the nanoparticles. The aim of our research is i) to characterize the optical and structural properties of nanoparticles at the single particle level; ii) to understand the interaction between various materials, eg. exciton-plasmon interaction between colloidal quantum dots and noble metal nanoparticles; iii) to functionalize the nanoparticles and to control and optimize their properties for biological sensing and imaging, and energy related applications. Specifically, the tools we use include single particle/molecule spectroscopy, time-resolved fluorescence, Raman scattering, plasmonics, nanofabrication, electron microscopy, atomic force microscopy, etc.