

Chemical Biology

Department of Chemistry
University of Illinois at Urbana-Champaign

For more information, visit
chemistry.illinois.edu



What is Chemical Biology?

Any definition of “chemical biology” is inherently imprecise, due to the immense breadth of this relatively new scientific discipline. Many chemists working in chemical biology use chemical tools and approaches to understand and control biological systems, whereas others apply biology in service of chemistry. Our program has many research groups that are investigating all facets of modern chemical biology, with close connections to analytical, inorganic, materials, organic, and physical chemistry.



Martin D. Burke

Synthesis and study of small molecules with protein-like functions; molecular prosthetics; synthesis of complex natural products; iterative cross-coupling; MIDA boronates

chemistry.illinois.edu/mdburke



Jefferson Chan

Development of chemical probes for sensing and biological imaging of disease states; synthesis of small molecules and nanomaterials to modulate biology with light

chemistry.illinois.edu/jeffchan



Martin Gruebele

In vitro, in cell, and *in vivo* protein folding; protein-RNA interactions; protein-protein interaction dynamics

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Hee-Sun Han

Dissecting complex molecular networks in healthy/diseased tissues; single virus genomics; single cell transcriptomics; *in vitro/in vivo* imaging; quantum dots; microfluidics; high-throughput technologies

chemistry.illinois.edu/hshhan



Paul J. Hergenrother

Use of small molecules to identify and define novel targets for the treatment of cancer, neurodegeneration, and drug-resistant bacteria

chemistry.illinois.edu/hergenro



Yi Lu

Metalloprotein design based on proteomics and computational biology; nucleic acid sensors and therapeutics; DNA nanomaterials

chemistry.illinois.edu/yi-lu



Zaida Luthey-Schulten

Simulations of *in vivo* stochastic processes in single cells and colonies using GPUs; physics of metabolic networks; evolution of translation; dynamical networks of protein-RNA interactions; statistical mechanics of the genome and DNA replication

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I ILLINOIS
Chemistry

SCHOOL OF CHEMICAL SCIENCES

also see reverse side

Chemical Biology

Other faculty with interests in Chemical Biology

Raven Huang (affiliate faculty)
Structural biology

Mary L. Kraft (affiliate faculty)
Biomembrane surface science

Deborah E. Leckband
Biological adhesion

Susan A. Martinis (affiliate faculty)
RNA-protein structure/function

Catherine J. Murphy
Biophysical chemistry

Satish K. Nair (affiliate faculty)
Structural biology

Eric Oldfield
Drug discovery and NMR/X-ray

Stephen G. Sligar (emeritus faculty)
Nanobiotechnology and drug discovery

Huimin Zhao (affiliate faculty)
Biocatalysis and synthetic biology



Liviu M. Mirica

Development of bifunctional therapeutic and diagnostic agents for amyloid peptide disorders such as Alzheimer's disease; study of the role of transition metal ions in neurodegenerative diseases

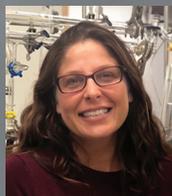
chemistry.illinois.edu/mirica



Douglas A. Mitchell

Natural product chemical biology; mechanistic enzymology; structure-function studies of complex small molecules; bioinformatic and bioorganic methodology to accelerate biomedical discovery

chemistry.illinois.edu/douglasm



Lisa Olshansky

Switchable artificial metalloproteins for the investigation of enzyme mechanism; application to renewable energy conversion and in the development of targeted therapeutics

chemistry.illinois.edu/lolshans



Chad M. Rienstra

NMR methods for biomolecular structure and function; applications to Parkinson's disease, systemic amyloidosis, and drug-sterol interactions

chemistry.illinois.edu/rienstra



Scott K. Silverman

DNA as an enzyme

chemistry.illinois.edu/sks



Jonathan V. Sweedler

Neurochemistry: the characterization of unusual neurotransmitters and neuromodulators and the determination of their function

chemistry.illinois.edu/jsweedle



Wilfred A. van der Donk

Antibiotic biosynthesis; combinatorial chemistry of phosphonates; enzymology

chemistry.illinois.edu/vddonk



Steven C. Zimmerman

Small-molecule therapeutic agents that target DNA and RNA; development of chemical catalysts for chemical biology; drug and cellular delivery agents; biomaterials; nanomedicine

chemistry.illinois.edu/sczimmer