

# Chemical Biology

Department of Chemistry  
University of Illinois at Urbana-Champaign

For more information, visit  
[chemistry.illinois.edu](http://chemistry.illinois.edu)



## What is Chemical Biology?

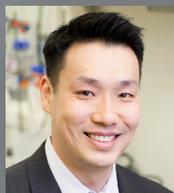
Any definition of “chemical biology” is inherently imprecise, due to the immense breadth of this relatively new scientific discipline. Many chemists working in chemical biology use chemical tools and approaches to understand and control biological systems, whereas others apply biology in service of chemistry. 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](http://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

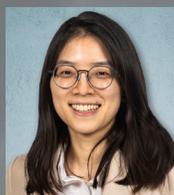
[chemistry.illinois.edu/jeffchan](http://chemistry.illinois.edu/jeffchan)



### Martin Gruebele

Protein and RNA folding and interactions in vitro, in cells and in vivo

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### Hee-Sun Han

Developing new bioimaging and sequencing platforms to unveil the molecular mechanisms driving the ensemble behavior of biological systems; imaging-based spatial transcriptomics, microfluidic-based single virus genomics, lab-on-a-chip platforms for disease diagnostics

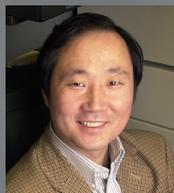
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### Paul J. Hergenrother

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

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### Yi Lu

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

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### Zaida Luthey-Schulten

Stochastic simulations of biological processes in minimal cells; physics of metabolism and ribosome biogenesis; dynamical networks of protein-RNA and protein-DNA interactions; statistical mechanics of the genome and DNA replication

[chemistry.illinois.edu/zan](http://chemistry.illinois.edu/zan)

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also see reverse side

rev. 10/2020

# 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

**Elena V. Romanova (research faculty)**  
Mass spectrometry of peptides

**Stanislav Rubakhin (research faculty)**  
Microbioanalytical chemistry & imaging

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

**Huimin Zhao (affiliate faculty)**  
Biocatalysis and synthetic biology



### Angad Mehta

Synthetic biology to develop: (i) vaccine platforms for bacterial and viral vaccines (ii) experimental models to study eukaryotic cell evolution and (iii) photosynthetic bioproduction platforms

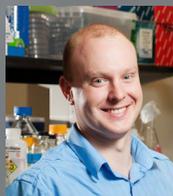
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### Liviu M. Mirica

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

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### 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/douglassm](http://chemistry.illinois.edu/douglassm)



### Lisa Olshansky

Engineering conformationally gated artificial metalloproteins for the investigation of enzyme mechanism, energy conversion, switchable catalysis, and biomedical imaging

[chemistry.illinois.edu/lolshans](http://chemistry.illinois.edu/lolshans)



### Scott K. Silverman

DNA as an enzyme

[chemistry.illinois.edu/sks](http://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](http://chemistry.illinois.edu/jsweedle)



### Wilfred A. van der Donk

Antibiotic biosynthesis; combinatorial chemistry of cyclic peptides; enzymology

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### 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](http://chemistry.illinois.edu/sczimmer)

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