

FACULTY TEAM LEADERS

Probal Banerjee (S): phosphatidylserine-membrane assemblies and receptors
Robert Bittman (Q): synthesis/properties of bioactive lipids
Zimei Bu (C): structural biology of scaffolding proteins
Lesley Davenport (B): lipid, protein and DNA interactions; fluorescence spectroscopy
Ruel Desamero (Y) protein-small molecule interactions; Raman and IR spectroscopy
C. Michael Drain (H): self-assembled photonic materials, biomolecular recognition
Ranajeet Ghose (C): structural biology of signal transduction, protein dynamics; NMR methodology
Brian Gibney (B): protein structure and design, metalloproteins, thermodynamics
M. Lane Gilchrist, Jr. (C): biomolecular materials; supra-molecular assemblies
Dixie J. Goss (H): studies of protein-nucleic acid interactions and regulation of transcription and translation.
Paul Gottlieb (C): assembly, replication and structure of cyto- viruses; viral etiology of systemic autoimmune disease
Nancy Greenbaum (H): RNA structure, interactions with ions and proteins; NMR and fluorescence spectroscopy
Marilyn Gunner (C): computational electrostatics of protein recognition
Gabor T. Herman (G): image processing in biological 3D electron microscopy
David Jeruzalmi (C): DNA replication and repair: structure and function
George John (C): organic synthesis, self-assembled soft materials, and bionanotechnology
Reza Khayat (C): structural studies of host-pathogen interaction and cytoskeletal regulation using x-ray crystallography and Cryo-EM
Frida Kleiman (H): studies of RNA processing, transcription and tumor suppression following DNA damage
Ronald Koder (C): protein design, cofactor design, solution and solid state NMR
William L'Amoreaux (S): protein-nanoparticle conjugates for drug delivery
Themis Lazaridis (C): modeling protein-membrane interactions and molecular recognition
Louis Levinger (Y): biochemistry and molecular biology of RNA processing
Hiroshi Matsui (H): bionanotechnology, biomimetics, bioelectronics, sensors, peptide assembly, biomaterials
Fred Naider (S): receptor function; membrane transporters, protein-membrane interactions
Ralf Peetz (S): conjugated thin films in the nano regime via self-assembly
Sebastien Poget (S): membrane protein NMR, ion channels, transmembrane receptors
Adam A. Proffit (Y): chemical biology of protein-protein interactions
Krishnaswami Raja (S): synthetic polymer-biopolymer hybrid materials; chemically modified biomacromolecular assemblies
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Kevin Ryan (C): biochemistry and molecular biology of pre-mRNA processing; molecular recognition in olfaction
Chwen-yang Shew (S): statistical mechanics of model biological systems
Chang-hui Shen (S): protein-nucleic acid, protein-protein interactions
Ruth E. Stark (C): protein-ligand and plant biopolymer assemblies; NMR methodology
Raymond Tu (C): peptide and biomacromolecule engineering, interfacial assembly
Yujia Xu (H): protein folding, macromolecular assembly
Nan-Loh Yang (S): nanofabricated macromolecules for controlled cell assembly
Shuiqin Zhou (S): self-assembly of amphiphilic copolymers, lipids and fullerene-based surfactants
Emeritus Faculty: Tom Haines, Maria Luisa Tasayco
Campus affiliation: B – Brooklyn College; H – Hunter College; Y – York College; C – City College; Q – Queens College; S – College of Staten Island; G – CUNY Graduate Center

REGIONAL PARTNERSHIPS

The New York Structural Biology Center (NYSBC), located on CUNY's City College campus, is a world-class center developed cooperatively by ten research institutions that share 9 high-field NMR spectrometers operating at 500-900 MHz, 3 cryoelectron microscopes, and access to X-ray facilities at Brookhaven National Lab.

The Center for Biocatalysis and Bioprocessing of Macromolecules is an NSF-funded Industry-University Cooperative Research Center at Polytechnic Institute of NYU. The Center exploits enzyme catalysis to achieve additional control of polymer structure without adding processing steps.

The New York Structural Biology Discussion Group (NYSBDG) is a community of structural biologists, biophysicists, and biochemists working to characterize the shapes of proteins and other macromolecules. Convening twice annually, the Group hosts presentations of emerging results by laboratory heads, post-docs, and graduate students using oral and poster formats.

The NSF-funded Research Coordination Network for Emerging Methodologies of Molecular Structure Determination of Biological Solids is an international community of researchers and students studying molecular structure and micromechanical properties of solid-state macromolecular assemblies.

The Biomolecular Engineering Discussion Group hosts a yearly spring symposium that brings together scientists and engineers applying physical science and engineering knowledge to bioactive systems. Each symposium highlights advances in molecular and protein design, self-assembly, gene circuit design, artificial cell design, and evolution that have applications in biology, medicine, environment and energy.

**CUNY Institute for Macromolecular Assemblies
at The City College of New York**
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Institute for Macromolecular
Assemblies (MMA)

at

The City College of New York

The City College
of New York

www.sci.ccny.cuny.edu/mma

CUNY Chancellor: Matthew Goldstein

CCNY President: Lisa S. Coico

September, 2012

WHAT IS THE CUNY MMA?

Approved as an Institute of The City University of New York in July of 2003, the Macromolecular Assemblies Institute (MMA) builds on the research strength of campus-based faculty in Chemistry, Biology, and allied fields, on the collaborative research alliances we have made with other institutions, and on our unique laboratory capabilities.

The MMA coordinates existing and new research investigations for both natural and engineered macromolecular assemblies of biological and medical importance, integrates graduate and undergraduate educational programs in these areas across CUNY, and aims to expand both public and private support for macromolecular research.

Faculty and staff affiliates are based at Brooklyn College, City College, College of Staten Island, Hunter College, Queens College, The CUNY Graduate Center, Lehman College, and York College.

The infrastructure of the MMA has been supported by New York State's Generating Employment through New York Science (Gen*NY*sis) program and Office of Science and Technology and Academic Research (NYSTAR), CUNY's Office of Academic Affairs, and the National Science Foundation (NSF). The City College of New York serves as a centrally located home base for MMA research efforts, and The College of Staten Island hosts the MMA Center for Controlled Delivery and Pharmaceutical Design.

MMA research efforts are funded by the NSF, the National Institutes of Health, the Departments of Agriculture, Defense and Energy, US Airforce, private foundations and companies, US Agency for International Development, and seed grants from the university.

RESEARCH GOALS

A host of remarkable molecular machines ensure the functioning of all animal and plant life, impacting processes that range from taking a deep breath to reproducing the species to harnessing sunlight by photosynthesis. These naturally occurring macromolecular assemblies have also inspired the engineering of biomedical devices used in tissue replacement, diagnosis of vision and heart disorders, drug delivery, and wound healing. Positioned at the interface of chemistry, biology, physics, and engineering and addressing fundamental and applied questions at the frontier of life sciences research, the CUNY MMA has research goals that include the following:

- to identify and characterize new molecular targets for drug design
- to delineate disease-related molecular signals of cellular metabolism
- to understand protein-nucleic acid interactions in animals and plants
- to characterize macromolecular assemblies associated with microbial virulence and cellular resistance to chemotherapy
- to design polymeric biomedical materials for organ transplants and drug delivery
- to design self-assembled materials for light harvesting, imaging, and sensor applications
- to identify natural polymer complexes that promote resistance of plants to microbial pathogens and environmental stresses

EDUCATIONAL PROGRAMS

GRADUATE

- CUNY Ph.D. Programs in Chemistry, Biology, Biochemistry, Physics, Chemical Engineering, Computer Science; Subdiscipline in Molecular Biophysics
- Teaching and research fellowships
- Fellowships for underrepresented minorities, first-generation college attendees

UNDERGRADUATE

- Summer research experiences for undergraduates
- Chemistry, biology, physics, chemical engineering, biotechnology, pre-medical, pre-pharmacy curricula
- Fellowships for underrepresented and economically disadvantaged students, teacher trainees

OUTREACH ACTIVITIES

- Research-inspired K-12 and Teacher Training Laboratory courses with the CUNY Discovery Institute, CCNY Pathways Center, CUNY College Now
- Public presentations for faculty, alumni, business and legislative leaders

INSTITUTIONAL AND ECONOMIC DEVELOPMENT

- Research: grants, publications, seminars, symposia, focus groups, review panels
 - Education: curricula, workshops, technical training, recruitment
 - Technology: patents, licenses, industrial partnerships
 - Jobs: R&D stimulation, new businesses, added employment opportunities.
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