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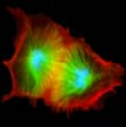
NSF Funding Opportunities in Biological Sciences

LaJoyce H. Debro

Program Director

Cellular Systems/Signal Transduction

Division of Molecular and Cellular Biosciences





Directorate for Biological Sciences (BIO)

James Collins, Assistant Director
Joann Roskoski, Executive Officer

Information and Automation Resources Unit (IAR)

Division of Biological Infrastructure (DBI)

Human Resources

Research Resources

Plant Genome Research Program

Division of Environmental Biology (DEB)

Ecological Biology

Ecosystem Science

Population & Evolutionary Processes

Systematic Biology & Biodiversity Inventories

Division of Integrative Organismal Systems (IOS)

Behavioral Systems

Developmental Systems

Neural Systems

Physiological & Structural Systems

Division of Molecular and Cellular Biosciences (MCB)

Biomolecular Systems

Cellular Systems

Genes and Genome Systems

Emerging Frontiers (EF)

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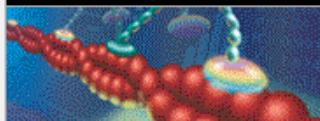
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Molecular and Cellular Biosciences (MCB)

Programs and Funding Opportunities

Key: [C](#) Crosscutting | [N](#) NSF-wide

[Biomolecular Systems Cluster](#)

[Cellular Systems Cluster](#)

- [Microbial Observatories \(MO\) and Microbial Interactions and Processes \(MIP\)](#)

[Genes and Genome Systems Cluster](#)

[Xtra Funding Opportunities in MCB](#)

- [2010 Project](#)
- [Interagency Opportunities in Metabolic Engineering](#) [C](#)
- [Microbial Genome Sequencing Program FY 2005](#) [C](#)
- [NSF-NIST Interaction in Chemistry, Materials Research, Molecular Biosciences, Bioengineering, and Chemical Engineering](#) [C](#)
- [Research Coordination Networks in Biological Sciences \(RCN\)](#)
- [Research Experience for Teachers \(RET\): Supplement Opportunity](#)
- [Research Opportunity Award \(ROA\): Supplement Opportunity](#)

Featured NSF-wide Programs

[Faculty Early Career Development \(CAREER\) Program](#) [N](#)

[International Research Fellowship Program](#) [N](#)



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Division of Molecular and Cellular Biosciences (MCB)

Fundamental understanding of life processes at the molecular, subcellular, and cellular levels

■ Biomolecular Systems

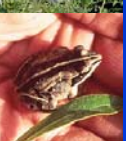
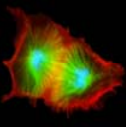
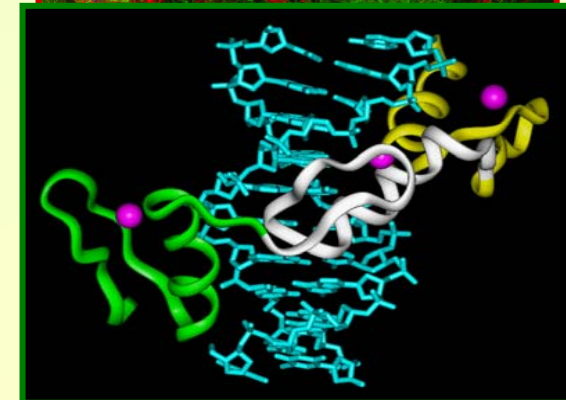
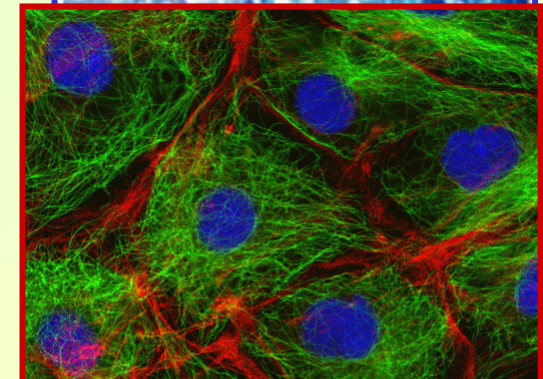
- Structure, function, dynamics, interactions, and interconversions of biological molecules

■ Cellular Systems

- Emphasizes the structure, function, and regulation of plant, animal and microbial cells, and their interactions with the environment and with one another

■ Genes and Genome Systems

- Emphasizes genomes and genetic mechanisms in all organisms, whether prokaryote, eukaryote, phage, or virus





Biomolecular Systems

Molecular Biophysics

NMR

Optical Spectroscopy

Single molecule analyses



Theory, Computation and Modeling

Protein folding
Protein Interactions
Protein structure

Molecular Biochemistry

Enzymes

Computational and structural analysis
Metalloenzymes, EPR

Membrane Biochemistry

Electron transfer
Transporters
Structure of membrane proteins

Nucleic Acid Biochemistry

Enzymes that use NA as substrates
NA as enzymes
NA structure

Protein folding, assembly and degradation

Viral assembly and structure

Metabolic Biochemistry

Enzymes

Structure-function relations and regulation
Mechanistic enzymology

Metabolites

Analysis, fluxes, etc.
Lipids, Carbohydrates, AA, etc.

Pathways and Networks

Holistic analyses of metabolic pathways and networks

Physiology

Global analyses
Environmental biology and remediation
Cellular and community physiology

Development of methods and primary applications

Application of several methods to address a question
Theory and Experimentation



Cellular Systems Cluster Organization

Cellular Systems Cluster

Cellular Organization

Signal Transduction & Cellular Regulation

Functional Dynamics

protein translocation and movement into, within and out of cells
cellular aspects of quality control/turnover & autophagy
endomembrane systems: biogenesis, trafficking, functions

cytoskeleton structure and dynamics
dynamic (e.g., actin, tubulin, FtsZ, MreB, etc)
scaffold / structural (e.g., septins, IFs, etc.)
cytoskeleton-associated molecular motors
membrane linkage: higher-order structures (e.g., centriole, spindle, etc.)

cellular motility (crawling, swimming, gliding, etc.)

structural and dynamic aspects of cell division and cytokinesis

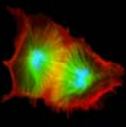
external signals: transduction mechanisms, systems/cascades & networks
localization/visualization, biochem/phys, & computational/modelling
e.g., receptors, kinases, phosphatases, ions, G-proteins, etc.
two-component regulatory systems
lipid signalling
ion channels, structure/function relationships

intracellular signalling: adaptation; apoptosis
cell cycle regulation; intracellular biological clocks
ion channel function, structure/function relationships

chemotaxis: regulation of cellular and subcellular functions
regulation of processes such as cell division and cytokinesis

cell-cell communication
quorum sensing; biofilm development (prokaryotic/eukaryotic)
cellular aspects of self-nonself recognition (cellular immunology)

Plants, Animals, Eubacteria, Archaeobacteria, Fungi, Protists, and all other taxa

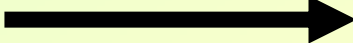


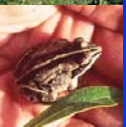
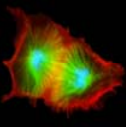
Genes and Genome Systems

I. Genetic Analysis and Functional Genomics

II. Genome Dynamics and Regulation of Gene Expression

III. RNAs and RNA-mediated regulations

Nucleic acid  **Population Genetics**



Getting Support in Proposal Writing

■ NSF Publications

- Program Solicitations
- Grant Proposal Guide
- Web Pages
- Funded Project Abstracts
- Reports, Special Publications

■ Program Directors

- Incumbent
- Former "Rotators"

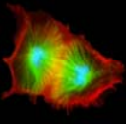
■ Mentors on Campus

■ Previous Panelists

■ Serving As A Reviewer

■ Sponsored Research Office

■ Successful Proposals



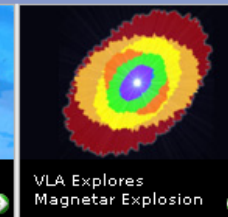
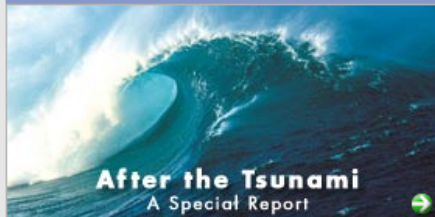


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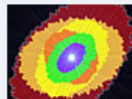
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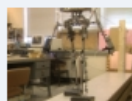
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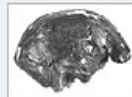
VLA Probes Secrets of Mysterious Magnetar

Released February 18, 2005



Bipedal Bots Star at AAAS Media Briefing

Released February 17, 2005



New Clues Add 40,000 Years to Age of Human Species

Released February 16, 2005

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