UCONN | THE GRADUATE SCHOOL

UCONN HEALTH BIOMEDICAL SCIENCE PROGRAM

Systems Biology Concentration

Multidisciplinary Research: Interface of Biology, Physics, Chemistry, Biophysics, Mathematics, CS&E.

Modeling & Simulation

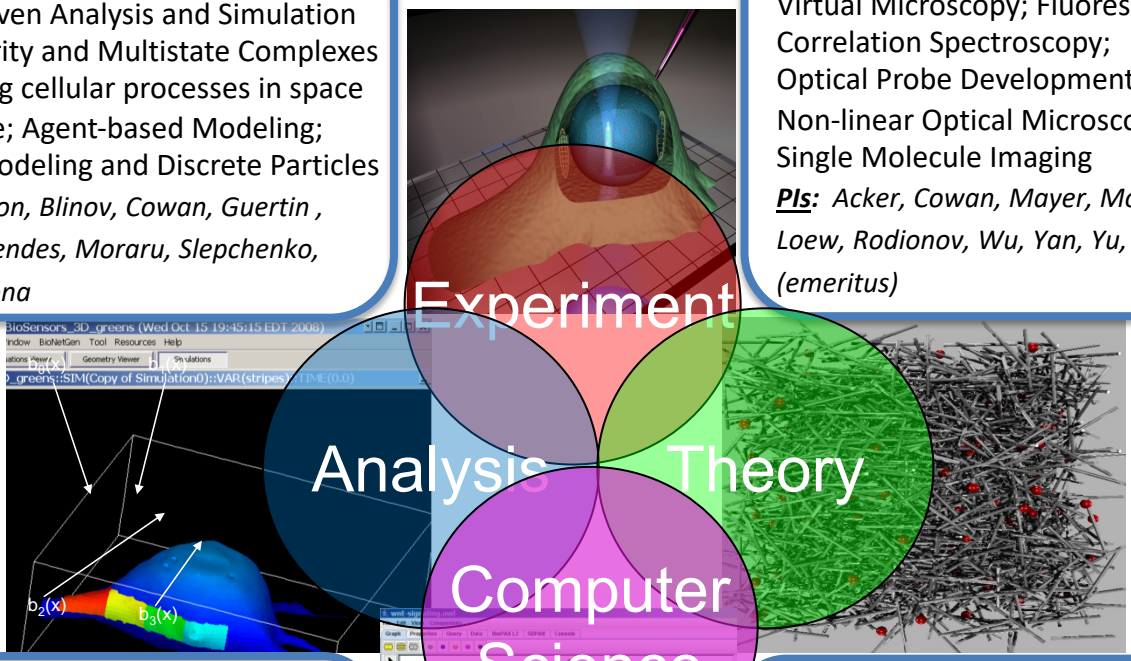
Data Driven Analysis and Simulation
Modularity and Multistate Complexes
Modeling cellular processes in space and time; Agent-based Modeling;
Stoch Modeling and Discrete Particles

PIs: *Agmon, Blinov, Cowan, Guertin , Loew, Mendes, Moraru, Slepchenko, Vera-Licona*

Optical Imaging

Virtual Microscopy; Fluorescent Correlation Spectroscopy;
Optical Probe Development
Non-linear Optical Microscopy
Single Molecule Imaging

PIs: *Acker, Cowan, Mayer, Mohler, Loew, Rodionov, Wu, Yan, Yu, Carson* (emeritus)*



Omics analysis

Pathway Analysis; Gene regulatory Networks; Gene expression & Proteomics analysis; Large scale modeling; Molecular Medicine

PIs: *Blinov, Guertin, Kshitiz, Mendes, Moraru, Vera-Licona*

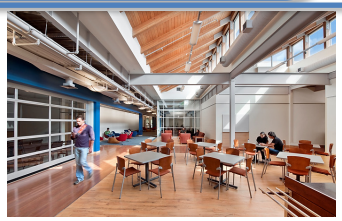
Cell Biology & Biophysics

Signal Transduction; Biological Signaling Platforms; Single Molecule and Particle Tracking; Cytoskeletal Dynamics and Morphogenesis

PIs: *Cowan, Kshitiz, Loew, Mayer, Mohler, Rodionov, Wu, Yu*

Systems Biology Area of Concentration:

- ✓ Multidisciplinary Faculty
- ✓ Multi-mentor graduate training
- ✓ Located in a new state-of-the art facility (R&D Magazine's "Renovated Lab of the Year 2011")
- ✓ Shares facility with Genetics AoC & Technology Incubator.



Cell Analysis and Modeling Center (CCAM): https://health.uconn.edu/cell-analysis-modeling/

Center for Quantitative Medicine (CQM): https://health.uconn.edu/quantitative-medicine/

AoC: http://health.uconn.edu/graduate-school/academics/programs/ph-d-biomedical-science/cell-analysis-and-modeling-graduate-program/

Program Director: Dr. Michael Blinov (blinov@uchc.edu). Associate Director: Dr. Yi Wu (yiwu@uchc.edu)

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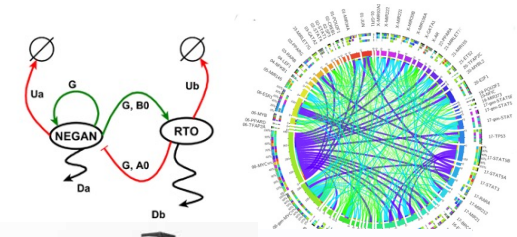
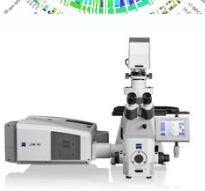
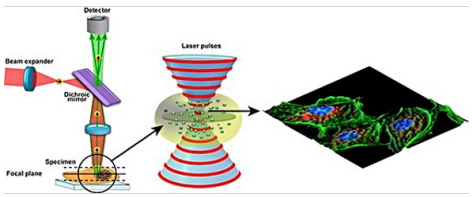
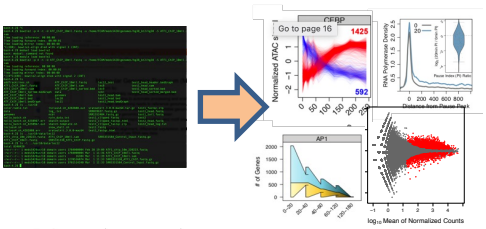
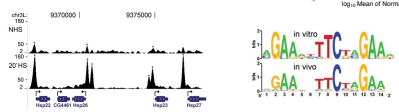
Systems Biology Concentration











Introduction to Systems Biology (MEDS-6455)

The goal is to provide the necessary background to read modeling papers, choose computer resources that will help in biological projects, and be able to select a modeling technique appropriate for a given biological project.

- Predictive mathematical models and their dynamical behavior;
- Resources needed to start building a model;
- Models exchange, simulation and visualization;
- Public databases and software tools available for a modeler.
- Stability, switching and stochasticity of a biological system;

Optical Microscopy and Bio-imaging (MEDS-6450)

An introductory course to help students understand the broad array of optical microscopy techniques employed in current biological literature.

- An overview of geometrical optics and optical and fluorescence microscopy, with an emphasis on instrumentations.
- Focus on state-of-the-art imaging techniques including Confocal microscopy, nonlinear optical processes, optical sensors, optogenetics and super-resolution imaging.
- Interdisciplinary topics. Learn physics, protein engineering and computational concepts.
- Literature-based learning.
- Three labs to gain some hands-on experiences.

Molecular Genomics Practicum (MEDS-5420)

Learn to:

- Comfortably navigate the command line.
- Use scripting to automate processing and analysis of genomics data.
- Align sequencing reads to reference genomes.
- Retrieve and analyze publicly available genomic data sets.
- Visualize genomics data on a browser.
- Perform alignment, peak calling, and motif analysis starting of raw ChIP-seq data.
- Perform alignment, differential expression, and gene set enrichment analysis of raw RNA-seq data.

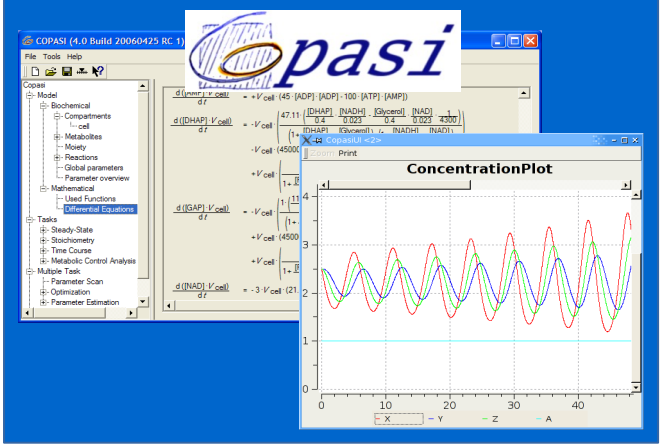
Practical Microscopy and Modeling (MEDS-5382)

Hands-on experience in wide variety of microscopy techniques and related mathematical modeling

Systems Biology Journal Club (MEDS-6497)

Discussion of papers, current research and attended meetings.

COPASI – biochemical simulator



Virtual Cell – spatial modeling environment