Biomolecular Interaction Technologies Center (BITC)

University of New Hampshire

The accurate description of biomolecular interactions is a central element in understanding disease mechanisms and is essential for devising safe and effective drugs

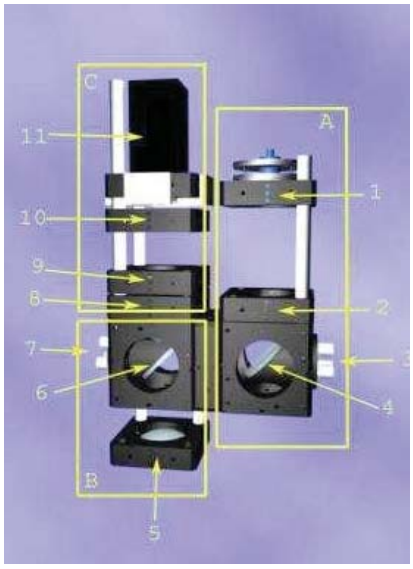
The University of New Hampshire *Biomolecular Interactions Technology Center*

A National Science Foundation Industry/University Cooperative Research Center since 2001

Center Mission and Rationale

The pharmaceutical and biotechnology industries increasingly have turned to biomolecules, such as proteins, for the treatment and prevention of diseases. Of the new drugs approved by the FDA in 1999, 60 percent were either proteins or molecules that will interact with naturally occurring proteins. The accurate description of biomolecular interactions is a central element in understanding disease mechanisms and is essential for devising safe and effective pharmaceuticals. The characterizations of these interactions are important to the pharmaceutical and biotechnology industries in the areas of drug discovery, drug development, drug formulation, and quality assurance/quality control. In each of these areas, questions arise concerning the number of molecules interacting and the binding strength of their interactions. For drug discovery, determining the binding strength between a drug and its target is important since higher binding strength often correlates with increased drug potency and specificity. During drug development, the mode of delivery, body clearance rates, and the effective and tolerated doses are necessary information.

The Biomolecular Interaction Technologies Center (BITC) is an NSF Industry/University Cooperative Research Center, established in 2001, that will enable pharmaceutical, biotechnological, and instrumentation companies to work together toward the development of advanced technologies for characterizing protein molecular interactions. This is a problem that is of interest to almost all pharmaceutical and biotechnology companies.



Characterization of molecular interactions is central to the development of drugs that are safe and effective. Shown here is a schematic for a prototype fluorescence detection system for the analytical ultracentrifuge. These optics will enable pharmaceutical companies to characterize molecular interactions in complex fluids.

In collaboration with Center members from the instrumentation industry, the Center will draw upon the unique resources at the University of New Hampshire (UNH) to develop instruments and methods for the pharmaceutical and biotechnology industries.

The BITC goals are to:

- Develop and improve instruments and methods for the characterization of molecular interactions of importance to the pharmaceutical and biotechnology industry
- Provide an environment in which researchers from the pharmaceutical, biotechnological, and instrumentation industry collaborate with UNH students and Center scientists
- Train graduate and undergraduate students versed in the needs of industry
- Transfer technology through personnel exchanges, workshops, consultations, and collaborations.

Research Program

BITC will be staffed by faculty researchers and students from the University of New Hampshire and the University of Utah. Research programs will be in the areas of:

- Testing, validation, and assay development for a new CPWR biosensor
- High-throughput, high-resolution absorbance data acquisition for the analytical ultracentrifuge
- Construction of a prototype fluorescence detector for the analytical ultracentrifuge
- Provision of workshops and educational resources.

The Center has available to it the following equipment and facilities for the study of protein molecular interactions:

- Research Computing Center
- NASA-Certified Machine Shop
- Center to Advance Molecular Interaction Science
- Ultracentrifuges
- Surface plasmon resonance apparatus
- Calorimeters
- Fluorescence detector instruments.

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