A Closer Look at Research Clusters

COMPUTATIONAL SCIENCES, ANALYSIS AND MODELING

Overview

Computational sciences, analysis and modeling represents an intersection of computer science, engineering, applied math, and the sciences (biology, physics, chemistry). The primary focus of the field is the construction of models and numerical analysis techniques to simulate, evaluate, and solve problems using computers. Computational modeling is heavily applications-oriented with particular emphasis on understanding and solving problems in areas of biology, medicine, economics, business, and the environment.

Focus of Research at UMass Boston

- Decision analysis for R&D strategies and technology portfolio management
- Management science and information systems
- Data fusion and visualization, modeling and forecasting with applications in security, wave movement, weather forecasting and temperature monitoring
- Complex models using non-linear dynamic systems
- Biodiversity informatics – information systems at the organism level or higher – focus on specimen databases, provision of metadata in images, “knowledge representation”/”automatic mark-up” research
- “Biophysics” – theoretical data analysis of genomics
- Qualitative and survey research expertise spanning focus group, interviewing methodologies, interaction of qualitative and quantitative analysis approaches, survey design

UMass Boston Departments Involved

Computer Sciences; Physics; College of Management; Center for Survey Research; Sociology; Gerontology; Biology; Chemistry; GIS Core Research Facility

Collaborations Established and Potential

Mass General Hospital and Brigham and Women’s Hospital in bioinformatics; UMass Medical School. Major potential for key targeted sectors, such as healthcare and financial services, along with serving to provide enabling systems and modeling infrastructure for a number of research clusters.

Distinctive UMass Approach

- Continue to build an applications-oriented, user-inspired research of data mining, database design, networking, data fusion, decision sciences, and non-linear, dynamic systems
- Offer go-to facilities offering breadth of state-of-art applications in computational sciences and modeling
- Grid computing is a notable research opportunity area
- Integration of qualitative and quantitative approaches