NORTHWESTERN INSTITUTE
ON COMPLEX SYSTEMS (NICO)

CHAMBERS HALL
600 FOSTER STREET
EVANSTON, IL 60208-4057
T . 847 491 2527
F . 847 556 1280

NORTHWESTERN UNIVERSITY

Northwestern Institute on Complex Systems
invites you to its

Weekly Seminar

Speaker: **Dr. Gary An, Assistant Professor, Trauma and Critical Care, Northwestern University Feinberg School of Medicine**

Title: **Multi-hierarchical ABM Approaches to Biomedical Modeling**

When: **Wednesday, January 17, 2007**

Where: **Chambers Hall, 600 Foster Street, Lower Classroom Level**

Time: **12:00 – 1:00**

NICO Coffee Hour will follow for questions, networking, and collaboration

Abstract

A primary focus of traditional biology was classification based on observed morphological and structural differences. The advent of molecular biology in the mid-20th century led to a switch in the emphasis of biology towards more formal analysis along the lines of the Newtonian physics-based reductionist paradigm. While this approach has been, and continues to be, extremely successful in the acquisition of mounds of detailed information, it is now recognized that there are significant limitations to this method. One is the sheer volume of information that needs to be analyzed and integrated, another is the recognition of the importance of systems-level approaches needed to re-integrate the connectivity lost in the reductionist process. The information is generated by research endeavors at multiple scales and hierarchies: gene => protein/enzyme => cell => tissue => organ => organism. The existence of these hierarchies presents significant challenges for the translation of mechanistic research results from one level to another. Furthermore, the research community itself remains relatively compartmentalized, leading to barriers to communication and adding an additional challenge to synthesis of basic science data into a unified whole. In the medical field this has led to difficulty in translating the results of basic science research into effective clinical regimens. Agent Based Modeling is particularly well suited to this translational role. The traditional emphasis on classification/morphology is directly applicable to ABM construction, and the inherent modularity of ABMs makes them good platforms for the collaborative efforts necessary in a widely dispersed and compartmentalized research community. Furthermore, the nature of ABMs make them suitable for translational "grammars" for expressing the results of wet lab experiments and hypotheses. I present here an ABM framework with a modular, multi-scale approach and a preliminary exampleof a translational syntactical grammar that will hopefully become a prototype platform for a community-wide, open-source, dynamically-functional data base of biomedical information.

Posted on Plan-It Purple