



Faculty of Computer Science 2007–2008 Seminar Series

Applying Combinatorial Rigidity to the Mystery of Protein Allostery

By

Andrea Mantler

PhD. Candidate from the University of North Carolina

Wednesday, June 13th, 2007

2:30pm

ITC317

A protein is allosteric if binding a ligand at one site affects how another ligand binds at a different site, and this effect cannot be explained by overlap of the sites or steric collisions between the ligands. Allosteric proteins are "interesting" for several reasons, such as:

- Allostery regulates many functions in the body. For example, allostery is what causes hemoglobin to transfer oxygen from the lungs to other locations.
- Most instances of allostery are not understood.
- Understanding allostery can help drug design.

My interest is piqued by the second reason listed. Whiteley hypothesized that changes in rigidity / flexibility can explain some instances of allostery.

In this talk I will cover a combinatorial technique for exploring rigidity / flexibility of proteins. I will present a model, explain the mathematics behind it (and some of the problems with the math), explain how to convert a protein to this model, and discuss the issues that hydrogen bonds present in this model. I will then illustrate the algorithm used to compute rigidity in this model. Finally, I will explore the interesting topic of finding allosteric effects that are caused by changes in rigidity / flexibility, and computational tricks (both completed and in progress) to do this.

STUDENTS ARE ENCOURAGED TO ATTEND
