Exploring sequence space

Proteins are heteropolymers of amino acids, and the sequence of monomers along the chain largely determines the structure and function of the molecule. Random sequences typically will not fold into well defined three dimensional structures, while on the other hand a single protein can tolerate large numbers of amino acid substitutions without significant changes in function. The amino acids sequences in functional proteins thus represent an interesting balance between robustness and selection or fine tuning. What is the correct description of the ensemble of sequences consistent with a particular function? Is the ensemble that we see today shaped largely by these functional constraints, or by the limited opportunities for exploration over evolutionary time? The exponentially increasing database of known protein sequences has stimulated new theoretical approaches to these problems, bringing methods from statistical physics, machine learning, and other disciplines. As part of a longer program on emergent phenomena in biological systems, this day of discussions will explore these recent developments.

Wednesday, 2 March 2011
Starting at 10:00 AM in Room 4412

Participants will include

William Bialek, Princeton University & CUNY
Harmen Bussemaker, Columbia University
Simona Cocco, Institute for Advanced Study
Lucy Colwell, Harvard University
Justin Kinney, Cold Spring Harbor Laboratory
Debora Marks, Harvard Medical School
Remi Monasson, Instituet for Advanced Study
Thierry Mora, CNRS & École Normale Supérieure, Paris
Aleksandra Walczak, CNRS & École Normale Supérieure, Paris
Martin Weigt, Human Genetics Foundation, Torino

We hope that others will join in as the day progresses. To encourage informality, we will start in a small venue with only a blackboard, and move as needed to accommodate the participants.

Events are free and open to the scientific community, but we ask that you register by sending an email to its@gc.cuny.edu. We particularly encourage participation by students and postdoctoral fellows, and some funds are available to help with travel and lodging. The Graduate Center of the City University of New York is located at 365 Fifth Ave., between 34th and 35th Streets, in Manhattan. For more information about ITS programs, see http://web.gc.cuny.edu/its/. Program supported in part by the Burroughs Wellcome Fund.