Self Assembly

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Thursday, December 2, 2004
102 Bradley Hall, 4:00 pm
(Tea 3:30 pm Math Lounge)

Abstract

Advances in chemical synthesis have laid the groundwork for computation at nanoscale, where self assembly becomes the core process, either as a computation itself, or as a mechanism for fabricating nanodevices. By such processes, elementary particles, such as DNA molecules, combine into large complexes following built-in bonding rules. We study self assembly viewed as a random growth process, addressing such questions as: "How long does a given structure take to self-assemble?" "How does one optimize the yield of a particular self-assembly process?" "What are the trade-offs between the reliability (error tolerance) and speed of self assembly?" Answers to these questions bring out unexpected connections with classical areas of mathematics.

The rest of the team: Yu. Baryshnikov, P. Momcilovic, N. Seeman, P. Winkler

This talk should be accessible to graduate students.