CIBM PROGRAM RETREAT

Computation and Informatics in Biology and Medicine
Training Program Retreat

9:45 a.m. Presentation

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DNA Computing on Surfaces

Abstract:
The field of DNA computing was initiated in 1994 by Adleman, who proposed that the tools of molecular biology could be used to solve instances of difficult mathematical problems known as NP-complete problems, and demonstrated the principle experimentally in a small demonstration experiment. This work generated considerable excitement in the computer science community as an actual implementation of the concept of "molecular computing", with potential to provide a completely new paradigm for high-performance computation. However, the particular experimental implementation employed by Adleman did not scale well to larger problems, due to a variety of practical issues in the chemistry. To address this problem we established several years ago a collaborative effort between the research groups of Professor Anne Condon of the UW Department of Computer Science, Professors Rob Corn and Lloyd Smith of the UW Department of Chemistry, and Professor Max Lagally of the UW Department of Materials Science and Engineering. This collaborative effort has as its focus the development of a surface-based implementation of the DNA computing process. The use of a solid support permits the DNA molecules to be easily purified at every step of the DNA computing process, facilitating scale-up to the solution of larger problems. In this talk the basic principles of DNA computing will be presented, as well as the novel chemistries and enzymologies that have been developed for implementation of this project. In addition to their utility for DNA-based computing, the novel chemistries and enzymologies that we have developed are likely to find useful applications in the fields of Biotechnology and Genomics.

Friday, October 15th

Pyle Center, Room 325/326
702 Langdon Street
9:00 a.m. – 5:00 p.m.