Joint seminar Department of Mathematics – CIBIO

Monday 15 October 2018 – at 11:30 am

Seminar Room “-1” – Department of Mathematics

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Molecular Programming

Abstract

Digital computers allow us to manipulate information systematically, leading to recent advances in our ability to structure our society and to communicate in richer ways. They also allow us to orchestrate physical forces, transforming and optimizing our manufacturing processes. What they cannot do very well, is to interact directly with biological organisms or in general orchestrate molecular arrangements. Thanks to biotechnology, nucleic acids (DNA/RNA) are particularly effective ‘user-programmable’ entities at the molecular scale. They can be directed to assemble nano-scale structures, to produce physical forces, to act as sensors and actuators, and to do general computation in between. We will be able to interface this new class of devices with biological machinery, to detect and cure diseases at the cellular level under program control. The theory of computability directed the design of digital computers, and it can now inform the development of new computational fabrics, at the molecular level, that will eventually give us control of an entirely new domain of reality.

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