BCI biology computation information
2010

BIOLOGY, COMPUTATION AND INFORMATION

Dobbiaco, Italy   20-24 September 2010

The School of Biology, Computation, and Information (BCI), reaching this year its sixth edition, aims at bringing together Teachers and Students in Biology, Mathematics, and Computer Science.

The main goal of the School is to give an updated overview of interdisciplinary techniques and problems cross-bordering the three fields.

This year's edition will be dedicated to discuss the different points of view on Bioinformatics typical of the two main sub-communities of computationally oriented scientists working in the field. The central question that will be addressed is whether the more algorithmic or more systemic approach to Bioinformatics is going to lead the way in the future.

The three distinguished speakers for this year's edition are **Jasmin Fisher** (Biology), **Eugene Myers** (Computer Science), and **Bud Mishra** (Mathematics). The school will take place during the fourth week of September (September 20-24, 2010).

COURSES
Algorithmic vs Systemic Approach to Bioinformatics

Area: **Mathematics**
Lecturer: **Prof. Bud Mishra**
Courant Institute of Mathematical Sciences, New York University, USA. Mt. Sinai School of Medicine, New York, USA. NYU School of Medicine, New York University, USA.

Abstract: Solved and Unsolved Problems in Biology
Prof. Mishra will describe a few classical and recent open problems in biology that require careful reasoning (Thought Biology). It is interesting to ask how areas such as systems biology, model checking and quantitative biology may be able to tackle these problems. To address these questions, we will develop a model of causality that is based on the work of various philosophers, starting with John Stuart Mill and David Hume, but more recently by Skyrms, Suppes and Eells. Examples from biology, neuroscience, finance, and web applications will illustrate how we hope to exploit this technology.   This is joint work with Samantha Kleinberg.

 Area: Computer Science
Lecturer: Prof. Eugene Myers,
HHMI Janelia Farm Research Campus, USA

Abstract.
While there have been a few interesting discoveries based on prediction, my own sense is that most of the knowledge accumulated in molecular biology has been based on observation, the more direct, the better. I believe that the main contribution of the genome project(s) has been that we can now do recombinant genetics on a genome-wide scale.

The output of such studies are typically images produced by light or EM microscopy.
I will describe the growing sub-field of "bio-image informatics" and illustrate projects underway to directly model and measure the cellular anatomy of organs, the meso-scale anatomy of cells, and the developmental trajectory of a genome.

Area: Biology
Lecturer: Prof. Jasmin Fisher
Cambridge University, UK.
Microsoft Research Center, Cambridge, UK.

Abstract: Executable Biology: Successes and Challenges
Understanding living systems remains one of the greatest challenges in science, despite an explosion of data in the Biological Sciences. Computational modelling of biological systems is consequently becoming increasingly important in efforts to better understand complex biological behaviours. In my talks I will outline one branch of research aiming to address this important challenge. We distinguish between two types of biological models -mathematical and computational- which differ in their representations of biological phenomena. We call the approach of constructing computational models of biological systems Executable Biology, as it focuses on the design of executable computer algorithms that mimic biological phenomena. In the talks I will survey the main modelling efforts in this direction (e.g., Boolean networks, process calculi, Petri nets, interacting state-machines), emphasize the applicability and benefits of executable models in biological research, mainly through models of cancer-related signalling pathways, and highlight some of the main challenges that executable biology poses for Biology and Computer Science.

REGISTRATION

Early registration deadline: **July 1, 2010**.
Early registration fee: **€ 500**

Late registration deadline: **August 31, 2010**.
Reduced late registration fee: **€ 600**.

Supplement for single room: **€ 100**.

The registration fee covers participation to all lectures, course materials, coffee break, and full board accommodation.

ACCOMODATION: Participants will be lodged at the Apparthotel Germania (http://www.apparthotel-germania.com/), located in Dobbiaco, just in front of the conference center.
Accommodation includes five nights with breakfasts, lunches and dinners, including the dinner on Sunday 19, 2010 h20:00, and the lunch on Friday 24, 2010.
Students will be accomodated in double rooms, shared with other participants. Single room accomodation is possible by paying a supplementary fee.

For persons accompanying the School participants, please, contact the organizing committee.

WEBSITE AND CONTACT

For all additional information, please visit the website:
http://www.dmi.units.it/bci2010/

You can also contact the school organizers by email at
bci2010@dmi.units.it

LOCATION

The school will take place in Dobbiaco, an inspiring village in the italian Alps, called "the door to the Dolomiti". Lessons will be held at the congress center Centro Culturale Grandhotel Dobbiaco, via Dolomiti 31, I-39040 Dobbiaco.
The congress center is close to the railway station.

ORGANIZING COMMITTEE

Alberto Policriti, *University of Udine* (school director)
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