

## SEMINAR OF APPLIED MATHEMATICS

**MONDAY 09 March 2015 at 11h15, lecture hall BI A0 448 (CIB)**

*Prof. **Caroline UHLER** (IST Austria) will present a seminar entitled:*

### **"Gene Regulation in Space and Time"**

#### Abstract:

Although the genetic information in each cell within an organism is identical, gene expression varies widely between different cell types. The quest to understand this phenomenon has led to many interesting mathematics problems. First, I will present a new method for learning gene regulatory networks. It overcomes the limitations of existing algorithms for learning directed graphs and is based on algebraic, geometric and combinatorial arguments.

Second, I will analyze the hypothesis that the differential gene expression is related to the spatial organization of chromosomes. I will describe a bi-level optimization formulation to find minimal overlap configurations of ellipsoids and model chromosome arrangements. Analyzing the resulting ellipsoid configurations has important implications for the reprogramming of cells during development. Any knowledge of biology which is needed for the talk will be introduced during the lecture.

Lausanne, March 4, 2015 / mg