Computational Models in Cell Biology

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The course is a short panoramic introduction to mathematical models of cell metabolism and to the necessary tools of computational statistics and numerical methods. The course consists of six lectures of approximately one hour. The lectures will be given on **Wednesday, 14–15** Room U356. The first lecture is **March 14, 2007**. This is a **1 ECTS credit** course.

The contents of the lectures is the following.

1. Introduction: Modelling cellular metabolism, what are the goals. Why statistical modelling is essential.

2. Specialized organs, different metabolism. Metabolic functioning of brain, heart, liver and skeletal muscles. Diseased conditions: diabetes, ischemia. Epilepsy and autism: does metabolic modelling help?

3. Metabolic pathways, analysis of the steady and stationary states. Extreme pathways. Bayesian point of view.

4. Spatially homogenized models. Heart and skeletal muscle as examples. Steady states and Gibbs sampling.

5. Spatially distributed model. Liver as an example. Hit and Run algorithm.

6. Dynamic models. Michaelis-Menten approximation. Skeletal muscle and heart as examples. Sequential Metropolis-Hastings algorithm and modelling the prior.

News concerning this course will be posted on the web page of the course *Computational Methods in Inverse Problems*, http:://math.tkk.fi/opetus/inv/.