

### Centro de Investigação em Matemática e Aplicações Mestrado em Modelação Estatística e Análises de Dados Departamento de Matemática

## **Short course**

## 4-5 de Novembro de 2011 Predictive and simulation modeling

## Georgiy Bobashev

RTI International, Durham, NC USA.

## Resumo

This short course is aimed at the audience of statisticians, analysts and researchers in social sciences who are interested in learning of the tools available for making estimates of risks, future outcomes and qualitative relationships.

The course will describe existing methodology covering statistical models (regressions and data mining tools). Markov models, system dynamics models, and agent-based models. In the course I will discuss and illustrate the differences in modeling objectives and the applicability of each of the tools to achieve the objective. The course will discuss approaches to model validation so that they are "trustable".

#### 4 de Novembro de 2011, Sexta-feira 5 de Novembro de 2011, Sábado CLAV – Anf. 1 – 14:00-17:00

#### **Introduction to modeling**

- 1. Why model? Modeling objectives, and type of objectives: predict a number, make a decision, understand a relationship, estimate risk
- 2. Model types: statistical, Markov, system dynamics, and agent-based
- 3. Advantages and disadvantages of each model type
- 4. Examples of data driven and data-free models

# CLAV – Anf. 1 – 9:00-12:00

#### Predicting (forecasting) with models

- 5. How to model? Modeling fundamentals and common basic techniques in model building
- 6. The model is built, now what? Simulations and analysis of the results
- 7. Why should one trust your model? Uncertainty and validation. Interpretation of the results