



## **MCT: Mathematical Control in Trieste**

**SISSA/ISAS - International School for Advanced Studies - Trieste, Italy**

**2-6 December 2013**

**<http://mct.lsis.org>**

**Sponsored by:** ESF European Science Foundation, ERC European Research Council, IFAC International Federation of Automatic Control, INdAM Istituto Nazionale di Alta Matematica, SISSA International School for Advanced Studies, LSIS Laboratoire de Sciences de l'Information et Systèmes.

**Scope:** The mathematical theory of control involves several different research fields: from calculus of variations to Hamiltonian mechanics, from stochastic analysis to robotic engineering. The object of study in this context are controlled systems, i.e. dynamical systems whose evolution can be influenced by some external agent. Typical problems, such as controllability (how to design a control law steering the system to a desired configuration, possibly in an optimal way) and stabilization (how to construct controls stabilizing equilibria of the system) have been deeply investigated for systems governed both by ordinary differential equations (ODEs) and by partial differential equations (PDEs). Because of the variety of challenges in emerging research fields, many applications are currently being studied: for instance, biochemical reactors for production of renewable energy, traffic networks in transport and logistics, decision policies in game theory. Furthermore, recent connections have been developed between PDE and ODE-based models, giving rise to the study of multiscale systems (presenting a full coupling between a system of ODEs and a system of PDEs) or the analysis of phenomena governed by PDEs by means of ODEs systems of high dimension. The purpose of the conference is to enhance interaction between experienced and young researchers in the field of control of ODEs and of PDEs and to promote diffusion of their achievement in this area.

**Topics:** Topics of the conference comprehend (but are not limited to) mathematical techniques for modeling, control and simulation of dynamical systems governed by ODEs and PDEs, in particular: control-affine and nonlinear systems in finite and infinite dimensions, switching systems, networks and multi-physics systems. Furthermore, optimal control problems and questions in stochastic control, sparse control and fluid mechanics will be discussed. Different approaches will be considered, e.g., differential geometric and algebraic methods as well as numerical techniques. In addition, applications to different fields will be covered including cognitive neuroscience, geometry of vision, humanoid robotics, quantum control, multi-scale systems, collective dynamics, traffic networks, supply chains.

**Location:** The conference will take place at the International School for Advanced Studies in Trieste, Italy. SISSA, founded in 1978 and the first institution in Italy to promote post-graduate courses to achieve a Doctor Philosophiae (or PhD) degree, is a centre of excellence in the Italian and international university context. It is located in Trieste, in an over 100,000 square-metre large campus with a wonderful view on the Gulf of Trieste.

**Registration:** All participants are invited to register through the conference website by **November 15, 2013**. Registration is free but mandatory.

### **Scientific Committee:**

**A. Agrachev** (chair, SISSA Trieste) [agrachev@sissa.it](mailto:agrachev@sissa.it)  
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## **MCT: Mathematical Control in Trieste Call for Contributed Talks**

PhD students and young researchers are invited to apply to deliver a short talk presenting their achievements in the scientific area encompassed by topics of the conference. Short talks will last 30 minutes including questions.

### **Submission guidelines:**

To submit a talk, please send an email to [mct@isis.org](mailto:mct@isis.org) including the following information:

- name,
- affiliation,
- short CV (pdf format),
- title and abstract of the talk.

For further information visit the conference website <http://mct.lsis.org>.

### **Important dates:**

Submission deadline: **May 31, 2013**

Author notification: **June 30, 2013**