



# BULLETIN

## INTERNATIONAL CENTER FOR MATHEMATICS

JUNE 2006

20

### CONTENTS

<b>Coming Events</b>	1
<b>CIM News</b>	6
<b>News from our Associates</b>	7
<b>Past Events - Scientific Reports</b>	12
<b>Feature Article: <i>Poisson vs. Symplectic Geometry</i> by Rui Loja Fernandes</b>	15
<b>Math in the Media</b>	20
<b>Interview: <i>Marcelo Viana</i></b>	25

### COMING EVENTS

#### **June 28-30: Workshop “From Lie Algebras to Quantum Groups”**

##### ORGANIZERS

Helena Albuquerque and Joana Teles (University of Coimbra), Samuel Lopes (University of Porto).

##### AIMS

This workshop is a Satellite Conference of the International Congress of Mathematicians (ICM, Madrid, Au-

gust 22-30, 2006) and will bring together leading specialists in the topics of Lie algebras, quantum groups and related areas. It aims to present the latest developments in these areas as well as to stimulate the interaction between young researchers and established specialists.

The event will be held at the Department of Mathematics of the University of Coimbra.

##### KEYNOTE SPEAKERS

Helena Albuquerque (Univ. of Coimbra, Portugal)

Georgia Benkart (Univ. of Wisconsin-Madison, USA)  
Alberto Elduque (Univ. of Zaragoza, Spain)  
George Lusztig (MIT, USA)  
Shahn Majid (Univ. of London, UK)  
Carlos Moreno (Univ. Complutense de Madrid, Spain)  
Michael Semenov-Tian-Shansky (Univ. of Bourgogne, France)

For more information about the event, see

[www.aim.estt.ipt.pt/~jmmp/CIM/Lie/index.htm](http://www.aim.estt.ipt.pt/~jmmp/CIM/Lie/index.htm)

---

### July 1: 9th European Workshop on Applications and Generalizations of Complex Analysis

#### ORGANIZERS

Amílcar Branquinho and J. Carvalho e Silva (Univ. of Coimbra), Ana Foulquié and Maria Isabel Cação (Univ. of Aveiro).

#### AIMS

This workshop is satellite to the “12th European Intensive Course on Complex Analysis and Applications to Partial Differential Equations” to be held in both Universities of Coimbra and Aveiro from June 26 to July 7, 2006. It is intended to give an opportunity for discussions between junior and senior researchers from several European countries in various fields of mathematics related to Complex, Quaternionic and Clifford Analysis, like Algebra, Geometry, Numerical Analysis, Differential Equations, and Special Functions.

The event will be held at the CIM premises at the Astronomical Observatory of the University of Coimbra.

For more information about the event, see

[www.mat.uc.pt/~ajplb/9th.htm](http://www.mat.uc.pt/~ajplb/9th.htm)

---

### July 19-21: Workshop on Mathematics in Chemistry

#### ORGANIZERS

Jean-Claude Zambrini, J. Pinto Paixão and F. Bastos Pereira (University of Lisbon).

#### AIMS

To identify and discuss research problems in the area of the chemical sciences whose development is strongly dependent on mathematical techniques. To foster the collaboration between leading researchers in chemistry and mathematics.

Chemistry is an exact science since it relies on quantitative models that can be described and applied by using the mathematical language. For instance, the theory of chemical bonding and molecular structure, rates and equilibria of chemical reactions, molecular thermodynamics, relationships involving energy, structure and reactivity, modeling of solvation, are swarming with problems whose solutions require sophisticated mathematical techniques. Mathematics also plays a central role in many areas of “applied” chemistry and chemical engineering. Important examples include atmospheric chemistry, biochemistry, and the broad field of computer simulations. The development of faster and more accurate spectroscopic techniques, the design of molecular devices, biomolecular computers, and of new empirical methods to predict reliable chemical data, and the conception of more efficient chemical reactors are just a few of a vast number of other topics that have strong links to applied mathematics. A closer interaction between chemists and mathematicians may therefore lead to significant progress in many key problems in chemistry. The proposed workshop will foster that interaction since it will identify a number of important research issues which will benefit from a joint effort.

Intended Audience are Researchers and post-graduate students on mathematics or chemical sciences.

The event will be held at the Complexo Interdisciplinar of the University of Lisbon.

#### INVITED SPEAKERS

Sylvio Canuto (São Paulo, Brazil)

David C. Clary (Oxford, UK)

Irene Fonseca (Pittsburgh, USA)

James T. Hynes (Paris, France and Boulder, USA)

Claude Leforestier (Montpellier, France)

John A. Perdew (New Orleans, USA)

Piotr Piecuch (Michigan, USA)

Jean-Louis Rivail (Nancy, France)

Mário Nuno Berberan e Santos (Lisboa, Portugal)

João Aires de Sousa (Lisboa, Portugal)

António Varandas (Coimbra, Portugal)  
Marcelo Viana (Rio de Janeiro, Brazil)  
Hans-Joachim Werner (Stuttgart, Germany)  
J. H. Zhang (New York, USA)

For more information about the event, see

[www.math-chem.org](http://www.math-chem.org)

---

### September 4-8: 3rd International Workshop on Mathematical Techniques and Problems in Telecommunications

#### ORGANIZERS

António Navarro (Univ. of Aveiro), Carlos Rocha and Carlos Salema (Technical Univ. of Lisbon).

#### AIMS

The goals are three fold. Firstly, to identify and possibly find solutions for a number of mathematical problems in the field of Telecommunications. Secondly to disseminate among telecommunications engineers some mathematical techniques which are not widely known in this community even if they are being applied in modern communication techniques. Thirdly, to improve mutual understanding and recognition between mathematicians and telecommunication engineers, heavy users of mathematical techniques in the field of engineering.

The intended audience includes telecommunications engineers, mostly those providing the problems and being introduced to new mathematical tools, and mathematicians, mainly providing solutions and being introduced to real life problems that may influence the direction of their research. A strong participation of young scientists, mainly those attending undergraduate degrees is also expected.

The event is a Satellite Conference of the ICM and will take place at the Polytechnic Institute of Leiria.

#### INVITED SPEAKERS

V. Poor (Princeton University, USA)  
*Cross-Layer Issues in Wireless Networks*

J. Rosenthal (Notre Dame University, USA)  
*Encryption*

J. C. Pedro (University of Aveiro, Portugal)  
*Mathematical Needs for Behavioural Modelling of Telecommunication Circuits and Systems*

J. Craveirinha (University of Coimbra, Portugal)  
*A multiobjective routing optimisation framework for multiservice networks - a heuristic approach*

C. Guillemot (INRIA, France)  
*Signal Processing And Compression*

For more information about the event, see

[www.mtpt.it.pt](http://www.mtpt.it.pt)

---

### September 11-15: 2nd Summer School on Mathematics in Biology and Medicine

#### ORGANIZERS

J. Carneiro, F. Dionísio, G. Gomes and I. Gordo (Gulbenkian Institute of Science, Oeiras).

#### AIMS

The aim of this event is to promote the use of mathematical modelling in biology and medicine. This will be accomplished by bringing some of international experts to give a short course on their area of expertise. The lecturing team combines researchers with a diversity of backgrounds in mathematics, biology and medicine, who will share their experience with the participants.

The school is aimed at postgraduate students from mathematics, physics, biology or medicine, who are motivated to develop biomathematical research approaches.

The role of mathematical formalisms in providing insight into biological and medical processes became apparent at the beginning of the 20th century. The approach has since increased in popularity, especially during the past 10-20 years. This new phase of expansion is, to a large degree, stimulated by new developments in molecular biology and computation. Appropriate mathematical models are in great demand in many areas of biology.

Given the high stands of mathematical and biomedical research in Portugal, it is disappointing that only a few research groups integrate the two disciplines. This can be promoted by organizing interdisciplinary activities as proposed here.

The school will include a broad range of areas in biology and medicine where mathematical modelling is established. We plan to include six courses covering several research areas such as evolution, populations genetics,

epidemiology, population biology, developmental biology and immunology. Each course will consist of three lectures.

The event will take place at the Gulbenkian Institute of Science, Oeiras.

#### SHORT COURSES

##### *Developmental Biology*

R. Azevedo (University of Houston, USA)

##### *Neurobiology*

C. Brody (Cold Spring Harbor, USA)

##### *Immunology*

D. Coombs (Univ. of British Columbia, Canada)

##### *Evolutionary Biology*

T. Day (Queens University, Ontario, Canada)

##### *Epidemiology and Population Biology*

S. Levin (Princeton University, USA)

##### *Population Genetics and Disease Mapping*

G. McVean (University of Oxford, UK)

For more information about the event, see

[eao.igc.gulbenkian.pt/mbm2006](http://eao.igc.gulbenkian.pt/mbm2006)

---

### **October 20-21: CompIMAGE: International Symposium on Computational Modelling of Objects Represented in Images**

#### ORGANIZERS

João Manuel Tavares and Renato Natal Jorge (Faculty of Engineering, Univ. of Porto, Portugal).

#### AIMS

In our days the research related with objects modelling has been a source of hard work in several distinct areas of science as, for example, mathematics, mechanical, physics, informatics, etc. One major application of objects modelling is in medical area. For instance, it is possible to consider the use of statistical or physical procedures on medical images in order to model the represented objects. Its modelling can have different goals like 3D shapes reconstruction, organs segmentation in

3D or 2D images, etc. Examples of others applications are: temporal tracking of objects, tracking and analyses of objects deformation, objects recognition, objects simulation, etc.

The main goal of the CompIMAGE consists in the provision of a comprehensive forum for discussion on the current state-of-the-art in these fields. The Symposium will cover (but is not limited to): Image Processing and Analysis, Image Segmentation, Data Interpolation, Registration, Acquisition and Compression 3D Reconstruction, Objects Tracking, Motion and Deformation Analysis, Objects Simulation, Medical Imaging, Computational Bioimaging and Visualization.

The Symposium will bring together several researchers representing several fields related to Computational Vision, Computer Graphics, Computational Mechanical, Mathematics, Statistics, Medical Imaging, etc. The expertise will span a broad range of techniques, such as finite element method, modal analyses, stochastic methods, principal components analyses, independent components analyses, distribution models, etc.

The Symposium will be held at Hotel D. Luís, Coimbra.

#### INVITED SPEAKERS

Francisco J. Perales (Univ. Illes Balears, Spain)

*Perceptual Users Interfaces. Virtual & Augmented Reality Applications*

Hélder Araújo (University of Coimbra, Portugal)

*Active and Catadioptric Vision Systems for Robotics Applications*

Mario Forjaz Secca (Univ. Nova de Lisboa, Portugal)

*MR Diffusion Tensor Imaging*

Sónia Isabel Gonçalves (University of Lisbon, Portugal and Vrije Universiteit Medical Centre, Netherlands)

*Multimodality in Brain Imaging: Methodologic aspects and applications*

Hemerson Pistori (Dom Bosco Catholic Univ., Brasil)

*Computer Vision and Digital Inclusion of Persons with Special Needs: Overview and State of Art*

Tony Chan (UCLA, USA)

*Capturing illusory objects in images via level set methods*

For more information about the event, see

[paginas.fe.up.pt/CompIMAGE](http://paginas.fe.up.pt/CompIMAGE)

---

OTHER CIM EVENTS IN 2006:

WORKING AFTERNOONS SPM/CIM

CIM, Coimbra

A joint initiative of the Portuguese Mathematical Society (SPM) and the International Center for Mathematics (CIM). Next meetings:

**October 7, 2006 - Numerical Analysis**

Organizer: Maria Joana Soares (Univ. of Minho)

**December 16, 2006 - Algebra**

Organizer: Gracinda Gomes (Univ. of Lisbon)

For more information, see

[www.spm.pt/investigacao/spmcim/spmcim.phtml](http://www.spm.pt/investigacao/spmcim/spmcim.phtml)

---

IBERIAN CONFERENCE IN OPTIMIZATION

**November 16-18**, CIM, Coimbra

---

CIM EVENTS FOR 2007

The CIM Scientific Council, in a meeting held in Coimbra on February 11, approved the CIM scientific programme for 2007.

The list of events is the following:

WORKSHOP ON  
MATHEMATICAL CONTROL THEORY AND FINANCE

April 10-14, Instituto Superior de Economia e Gestão,  
Lisboa

WORKSHOP ON EIGENVALUE PROBLEMS:  
SOFTWARE AND APPLICATIONS

June 27-29, University of Porto

LISBON QUANTUM COMPUTATION, INFORMATION  
AND LOGIC 2007

July 18-20, Instituto Superior Técnico, Lisboa

CIM / UC SUMMER SCHOOL:  
TOPICS IN NONLINEAR PDES

July 22-28, University of Coimbra

WORKSHOP ON ROBOTICS AND MATHEMATICS

September 17-19, University of Coimbra

---

For updated information on these events, see

[www.cim.pt/?q=events](http://www.cim.pt/?q=events)

---