

MATHFSS

Minutes of the meeting of the Advisory Committee held at the CRM Barcelona on February 4, 2006

List of attendants

Jean-Pierre Bourguignon
Carles Casacuberta
Manuel Castellet
Enric Nart
Mina Teicher (Chair)
Henry Wynn

Agenda

- Welcoming words
- Calendar of events for the project
- Priority mathematical topics in each of the four main subjects
- Membership of Expert Groups
- Preparation of a round table at ICM 2006
- Other actions to be organized within the project
- Other issues

The meeting started at 15.00 with welcoming words by Manuel Castellet, acting as project coordinator and director of the CRM, followed by opening remarks by the committee chair, Mina Teicher. She gave a review of the aims of the project and emphasized that, although the applications are different, the methods interplay and cover a wide range of mathematical topics. The granting of this project symbolizes that the European Commission acknowledges the fact that Mathematics is on the basis of future science.

Carles Casacuberta was asked and agreed to serve as secretary of the committee.

Dates and places of meetings

The events listed in the project were reviewed and adjusted as follows:

Risk Measures and Risk Management for High-Frequency Data
EURANDOM, Eindhoven, March 6 to 8, 2006
Coordinator: Jef Teugels

Mathematical Neuroscience
Universitat d'Andorra, September 1 to 4, 2006
Coordinator: Antoni Guillamon

Compositionality and Synchronization

Accademia dei Lincei, Roma, October 9 to 11, 2006

Coordinator: Mina Teicher

Systems Biology from a Truly Interdisciplinary Point of View with a Mathematical Twist

IHÉS, Bures-sur-Yvette, Fall 2006 and Fall 2007

Coordinator: Mikhail Gromov

Medical Applications of Neuromathematics

Emmy Noether Institute, Bar-Ilan, February 2007

Coordinator: Mina Teicher

Mathematical Methodologies for Operational Risk

EURANDOM, Eindhoven, March 2007

Coordinator: Henry Wynn

Cryptography and Digital Content Security

CRM, Bellaterra, June 2007

Coordinator: Enric Nart

It should be taken into account, for possible interaction, that Eurocrypt'07 (an annual congress on Cryptology) will take place in May 2007 in Barcelona.

ICM 2006 Round Table

A round table organized by MATHFSS is planned during the ICM 2006 in Madrid (August 22 to 30, 2006). The following dates are proposed: August 22 as first option; August 25 as a second option. A tentative title is *The Place of Mathematics in New and Emerging Science and Technology*.

Preliminary planning of the Round Table:

- Presentation of the MATHFSS project (10 minutes)
- Presentation of each of the four project main subjects, with emphasis on methodologies (30 minutes)
- Discussion around some of the following tentative questions(70 minutes):
 - How is Mathematics influenced by each of the project subjects?
 - What is the impact of Mathematics on each of the project subjects?
 - How can mathematicians benefit from European funding programmes?
- Closing speech of a Spanish scientific politician (10 minutes)

The Round Table will be advertised through the ICM 2006 website and using several e-mail lists (from ERCOM, mathematical societies, etc.).

The Round Table will be moderated by Mina Teicher. The following people are mentioned as tentative panelists: Moshe Abeles, Touradj Ebrahimi, Mikhail Gromov, Antoni Guillamon, Jürgen Jost, François Képès, Franck Leprevost, Jef Teugels, Henry Wynn.

Printing of a leaflet

A promotional leaflet will be printed by the CRM and sent to the other partners. A sufficient number of copies of the leaflet will be distributed at the ICM, including a flier announcing the Round Table.

Expert groups

A group of experts is to be nominated for each of the four project subjects. The following preliminary names of people are suggested. The final lists of names will be agreed as soon as possible by e-mail.

Systems Biology:

C. Bedsholtz, J. Johnson, F. Képès, C. Tryggbesy, A. Wittinghofer
Chair: J.-P. Bourguignon

Mathematical Neuroscience:

M. Abeles, P. Bourguine, I. Fried, J. Jost, D. Mumford, R. Yuste
Chair: M. Teicher

Risk Assessment:

T. Bedford, T. Mikosch, H. Wynn
Chair: J. Teugels

Digital Content Security:

T. Ebrahimi, F. Leprevost, J. Villar
Chair: E. Nart

Content of the final report

- Programme of each conference and lists of participants
- Minutes of each round table
- Syllabus for doctoral studies in each project subject
- Data base of publications on each project subject
- Recommendations to be made to the European Commission

In addition, a mission document will be written with an internal evaluation of the project and including a special report on the ICM 2006 Round Table.

Priority mathematical topics

The following keywords were suggested as scientific directions to be emphasized within each of the project subjects:

Systems Biology

To be specified

Mathematical Neuroscience

- Data mining
- Differential geometry
- Signal processing
- Low dimensional topology
- Stereography
- Category theory
- Dynamical systems

Risk Assessment

- Axiomatic aspects
- Performance of specific risk measures
- Applications of risk measures
- Optimization and statistical aspects
- Estimation of risk measures
- Credit risk
- Interest risk and interest rate models
- Reliability
- Measures of robustness
- Failure models of risk
- Stochastic process models
- Compartmental models

Digital Content Security

- Provable security
- Public key cryptography
- Elliptic curves
- Low dimensional topology
- Number theory
- Information embedding and steganography
- Intellectual property protection
- Authentication and data integrity
- Biometrics

Website

The MATHFSS website will be prepared by the CRM and agreed by all partners. The internet domain www.mathfss.org has been reserved and paid to *Nominalia* (a domain registrar in Barcelona) until January 25, 2009. The website will include an intranet where relevant material will be stored.

Data base

The project data base of information and publications will mainly consist of a list of links to be included in the MATHFSS website.

A project called NETIAM is mentioned as another interesting NEST project in Mathematics. Since it ran in earlier dates than MATHFSS, it should be useful for comparison and in order to have models for reports to be issued to the European Commission.

The meeting finished at 19.00 after the Chair thanked all the attendants for their valuable contributions.

Mina Teicher, Chair

Carles Casacuberta, Secretary