CENTRE DE RECERCA MATEMÀTICA
REPORT OF ACTIVITIES 2003

In the scientific aspect, this year 2003 one must point out the start of the CRM Research Programmes, which will be in the near future the axis of the research activity of the CRM, and the consolidation of the series *Advanced Courses in Mathematics CRM Barcelona*, published by Birkhäuser-Verlag.

The Research Programme in Set Theory, co-ordinated by Joan Bagaria and Stevo Todorcevic, has started strongly with the *Barcelona Conference on Set Theory* and the research visit of the most accomplished researchers in the topics of Ramsey methods in functional analysis and the continuum problem.

The series *Advanced Courses in Mathematics, CRM Barcelona* has published 3 new books this year, from advanced courses organised by the CRM in Bellaterra and in Castelló de la Plana, during the summer of 2001, on simplectic geometry of integrable Hamiltonian systems, on global Riemannian geometry, and on proper group actions. Thus, we maintain the average of two books per year as established as the optimal production.

In the organisational and structural aspects one must point out the signature of a contract programme between the Catalan Government and the *Centre de Recerca Matemàtica*, which establishes a framework for the relationship between the two institutions that will allow the CRM to continue pursuing its goals. This has been a new step ahead toward the consolidation of the CRM as a leading research institute, after the constitution last year of the consortium between the Catalan Government and the *Institut d'Estudis Catalans* (IEC), which gives it legal status.

This same year a deep reestructuring of the administrative and technical services has begun and it will end in the year 2004 with the functional detachment of the CRM from the IEC. The consolidation process will finish with a future expansion of the premises that the CRM occupies at the *Universitat Autònoma de Barcelona*. The expansion we believe that will be on its track at the end of the year 2004, coinciding with the 20th anniversary of the *Centre de Recerca Matemàtica*.

Manuel Castellet
Director

CONTENTS

ACRONYMS

CIRIT	Inter-departmental Committee on Research and Technological Innovation
CRM	Centre de Recerca Matemàtica
CSIC	Consejo Superior de Investigaciones Científicas
DURSI	Department of Universities, Research and the Information Society
EMS	European Mathematical Society
EPDI	European Post-doctoral Institute for the Mathematical Sciences
ERCOM	European Research Centres on Mathematics
EU	European Union
FFSB	Ferran Sunyer i Balaguer Foundation
ICREA	Catalan Institution of Research and Advanced Studies
IEC	Institut d'Estudis Catalans
INEFC	Institut Nacional d'Educació Física de Catalunya
MCyT	Ministry of Science and Technology
MECyD	Ministry of Education, Culture and Sport
SCM	Catalan Mathematical Society
UAB	Universitat Autònoma de Barcelona
UAM	Universidad Autónoma de Madrid
UB	Universitat de Barcelona
UdG	Universitat de Girona
UPC	Universitat Politècnica de Catalunya
UPF	Universitat Pompeu Fabra
UPM	Universidad Politécnica de Madrid
URL	Universitat Ramon Llull
UV	Universitat de València

1. THE CENTRE DE RECERCA MATEMÀTICA

The *Centre de Recerca Matemàtica* (CRM) is a Consortium, with its own legal status, integrated by the *Institut d'Estudis Catalans* and the Catalan Government that takes part in it through its Department of Universities, Research and the Information Society (DURSI). The *Centre de Recerca Matemàtica* is a research institute associated with the *Universitat Autònoma de Barcelona*.

The *Centre de Recerca Matemàtica* is, in essence, a horizontal infrastructure that gives support to all mathematical research groups in Catalonia, and encourages the pursuit of new emerging lines of research.

The CRM has the following goals:

• To consolidate the research programmes.
• To attract the best post-doctoral fellows on the basis of the competitive programmes of various administrations and agencies.
• To stimulate the best research programmes of the Catalan researchers.
• To stablish mechanisms to guarantee a more efficient service for all the Catalan mathematicians.
• To enable the CRM to take a new step towards becomming as competitive as the best European research centres and those of the other scientifically developed countries of similar characteristics.

To achieve these goals the CRM invites outstanding scientists from around the world to do research visits, gives the oportunity to both the scientific institutions and our young researchers to get in contact with them, carries out research programmes, organises conferences, seminars and other scientific meetings and spreads the results of the research.

The new statutes of the CRM provide for the following governing bodies:

• The Governing Board, composed of the Minister of the DURSI, who acts as president, the President of the IEC, three members designated by the Government and three by the IEC.
• The Director, who is appointed by the Governing Board.
• The Scientific Advisory Board, whose members are proposed by the Director and approved by the Governing Board.
• Administrative support
  – Technical and administrative support.
  – Computer system support.
  – Economic and personnel administrative support.

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Apartat 50
E-08193 Bellaterra
Tel.: +34-935811081
Fax: +34-935812202
E-mail address: *crm@crm.es*
Web: http://www.crm.es

1.1 THE INSTITUT D'ESTUDIS CATALANS

The *Institut d'Estudis Catalans* (Institute for Catalan Studies, IEC), founded in 1907, is an academic, scientific and cultural body whose sphere of activities includes all aspects of Catalan language and culture.

The aim of the IEC is to promote the scientific research, in particular the research related to all aspects of Catalan culture. It contributes to the planning, co-ordination and implementation of research in different fields of science, technology and humanities. Moreover, its own activities further the progress and development of society in general, and, when necessary, acts as an advisor to the government and other institutions.

The IEC is made up of five different sections defined by broad subject units in science, technology and humanities. Each section is formed by a maximum of twenty-eight full members. There are 26 societies affiliated to the IEC, with more than 9,000 members, one of them is the Catalan Mathematical Society (SCM).

Web: http://www.iecat.net

1.2 THE GENERALITAT DE CATALUNYA

The *Generalitat de Catalunya* is the institution in which the self-government of Catalonia is politically organised through a Parliament and an Autonomous Government. It was created in the thirteenth century, bearing the same name, as an executive body, by the General Courts of the Confederation of the Catalan-Aragonese Crown.

The *Generalitat de Catalunya* participates in the CRM Consortium by means of its Department of Universities, Research and the Information Society (DURSI).

Web: http://www.gencat.es

2. GOVERNING BODY AND SECRETARIAT

2.1 THE GOVERNING BOARD

The CRM is governed by a Governing Board that this year 2003 has consisted of:

President:

The Minister of Universities, Research and the Information Society, Andreu Mas-Colell. Professor of Mathematical Economy at the UPF.

Members:

The President of the *Institut d'Estudis Catalans*, Josep Laporte. Former Professor of Pharmacology at the UAB.

The General Director of Research of the Catalan Government, Joaquim Casal. Professor of Chemical Engineering at the UPC.

The Vice-Director of Research of the Catalan Government, Joaquim Ibañez.

The Director of the Inter-departmental Committee on Research and Technological Innovation (CIRIT) of the Catalan Government, Antoni Oliva. Professor of Chemical Physics at the UAB.

Carles Solà, member of the IEC. Professor of Chemical Engineering at the UAB.

Josep Enric Llebot, member of the IEC. Professor of Condensed Matter Physics at the UAB.

Sebastià Xambó, Professor of Information Theory and Coding at the UPC.

2.2 THE DIRECTOR

The Governing Board elects a Director to serve for a period of four years. The current Director is Manuel Castellet, Professor of Geometry and Topology at the UAB, who was re-elected for the period 2002-2006 at the, July 25, 2002 meeting of the Governing Board.

From October of this year the Director is assisted by Carles Casacuberta, professor of Geometry and Topology at the UB, and Jordi Quer, professor of Applied Mathematics at the UPC. This directorate team carries out the resolutions approved by the Governing Board and is advised by the Scientific Advisory Board every three months.

2.3 THE SCIENTIFIC ADVISORY BOARD

The Governing Board, in its meeting of November 2002, agreed to designate as members of the Scientific Advisory Board the following people: Joan Bagaria, ICREA-UB; Àngel Calsina, UdG; Carles Casacuberta, president of the SCM; Vicent Caselles, UPF; Alberto Facchini, Università degli Studi di Padova; Evarist Giné, University of Connecticut; Joan Girbau, UAB; Antoni Huerta, UPC; Jaume Llibre, UAB; Xavier Massaneda, UB; M. Pilar Muñoz, UPC; Joan Carles Naranjo, UB; David Nualart, UB; Pere Pascual, Director of the FFSB; Joan Porti, UAB; Jordi Quer, UPC; Oriol Serra, UPC; Juan Luis Vázquez, UAM.

2.4   THE SECRETARIAT

During the year 2003 the Secretariat has been formed by:

Maria Julià
maria@crm.es
+34-935812953
Has been in charge of the publications, the accounting and attending the computer system of the centre.

Neus Portet
nportet@crm.es
+34-935814086
Has been in charge of the visitors and the centre's activities.

Consol Roca
croca@crm.es
+34-935811081
Has been in charge of the Directors office, the centre's activities and the institutional relations.

3. FACILITIES

3.1 PREMISES

The CRM is located in the Science building at the UAB. It occupies a total of 940 square metres, containing 8 single offices, 2 doubles, 3 triples, a secretarial office, a director's office, a computer room, a storage room, 2 lecture rooms (one for 50 people and another one for 25 people), a meeting room, and an informal meeting space. All rooms have central heating and air conditioning.

3.2 COMPUTER EQUIPMENT

The CRM has a LAN Ethernet net of 100 Mbps. There are twenty-five working stations connected to the net and four printers.

Twenty-one of those workstations are distributed in the different offices. There are two printers, two Linux workstations and three Windows workstations in the Computer room.

All workstations are part of a Windows Domain supplied by a central server (HP Netserver LC10) that at the same time works as a mail server and DNS server of the CRM own domain (crm.es). A second server serves as a back-up and as a SQL server (centre's data base programme).

This LAN net is connected to Internet through the UAB net. A Firewall (Netscreen) protects the net from the outside in a controlled way.

It is possible to connect to MathSciNet from all of the centre's stations.

3.3 LIBRARY

The CRM visitors have free access to all the scientific infraestructure of the UAB, consisting of essentially the Science and Engineerings Library, with more than 460 journals and 12,800 volumes in mathematics. The Library catalog is available online.

Web: http://www.bib.uab.es.

3.4 HOUSING

The CRM has a few rented furnished apartments for the use of its visitors in Sant Cugat del Vallès (a small town connected by train to the UAB campus and to Barcelona) and in the *Vila Universitària*, at the UAB campus. Most of the apartments consist of a dining room with kitchen, a bathroom and one bedroom with two single beds. A few of them have two or three bedrooms, and are suitable for families.

The rent, including utilities, ranges from 420 to 750 euros per month.

Upon request, the apartments may be provided with a telephone connection at the visitors' expense.

ACTIVITIES YEAR 2003

4. THE CONTRACT PROGRAMME WITH THE CATALAN GOVERNMENT

On June 18, the Minister of the Department of Universities, Research and the Information Society of the Catalan Government and the Director of the *Centre de Recerca Matemàtica* signed a contract programme for the period 2003-2007, with the following goals:

• To establish a framework of relationship between the DURSI and the CRM.

• To provide the CRM with the necessary means to continue accomplishing its goals, according to the approved resolutions.

• To determine the participation of the DURSI in the definition and programming of the goals and of the funding of the CRM.

• To become an instrument of strategic planning, of the management of the scientific research and the improvement of quality.

In the general framework of giving support to the Catalan research teams in all areas of mathematics, the contract proposes as strategic goals of the CRM the following:

• To give support to the best research programmes of Catalan researchers and obtain their full participation in the programmes and activities offered by the CRM.

• To organise research-training activities and to promote the dissemination of the scientific results at the highest level in order to compete worldwide.

• To achieve the full integration of the Catalan mathematical community in the European research area and the acknowledgement of Catalonia as a mathematically developed country.

• To place the CRM among the best and more active mathematical research institutes in Europe.

Among the actions established in order to accomplish these goals, one must point out:

• The annual CRM Research Programmes.

• The visiting researchers and post-doctoral fellows.

• The organisation of conferences and advanced courses.

• The series *Advanced Courses in Mathematics CRM Barcelona*.

• The presence of Catalan mathematicians in the priority thematic areas of the 6th Framework Programme of the European Union.

• The Master's course in Mathematical Finance.

• The participation in ERCOM and in the EPDI.

Regarding the funding it is established that if the planned goals are reached, the DURSI will contribute to the managing of the CRM in a stable way during the whole period of the contract programme with the following quantities:
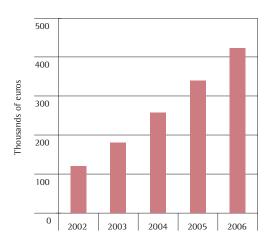
Year 2003   180.000 euros
Year 2004   257.000 euros
Year 2005   339.000 euros
Year 2006   422.000 euros

Contract programme

5. VISITING RESEARCHERS

5.1   GENERAL LIST

G. Swirszcz	Dynamical Systems, 15.11.2000 – 30.11.2003 Uniwersytet Warszawski
D. Chataur	Algebraic Topology, 01.10.2001 – 30.09.2003 Université d'Angers
M. Eddahbi	Stochastic Analysis, 01.03.2002 – 31.08.2003 Université Cadi Ayyad, Morocco
Ch. Li	Dynamical Systems, 01.09.2002 – 31.08.2003 Beijing University
S. Iai	Communtative Algebra, 01.09.2002 – 31.08.2003 Meiji University
J. Trlifaj	Ring Theory, 01.09.2002 – 31.01.2003 Charles University
T. Beke	Algebraic Topology, 01.09.2002 – 28.02.2003 University of Michigan
J. Smrekar	Algebraic Topology, 01.09.2002 – 31.08.2003 Univerza v Ljubljani
A. Facchini	Algebra, 30.09.2002 – 30.09.2003 Università di Padova
E. Dror Farjoun	Algebraic Topology, 01.10.2002 – 31.01.2003 Hebrew University of Jerusalem
A. Volberg	Harmonic Analysis, 01.11.2002 – 30.04.2003 Michigan State University
J. Scott	Topology, 01.12.2002 – 31.01.2003 University of Aberdeen
F. Perera	Algebra, 15.12.2002 – 30.01.2003 The Queen's University of Belfast
Ch.J. Morgan	Model Theory, 01.01.2003 – 31.12.2003 University College London
S. Francaviglia	Algebraic Topology, 14.01.2002 – 15.07.2003 Scuola Normale Superiore de Pisa
J. Stirling	Applied Mathematics, 01.01.2003 – 30.05.2003 Universitat Politècnica de Catalunya
U. Ray	Topology, 01.01.2003 – 15.02.2003 Université de Reims

P. Koszmider   Set Theory, 03.01.2003 – 15.02.2003
Universidade de Sao Paulo

B. Oliver   Algebraic Topology, 07.01.2003 – 16.01.2003
Université de Paris XIII

M. Rørdam   Algebra, 08.01.2003 – 26.01.2003
Syddansk Universitet

R. Levi   Algebraic Topology, 08.01.2003 – 15.01.2003
University of Aberdeen

C. Busch   Algebraic Topology, 01.02.2003 – 30.04.2004
Katholische Universität Eichstätt-Ingolstadt

M. Bruguera   Topology, 01.02.2003 – 30.04.2003
Universitat Politècnica de Catalunya

V. Tarieladze   Probabilities and Harmonic Analysis, 01.02.2003 – 08.04.2003
Georgian Academy of Sciences

A. Olivieri   Algebra, 04.02.2003 – 17.03.2003
Universidad de Málaga

F-A. Buica   Dynamical Systems, 01.03.2003 – 31.08.2004
Baber-Bolyai University

L. Dieulefait   Number Theory, 01.03.2003 – 31.12.2003
Université de Paris XIII

M. Tkatchenko   Topology, 01.03.2003 – 30.04.2003
UNAM

P. Paramonov   Analysis, 01.03.2003 – 15.04.2003
Moscow State University

U. Ray   Topology, 15.03.2003 – 30.04.2003
Université de Reims

A. Martino   Algebra, 01.04.2003 – 30.09.2004
University of Southampton

B. Huber   Algebra, 01.04.2003 – 31.07.2003
Universität München

E. Pardo   Algebra, 01.04.2003 – 25.05.2003
Universidad de Cádiz

F. Loray   Differential Geometry, 18.04.2003 – 30.06.2003
Université de Lille 1

S. Tindel   Statistics and Probabilities, 01.05.2003 – 31.07.2003
Université de Paris XIII

K. Goodearl   Algebra, 01.05.2003 – 31.05.2003
University of California at Santa Barbara

L. Teyssier	Differential Geometry, 01.05.2003 – 31.05.2003
	Université de Lille 1
M. Zakynthinaki	Applied Mathematics, 01.05.2003 – 31.05.2003
	Universitat Politècnica de Catalunya
L. Capogna	Partial Differential Equations, 12.05.2003 – 09.06.2003
	University of Arkansas
L. Lanzani	Analysis, 12.05.2003 – 09.06.2003
	University of Arkansas
L.J. Alias	Differential Geometry, 01.06.2003 – 06.06.2003
	Universidad de Murcia
J.F. Escobar	Geometry, 02.06.2003 – 15.06.2003
	Cornell University
M. Livernet	Algebraic Topology, 21.06.2003 – 27.06.2003
	Université de Paris XIII
A. Volberg	Harmonic Analysis, 24.06.2003 – 31.07.2003
	Michigan State University
E. Dror Farjoun	Algebraic Topology, 24.06.2003 – 31.07.2003
	Hebrew University of Jerusalem
A. Mimouni	Topology, 30.06.2003 – 26.07.2003
	Université de Fez
E. Formanek	Algebra, 30.06.2003 – 25.07.2003
	Pennsylvania State University
V. Drensky	Algebra, 30.06.2003 – 11.07.2003
	Bulgarian Academy of Sciences
P. Koepke	Set Theory, 01.08.2003 – 30.09.2003
	Universität Bonn
J. Hirschorn	Set Theory, 01.09.2003 – 28.02.2005
	Universität Wien
J. Bagaria	Set Theory, 01.09.2003 – 31.08.2004
	ICREA/Universitat de Barcelona
P. Larson	Set Theory, 01.09.2003 – 31.08.2004
	The Fields Institute for Research in Mathematical Sciences
S. Todorcevic	Set Theory, 01.09.2003 – 31.08.2004
	CNRS, Université Paris 7
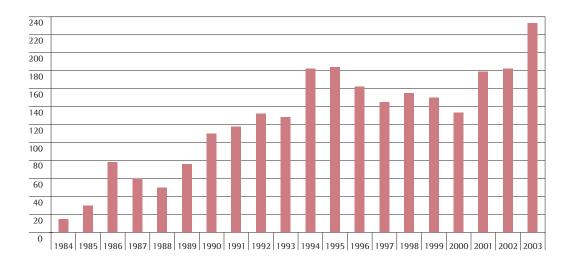
J. López	Set Theory, 01.09.2003 – 31.07.2004
	Universitat de Barcelona
R. Bosch	Set Theory, 01.09.2003 – 28.02.2004
	Universidad de Oviedo
C. Pereyra	Analysis, 01.09.2003 – 31.12.2003
	University of New Mexico
P. van der Laan	Topology, 01.09.2003 – 31.12.2003
	Universiteit Utrecht
M. Sawicki	Topology, 01.09.2003 – 30.11.2003
	Politechnika Warszawska
J. Llopis	Set Theory, 01.09.2003 – 30.09.2003
	Universitat Pompeu Fabra
D. Asperó	Set Theory, 01.09.2003 – 30.09.2003
	Universität Wien
S. Yuan Chyuan	Logic, 13.09.2003 – 20.09.2003
	University of Florida
S. Friedman	Set Theory, 14.09.2003 – 27.09.2003
	Universität Wien
O. de la Cruz	Set Theory, 14.09.2003 – 30.06.2004
	Purdue University
C. Di Prisco	Set Theory, 14.09.2003 – 15.11.2003
	Instituto Venezolano de Investigaciones Científicas

Number of months of visitors

A. Mathias	Set Theory, 15.09.2003 – 31.07.2004 Université de la Réunion
J. Zapletal	Set Theory, 15.09.2003 – 15.11.2003 University of Florida
O. Penacchio	Topology, 01.10.2003 – 31.01.2006 Université de Nice-Sophia Antipolis
U. Ray	Topology, 01.10.2003 – 30.07.2004 Université de Reims
A. Kechris	Set Theory, 15.10.2003 – 08.11.2003 Caltech University
A. Gulisashvili	Harmonic Analysis, 01.11.2003 – 31.04.2004 Ohio University
B. Velickovic	Set Theory, 15.11.2003 – 15.12.2003 Université Paris 7
A. Caicedo	Set Theory, 11.12.2003 – 19.12.2003 Universität Wien
W.H. Woodin	Set Theory, 12.12.2003 – 18.12.2003 University of California at Berkeley
B. Kono	Algebraic Topology, 16.12.2003 – 12.01.2004 Kyoto University
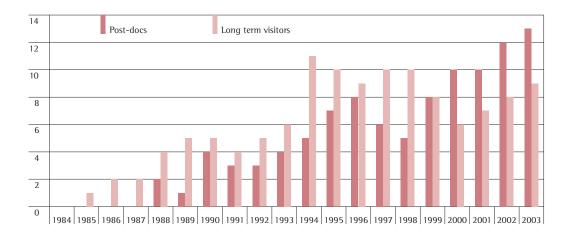
5.2 POST-DOCTORAL FELLOWS

Among the visiting researchers at the CRM during the year 2003 we note the presence of 13 post-doctoral fellows, 12 of which have been visiting for more than 9 months, thereby, fulfilling one of the founda-tional aims of the CRM, namely to facilitate the work of young researchers and their contact with leading scientists.

They were:

G. Świrszcz	15.11.00 – 30.11.03 (CRM, Marie Curie, MECyD)
D. Chataur	01.10.01 – 31.09.03 (Marie Curie)
M. Eddahbi	01.03.02 – 31.08.03 (MECyD)
Sh. Iai	01.09.02 – 31.08.03 (MECyD)
T. Beke	08.09.02 – 28.02.03 (Modern Homotopy Theory Network)
C. Busch	01.02.03 – 30.04.04 (MECyD)
F.-A. Buica	01.03.03 – 31.08.04 (MECyD)
L. Dieulefait	01.03.03 – 31.12.03 (MECyD)
A. Martino	01.04.03 – 30.09.04 (MECyD)
F. Loray	18.04.03 – 30.06.03 (MECyD)
J. Hirschorn	01.09.03 – 28.02.05 (MECyD)
P. Larson	01.09.03 – 31.08.04 (MECyD)
O. Penacchio	01.10.03 – 31.01.06 (Marie Curie)

Institutional funding

5.3   MARIE CURIE TRAINING FELLOWS

In the year 2000 call of the European Union, the CRM received the nomination of Marie Curie Training Site for its Barcelona Algebraic Topology Group. This activity is co-ordinated by Carles Casacuberta (UB).

During the year 2003, the group has hosted several doctoral students of Topology programmes from different universities of the European Community or from associated states. They have been:

T. Beke	University of Michigan
B. Huber	Universität München
S. Francaviglia	Scuola Normale Superiore de Pisa
M. Sawicki	Politechnika Warszawska
J. Smrekar	Univerza v Ljubljani
P. van der Laan	Universiteit Utrecht

6. SCIENTIFIC ACTIVITIES

▌6.1 RESEARCH PROGRAMMES

6.1.1 STRUCTURE

On November 22, 2002 the CRM Governing Board passed a resolution consisting on a quadrennial strategic plan that includes two Research Programmes per year, together with other complementary activities.

Goal

To foster, during every year, the work of two outstanding research groups from Catalan institutions, by hosting visitors and post-doctoral fellows.

Scientific research staff

• 1 full time local researcher; eventually 2, one semester each.
• 1 full time visiting researcher; eventually 2, one semester each.
• 2 post-doctoral fellows.
• 24 months of visiting researchers for periods of 1 to 3 months.
• Other local or visiting researchers.

Activities

• Research.
• Seminars.
• 1 conference or workshop.
• 1 advanced intensive course at a doctoral or recent post-doctoral level.

The annual Research Programmes have started this academic year 2003-2004. An open call is made public at least a year and a half before the expected start of the programme. Each programme has to be approved by the CRM Governing Board, at the proposal of the Director, who is counselled by the Sci-entific Advisory Board, which evaluates the applications received.

6.1.2 RESEARCH PROGRAMME ON SET THEORY

Organisers

Local   Joan Bagaria (ICREA and UB)

Visitor   Stevo Todorcevic (CNRS, Paris)

Main research topics

• Ramsey methods in functional analysis
• The continuum problem

Other research topics

• Applications of combinatorial set theory and forcing to general topology and Boolean algebras.
• Inner model theory for large cardinals.
• Generic absoluteness and its consequences in combinatorics and descriptive set theory.
• Current topics in descriptive set theory.
• Current topics in combinatorial set theory.

Visiting researchers

Spiros Argyros
National Technical University of Athens

David Asperó
Institut für Formale Logik, Wien

Tomek Bartoszynski
Boise State University, Idaho

Andreas Blass
University of Michigan

Roger Bosch
Universidad de Oviedo

Jörg Brendle
Kobe University

Andrés Caicedo
Universität Wien

Omar de la Cruz
Purdue University

Carlos Di Prisco
Instituto Venezolano de Investigaciones Científicas

Rachid El Harti
Université Hassan 1

Mathew Foreman
University of California at Irvine

Sy Friedman
Institut für Formale Logik, Wien

James Hirschorn
Institut für Formale Logik, Wien

Thomas Jech
Pennsylvania State University

Alexander Kechris
California Institute of Technology

Peter Koepke
Universität Bonn

Paul Larson
The Fields Institute, Toronto

Jordi López
Université Paris 7

Jimena Llopis
Universitat Pompeu Fabra, Barcelona

Adrian Mathias
Université de La Réunion

Charles Morgan
University College London

Ralf Schindler
Universität Münster

Jouko Väänänen
University of Helsinki

Jip Veldman
Universität Bonn

Boban Velickovic
Université Paris 7

W. Hugh Woodin
University of California at Berkeley

Philip Welch
University of Bristol

Jindra Zapletal
University of Florida

Activities

Seminars

Two weekly seminars on:

• Set Theory (co-ordinated by J. Bagaria)

• Combinatorics and its applicacions to Analysis (co-ordinated by S. Todorcevic)

Conference

Barcelona Conference on Set Theory
September 16 to 20, 2003

Advanced Course

Ramsey methods in Analysis
January, 19 to 28, 2004
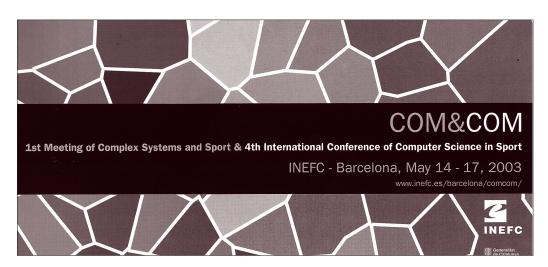
Workshop

Strong axioms on Set Theory and the Continuum problem
June 2004

6.2 CONFERENCES

6.2.1 THE 1st MEETING OF COMPLEX SYSTEMS AND SPORT AND THE 4th INTERNATIONAL CONFERENCE OF COMPUTER SCIENCE IN SPORT

From May 14 to 18, 2003 was held at the INEFC, in Barcelona, the conference *The 1st Meeting of Complex Systems and Sport and the 4th International Conference of Computer Science in Sport,* organised by the INEFC with the collaboration of the CRM and the UPC. The organising committee consisted of N. Balagué (INEFC), A. Delshams (UPC), E. Gil (INEFC), P. Manuel (INEFC), M. Segura (INEFC), J. Solà (INEFC), M. Tapiador (INEFC) and M. Zakynthinaki (UPC). This conference, which had a participation of 90 researchers and PhD students, was partially funded by the Ministry of Science and Technology (BFM2002-10343-E) and by the *Universitat Politècnica de Catalunya.*

COM&COM
1st Meeting of Complex Systems and Sport & 4th International Conference of Computer Science in Sport
INEFC - Barcelona, May 14 - 17, 2003
www.inefc.es/barcelona/comcom/
INEFC
Generalitat de Catalunya

The plenary lectures of the 1st Meeting of Complex Systems and Sport were:

Yaneer Bar-Yam; *Complexity and teamwork in sports.*

Veronique Billat; *The multi-fractal approach of middle and long-distance running.*

Keith Davids; *Acquiring skill in sport: a constraints-led perspective.*

Scott Kelso; *Understanding human motor behaviour: Coordination dynamics.*

Wolfgang Schöllhorn; *Coordination dynamics and its consequences on sports.*

Francisco Seirul·lo; *Dynamic systems and performance in team sports.*

James Stirling; *Mathematical modelling of the physiological response to exercise.*

Susan Ward; *Dynamic control models of ventilation during exercise.*

Brian Whipp; *Intensity-dependent limitations to exercise tolerance-clues from dynamic analysis of pulmonary gas-exchange.*

Maria Zakynthinaky; *Mathematical modelling in biomechanics.*

The plenary lectures of the 4th International Conference of Computer Science in Sport were:

Raul Arellano; *Complex systems applied to competitive swimming: analysis of swimming performance and fluid mechanics.*

Arnold Baca; *Computer Science-based feedback systems on sports performance.*

Domènec Blázquez; *e-learning experience of the* Campus Virtual de l'Esport.

Josep Escoda; *Technological projects: MARES – DTL – GEST.*

Ulrich Hartmann; *Computer based modelling –a chance to increase validity and reliability of performance diagnostics results.*

Christian Holzer; *Match analysis by transmitter position measurement.*

Mike Hughes; *Reliability of using computers to analyse performance in large events –the 2002 World Cup for Soccer.*

Martin Lames; *Computer Science for top-level team sports.*

Joachim Mester; *Integrated scientific information asset management: A perspective for education and research in Europe.*

Jürgen Perl; *On the long-term behaviour of the performance-potential-metamodel PerPot: New results and approaches.*

Antonio Rivas; *Computer science for planning, programming and balance process in sport coaching.*

Jordi Serrallach; *Key factors in influencing the outcome of games.*

Antoni Susin; *Software dynamic tools for analysing human motion.*

Joseph Wiemeyer; *Learning with multimedia –more promise than practice?*

Discussion sessions were organised during the conference with the following subjects:

Training and practice in individual and team sports from a dynamical systems perspective, moderated by Wolfgang Schöllhorn.

Complex Systems and Exercise Physiology, moderated by Joachim Mester.

The role of the coach/teacher/therapist in organising training and practice from a dynamical systems perspective, moderated by Keith Davids.

Modelling in sport, moderated by Jürgen Perl.

Game analysis and performance, moderated by Mike Hughes.

6.2.2 BARCELONA CONFERENCE ON ASYMPTOTIC STATISTICS

The *Barcelona Conference on Asymptotic Statistics*, was held September 2 to 6 at the *Centre de Recerca Matemàtica*.

The Scientific Committee consisted of U. Küchler (Humboldt-Universität zu Berlin), Y. Kutoyants (Université du Maine, Le Mans), F. Utzet (UAB) and Vl. Zaiats (UAB and Universitat de Vic). The members of the organising committee were W. González (Universidade de Santiago de Compostela), P. Puig (UAB), F. Utzet (UAB) and Vl. Zaiats (UAB and Universitat de Vic). This conference, which had a participation of 53 researchers from around the world, was partially funded by the Ministry of Science and Technology (BFM2002-10238-E) and by the Universitat Autònoma de Barcelona (ORG2003-030/1T).

The scientific structure of the BAS2003 was divided into four blocks:

• Eight main speakers who gave one-hour plenary lectures.

• Three speakers who gave one-hour special speeches.

• Thirty authors, selected by the Scientific Committee, who were invited to present their work in 30 minutes communications.

• Eight participants invited by the Scientific Committee to present their work as poster.

The plenary lectures were:

Denis Bosq; *Locally superoptimal data-driven projection density estimators.*

Ricardo Cao; *Convolution-type estimation of the marginal density of moving average processes.*

Iain Johnstone; *Wavelet shrinkage for function estimation, and adaptive selection of thresholds via empirical Bayes.*

Raphail Khasminskii; *On-line nonparametric estimation.*

Uwe Küchler; *Asymptotic properties of estimators for stochastic differential equations with memory.*

Yury A. Kutoyants; *On density estimation for ergodic diffusion processes.*

Alain Le Breton; *Asymptotically optimal filtering in linear systems with fractional Brownian noises.*

Thomas Mikosch; *Asymptotic theory for non-linear functionals of a strictly stationary sequence.*

The one-hour special speeches were:

Ion Grama; *Estimation of the tail of a distribution by local exponential modelling.*

Reinhard Höpfner; *Strange shape of invariant density in finite systems of branching and diffusing particles and some statistical consequences.*

Vladimir Zaiats; *Random sampling in the estimation of functional characteristics of stochastic processes.*

The thirty minutes communications were:

J.M.P. Albin; *On extremes of infinitely divisible ornstein-uhlenbeck processe.*

G. Aneiros-Pérez; *Some asymptotic theory for a partial linear regression model under long-memory dependence.*

Jean-Marc Azaïs; *Asymptotic Poisson character of extremes in non-stationary Gaussian model.*

Cristina Butucea; *Minimax testing in deconvolution model, parametric vs nonparametric class.*

Fateh Chebana; *M-process and applications.*

Dominique Dehay; *On likelihood estimation for a discretely observed Markov jump process.*

Joan del Castillo; *On the tails of assets returns.*

Nikolay Demesh; *Spectral analysis of discrete-time stable processes and fields.*

Dong Q. Wang; *Asymptotic distribution of eigenvalues and its applications in multivariate analysis.*

Elżbieta Z. Ferenstein; *Modelling stock returns with AR-GARCH processes.*

Helena Ferreira; *Extremes of periodic moving averages of random variables with regularly varying tail probabilities.*

Jeanne Fine; *Asymptotic study of Canonical Correlation Analysis: from matrix and analytic approach to operator and tensor approach.*

Valentine Genon-Catalot; *Random scale perturbation of an AR(1)-process: Filtering and statistical properties.*

Alexander A. Gushchin; *On estimation of delay location.*

Nethal Jaho; *Graphical display in outlier diagnostics: adequacy and robustness.*

Ekaterina S. Kirik; *A robust analogue of the Nadaraya-Watson regression estimate.*

Oleg Klesov; *Strong consistence of the estimator of an unknown mean value of a homogeneous random field.*

P.S. Knopov; *On large deviations in estimation problems with dependent observations.*

Rémi Léandre; *Applications of Malliavin calculus in the non compact case.*

Hannelore Liero; *Nonparametric testing of the hazard function.*

Daria Loukianova; *Random rate of convergence of maximum likelihood estimators for Harris diffusions.*

Natalia M. Markovich; *Estimation of heavy-tailed densities by a transformation.*

José Raúl Martínez; *On weak convergence to Tweedie laws and regular variation of natural exponential.*

Elina M. Moldavskaya; *Nongaussianity in asymptotic distributions of LSE in regression models with strong dependence and non-linear inequality constraints.*

Isidore Seraphine Ngongo; *Asymptotic formulas for fractional moments of spectral sums.*

M. Pashkevich; *On robustness of the maximum likelihood estimators for a beta-logistic model of grouped binary data.*

Clémentine Prieur; *Some asymptotic results for record processes and applications.*

Imen Rached; *Generalization of the probability weighted moments method applied to the distribution of excesses.*

Ekaterina V. Serikova; *Stepwise discriminant procedure based on behaviour of the interclass distance.*

Philippe Soulier; *Asymptotics for nonlinear fractional processes with structural change.*

Sviatlana M. Staleuskaya; *The tuning constant choice for B-robust M-estimators.*

Michael A. Stephens; *Asymptotic power of EDF statistics for exponentiality against Weibull and Gamma alternatives.*

Mikolay Troush; *Estimation of the mutual variogram in time series.*

Alexander Zaigraev; *Asymptotic properties of stochastic criteria in experimental design.*

Barys Zaleski; *Gibbs classifiers with submodular energy functions.*

Nadiia Zinchenko; *Asymptotic behaviour of extremes of stable Lévy processes and their increments.*

Silvelyn Zwanzig; *On consistency in errors-in-variables models.*

The following posters were presented:

G. Aneiros-Pérez, W. González-Manteiga, P. Vieu; *Some asymptotic theory for a partial linear regression model under long-memory dependence.*

E. Ferenstein; *Modelling stock returns with AR-GARCH processes.*

F. Chebana; *M-process and applications.* (oral)

l. Ngongo; *Asymptotic formulas for fractional moments of spectral sums.* (oral)

M. Pashkevich; *On robustness of the maximum likelihood estimators for a beta-logistic model of grouped binary data.* (oral)

l. Rached; *Generalization of the probability weighted moments method applied to the distribution of excesses.* (oral)

6.2.3 BARCELONA CONFERENCE ON SET THEORY

From September 16 to 20, 2003 the Centre de Recerca Matemàtica held the *Barcelona Conference on Set Theory.* The scientific committee consisted of A. Blass (University of Michigan), S.D. Friedman (Universität Wien), S. Todorcevic (CNRS) and W.H. Woodin (University of California at Berkeley). The members of the organising committee were D. Asperó (Institut für Formale Logik, Wien), J. Bagaria (ICREA and Universitat de Barcelona), R. Bosch (Universidad de Oviedo), J. Llopis (Universitat Pompeu Fabra) and J. López-Abad (Université Paris 7). This conference, which had a participation of 64 researchers from around the world, was partially funded by the Ministry of Science and Technology (BFM2002-10223-E), by the Department of Universities, Research and the Information Society (2003ARCS 00176) and by the Universitat de Barcelona.

The scientific programme consisted of:

- Two four-hours courses
- Nine one-hour plenary lectures
- Fifteen twenty-minutes communications

The two courses were given by:

Howard Becker; *Invariant descriptive set theory.*

Ralf Schindler; *The role of absoluteness and correctness.*

The plenary lectures were:

Mirna Dzamonja; *On epsilon density and precalibers of measure algebras.*

Ilijas Farah i Sławomir Solecki; *Borel subgroups of Polish groups.*

James Hirschorn; *Nonhomogeneous analytic families of trees.*

Greg Hjorth; *Borel reducibility for equivalence relations.*

Ronald Jensen; *Robust Extenders.*

Heike Mildenberger; *Creatures without halving and weak diamonds.*

Otmar Spinas; *Analytic splitting families.*

Boban Veličković;*Convergence versus independence in topology and measure theory.*

Jindrich Zapletal; *The continuity ideal revisited.*

Other talks:

Katarzyna Chmielewska; *Measurability of functions with values in Banach spaces.*

Omar de la Cruz; *External types of non-well-orderable sets.*

Carlos Di Prisco; *Canonical forms of shift-invariant maps.*

Marco Forti; *Hausdorff ultrafilters.*

Kai Hauser; *What are mathematical objects and what can we know about them?.*

Istvan Juhasz; *Topological version of Fodor's theorem.*

Peter Koepke; *Toring computations on ordinals and the constructible sets maps.*

Miloš S. Kurilić; *Mad families, forcing and the suslin hypothesis.*

Agnieszka Malek; *A classification of Baire one star functions.*

Aleksander Maliszewski; *On families of functions for which a common summand exists.*

Alberto Marcone; *Classification of sets and equivalence relations in continuum theory.*

Bill Mitchell; *Adding closed unbounded set with finite conditions.*

Lajos Soukup; *How to drive mad our families.*

Boasz Tsaban; *New directions in infinite-combinatorial topology.*

Piotr Wasilewski; *Generalized components and s-algebras.*

Tomasz Weiss; *On the Ramseyan properties of special subsets of R.*

6.3 ADVANCED COURSES

This year for the ninth time, the CRM organised a series of advanced courses on specific subjects that have seen recent development. These intensive courses are addressed to advanced PhD students and recent PhD graduates and taught by well known specialists in each area.

During the year 2003 the following course was given:

6.3.1 POLYNOMIAL IDENTITY RINGS

From July 1 to 10, 2003, co-ordinated by F. Cedó from UAB and taught by:

EDWARD FORMANEK (Pennsylvania State University). *Structure of PI-rings.*

Structure of the theorems of Kaplansky, Posner and Artin and Amitsur's theorem that the ring of generic matrices is a domain. One consequence of these general results is the existence of the so-called generic division ring. The relation of the generic division ring with the theory of central simple algebras has been explored, as well as the structure of the centre of the generic division ring.

VESSELIN DRENSKY (Bulgarian Academy of Sciences) *Combinatorial aspects in PI-rings.*

The course presented several results which form the foundation of the combinatorial theory of PI-algebras: The Amitsur-Levitzki theorem, the construction of central polynomials for matrices (Formaned and Razmyslov), the polynomial identities of matrices and their relation with invariant theory, the Nagata-Higman theorem on the nilpoten-

cy of nil algebras of bounded index, the Shirshov theorem for finitely generated PI-algebras and the Regev theorem for the tensor product of PI-algebras.

Other talks given:

E. Beneish; *Lattice invariants and the center of the generic division algebra.*

M. Cabrera; *GPI for nonassociative algebras.*

J. Colombo; *Central Polynomial in the matrix algebra of order two.*

L. El Fadil; *Invariant factors of an endomorphism of a projective module.*

R. Hazrat; *Reduced K-theory for Azumaya Algebras.*

V. Petrogradsky; *Hierarchies of growth for Lie algebras.*

I. Shestakov; *Algebras of generic elements and invariants.*

N. Zhukavets; *On associative algebras satisfying the identity $x^5 = 0$.*

This advanced course, which had a participation of 47 researchers and PhD students, was partially funded by the Ministry of Science and Technology (BFM2002-10227-E) and by the UAB.
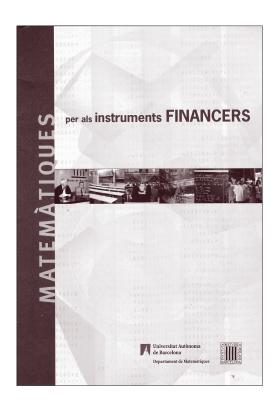
6.4   MATHEMATICAL FINANCE

6.4.1   MASTER'S COURSE IN MATHEMATICAL FINANCE

During this year the Master's course *Matemàtiques per als Instruments Financers* began its sixth edition. The course is organised by the *Centre de Recerca Matemàtica* together with the Mathematics Department of the UAB and several financial companies such as the Barcelona Stock Exchange, which is the sponsoring institution. Other collaborating institutions are the departments of Economics and Economics History, Applied Economics, and Business Economics of the UAB, the Statistics Department of the UB and several outstanding specialists who work in direct contact with the markets.

The goal of the Master's course is to train specialists capable of developing new financial products, according to the current needs, and prepare them to understand and critically discuss the hypotheses and limitations of the existing models. This year the students have been introduced into the aspects of risk linked to insurance companies, thus establishing a collaboration in this area with the *Caixa de Balears «Sa Nostra».*

The Master's course is structured in three terms, two theoretical, each with 120 hours of teaching, and a third practical in a financial company.

The Master's responsability lies on the Academic Commission, consisting of professors Joan del Castillo, Jaume Llibre, Frederic Utzet, and Josep Vives who has been the co-ordinator, and the Advisory Council, consisting of Xavier Auguets (*Caixa Catalunya*), Antoni Giralt (Barcelona Stock Exchange), Pere Guinjoan (*Caixa d'Estalvis i Pensions de Barcelona*), Joan Sueiro (*Banc Sabadell*), Jacint Boixasa (Caifor) and M. Victòria Castellot (Caifor). Every year a maximum of twenty students are admitted to the course, and they have access, at the premises of the CRM, to the most advanced technology in order to follow the financial markets.

6.5 TALKS AND SEMINARS

6.5.1 ALGEBRA SEMINAR

Organised by the *Universitat Autònoma de Barcelona*.

Co-ordinated by Ferran Cedó and Francesc Perera.

M. Rørdam; *On simple C*-algebras.*

A. Facchini; *Projective modules and divisor homomorphisms.*

W. Zimmermann; *Course on pure-injectivity, H-subgroups and duality.*

A. Olivieri; *Cálculo de la descomposición de Wedderburn de QG.*

E. Pardo; *Embedding simple ordered groups into simple Riesz groups.*

K. Goodearl; *Noncommutative dedekind domains.*

E. Ortega; *Propietat de Baer en l'anell maximal simètric de quocients.*

E. Ortega; *Anell maximal simètric de quocients d'àlgebres d'incidència.*

M.J. González; *Anillos de polinomios torcidos sobre monoides.*

M. Brustenga; *El teorema de Bass-Heller-Swan-Farrell-Hsiang-Siebenmann.*

M.A. Moreno; *Grupos Ext para sistemas completamente integrables.*

U. Ray; *Lie superalgebras and character formulas.*

A. Martino; *Groups acting on Non-archimedean trees.*

D. Herbera; *Flat and projective modules.*

A. Facchini; *Descomposiciones de módulos y monoide de las clases de isomorfismo de los proyectivos.*

6.5.2 BARCELONA SEMINAR ON MATHEMATICAL ANALYSIS (UAB–UB)

Organised jointly by the *Universitat Autònoma de Barcelona* and the *Universitat de Barcelona*.

Co-ordinated by Joan Orobitg and Xavier Tolsa.

M. Llorente; *Dimensiones locales de secciones de medidas y estabilidad de la dimensión de packing de secciones de conjuntos.*

A. Käenmäki; *On the existence of the natural invariant measure on iterated function systems.*

D. Faraco; *Quasiconvexidad y ecuaciones elípticas.*

M. Melnikov; *Solució del problema de l'aproximació uniforme pel quadrat de l'operador de Cauchy-Riemann.*

A. Ulanovski; *On the sign changes of real functions having spectral gap at the origin.*

X. Tolsa; *Analitic capacity and bilipschitz maps.*

J.M. Burgués; *El Teorema d'Stockes.*

K. Fedorovskiy; *Approximation by polyanalytic polynomials.*

J. González*; Sobre la propietat de Gehring-Hayman, el teorema de Riesz i un resultat de David i Semmes.*

M. Mastylo*; Orlicz norm estimates for eigenvalues of matrices.*

E. Levin*; Zero distribution of Bergman orthogonal polynomials for certain planar domains.*

M. Fructus*; Anisotropic estimates in convex domain of finite type.*

G. Curbera*; Series de Rademaecher en espacios de funciones.*

F. Pérez-González*; Imágenes inversas de sectores por funciones de Bergman con pesos.*

P. Paramonov*; On uniform approximation by polynomial solutions of elliptic equations of the second order on plane compact sets.*

J. Ortega Cerdà*; Formatges suïssos i mesura harmònica.*

E. Poletsky*; Jensen measures and analytic multifunctions.*

P. Ahern*; More on the commutator of a biholomorphism.*

J. Bastero*; El problema del hiperplano.*

M.J. González*; Geometry of curves and Beltrami-type operators.*

L. Capogna*; Ahlfors regularity in Carnot-Caratheodory spaces: an introduction.*

L. Lanzani*; Geometry of the boundary curve and regularity of the Szego and Bergman projections.*

D. Speegle*; On dilations admiting wavelets with good time-frequency localization.*

M. Ounaies*; On interpolating discrete varieties for weighted spaces of entire functions.*

P.M. Gauthier*; Approximation sur les surfaces de Riemann.*

B. Mityagin*; Carleman classes of infinitely differentiable functions and smooth solutions of nonlinear ODE.*

Celebrating Easter

N. Popa*; Some problems in matriceal harmonic analysis.*

S. Hruscev*; Continued Fractions and Orthogonal Polynomials.*

J. Martín*; Interpolació d'espais de funcions mitjançant mètodes definits per polígons.*

X. Dussau*; Reflexivity results for multipliers of weighted spaces.*

O. Lemmers*; The Gleason problem, past and present.*

M. Solomyak*; On approximation of functions from Sobolev spaces on metric graphs.*

C. Pereyra*; Haar multipliers revisited.*

B. Demange*; A variant of the uncertainty principle associated to non positive definite quadratic forms.*

J. López*; A class of Banach spaces with no unconditional basic sequence.*

E. Saksman*; On the boundary correspondence of the Nevanlinna counting functions.*

A. Cianchi*; Moser-Trudinger inequalities without boundary conditions and isoperimetric problems.*

K. Fedorovskiy*; On the Dirichlet problem for bianalytic functions.*

L. Vega*; Sobre la dinámica de hilos de torbellino.*

P. Mattila*; Fourier transforms of measures and orthogonal projections.*

6.5.3 PDEs AND APLICACIONS SEMINAR

Organised by the *Universitat Autònoma de Barcelona.*

Co-ordinated by Albert Avinyó.

K.A. Fellner*; Convergence to global equilibrium for spatial inhomogeneous kinetic models.*

X. Mora*; Les solucions auto-similars de les equacions de Navier-Stokes. Motivació i resultats.*

J.A. Carrillo*; Comportamiento asintótico de ecuaciones de difusión no lineal: Método de entropía.*

A. Calsina*; Sobre solucions estacionàries d'equacions de selecció-mutació.*

A. Capella*; Sobre la estabilidad de soluciones radiales a ecuaciones elípticas semilineales en todo el espacio.*

6.5.4 GEOMETRY SEMINAR

Organised by the *Universitat Autònoma de Barcelona.*

Co-ordinated by Marcel Nicolau.

G. Solanes; *Integrals de curvatura i geometria integral a l'espai hiperbòlic.*

L. Teyssier*; Classification analytique du «temps» d'un champ de vecteurs.*

L. Teyssier; *Analytical classification of vector fields.*

J. Escobar; *Métricas conformes en la bola con curvatura escalar nula y curvatura media prescrita*

J. Amorós*; Pinceles de Lefschetz en variedades simplécticas.*

L. Alías*; Sobre la curvatura de superficies espaciales de curvatura media cero en los espacios de Lorentz-Minkowski.*

G. Solanes*; Geometría integral en la esfera de Sitter.*

F. Loray*; Formes normales analytiques locales de champs de vecteurs singuliers.*

C.J. Rodriguez*; Dos pruebas del teorema de los cuatro vértices.*

I. Mundet*; Fibrats de Higgs i representacions del grup fonamental d'una superficie.*

S. Francaviglia; *Hyperbolic volume of representations of fundamental groups of 3-manifolds.*

6.5.5 BARCELONA LOGIC SEMINAR

Organised jointly by the *Universitat de Barcelona* and the *Universitat Politècnica de Catalunya.*

Co-ordinated by Joan Bagaria (ICREA-UB), Enrique Casanovas (UB) and Rafel Farré (UPC).

I. Jané; *Extensions fregeanes i teoria de conjunts.*

P. Koszmider; *Logical aspects of the theory of Banach spaces of continuous functions.*

R. Cignoli; *Extensión de la dualidad de Stone para multiconjuntos y MV-álgebras.*

Ch. Morgan; *Step ups and stretches.*

R. Farré; *Sobre eliminació d'imaginaris.*

I. Jané; *La concepció iterativa a partir de principis cantorians.*

J. Llopis; *Particiones suslin de productores de conjuntos finitos.*

E. Casanovas; *Operadores lógicos invariantes.*

K. Hauser; *What new axioms could not be?*

M. García-Matos*; Teoremas de caracterización en teoría de modelos abstractos.*

6.5.6 PROBABILITIES AND STATISTICS SEMINAR

Organised by the *Universitat Autònoma de Barcelona.*

Co-ordinated by Josep Lluís Solé.

V. Tarieladze; *Prokhorov's type of strong laws of large numbers for infinite-dimensional Gaussian random vectors: the role of covariance operators.*

C.J. Park; *Estimación del parámetro de intensidad bajo un esquema de muestreo por pasos.*

Y. Kutoyants; *Statistical inference for ergodic diffusion processes.*

M. Ferrante; *On the tail of the stationary distribution of some non-linear discrete time Markov processes.*

A. Alabert; *Aleatorització quàntica.*

6.5.7 DYNAMICAL SYSTEMS SEMINAR (UAB)

Organised by the *Universitat Autònoma de Barcelona.*

Co-ordinated by Armengol Gasull.

J.J. Donaire; *Mesures i dimensió de Hausdorff.*

S. Ruette; *Measures of maximal entropy for interval maps.*

R. de la Llave; *Sobre los exponentes de Lyapunov.*

M. Hemke; *On the dynamics of meromorphic functions on their Julia sets.*

A. Alabert; *Stochastic Differential Equations.*

J. Llibre; *Any finite configuration of limit cycles is realizable by polynomial vector fields.*

A. Douady; *Searching for Julia sets of positive measure.*

D. Schlomiuk; *Analysis, algebra and geometry intertwined in the study of planar polynomial vector fields.*

A. Lauber; *On the dynamics of a family of entire transcendental functions.*

Ch. Li; *Perturbation from an elliptic Hamiltonian of degree four.*

A. Cima; *Periodic rational recurrences.*

J.M. Mondelo; *On the dynamics around the collinear libration points.*

A. Gasull; *Upper bounds for the number of limit cycles through linear differential equations.*

G. Chen; *Unique normal forms of vector fields.*

J.C. da Rocha Medrado; *Darboux integrability and reversible quadratic vector fields.*

P. Ahern; *On the commutator of a biholomorphism.*

A. Samà; *Stability parameters for a family of periodic linear systems.*

J. Chavarriga; *Integrabilidad racional: El problema de Poincaré.*

J. Giné; *New directions in the integrability theory of planar polynomial differential systems.*

S. Cuadrado; *A dynamical system for biological evolution.*

Ll. Alsedà; *On the strange nonchaotic attractors.*

J.C. Artés; *Measuring the stable quadratic systems.*

Z. Nitecki; *Embedding one-dimensional dynamics in a surface.*

M. Moreno-Rocha; *Indecomposable invariant sets of unstable exponentials.*

P. Torres*; Algunos resultados y problemas abiertos en ecuaciones con impactos.*

C. Vargas*; Sobre la epidemiologia del Dengue.*

A. Mingarelli*; Some remarks on non-flat central configurations in the classical and charged n-body problem.*

D. Marin*; Monodromia i integrals abelianes.*

J. Bobok*; Twist systems on the interval.*

F-A. Buica*; Coincidence theorems and some of their applications.*

J. Bobok*; Shift systems with simple kernel.*

V. Mañosas*; An adaptive Lyapunov-based control scheme for systems with uncertainties.*

J. Torregrosa*; Exact number of limit cycles for a family of rigid systems.*

S. Kolyada*; Li-Yorke sensitivity and weakly mixing dynamical systems.*

Ll. Alsedà*; Sets of period for tree maps.*

6.5.8   STATISTICS SERVICE SEMINAR

Organised by the Statistics Service of the UAB.

Co-ordinated by Pere Puig.

A. Sorribas; *La familia de distribuciones GS como modelo paramétrico para datos univariantes.*

A. Riba and J. Ginebra; *Estadística i homogeneïtat d'estil en el Tirant lo Blanc.*

V. Moreno; *Análisis estadístico de microarrays de ADN. ¿Cómo analizar simultáneamente miles de variables?*

R. Marshall*; Classification by search partition analysis: an alternative to tree methods in medical problems.*

6.5.9   SET THEORY SEMINAR

Organised by the *Centre de Recerca Matemàtica.*

Co-ordinated by Joan Bagaria (ICREA-UB).

J. López; *Some set-theoretic problems in Banach space theory.*

D. Asperó; *Forcing notions in inner models.*

C. Di Prisco; *Canonical forms for continuous functions.*

A. Mathias; *Successes and failures of the Cantor-Bendixon process.*

S. Todorcevic; *Biorthogonal systems in Banach Spaces.*

J. Zapletal; *Games related to sigma-continuaity and sigma-porosity.*

A. Kechris; *Fraïssé Limits, Ramsey Theory, and Topological Dynamics of Automorphism Groups.*

J. Hirschorn; *Random gaps.*

Ch. Morgan; *κ-M-proper forcing, the SCH, and other combinatorial problems.*

J. Zapletal; *σ-continuity and σ-porosity.*

D. Casacuberta; *Implications of large-cardinal axioms in homotopy theory.*

O. de la Cruz; *Permutation models.*

B. Velickovic; *CCC forcing and splitting reals.*

W.H. Woodin; *The determinacy of real games and the property of Baire.*

A. Caicedo; *Real-valued measurable cardinals and Σ^2_1 –well-orderings of the reals.*

6.5.10 UAB NUMBER THEORY SEMINAR

Organised by the *Universitat Autò-noma de Barcelona.*

Co-ordinated by Francesc Bars.

E. Nart; *Propietats locals i globals dels esquemes.*

E. Nart; *Esquemes regulars.*

C.A. Infante; *Superfícies el·líptiques.*

A. Gurevich; *Models de Néron.*

J. Roe; *Desingularització i Blowing up.*

J. Roe; *Superfícies regulars.*

J. Roe; *Desingularització de corbes i superfícies.*

A. Vidiella; *Longevitat i dependència: la demografia i els nous productes d'assegurances.*

V. Rotger; *Superfícies fibrades.*

J. Roe; *Desingularització de superfícies.*

X. Xarles; *Semiestabilitat i resolució de singularitats.*

F. Bars; *Reducció estable de corbes.*

R. Litcanu; *Dessins d'enfants in genus 1.*

X. Xarles; *Introducció a dibuixos d'infants.*

6.5.11 TOPOLOGY SEMINAR

Organised jointly by the *Universitat Autònoma de Barcelona* and the *Universitat de Barcelona.*

Co-ordinated by J. Aguadé and C. Casacuberta.

W. Pitsch; *3-dimensional manifolds and the Casson invariant.*

C. Busch; *Representations of cyclic groups of prime order and Farrell cohomology.*

I. Serra; *Intersection theory I: geometric vs homological approach.*

J. Smrekar; *Intersection theory: stable approach.*

M. Tkachenko; *Conjuntos acotados en grupos topológicos.*

D. Chataur; *How to play with strings?*

D. Morales; *An introduction to Hochschild homology.*

J. Martínez; *Gerstenhaber algebras and little discs.*

J.A. Crespo; *Cacti in algebraic topology.*

J. Scherer; *The homotopic realization of string topology.*

C. Broto; *The algebraic model of string topology.*

D. Chataur; *Geometric homology and string topology.*

J. Smith; *Inverting an object in a monoidal model category.*

J. Smith; *Framed disk actions and free loop spaces.*

E. Dror-Farjoun; *Galois cohomology as a homotopy classification problem.*

J. Aguadé; *La topologia del grup de classes d'aplicacions.*

C. Broto; *Harer's stability results.*

J. Aguadé; *Characteristic classes for surface bundles.*

I. Serra; *2-categories.*

N. Castellana: *The 2-category of surfaces.*

A. Kono; *On unstable K-theory.*

6.5.12 OTHER TALKS

U. Ray; *An overview of the Moonshine Theorem.*

U. Ray; *Generalized Kac-Moody algebras.*

U. Ray; *Vertex algebras, No-Ghost Theorem, and the Monster Lie algebra.*

A. Toen; *Homotopical algebraic geometry.*

U. Ray; *Lie algebra homology and Replicable functions.*

M. Eddahbi; *Stochastic integral is not a Stieltjes integral.*

A. and S. Feferman; *Alfred Tarski: The Warsaw Years and Building an Empire.*

P. van der Laan: *Strongly homotopy operads.*

A. Satorra; *SEM, una eina clàssica i moderna per l'anàlisi multivariant aplicada.*

M. Sawicki; *Extending maps in asymptotic categories.*

F. Neumann; *Etale homotopy theory of moduli stacks of algebraic curves with symmetries.*

K. Hess; *A thomason-type model category structure on small 2-categories.*

T.J. Eguren; *El mundo de las finanzas: teoría y praxi.*

A. Tonks; *L'aproximació diagonal de l'associaedre.*

F. Andreu-Vaillo, V. Caselles and J.M. Mazón; *Parabolic Quasilinear Equations Minimizing Linear Growth Functionals.*

L. Dieulefait; *Galois actions on arithmetic varieties and modular forms.*

D. Chataur; *Iterated integrals: from algebraic topology to number theory.*

J. Villar; *Some reflections about One-Way functions and CCA security in the Random Oracle Model.*

7. PUBLICATIONS

During the year 2003 the CRM has continued the series «Advanced Courses in Mathematics CRM Barcelona», «Quaderns», and «Preprints».

7.1 ADVANCED COURSES IN MATHEMATICS CRM BARCELONA

The volumes of this series, published by the Swiss publishing company Birkhäuser-Verlag, cover the content of some of the advanced courses taught by distinguished specialists at the CRM, based on the notes handed out to the students at the beginning of the course, which are later reworked by the authors. They are especially addressed to advanced doctoral and young post-doctoral students, and completely elucidate their content, with the necessary preliminaries, definitions and detailed proofs.

This year 2003, the following volumes have been published:

Symplectic Geometry on Integrable Hamiltonian Systems, by M. Audin, A. Cannas da Silva and E. Lerman, from the advanced course of the same title given in July 2001.

Global Riemannian Geometry: curvature and topology, by S. Markvorsen and M. Min-Oo, from the advanced course of the same title given in July 2001.

Proper Group Actions and the Baum-Connes Conjecture, by G. Mislin and A. Valette, from the advanced course of the same title given in September 2001.
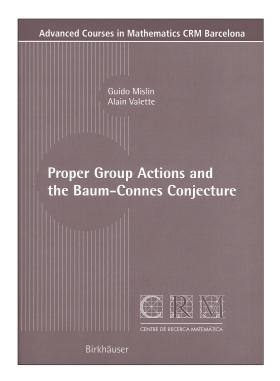
One more volume, currently in print, will be published in 2004.

Polynomial Identity Rings, by V. Drenski and E. Formanek.

7.2 QUADERNS

They compile the content of specialised activities. The following issue has been published:

Advanced Course on Polynomial Identity Rings. Editor: Ferran Cedó (n. 26).

Advanced Courses in Mathematics CRM Barcelona

Guido Mislin
Alain Valette

Proper Group Actions and the Baum-Connes Conjecture

CRM
CENTRE DE RECERCA MATEMÀTICA

Birkhäuser

7.3   PREPRINTS

The following forty-three issues have been published:

Cohomology of classifying spaces of central quotients of rank two Kac-Moody groups. J. Aguadé, C. Broto, N. Kitchloo, L. Saumell (n. 521)

Descending chains of modules and Jordan-Hölder theorem. L. Diracca, A. Facchini (n. 522).

Duality for equilibrium problems. J.E. Martínez-Legaz, W. Sosa (n. 523).

On strongly flat modules over Matlis domains. L. Fuchs, L. Salce, J. Trlifaj (n. 524).

Higher Cech theory. T. Beke (n. 525).

A uniform proof on the weak Hilbert's 16th problem for n=2. F. Chen, Ch. Li, J. Llibre, Z. Zhang (n. 526).

Etale homotopy types of moduli stacks of algebraic curves with symmetries. P. Frediani, F. Neumann (n. 527).

New families of centres and limit cycles for polynomial differential systems with homogeneous nonlinearities. Ch. Li, W. Li, J. Llibre, Zh. Zhang (n. 528).

Moduli stacks of vector bundles and Frobenius morphisms. (n. 529).

Tilting modules and Gorenstein rings. L. Angeleri Hügel, D. Herbera, J. Trlifaj (n. 530).

Rank invariance and automorphisms of generalized Kac-Moody superalgebras. U. Ray (n. 531).
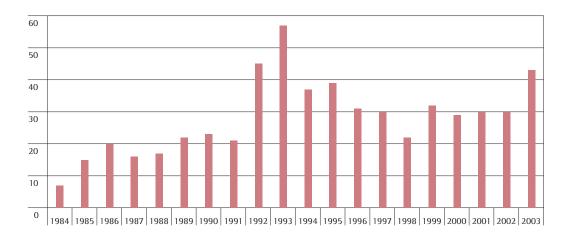
Modularity of rigid Calabi-Yau threefolds over Q. L. Dieulefait, J. Manoharmayum (n. 532).

Bohr-angelicity and related properties for topological abelian groups. M. Bruguera, E. Martín-Peinador, V. Tarieladze (n. 533).

Modularity of abelian surfaces with quaternionic multiplication. L. Dieulefait (n. 534).

Adaptive backstepping control of a class of uncertain nonlinear systems Application to Bouc–Wen hysteretic oscillators. F. Ikhouane, V. Mañosa, J. Rodellar (n. 535).

Number of preprints

Uniform behavior of families of Galois representations on Siegel modular forms. L.V. Dieulefait (n. 536).

Compactness type properties and extensions of topological groups. M. Bruguera, M. Tkachenko (n. 537).

Fixed subgroups are compressed in free groups. A. Martino, E. Ventura (n. 538).

Supersequences and bounded sets in topological groups. M. Bruguera, M. Tkachenko (n. 539).

Gorenstein graded ring associated to ideals. S. Goto, S. Iai (n. 540).

Hyperbolic volume of representations of fundamental groups of cusped 3-manifolds. S. Francaviglia (n. 541).

A bordism approach to string topology. D. Chataur (n. 542).

Algebraic and geometric solutions of hyperbolic Dehn filling equations. S. Francaviglia (n. 543).

Uniform approximation on closed subsets of C by polyanalytic functions. A. Boivin, P.M. Gauthier, P.V. Paramonov (n. 544).

Analytic normal forms for non degenerate singularities of planar vector fields. F. Loray (n. 545).

A uniform study on the cyclicity of period annulus of the reversible quadratic Hamiltonian systems. Ch. Li, J. Llibre (n. 546).

Discriminant and separability. L. El Fadil (n. 547).

CW type of inverse limits and function spaces. J. Smrekar (n. 548).

Integral domains in which each ideal is a w-ideal. A. Mimouni (n. 549).

Galois theory of graded fields. L. El Fadil (n. 550).

Weakened Markus–Yamabe conditions for two-dimensional global asymptotic stability. M. Chamberland, J. Llibre, G. Swirszcz (n. 551).

Invariant factors of an endomorphism of a projective module. L. El Fadil, I. Akharraz (n. 552).

Relationships between limit cycles and algebraic invariant curves for quadratic systems. J. Llibre, G. Swirszcz (n. 553).

A new finestructural hierarchy for the constructible universe. P. Koepke (n. 554).

A couple of gentle stretching exercises. Ch. Morgan (n. 555).

Forcing with finite conditions. S.D. Friedman (n. 556).

Coding into Ramsey sets. J. López-Abad (n. 557).

Canonical equivalence relations on nets of PS_{c0}. J. López-Abad (n. 558).

Canonical forms of shift-invariant maps on $[N]^{\infty}$. C.A. Di Prisco, S. Todorcevic (n. 559).

Proper forcing and rectangular Ramsey theorems. J. Zapletal (n. 560).

Operads and the Hopf algebras of renormalisation. P. van der Laan (n. 561).

Algebraic mapping-class groups of orientable surfaces with boundaries. W. Dicks, E. Formanek (n. 562).

Axioms of generic absoluteness. J. Bagaria (n. 563).

7.4 OTHER PUBLICATIONS

The CRM activities from previous years have produced several books in the publishing world:

• *Stochastic Inequalities and Applications*, edited by E. Giné, Ch. Houdré and D. Nualart and published by Birkhäuser-Verlag in the series *Progress in Probabilities* (n. 56). The book compiles the most prominent contributions to the conference organised by the *Centre de Recerca Matemàtica* in June 2002 under the same name.

• *EuroComb'01*, monographical volume of the journal *Discrete Mathematics*, edited by J. Ne?etril, M. Noy and O. Serra, which compiles a selection of the contributions made at the *Euroconference on Combinatorics, Graph Theory and Applications* and at the *Workshop on Graphs, Morphisms and Applications,* organised by the CRM in September 2001.

• *Special Issue on the Tutte Polynomial,* monographical volume of the journal *Advances in Applied Mathematics*, edited by J. Kung, M. Noy and D. Welsh, which compiles the most outstanding contributions of the *Workshop on Tutte Polynomials and Related Topics,* organised by the *Centre de Recerca Matemàtica* in October 2001.

8. THE EUROPEAN FRAMEWORK

8.1 ERCOM

ERCOM (European Research Centres on Mathematics) is an European Mathematical Society (EMS) committee consisting of Scientific Directors of European Research Centres in the Mathematical Sciences. Only centres for which the number of visiting staff substantially exceeds the number of permanent and long-term staff and that cover Mathematical Sciences broadly are eligible for representation in ERCOM.
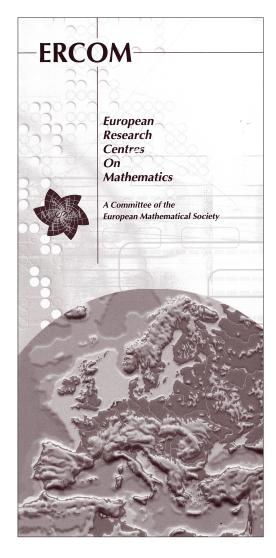
The purposes of ERCOM are:

• to constitute a forum for communication and exchange of information and to foster collaboration and co-ordination among the centres themselves and between the centres and the EMS.

• to promote advanced research training on a European level.

• to advise the Executive Committee of the EMS on matters related to activities of the centres.

• to contribute to make the EMS more visible.

• to cultivate contacts with similar research centres within and outside Europe.

The Chair of ERCOM is proposed by the Committee and appointed by the Executive Committee of the EMS for a period of 4 years (to be renewed for 2 more years).

The *Centre de Recerca Matemàtica* is member of ERCOM from its foundation.

From 2002 the Director of the CRM, Manuel Castellet is Chair of ERCOM.

ERCOM

European Research Centres On Mathematics

A Committee of the European Mathematical Society

The annual meeting of ERCOM took place on March 15 and 16 in Vienna, at the Erwing Schrödinger International Institute for Mathematical Physics. The Directors and Administrators of ERCOM held different sessions, first separately and then jointly.

The 2004 meeting will take place on March 27 and 28, at *The Danish National Research Foundation* in Aarhus.

Web: http://www.crm.es/ercom

8.2 THE EPDI

The CRM is member of EPDI (European Post-doctoral Institute for the Mathematical Sciences) since December 2000. The EPDI is a network of 9 European research institutes, which are: the Institut des Hautes Études Scientifiques (IHES) in Bures (which was the promoter and whose Director J.-P. Bourguignon co-ordinates it), the Max-Planck-Institut für Mathematik in Bonn, the Isaac Newton Institute for the Mathematical Sciences in Cambridge, the Max-Planck-Institut für Mathematik in den Naturwissenschaften in Leipzig, the Institut Mittag-Leffler in Djursholm, the Banach Center in Warsaw, the Erwin Schrödinger Institut in Vienna and the Forschungsinstitut für Mathematik (FIM) in Zürich and the CRM.

Every year, the EPDI offers two-year Post-doctoral fellowships in Mathematics (pure and applied) and in Mathematical Physics to young Europeans.

In 2002 one of the fellowships was awarded to Cyril Lecuire, who will visit the CRM from January to September 2005 and will work on hyperbolic geometry. The scientist in charge is Joan Porti, from the UAB.

The 2003 call will be awarded at the meeting of the Scientific Committee in the month of January 2004 at the ETH Zürich.

Web: http://seven.ihes.fr/EPDI/index.html

8.3 THE EMS

Since this year the *Centre de Recerca Matemàtica* is an institutional member of the European Mathematical Society (EMS), a category created statutarily to facilitate the integration into the EMS of institutions and academic bodies. At the closing of this report, the EMS has 22 institutional members, which gives them the right to be represented by four delegates to the Council of the Society. The Director of the CRM has been elected as a delegate and will attend the meeting of the EMS Council as such. The meeting will take place in Uppsala at the end of June 2004, just before the 4th European Congress of Mathematics that will take place in Stockholm.

8.4 THE CRM IN THE 6TH FRAMEWORK PROGRAMME OF THE EUROPEAN UNION

8.4.1 MARIE CURIE ACTIONS

During the year 2003 three projects of the CRM, which came from past calls of the 5th Framework Programme, have been financed by the European Union:

• The Research Training Network *Modern Homotopy Theory*, co-ordinated by John Hubbuck (University of Aberdeen), in which the CRM has participated through the Algebraic Topology Group and a subnode created at the *Universidad de Málaga*. This project ended on January 31, 2003.

• A Marie Curie fellowship, awarded to David Chataur, who ended his stay at the CRM on September 30, 2003.

• The Marie Curie Training Site on *Cohomological and Group Theory Methods in Topology* designated by the European Commission in the year 2000, thereby recognising its capacity for training doctoral students. During this year six students from Germany, Holland, Hungary, Italy, Poland and Slovenia have completed training stays with a total of 34 months.

The CRM has participated also in the first calls of the Marie Curie Actions, within the Human Resources and Mobility Programme of the EU 6th Framework Programme. The result has been uneven.

• One application for 4 activities in the call Marie Curie Conferences and Training Courses obtained a score of 90 (from 100), thus exceeding in each block the minimum required, but it could not be funded.

• The advanced course *Recent Trends on Combinatorics in the Mathematical Context* will be funded by the European Commission as it was included in an application submitted by the European Mathematical Society, which obtained a score of 91,5.

• An Intra-European Marie Curie Fellowship for Olivier Penacchio (Université de Nice-Sophia Antipolis), who will join the CRM in February 2004.

• An International Incoming Marie Curie Fellowship (for non-europeans) for Sergey Yu. Tikhonov (Moscow State University), who will join the CRM in the spring of 2004.

8.4.2 THEMATIC PRIORITIES OF THE 6TH FRAMEWORK PROGRAMME

The CRM has considered that mathematics can play a role in a fundamental way in each of the 7 priority thematic areas defined by the 6th Framework Programme of the European Union. The Scientific Advisory Board considered the need to encourage young mathematicians to participate in the current research priorities, as are the new lines of research, which spring from these thematic priorities.

To this end, the CRM has elaborated reports on the state of the matter in 4 of these areas, with the aim of discovering young researchers interested in them and provide them with the means to write a disertation in one of these areas.

The selected thematic areas are:

• Life sciences, genomics, and biothecnology for health (A. Guillamon, UPC).

• Nanotechnologies and nanosciences (J. A. Carrillo, ICREA-UAB).

• Information society technologies (O. Serra and J. Villar, UPC).

• Sustainable development, global change and ecosystems (J. Saldaña, UdG).

9. THE ALGEBRAIC TOPOLOGY GROUP

The Generalitat de Catalunya declared the Barcelona Algebraic Group a Consolidated Research Group in 1995. Headed by Jaume Aguadé (UAB) it belonged during the period 2000 – 2002 to the European Research Training Network *Modern Homotopy Theory*, co-ordinated by J. Hubbuck (University of Aberdeen). In the year 2000 call of the European Union it was designated a Marie Curie Training Site.

Among the activities of the *Barcelona Algebraic Topology Group* during this year 2003 one should point out:

• The call for 2 doctoral scholarships, awarded to Ramon Flores (UAB, advanced PhD student) and to Isabel Serra (UAB, PhD student).

• The participation in the organisation of the advanced course *String Topology and Hochschild Homology: Applications to Mathematical Physics*, which took place at the *Universidad de Almería* from September 16 to 20, 2003, with courses given by Ralph Cohen (Stanford University), Kathryn Hess (École Polytechnique Fédérale de Lausanne) and Alexander A. Voronov (University of Minnesota).

• The hosting, in the framework of the Marie Curie Training Site, of the following doctoral students:

J. Smrekar	Univerza v Ljubljani
S. Francaviglia	Università di Pisa
B.A. Huber	Universität München
P. van der Laan	Universiteit Utrecht
M. Sawicki	Politechnika Warszawska

Web: http://www.mat.uab.es/topalg/page.htm

10. THE RED ESPAÑOLA DE TOPOLOGÍA

Following the request of a group of Spanish topologists, co-ordinated by the Director of the CRM, the Spanish Ministry of Science and Technology (MCyT) awarded the *Centre de Recerca Matemàtica* the funds for the creation of a network including all Spanish researchers in Topology, the *Red Española de Topología* (RET).

Among the RET's planned activities which are being carried out, one must point out:

• The collaboration in the organisation of the *Encuentro de Topología*, annual meeting which has been celebrated every year since 1993 in a Spanish university, and that in 2004 will take place in the *Universitat de Barcelona*.

• The promotion and financing of Scientific Workshops specialised in one of the areas of Topology. The first one, about *Dimension Theory*, is organised by Elena Martín (UCM), and will take place in March 2004 in Barcelona.

• The collaboration in the organisation of advanved courses, the first of which took place in the *Universidad de Almería*, from September 16 to 20, about *String Topology and Hochschild Homology: Applications to Mathematical Physics*. This course was organised by José Luis Rodríguez (*Universidad de Almería*), Jérôme Scherer (UAB) and David Chataur (CRM).

• The promotion of the mobility of doctoral students among the different Spanish universities.

• The preparation of a white book on Topology in Spain, which will be published by the end of 2004.

11. LECTURES FERRAN SUNYER I BALAGUER

The *Centre de Recerca Matemàtica* has organised the III Lectures Ferran Sunyer i Balaguer, co-ordinated by its Director Manuel Castellet.

These lectures, jointly organised by the *Fundació Caixa de Sabadell*, take place every two years. Their objective is to offer university students of mathematics an array of perspectives both academic, of research and professional that will allow them to guide their future while improving the presence of mathematics in society.

The following lectures were given:

De Hilbert als problemes del mil·lenni, M. Castellet (UAB).
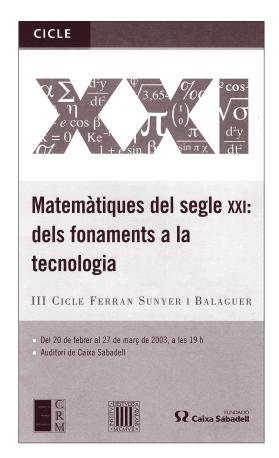
Una petita excursió al paradís de Cantor, J. Bagaria (ICREA-UB).

Recreacions computacionals de la teoria de codis correctors d'errors, S. Xambó (UPC).

Mathematical modeling in sport, J. Stirling (CRM).

Fractus i les antenes fractals: empresa i tecnologia, C. Puente (Fractus S.A.).

Genòmica, una ciència interdisciplinar, X. Messeguer (UPC).

CICLE

Matemàtiques del segle XXI: dels fonaments a la tecnologia

III CICLE FERRAN SUNYER I BALAGUER

- Del 20 de febrer al 27 de març de 2003, a les 19 h
- Auditori de Caixa Sabadell

CRM · INSTITVT D'ESTVDIS CATALANS MCMVII · FUNDACIÓ Caixa Sabadell

12. PRIZE OF THE FERRAN SUNYER I BALAGUER FOUNDATION

In 2003 the *Institut d'Estudis Catalans* and the Ferran Sunyer i Balaguer Foundation announced the International Ferran Sunyer i Balaguer Prize for the twelfth time. The prize is awarded to a monograph, which updates the progress in research in a mathematical area, which has recently been developed. The prize consists of 10,000 euros and the winning monograph is published by Birkhäuser Verlag in the Progress in Mathematics series.

In the announcement of the year 2002, eight monographs by authors from different countries were submitted. The Scientific Committee consisting of Hyman Bass (University of Michigan), Antonio Córdoba (UAM), Warren Dicks (UAB), Paul Malliavin (Université de Paris VI) and Joseph Oesterlé (Institut de Mathématiques de Jussieu), recommended that the Foundation should award the prize to the monograph:

Parabolic Quasilinear Equations Minimizing Linear Growth Functionals

by Fuensanta Andreu-Vaillo and José M. Mazón, Universitat de València,

and Vicent Caselles, Universitat Pompeu Fabra

(Progress in Mathematics, n. 223, Birkhäuser-Verlag.)

During this year 2003 Sebastià Xambó has resigned as Director of the Foundation. The new Director is Pere Pascual, professor of the Universitat Politècnica de Catalunya.

Web: http://www.crm.es/info/ffsb.htm

Winners from Previous Editions

1993 Alexander Lubotzky
Discrete Groups, Expanding Graphs and Invariant Measures.
(PM 125)

1994 Klaus Schmidt
Dynamical Systems of Algebraic Origin.
(PM 128)

1995 The scientific committee decided not to award the prize

1996 Vijaya Kumar Murty and Ram Murty
Non-Vanishing of L-Functions and Applications.
(PM 157)

1997 Albrecht Böttcher and Yuri I. Karlovich
Carleson Curves, Munchenhoupt Weights, and Toeplitz Operators.
(PM 154)

1998 Juan J. Morales-Ruiz
Differential Galois Theory and Non-integrability of Hamiltonian Systems.
(PM 179)

1999 Patrick Dehornoy
Braids and Self-Distributivity.
(PM 192)

2000 Juan-Pablo Ortega and Tudor Ratiu
Hamiltonian Singular Reduction

2001 Martin Golubitsky and Ian Stewart
The Symmetry Perspective
(PM 200)

2002 Alexander Lubotzky and Dan Segal
Subgroup Growth
(PM 212)
André Unterberger
Automorphic Pseudodifferential Analysis and Higher-level Weyl Calculi
(PM 209)

2003 Fuensanta Andreu-Vaillo, Vicent Caselles and José M. Mazón
Parabolic Quasilinear Equations Minimizing Linear Growth Functionals
(PM 223)

13. INSTITUTIONAL FUNDING

13.1 VISITING PROFESSORS (MECYD, DURSI)

Ch. Li	01.09.02 – 31.08.03
A. Facchini	01.10.02 – 30.09.03
E. Dror-Farjoun	01.10.02 – 31.01.03
J. Trlifaj	01.10.02 – 31.01.03
A.Volberg	01.11.02 – 30.04.03
Ch. Morgan	01.01.03 – 31.12.03
S. Todorcevic	01.09.03 – 31.08.04
A. Gulisashvili	01.11.03 – 30.04.04

13.2 POST–DOCTORAL FELLOWSHIPS (MECYD, DURSI)

M. Eddahbi	04.03.02 – 31.08.03
Sh. Iai	01.09.02 – 31.08.03
G. Swirszcz	01.06.02 – 30.11.03
C. Busch	01.02.03 – 30.04.04
F-A. Buica	01.03.03 – 31.08.04
A. Martino	01.04.03 – 30.09.04
P. Larson	01.09.03 – 31.08.04
J. Hirschorn	01.09.03 – 28.02.05

13.3 MARIE CURIE INDIVIDUAL FELLOWSHIPS (EU)

D. Chataur	01.11.01 – 30.09.03

13.4 FELLOWSHIPS OF THE MODERN HOMOTOPY THEORY NETWORK (EU)

T. Beke	01.09.02 – 31.01.03

13.5 MARIE CURIE TRAINING SITE FELLOWSHIPS (EU)

J. Smrekar	02.09.02 – 31.08.03
S. Francaviglia	15.01.03 – 15.07.03
B. A. Huber	01.04.03 – 31.07.03
M. Sawicki	01.09.03 – 30.11.03
P. van der Laan	01.09.03 – 31.12.03

13.6 ORGANISATION OF CONFERENCES AND ADVANCED COURSES

The 1st Meeting of Complex Systems and Sport and the 4th International Conference of Computer Science in Sport (MCyT, UPC)

Advanced Course on Polynomial Identity Rings (MCyT, UAB)

Barcelona Conference on Asymptotic Statistics, (MCyT, UAB)

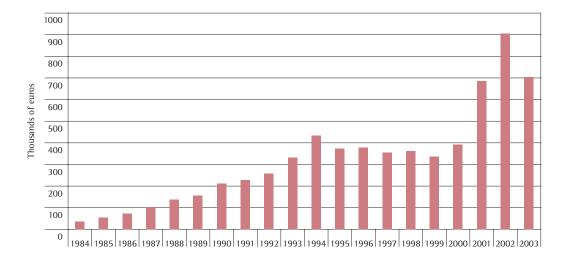*Barcelona Conference on Set Theory* (MCyT, DURSI, UB)

14. BUDGET

14.1 REVENUE

DURSI (subsidy)	180.000 €
MECyD	239.150 €
MCyT	59.000 €
DURSI (applications)	20.500 €
EU	115.900 €
UAB (facilities)	23.000 €
UAB (activities)	4.050 €
UB (activities)	1.500 €
Foundation FSB	12.000 €
Registration fees	19.650 €
Remainder year 2002	28.372 €
Total	**703.122 €**

14.2 EXPENDITURE

Visitors	170.320 €
Post-doctoral fellows	161.650 €
Graduate students	30.000 €
Conferences and courses	122.225 €
Travel of visitors	10.245 €
Maintenance	23.000 €
Long-term material	12.122 €
Day-to-day material	2.830 €
Administration	120.000 €
Direction	7.060 €
Publications	3.724 €
Miscellaneous	14.055 €
Remainder	25.891 €
Total	**703.122 €**

FUTURE ACTIVITIES

15. SCHEDULED SCIENTIFIC ACTIVITIES

15.1 RESEARCH PROGRAMMES

15.1.1 RESEARCH PROGRAMME ON SET THEORY

This programme, co-ordinated by J. Bagaria and S. Todorcevic, began in September 2003 and will end in July 2004.

Among the programmed activities for the year 2004, besides the visitors and the seminars, one must point out:

• The advanced course on *Ramsey Methods in Analysis*, from January 19 to 28, 2004, given by S. Argyros (National Technical University of Athens) and S. Todorcevic (CNRS, Université Paris 7).

• The *Workshop on the Foundations of Set Theory*, which will be held in June 2004.

15.1.2 RESEARCH PROGRAMME ON THE GEOMETRY OF THE WORD PROBLEM
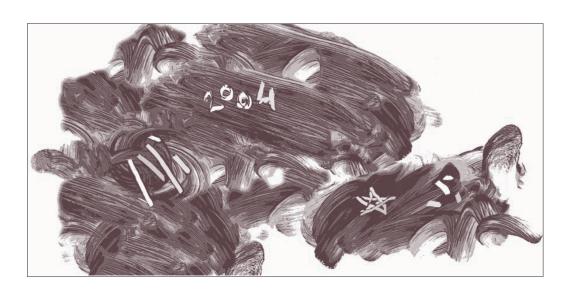
Period   September 2004 to July 2005

Scientists in charge

Locals   Josep Burillo (UPC)
          Enric Ventura (UPC)

Visitor   Noel Brady (University of Oklahoma)

Main research topic

• Geometry of the word problem for finitely presented groups.

59

Other research topics

• *Free groups and their automor-phisms*

• *Hyperbolic groups*

• *Amenability*

• *Current trends in the geometric group theory*

Visiting researchers

Emina Alibegovic
University of Michigan

Goulnara Arjantseva
Université de Genève

Oleg Bogopolski
Institute of Mathematics, Novosibirsk

Noel Brady
University of Oklahoma

Tom Brady
Dublin City University

Martin Bridson
Imperial College, London

Sean Cleary
City College of New York

Daryl Cooper
University of California at Santa Barbara

Victor Guba
Vologda State University

Ilya Kapovic
University of Illinois at Urbana-Champaign

Jérôme Los
CNRS, Marseille

Martin Lustig
Université Aix-Marseille III

John Meakin
University of Nebraska-Lincoln

Christophe Pittet
Université de Provence

Lawrence Reeves
Université Aix-Marseille III

Tim Riley
Yale University

Hamish Short
Université de Provence

Vladimir Shpilrain
City College of New York

Melanie Stein
Trinity College, Hartford

Jennifer Taback
University at Albany

Ted Turner
University at Albany

Pascal Weil
CNRS, Bordeaux

Planned activities

Seminars

Weekly seminar on the subject of the Research Programme

Conference

Barcelona Conference on Geometric Group Theory
June 28 to July 2, 2005
http://www.crm.es/GGroupTheory

Advanced Course

Geometry of the Word Problem for Finitely Generated Groups
July 5 to 15, 2005
http://www.crm.es/WordProblem

15.2 SPECIALISED QUARTERS

15.2.1 CONTROL, GEOMETRY AND ENGINEERING

Period   January to March, 2005
Co-ordinator   Miguel C. Muñoz (UPC)

Main research topics

- Geometric control of mechanical systems
- Hamiltonian systems port controlled
- Piecewise continuous systems

Research visitors

Anthony Bloch
University of Michingan

Francesco Bullo
University of Illinois

José Cariñena
Universidad de Zaragoza

Alan R. Champneys
University of Bristol

Jorge Cortés Monforte
University of Illinois

Manuel de León
CSIC, Madrid

Mario di Bernardo
University of Bristol

Y. Fedorov
Universitat Politècnica de Catalunya

S. J. Hogan
University of Bristol

Alberto Ibort
Universidad Carlos III

Bozidar Jovanovic
Mathematical Institute, SANU, Belgrade

Wang Sang Koon
California Institute of Technology

Andrew Lewis
Queen's University

Carlos López Lacasta
Universidad de Alcalá de Henares

David Martin de Diego
CSIC, Madrid

Eduardo Martinez
Universidad de Zaragoza

Bernhard Maschke
Université Claude Bernard

Sonia Martinez
University of Illinois

Romeo Ortega
CNRS, Gif Sur Yvette

Stefano Stramiglioli
University of Twente

Arjan van der Schaft
University of Twente

Dmitry Zenkov
North Carolina State University

Planned activities

PhD courses

Geometric control of mechanical systems
Co-ordinator: Francesco Bullo

Port controlled Hamiltonian systems
Co-ordinator: Stefano Stramiglioli

Neuroscience
Co-ordinator: to be decided

15.2.2 CONTEMPORARY CRYPTOLOGY

Period	February to June, 2005
Co-ordinators	Jorge Villar (UPC)
	Carles Padró (UPC)

Main research topic

• Mathematics of Contemporary Cryptology: Foundations, techniques and problems

Visiting researchers

Jesper Buus Nielsen
Aarhus Universitet

Ronald Cramer
Aarhus Universitet

Giovanni di Crescenzo
Universität Trier

Serge Fehr
Macquarie University

Marc Fischlin
University of California, San Diego

Maciej Koprowski
Aarhus Universitet

Hugo Krawczyk
Universität Trier

Arjen Lenstra
Citybank

Tatsuaki Okamoto
NTT Laboratories

Pascal Paillier
Universität Trier

Planned activities

Seminar

A weekly seminar on Multi-party computation and distributed cryptography

Workshop

Mathematical problems and techniques in cryptology
June 2005
http://www.crm.es/TechniquesCryptology

15.3 OTHER VISITING RESEARCHERS DURING THE YEAR 2004

|		
B. Apanasov	University of Oklahoma	Geometry
F-A. Buica	Babes-Bolyai University	Dynamical Systems
C. Busch	Katholische Universität Eichstätt-Ingolstadt	Algebraic Topology
P. Degond	Université Paul Sabatier	Differential Equations
E. Dror-Farjoun	Hebrew University of Jerusalem	Algebraic Topology
W.G. Dwyer	University of Notre Dame	Algebraic Topology
M. Eddahbi	Université Cadi Ayyad	Stochastic Analysis
R. El Harti	Université Hassan 1	Algebra
M. Ferrante	Università degli Studi di Padova	Stochastic Analysis
W. Gajda	Ohio State University	Algebraic Geometry
I. Gálvez	London Metropolitan University	Algebraic Topology
O.J. Gill	London Metropolitan University	Algebraic Topology
A. Gulisashvili	Ohio University	Harmonic Analysis
J.R. Harris	National University of Ireland	Algebraic Topology
R. Herrera	Princeton University	Differential Geometry
J. Hirschorn	Universität Wien	Set Theory
L.T. Hoa	Institute of Mathematics, Hanoi	Algebraic Geometry
D. Iesan	Technical University of Iasi	Applied Mathematics
A. Jüngel	Universität Mainz	Differential Equations
A. Martino	University College Cork	Algebra
W. Marzantowicz	Uniwersytet im. Adama Mickiewicz	Topology
A. Millet	Université de Paris VI	Stochastic Analysis
B.Z. Moroz	Max-Planck-Institut für Mathematik, Bonn	Number Theory
E. Pardo	Universidad de Cádiz	Algebra
O. Penacchio	Université de Nice-Sophia Antipolis	Topology
U. Ray	Université de Reims	Algebra
J. Rohlfs	Katholische Universität Eichstätt-Ingolstadt	Algebraic Geometry
M. Rørdam	Syddansk Universitet	Algebra
M. Tibar	Université de Lille 1	Algebraic Geometry
S.Yu Tikhonov	Moscow State University	Harmonic Analysis
G. Toscani	Università di Pavia	Differential Equations
A. Volberg	Michigan State University	Harmonic Analysis
Cl. Wilkerson	Purdue University	Algebraic Topology
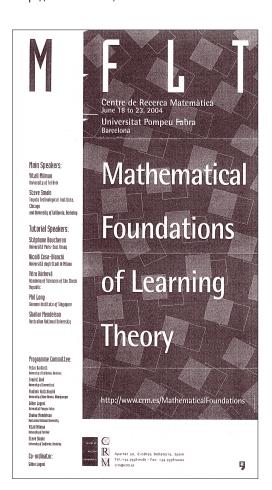
15.4 OTHER CONFERENCES AND ADVANCED COURSES

Advanced Course on Contemporary Cryptology
Co-ordinator: Paz Morillo (UPC).
February 2 to 13, 2004
http://www.crm.es/ContemporaryCryptology

Conference on Mathematical Foundations of Learning Theory
Co-ordinator: Gábor Lugosi (UPF).
June 18 to 23, 2004
http://www.crm.es/MathematicalFoundation

Workshop on Non-Linear Differential Galois Theory
Co-ordinator: Marcel Nicolau (UAB).
June 28 to July 2, 2004

Advanced Course on Automata Groups
Co-ordinator: Warren Dicks (UAB).
July 5 to 16, 2004
http://www.crm.es/AutomataGroups

HYKE Conference on Complex Flows
Co-ordinators: José A. Carrillo (ICREA-UAB) and Antonio Marquina (UV).
October 6 to 9, 2004
http://www.crm.es/ComplexFlows

4th Congress of the European Society for Research in Mathematics Education
Co-ordinator: Marianna Bosch (URL).
February 17 to 21, 2005
http://www.crm.es/MathematicsEducation

Advanced Course on Recent Trends on Combinatorics in the Mathematical Context
Co-ordinator: Oriol Serra (UPC).
September 12 to 23, 2005
http://www.crm.es/RecentTrends

15.5 AROUND THE ICM06

From August 22 to 30, 2006 the International Congress of Mathematicians (ICM06) will take place in Madrid.

With the aim to contribute to the development of the international mathematical community, the *Centre de Recerca Matemàtica* is preparing three special activities around the ICM06:

• A specialised research quarter on the subject of Analysis, co-ordinated by Xavier Tolsa (ICREA-UAB) and Ana Vargas (UAM), from April 15 to July 15.

• An advanced course on Computational Geometry to be held at the beginning of September in Madrid, co-ordinated by Ferran Hurtado (UPC) and Manuel Abellanas (UPM).

• A satellite congress on Topology in Andorra, the first week of September, co-organised by the CRM and the *Universitat d'Andorra.*

16. THE CONSOLIDATION OF A PROCESS

16.1 STRUCTURE OF THE SECRETARIAT AND SERVICES

The decision of the Institut d'Estudis Catalans, revoking the agreements signed as a result of the constitution of the *Consorci Centre de Recerca Matemàtica*, of detaching itself completely from the administrative and technical services of the CRM has forced, during the second half of the year 2003, the elaboration of a new structure of the work methods and the personnel of the CRM, that will start on January 1, 2004.

From 2004, the staff of the CRM will consist of:

• The Director, Manuel Castellet.

• The Assistant Directors, Carles Casacuberta and Jordi Quer.

• The Secretariat personnel: Consol Roca, Neus Portet, Sonia Padilla and Ana García-Donas.

• The accounting management, by Consultors Rodao & Associats.

• The computer management, by Getput Software.

• The technical service of data base management, by Agilgrup.

16.2 THE EXPANSION OF THE PREMISES

The consolidation of the *Centre de Recerca Matemàtica* after the constitution of the consortium between the Catalan Government and the *Institut d'Estudis Catalans*, and the signature of the contract programme with the Department of Universities, Research and Information Society of the Catalan Government, foresee a growth of the activities of the CRM and the number of its visiting researchers.

To be able to satisfy the future needs, a possible expansion of the premises currently occupied by the CRM at the Sciences Faculty of the *Universitat Autònoma de Barcelona* is now under study. It should allow:

• To improve the space for the Secretariat and services.

• To increase in 40% the working space for researchers.

• To acquire a properly equipped lecture room, with 90 seats, for activities of the CRM.

Work is in progress with the objective for this expansion to become a reality before the summer of 2005.

16.3 20 YEARS OF THE CENTRE DE RECERCA MATEMÀTICA

The *Centre de Recerca Matemàtica* started its activities in the Autumn of 1984 with a modest programme of visitors and a minimal infrastructure to support it.

Next Autumn the CRM will therefore be 20 years old. During this period it has grown in a continuous way with regard to the visiting researchers and the number of activities, the international presence, the premises allocated for research or its budget.

In order to commemorate this 20th anniversary, besides the publication of a volume and a CD which will contain in a synthesized and attractive way the history of the CRM, an academic event will take place in the second week of November. It will be presided by the foremost academic and political authorities of the country and Jean-Pierre Serre, the prestigious French mathematician of the Collège de France awarded by the first Abel Prize, will give a lecture.

My lingering dream
under a lenient sky
of a great white peace.

By Salvador Espriu in *Perquè un dia torni la cançó a Sinera*
Translated by Josep M. Jaumà