CENTRE DE RECERCA MATEMÀTICA

REPORT OF ACTIVITIES 2004

PRESENTATION

Four events highlighted the activities of the Centre for Mathematical Research in 2004: the consolidation of the managing and administrative structure of the CRM, in accordance with new legal personnel; changes to the governments of both Catalonia and the Spanish State; consolidation of the annual Research Programmes; and the celebration of the 20th anniversary of the creation of the CRM.

The CRM's management team is made up of the director, Manuel Castellet (UAB) and two associate directors, Carles Casacuberta (UB) and Jordi Quer (UPC), and has restructured its administrative and secretariat services, with four members of staff that deal with the everyday management of CRM activities and visitors, plus three external services that are responsible for financial management, information technology support and support for the database management program.

The major changes to the Catalan government (December 2003) and the Spanish State (March 2004) led to certain modifications to the centre's budget, which was affected by a specific reduction in the budget in 2004, and a major delay in the resolution of certain calls for the provision of additional resources. Nevertheless, neither CRM activity nor its management were affected, thanks to the efforts of the management team and the administrative personnel, who were able to provide cover for some of the shortcomings. In the coming year 2005, the level of finance established in the program contract signed for the CRM by the Government of Catalunya in 2003 should be recuperated, which should enable, among other things, the annual undertaking of two simultaneous Research Programmes and the extension of the facilities in order to accommodate up to 27 researchers at the same time.

The first annual Research Programme started in September 2003, dedicated to Set Theory and coordinated by Joan Bagaria and Stevo Todorcevic, about which more information is supplied in section 6.1.2 of this Report. During the 2004-2005 academic year, a Research Programme into the Geometry of the Word Problem is being performed, coordinated by Josep Burillo, Enric Ventura and Noel Brady, along with two thematic activities investigating Control Geometry and Engineering (coordinated by Miguel C. Muñoz) and Contemporary Cryptology (coordinated by Jorge Villar and Carles Padró).

The *Centre de Recerca Matemàtica*, created in 1984 by the Institute of Catalan Studies, celebrated its 20th anniversary by demonstrating its potential for research as the only institution for mathematical research in the Spanish State; compared to 30 months worth of visiting researchers in the 1984-1985 academic year, there were 275 months in 2003-2004, with a total of 969 research visits made by investigators from 58 different countries made over these 20 years, with the participation of 3,480 researchers and doctoral students from 72 countries in the 23 congresses, 22 advanced courses and 21 workshops that have been organised.

The event to commemorate this 20th anniversary, for which a book titled *Centre de Recerca Matemàtica 1984-2004* was published, was held on November 9, 2004, involving a magisterial conference given by the honorary professor of the Collège de France, Fields Medallist and the first Abel award-winner, Jean Pierre Serre, titled *Groups finis: choix de théorèmes.*

Manuel Castellet
Director

Contents

ACRONYMS

CIRIT	Inter-departmental Committee on Research and Technological Innovation
CNRS	Centre National de la Recherche Scientifique
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
MEC	Ministry of Education and Science
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 its 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 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 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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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: www.iecat.net

1.2 THE GENERALITAT DE CATALUNYA

Log o

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: www.gencat.es

2. GOVERNING BODY AND SECRETARIAT

2.1 THE GOVERNING BOARD

The CRM is governed by a Governing Board that this year 2004 has consisted of:

President: The Minister of Universities, Research and the Information Society, Carles Solà.
Members: The President of the *Institut d'Estudis Catalans*, Josep Laporte**.**
　　　　　The General Director of Research of the Catalan Government, Francesc-Xavier Hernàndez.
　　　　　The General Secretary of Research of the Catalan Government, Ramon-Jordi Moles.
　　　　　The Advisor to the Counsellor in research-related issues, Carles Perelló.
　　　　　Joan Girbau, member of the IEC.
　　　　　Salvador Alegret, General Secretary of the IEC.
　　　　　Josep Enric Llebot, member of the IEC.

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.

2.3 THE ASSOCIATE DIRECTORS

The Management Council agreed at its meeting of June 22 to the President's proposal to nominate Carles Casacuberta (UB) and Jordi Quer (UPC) as associate directors of the *Centre de Recerca Matemàtica* (CRM). Thanks to these appointments, the CRM will have a management team that can facilitate the management of the centre as well as interrelations with mathematicians at Catalan universities.

2.4 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.

2.5 THE SECRETARIAT

The administrative re-structuring of the CRM led to the departure of Ms Maria Julià and to the incorporation of two additional members of staff, Ms Ana García-Donas and Ms Núria Hernández. In 2004, the administrative staff therefore comprised:

Consol Roca
croca@crm.es
+34-935812953 Have been in charge of the Directors office,
         the centre's activities and the institutional
Ana García-Donas relations.
agarcia@crm.es
+34-935811081

Neus Portet
nportet@crm.es
+34-935814086 Have been in charge of the visitors and the
         centre's activities.
Núria Hernández
nhernandez@crm.es
+34-935811081

2.6 EXTERNAL SERVICES

In order to make the running of the CRM more flexible without increasing the number of work contracts, three companies offering external services shall perform the following tasks:

- Economic management and accounting: Consultors Rodao & Associates
- IT technical support: GetPut Software S.L.

- Support for the database management program: Àgil Grup

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, two 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.

The architect Àngel Valdés developed the basic and executive project for the extension of the premises, thus allowing us to increase the number of workplaces available for researchers and to broaden our classroom capacity both for congresses and advanced courses.

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 and Zentralblatt data base 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 464 journals, 13,508 volumes in mathematics and 360 electronic journals. The Library catalog is available online.

Web: 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* of 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 600 to 750 euros per month.

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

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ACTIVITIES YEAR 2004

4. THE CONTRACT PROGRAMME WITH THE CATALAN GOVERNMENT

On June 18, 2003 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.

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4.1 MEETING OF THE PROGRAM CONTRACT MONITORING COMMISSION

The program contract between the DURSI and the CRM foresees, in its ninth clause, the creation of a Monitoring Commission, made up of two DURSI and two CRM representatives. Its commission's main role is to evaluate the extent to which the objectives and commitments of the contract program are met, and to propose the measures it considers necessary to achieve said objectives.

The Monitoring Commission met for the first time on July 12, 2004. The DURSI was represented by Josep M. Vilalta, general sub-manager of research, acting as president, and Iolanda Font de Rubinat. The members of the commission acting as representatives of the CRM were the two associate directors, Carles Casacuberta and Jordi Quer. The director of CRM, Manuel Castellet, also attended the meeting as an invited guest.

The main aim of the meeting was to analyse CRM activity in 2003 and the results obtained for the foreseen indicators for that year in the program contract. On the basis of the data in the CRM activities report for 2003, complemented and detailed with additional information supplied by the Centre, the Commission announced that the objectives proposed for 2003 had been achieved, in some cases more than substantially. The Commission's evaluation of the Centre's activity in 2003, and its compliance with commitments to the program contract, was highly positive.

5. VISITING RESEARCHERS

5.1 GENERAL LIST

F.-A. Buica	Dynamical Systems, 01.03.2003 – 31.08.2004 Babes-Bolyai University
A. Martino	Algebra, 01.04.2003 – 31.08.2005 University College Cork
J. Hirschorn	Logic, 01.09.2003 – 28.02.2005 Universität Wien
P. Larson	Logic, 01.09.2003 – 31.08.2004 The Fields Institute
J. Bagaria	Logic, 01.09.2003 – 31.07.2004 ICREA-Universitat de Barcelona
J. López-Abad	Logic, 01.09.2003 – 31.07.2004 Université Paris 7
S. Todorcevic	Logic, 01.09.2003 – 31.08.2004 CNRS-Université Paris 7
A. Mathias	Logic, 14.09.2003 – 30.06.2004 Université de la Réunion
R. Bosch	Logic, 01.09.2003 – 28.02.2004 Universidad de Oviedo
O. de la Cruz	Logic, 15.09.2003 – 31.12.04 Purdue University
O. Penacchio	Topology, 01.10.2003 – 31.01.2006 Université de Nice-Sophia Antipolis
A. Gulisashvili	Harmonic Analysis, 01.11.2003 – 30.04.2004 Ohio University
A. Kono	Algebraic Topology, 16.12.2003 – 12.01.2004 Kyoto University

J. Llopis	Logic, 01.01.2004 – 31.07.2004	
	Universitat Pompeu Fabra	
J. Harris	Algebraic Topology, 13.01.2004 – 13.09.2004	
	National University of Ireland	
R. El Harti	Algebra, 15.01.2004 – 30.01.2004	
	Université Hassan I	
G. Toscani	Differential Equations, 17.01.2004 – 31.01.2004	
	Università di Pavia	
S. Argyros	Logic, 15.01.2004 – 15.02.2004	
	National Technical University of Athens	
A. Pelczar	Logic, 19.01.2004 – 13.02.2004	
	Uniwersytet Jagiellonski	
C. Machefert	Logic, 19.01.2004 – 30.06.2004	
	Université de la Réunion	
J. Brendle	Logic, 01.02.2004 – 24.02.2004	
	Kobe University	
W. Marzantowicz	Topology, 01.02.2004 – 31.03.2004	
	A. Mickiewicz University of Poznan	
J. Veldman	Logic, 08.02.2004 – 15.04.2004	
	Universität Bonn	
R. Schindler	Logic, 09.02.2004 – 22.02.2004	
	Universität Münster	
P. Koepke	Logic, 15.02.2004 – 15.04.2004	
	Universität Bonn	
C. Busch	Algebraic Topology, 01.02.2003 – 30.04.2004	
	Katholische Universität Eichstätt-Ingolstadt	
J. Rohlfs	Algebraic Geometry, 01.03.2004 – 26.03.2004	
	Katholische Universität Eichstätt-Ingolstadt	
B.Z. Moroz	Algebra, 01.03.2004 – 31.05.2004	
	Max-Planck-Institut für Mathematik	
P. Welch	Logic, 19.03.2004 – 19.04.2004	
	University of Bristol	
M. Foreman	Logic, 15.03.2004 – 11.04.2004	
	University of California at Irvine	
P. Prihoda	Algebra, 01.04.2004 – 30.06.2004	
	Charles University, Prague	
U. Ray	Topology, 01.04.2004 – 31.03.2005	
	Université de Reims	
S. Shamir	Topology, 03.04.2004 – 31.07.2004	
	The Hebrew University of Jerusalem	
J. Väänänen	Logic, 12.04.2004 – 12.05.2004	
	University of Helsinki	
C. Di Prisco	Logic, 15.04.2004 – 15.06.2004	
	Instituto Venezolano de Investigaciones Científicas	
M. Tibar	Topology, 17.04.2004 – 28.04.2004	
	Université de Lille 1	
T. Jech	Logic, 15.04.2004 – 15.05.2004	
	Czech Academy of Sciences	
D. Iesan	Differential Equations, 01.05.2004 – 31.05.2004	
	University of Iasi	
M. Eddahbi	Stochastic Analysis, 01.05.2004 – 27.06.2004	
	Université Cadi Ayyad	
M. Sawicki	Topology, 01.05.2004 – 31.07.2004	
	Politechnika Warszawska	

S. Friedman	Logic, 02.05.2004 – 09.05.2004	
	Universität Wien	
E. Pardo	Algebra, 03.05.2004 – 28.05.2004	
	Universidad de Cádiz	
A. Blass	Logic, 01.05.2004 – 31.05.2004	
	University of Michigan	
W. Woodin	Logic, 01.06.2004 – 30.06.2004	
	University of California at Berkeley	
M. Ferrante	Stochastic Analysis, 17.05.2004 – 03.06.2004	
	Università degli Studi di Padova	
T. Bartoszynski	Logic, 15.05.2004 – 15.06.2004	
	Boise State University	
C. Wilkerson	Algebraic Topology, 24.05.2004 – 25.06.2004	
	Purdue University	
W. Kubis	Logic, 01.06.2004 – 23.06.2004	
	York University	
R. Herrera	Differential Geometry, 01.07.2004 – 15.08.2004	
	Princeton University	
S. Friedman	Universität Wien	
	Logic, 08.06.2004 – 13.06.2004	
L.T. Hoa	Universität Wien	
	Algebraic Geometry, 15.06.2004 – 31.07.2004	
I. Gálvez	Institute of Mathematics	
	Algebraic Topology, 15.06.2004 – 31.07.2004	
A. Tonks	London Metropolitan University	
	Topology, 15.06.2004 – 31.07.2004	
O. Gill	London Metropolitan University	
	Algebraic Topology, 15.06.2004 – 15.09.2004	
W. Gajda	London Metropolitan University	
	Algebraic Geometry, 21.06.2004 – 20.07.2004	
E. Dror Farjoun	Ohio State University at Columbus	
	Algebraic Topology, 25.06.2004 – 25.07.2004	
	The Hebrew University of Jerusalem	
W. Dwyer	Algebraic Topology, 01.07.2004 – 31.07.2004	
	University of Notre Dame	
A. Zuk	Algebra, 05.07.2004 – 16.07.2004	
	Centre National de la Recherche Scientifique, Paris	
R. Grigorchuk	Algebra, 05.07.2004 – 16.07.2004	
	Texas A&M University	
D. Cooper	Geometry, 01.09.2003 - 30.11.2004	
	University of California at Santa Barbara	
J. Los	Dynamical Systems, 01.10.2004 – 31.12.2004	
	Université d'Aix-Marseille II	
J. Burillo	Group Theory, 01.09.2004 – 31.07.2005	
	Universitat Politècnica de Catalunya	
E. Ventura	Algebra, 01.09.2004 – 31.07.2005	
	Universitat Politècnica de Catalunya	
S. Tikhonov	Harmonic Analysis, 01.09.2004 – 31.08.2006	
	Moscow State University	
C. Valqui	Algebra, 01.09.2004 – 30.09.2004	
	Pontificia Universidad Católica del Perú	
V. Guba	Group Theory, 01.09.2004 – 30.09.2004	
	Vologda State Pedagogical University	

V. Bogopolskiy	Algebra, 01.09.2003 – 31.12.2004
	Novosibirsk State University
M. Bridson	Algebra, 01.09.2004 –30.09.2004
	Imperial College London
T. Goudon	Differential Equations 13.09.2004 – 10.10.2004
	Université des Sciences et Technologies Lille 1
L. Reeves	Geometry, 19.09.2004 – 15.10.2004
	The University of Melbourne
B. Apanasov	Geometry, 27.09.2004 – 30.11.2004
	University of Oklahoma
A. Millet	Stochastic Analysis, 01.10.2004 – 31.01.2005
	Université de Paris VI
G. Arjantseva	Group Theory, 01.10.2004 – 30.11.2004
	Université Genève
A. Jüngel	Differential Equations, 01.10.2004 – 20.10.2004
	Universität Mainz
P. Haissinsky	Complex Analysis, 12.10.2004 – 17.10.2004
	Université de Provence
I. Kapovich	Group Theory, 01.11.2004 – 30.11.2004
	University of Illinois at Urbana
J.-P. Serre	Algebra, 08.11.2004 – 11.11.2004
	Collège de France
H. Short	Group Theory, 10.11.2004 – 13.11.2004
	Université de Provence
M. Lustig	Group Theory, 15.11.2004 – 21.11.2004
	Université d'Aix-Marseille 3
J.-P. Preaux	Group Theory, 15.11.2004 – 25.11.2004
	École de l'Air, France
P. Degond	Differential Equations, 15.11.2004 – 26.11.2004
	Université Paul Sabatier
P. Weil	Algebra, 10.11.2004 – 25.11.2004
	Université de Bordeaux 1
T. Smirnova-Nagnibeda	Group Theory, 22.11.2004 – 26.11.2004
	University of Geneva
P. Brinkmann	Group Theory, 27.11.2004 – 05.12.2004
	Technische Universität Berlin
N. Masmoudi	Differential Equations, 28.11.2004 – 05.12.2004
	Courant Institute of Mathematical Sciences

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5.2 POST-DOCTORAL FELLOWS

Among the visiting researchers at the CRM during the year 2004 we note the presence of eight post-doctoral fellows for more than 9 months, thereby, fulfilling one of the foundational aims of the CRM, namely to facilitate the work of young researchers and their contact with leading scientists.

They were:

Cornelia Busch	01.02.2003 – 30.04.2004
Florina-Adriana Buica	01.03.2003 – 31.08.2004
Armando Martino	01.04.2003 – 30.11.2005
Paul Larson	01.09.2003 – 31.08.2004
James Hirschorn	01.09.2003 – 28.02.2005
Olivier Penacchio	01.10.2003 – 31.01.2006
Sergey Tikhonov	01.09.2004 – 31.08.2006
Jordi López-Abad	01.09.2003 – 31.07.2004

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5.3 MARIE CURIE TRAINING FELLOWS

In the year 2000 call of the European Committee, the CRM received the nomination of Marie Curie Training Site for its Barcelona Algebraic Topology Group, throughout the period 2001-2004. This activity was co-ordinated by Jaume Aguadé (UAB) for the first two years and subsequently by Carles Casacuberta (UB).

During the year 2004, the programme has hosted several doctoral students of Topology from different universities of the European Community or from associated states. They have been:

James Richard Harris	National University of Ireland
Pavel Prihoda	Charles University, Praha
Shoham Shamir	The Hebrew University of Jerusalem
Marcin Sawicki	Politechnika Warszawska
Olivia J. Gill	London Metropolitan University

During the programme's four years of duration, the CRM has welcomed 14 doctoral students in Topology, carrying out study and research visits totalling 71 months.

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 Scientific 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 I
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

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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.*

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.*

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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.*

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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)
I. 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)
I. 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.*

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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 Małek; *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 σ-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 nilpotency 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.

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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 $\mathbb{Q}\,G$.*
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.*

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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.*
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.*
A. 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*.
B. 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 $\sum^2_1$ -well-orderings of the reals*.

Per a la versió anglesa:

The Set Theory Seminar took place at the CRM on tuesdays and thursdays in the afternoon during the academic course 2003-04. It was an essential part of the CRM research programme on Set Theory and its Applications. Most of the visiting researchers that participated in the programme gave talks in the Seminar. There were also some talks given by researchers from other areas on topics of interest for the people working on Set Theory. Series of talks and mini-courses were given by: A. Blass, on products of infinite cyclic groups; A. R. D. Mathias, on weak axiom systems of Set Theory; P. Koepke, on inner models; J. López-Abad, on the classification of Banach spaces; A. Kechris, on applications of descriptive set theory to topological dynamics and automorphism groups, etc. Besides the CRM visitors and the members of the research programme, other mathematicians from the Catalan universities, professors as well as doctoral students, also attended the Seminar.
http://www.ub.es/tdconjunts

6.5.10 UAB Number Theory Seminar

Organised by the *Universitat Autònoma 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.

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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).

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).
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).

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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. Nešetřil, 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.

The anual 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

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8.2 The EPDI

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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

Log o

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

L O 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).

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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)

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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 €**