

CRM

Centre de Recerca Matemàtica, Barcelona

Institutional framework

The CRM was created in 1984 by the *Institut d'Estudis Catalans* (Institute for Catalan Studies), an academic, scientific and cultural body whose aim it is to promote research in science, technology and humanities, while supporting all aspects of Catalan culture. Since 2001, the CRM has been a consortium, with its own legal status, integrated by the *Institut d'Estudis Catalans* and the Catalan Government. It is a research institute associated with the *Universitat Autònoma de Barcelona* and located on the Bellaterra campus, about 15 km from Barcelona.

The Governing Board of the CRM has eight members and is chaired by the Minister of Universities, Research and the Information Society of the Catalan Government. In 2002, the Governing Board re-elected Manuel Castellet as Director and appointed a new Scientific Advisory Board, with the following members: Joan Bagaria, Àngel Calsina, Carles Casacuberta, Vicent Caselles, Alberto Facchini, Evarist Giné, Joan Girbau, Antoni Huerta, Jaume Llibre, Xavier Massaneda, M. Pilar Muñoz, Joan C. Naranjo, David Nualart, Pere Pascual, Joan Porti, Jordi Quer, Oriol Serra, and Juan L. Vázquez. Since 2004, Carles Casacuberta and Jordi Quer have acted as Vice-Directors.

Aims and scope

The CRM gives support to local research groups in all areas of mathematics and fos-

ters emerging research directions by inviting outstanding mathematicians and organising specialised research programmes, conferences, workshops, and advanced courses.

It hosts post-doctoral fellows (thirteen in 2003), including several Marie Curie grant holders, and it has also hosted doctoral students as a Marie Curie Training Site of the European Union from 2000 to 2004. Between 2000 and 2003, the CRM was a node of an EC Training Network entitled *Modern Homotopy Theory*, jointly with teams in Aarhus, Aberdeen, Lille, Louvain-la-Neuve, Paris, and Sheffield.

Research programmes

In 2002, the Governing Board of the CRM approved a quadrennial plan that includes two research programmes every year, together with complementary activities. Each research programme offers the following positions during one academic year: one full-time local researcher, one full-time visiting researcher, two post-doctoral fellows, and 24 months of visiting researchers for periods of one to three months. Activities include a weekly seminar, a conference or a workshop and an advanced course at a doctoral or post-doctoral level. Partial funding for visitors and activities is provided by the Department of Universities, Research and the Information Society (DURSI) of the Catalan Government, under a contract programme that is revised every year, and by means of

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competitive calls. Other sources of funding, through competitive applications, are the Spanish Ministry of Education and Science and the European Commission.

An open call for research programmes is made every year. Each programme has to be approved by the CRM Governing Board. Proposals are presented by the Director on the grounds of evaluation reports prepared by the Scientific Advisory Board.

During the academic year 2003-2004, a research programme on Set Theory was carried out. The organisers were Joan Bagaria (ICREA and Universitat de Barcelona) and Stevo Todorcevic (CNRS and Université Paris 7). For the academic year 2004-2005, a research programme on the Geometry of the Word Problem is planned, under the direction of Josep Burillo and Enric Ventura (Universitat Politècnica de Catalunya), and Noel Brady (University of Oklahoma). Shorter specialised programmes will be held on Control, Geometry and Engineering, co-ordinated by Miguel C. Muñoz (UPC), and on Contemporary Cryptology, co-ordinated by Jorge Villar and Carles Padró (UPC). The Scientific Advisory Board selected two programmes for the academic year 2005-2006: one on Arakelov Geometry and Shimura Varieties, co-ordinated by José I. Burgos (Universitat de Barcelona) and Jörg Wildeshaus (Université Paris 13), and another one on Hilbert's 16th Problem, co-ordinated by Armengol Gasull and Jaume Llibre (Universitat Autònoma de Barcelona), together with Chengzhi Li and Jiazhong Yang (Beijing University).



Excursion to Cabrera 1991

CRM Research Programmes

2003-2004

Set Theory

2004-2005

Geometry of the Word Problem

2005-2006

Arakelov Geometry and Shimura Varieties

On Hilbert's 16th Problem

Scientific meetings

The following conferences and courses were scheduled for 2004 and 2005: *Advanced Course on Ramsey Methods in Analysis* (January 19 to 28, 2004); *Workshop on the Foundations of Set Theory* (June 9 to 12, 2004); *Advanced Course on Contemporary Cryptology* (February 2 to 13, 2004); *Conference on Mathematical Foundations of Learning Theory* (June 18 to 23, 2004); *Workshop on Non-Linear Differential Galois Theory* (June 28 to July 2, 2004); *Advanced Course on Automata Groups* (July 5 to 16, 2004); *HYKE Conference on Complex Flows* (October 6 to 9, 2004); *4th Congress of the European Society for Research in Mathematics Education* (February 17 to 21, 2005); *Barcelona Conference on Geometric Group Theory* (June 8 to July 2, 2005); *Advanced Course on the Geometry of the Word Problem for Finitely Generated Groups* (July 5 to 15, 2005); *Advanced Course on Recent Trends on Combinatorics in the Mathematical Context* (September 12 to 23, 2005).

Around the International Congress of Mathematicians (ICM2006) in Madrid, the CRM will organise a three-month research programme on Analysis and an advanced course on Computational Geometry, both co-ordinated jointly by researchers from Barcelona and Madrid. An ICM satellite conference is also planned.

Links with European entities

Since 2003, the CRM has been an institutional member of the EMS. It is also a member of ERCOM (European Research Centres on Mathematics), a committee of the EMS consisting of scientific directors of European research centres in mathematics. In fact, the current CRM Director, Manuel Castellet, has been the chair of ERCOM since 2002.

In a similar vein to other ERCOM centres, the CRM undertakes actions to reinforce the role of mathematics in the thematic priorities of the 6th Framework Programme of the European Commission. Funding is offered to young mathematicians in order to foster the development of the following topics, which were selected on the basis of reports prepared by local teams: Life sciences,

Mathematics), a network of nine European research institutes that jointly offer post-doctoral fellowships in mathematics and mathematical physics every year.

Publications

Besides its twenty-year old preprint collection the CRM has published, since 2001, a monograph series entitled *Advanced*



Lecture room

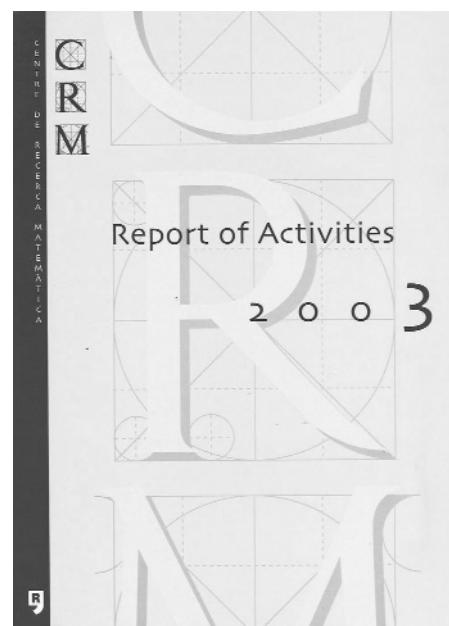
genomics, and biotechnology for health; nanotechnologies and nanosciences; information society technologies; sustainable development, global change and ecosystems. Several activities, including doctoral training and workshops, are planned on neuroscience and cryptology for the years 2004, 2005 and 2006.

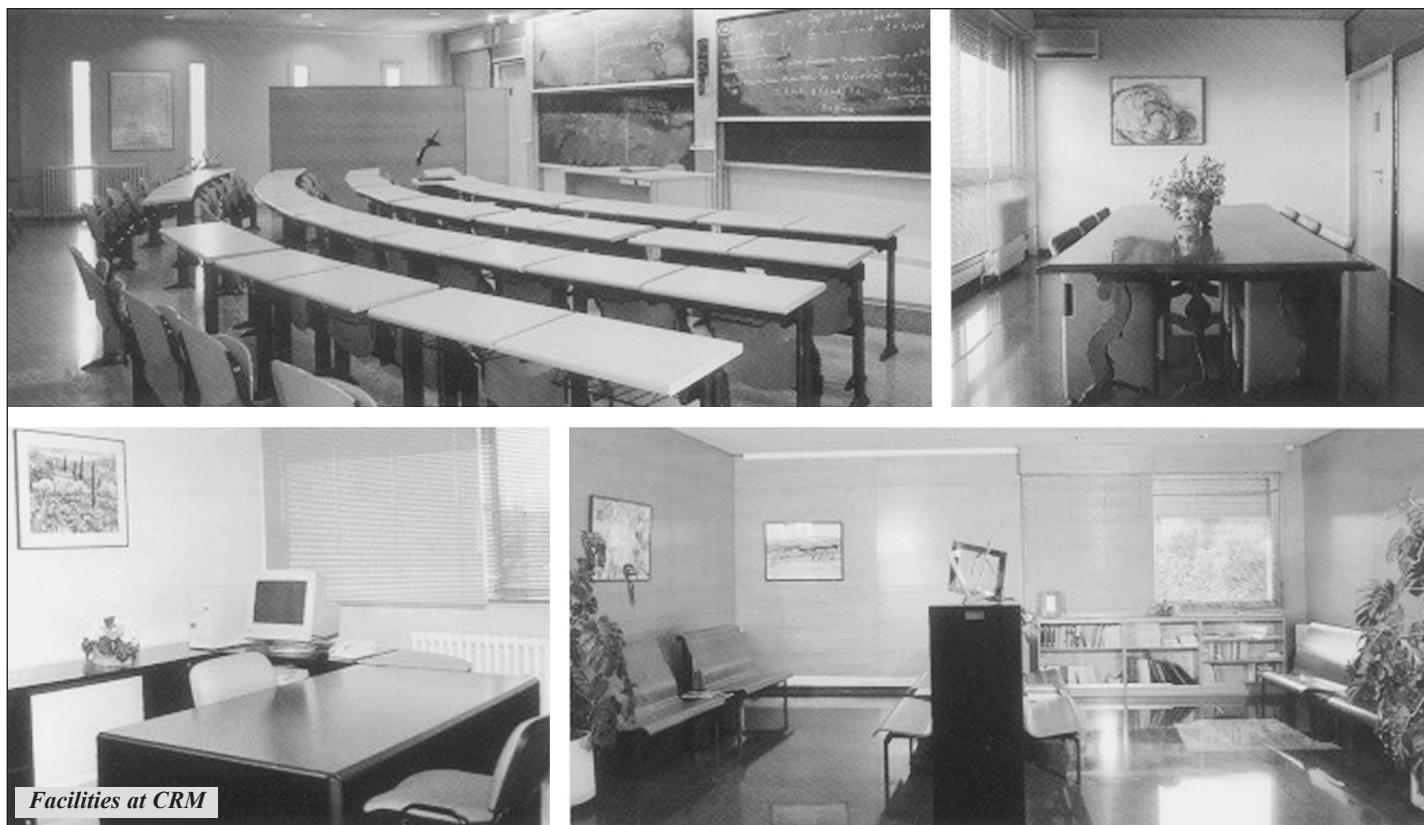
The CRM is a member of the EPDI (European Post-Doctoral Institute for

Courses in Mathematics CRM Barcelona, which is produced and distributed by Birkhäuser Verlag (Basel). The series is especially addressed to doctoral and post-doctoral students. Volumes contain carefully edited notes written by lecturers at CRM advanced courses. The following volumes were published in 2003 and 2004: *Symplectic Geometry and Integrable Hamiltonian Systems*, by M. Audin,



Congress at Institut d'Estudis Catalans. Andrew Barron, Steve Smale, and José M. Matías





Facilities at CRM

A. Cannas da Silva and E. Lerman; *Global Riemannian Geometry: Curvature and Topology*, by S. Markvorsen and M. Min-Oo; *Proper Group Actions and the Baum-Connes Conjecture*, by G. Mislin and A. Valette; *Polynomial Identity Rings*, by V. Drensky and E. Formanek.

Facilities and infrastructure

The CRM occupies 940 square metres in the Science Building of the *Universitat Autònoma de Barcelona*. Office space allows the allocation of up to fifteen guests. Two lecture rooms are used for seminars and meetings. All offices and rooms are fully equipped and air conditioned. The CRM has a LAN Ethernet with twenty-five working stations and four printers. Access to major bibliographic data bases is provided.

In addition, visitors have free access to the scientific infrastructure of the Catalan universities, including the use of the UAB Science and Engineering Library. The CRM has several furnished apartments at its disposal in the *Vila Universitària* of the Bellaterra campus and in the nearby town of Sant Cugat.

20th anniversary

In the Autumn of 2004, the CRM will celebrate its 20th anniversary. On this occasion, Jean-Pierre Serre will deliver a lecture during an academic event on November 9, which will be presided by the foremost academic and political authorities of Catalonia. The history of the CRM during its first twenty years of existence will be published

in a commemorative volume and a CD. In this period, the CRM hosted 969 visitors from 58 different countries, including 44 post-doctoral fellows. Twenty-four congresses were organised, together with 19 workshops and 23 advanced courses. These events were attended by a total number of 3,480 participants, coming from 72 countries. Many of them, hopefully all, enjoyed Barcelona, the Catalan countryside, or the hospitality of their Catalan colleagues, and keep pleasant memories from their stay.

20th Anniversary of the CRM
Jean-Pierre Serre, Collège de France
Groupes finis: Choix de théorèmes
November 9, 2004
 Institut d'Estudis Catalans, Barcelona

Web site

Additional information about the CRM, including full lists of visitors and activities, can be found at the internet address www.crm.es.

Centres at present represented in ERCOM, ordered by decreasing geographical latitude

Euler International Mathematical Institute, St. Petersburg (59°55')
 Institut Mittag-Leffler, Stockholm (59°20')
 Network in Mathematical Physics and Stochastics, Aarhus (56°10')
 International Centre for Mathematical Sciences, Edinburg (55°57')
 Isaac Newton Institute for Mathematical Sciences, Cambridge (52°21')
 Centrum voor Wiskunde en Informatica, Amsterdam (52°21')
 Stefan Banach International Mathematical Center, Warszawa (52°15')
 Thomas Stieltjes Institute for Mathematics, Leiden (52°10')
 Lorentz Center, Leiden (52°10')
 Mathematical Research Institute, Nijmegen (51°50')
 EURANDOM, Eindhoven (51°26')
 Max Planck Institute for Mathematics in the Sciences, Leipzig (51°20')
 Max-Planck Institut für Mathematik, Bonn (50°44')
 Institut Henri Poincaré, Centre Emile Borel, Paris (48°52')
 Institut des Hautes Études Scientifiques, Bures-sur-Ivette (48°52')
 Mathematisches Forschungsinstitut Oberwolfach (48°18')
 Erwin Schrödinger International Institute for Mathematical Physics, Wien (48°13')
 The Abdus Salam International Center for Theoretical Physics, Trieste (45°39')
 Centro di Ricerca Matematica Ennio Di Giorgi, Pisa (43°43')
 Centre International de Rencontres Mathématiques, Luminy (43°18')
 Instituto Nazionale di Alta Matemática Francesco Severi, Roma (41°53')
 Centre de Recerca Matemática, Barcelona (41°25')
 Centro Internacional de Matemática, Lisboa (38°44')
 Emmy Noether Research Institute for Mathematics, Ramat-Gan (32°35')