CENTRE DE RECERCA MATEMÀTICA

RECORD OF ACTIVITIES 1998

Cover designed by Carola Ribas.
Legal Deposit:

The Centre de Recerca Matemàtica (CRM) was created in 1984. Since then, the CRM has become one of the Europe's leading research institutes, highly active, and serving the Catalan mathematical community.

The CRM was one of the founding members of ERCOM (European Research Centers on Mathematics). ERCOM promotes collaboration between European mathematical research institutes that operate on a world-wide basis. It also promotes the exchange of information and research as well as joint and complementary activities. The directors of the ERCOM centres meet annually at one of the centres, Amsterdam in 1998.

This year, 1998, the CRM has accommodated a total of 72 researchers, 6 of whom are postdoctoral fellowship holders, has organized 2 international conferences, —the 1998 Barcelona Conference on Algebraic Topology and the 4th Barcelona Logic Meeting—, a workshop on Current Trends in Research on Mathematical Education, 2 specialized advanced courses and 322 lectures. Twenty-two new Preprints have appeared, as well as four new Quaderns, where the records of specialized activities are collected.

This year an important activity was the organization of the Intensive Trimester on Mathematical Education (TIEM), a pioneering step in our country in this research field, which is crucial for the students' training.

As in every recent year which is 2 plus a multiple of 4, specialized semesters on algebraic topology and on some aspects of dynamical systems have taken place.

All this activity has been possible thanks to the excellent work carried out by the secretaries. Even though their work is not reflected directly in the Record, it is essential for the smooth running of the CRM.

Manuel Castellet
Director

Contents

1 The Centre de Recerca Matemàtica

The Centre de Recerca Matemàtica is a university institute of the Institut d'Estudis Catalans associated with the Universitat Autònoma de Barcelona.

1.1 The Institut d'Estudis Catalans

The Institut d'Estudis Catalans, 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 advance scientific research, in particular research into all elements of Catalan culture. It contributes to the planning, coordination 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, it 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 the humanities. Each section is formed by a maximum of twenty-one full members. There are 25 affiliated societies to the IEC, with more than 8,000 members.

The headquarters of the IEC are the former Convalescent Home building, carrer del Carme 47, Barcelona (CP 08001).

1.2 The Centre de Recerca Matemàtica

In 1984, the Institut d'Estudis Catalans created the Centre de Recerca Matemàtica, with the main goal of providing Catalan mathematicians with a research institute which would stimulate the improvement of mathematical research in Catalonia, both qualitatively and quantitatively. To achieve this aim, the CRM invites outstanding mathematicians for research visits, facilitates scientific contacts between these visitors and our young local researchers, carries out research programmes, organizes lectures, conferences and other scientific meetings, and disseminates research results through its pre-prints series.

The CRM is located in the Science building of the Universitat Autònoma de Barcelona (UAB), on its campus at Bellaterra, in accordance with an agreement signed by the IEC and the UAB.

The address of the CRM is:
Centre de Recerca Matemàtica (IEC)
Apartat 50, E-08193 Bellaterra
Telephone: (34) 935 811 081
Fax: (34) 935 812 202
Electronic mail: `crm@crm.es`
web: `http:\\crm.es`

2 Governing body and structure

2.1 The Council

The CRM is directed by a Council consisting of four members in the area of mathematics of the Institut d'Estudis Catalans and a representative of the Societat Catalana de Matemàtiques (SCM). The members of the Council are:

Dr. Eduard Bonet (IEC)
Dr. Manuel Castellet (IEC)
Dr. Joan Girbau (IEC)
Dr. Sebastià Xambó (SCM)
Dr. Josep Vaquer (IEC).

2.2 The Director

The Council elects a Director to serve for a period of four years. The current Director is Dr. Manuel Castellet who was re-elected for the period 1998-1999 at the meeting of September 1995.

2.3 The Scientific Committee

At the meeting of May 1994, the CRM's Council, following a suggestion made by some members of the mathematical community, agreed to create a Scientific Committee.

The members of the Committee are: Dr. Jaume Agudé (UAB), Dr. Lluís Alsedà (UAB), Dr. Felipe Cucker (UPF), Dr. Joan Elias (UB), Dr. Josep M. Font (UB), Dr. Jaume Moncasi (UAB), Dr. Joaquín Ortega (UB), Dra. Marta Sanz (UB), Dr. Joan Solà-Morales (UPC), Dr. Joan Verdera (UAB) and Dr. Sebastià Xambó (UPC).

2.4 Secretariat

Mrs. Consol Roca and Mrs. Maria Julià are the persons in charge of the administration of the CRM. They also look after the guests and take care of the preparation of the scientific papers.

During this year Mr. Xavier Montes has been doing their social service at the CRM. He has welcomed the visitors, providing them with cultural information and helping them in their legal needs, such as obtaining visas or other official documents. Moreover, he has also updated all the information about the CRM on Internet.

3 Facilities

3.1 Premises

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

3.2 Computing facilities

The CRM has the following computer equipment:

- 3 work stations IBM Power-PC and Risc 6000.
- 17 PC pentium with 17" colour monitor and network card.
- 2 MacIntosh.
- 4 printers: HP LaserJet III, HP LaserJet IV M Plus, HP LaserJet 6MP and HP Desk Writer 600.
- 2 external tape streamers for making security copies for UNIX and PCs.
- 2 SAI for the work stations and the secretaries.

All computers are connected to a network. Besides the software needed to run the network, the centre is also well-equipped with scientific software for UNIX, as well as for PCs.

3.3 Library

The visitors to the CRM may use, without any limitation, the UAB's science library, which contains a mathematics corpus consisting of 391 journals and 10,400 books.

3.4 Accommodation

The CRM has 12 permanently rented furnished apartments for its guests. They are located in Sant Cugat del Vallès and in the Vila Universitària, in the Bellaterra Campus.

4 Visiting Scientists

R. Roy	Statistics, 01.09.97 – 30.06.98 Indian Statistical Institute
D. Karagueuzian	Algebraic Topology, 01.09.97 – 31.07.98 Northwestern University
J. Scherer	Algebraic Topology, 01.10.97 – 28.02.99 Université de Lausanne
L. Halbeisen	Logic, 01.11.97 – 31.09.98 Université de Caen
J. Smith	Algebraic Topology, 20.11.97 – 31.09.98 Purdue University
F. M. Borodich	Applied Mathematics, 03.12.97 – 31.03.98 Glasgow Caledonian University
C. di Prisco	Logic, 05.12.97 – 06.02.98 Instituto Venezolano de Investigaciones Cientîficas
P. Mattila	Analysis, 07.01.98 – 31.07.98 Jyväskylä Universiet
A. J. Bishop	Mathematical Education, 02.02.98 – 30.04.98 Monash University
N. Balacheff	Mathematical Education, 11.01.98 – 01.02.98 Institut IMAG
E. Formanek	Algebra, 16.01.98 - 12.02.98 Pennsylvania State University
N. Presmeg	Mathematical Education, 22.01.98 – 07.02.98 Florida State University
P. Nesher	Mathematical Education, 01.02.98 – 15.02.98 University of Haifa
K. Clements	Mathematical Education, 08.02.98 – 22.02.98 University of Newscastle
B. Parzysz	Mathematical Education, 08.02.98 – 22.02.98 Université de Metz
G. de Abreu	Mathematical Education, 15.02.98 – 01.03.98 Busan National University
R. Cantoral	Mathematical Education, 15.02.98 – 01.03.98 CINVESTAV-IPN
F. Goffree	Mathematical Education, 15.02.98 – 01.03.98 Freudenthal Institute

T. Dreyfus	Mathematical Education, 17.02.98 – 27.02.98 Weizmann Institute of Science
P. Hilton	Mathematical Education, 08.03.98 – 22.03.98 University of Central Florida
J. Pedersen	Mathematical Education, 08.03.98 – 22.03.98 Santa Clara University
B. Bolt	Mathematical Education, 15.03.98 – 29.03.98 University of Exeter
J. Llopis	Logic, 01.04.98 – 30.04.98 Universidad Simón Bolívar
D. Scevenels	Algebraic Topology, 07.04.98 – 26.04.98 Katholieke Universiteit Leuven
A. Adem	Algebraic Topology, 01.12.97 – 31.07.98 University of Wisconsin-Madison
J. P. Greenlees	Algebraic Topology, 14.04.98 – 04.05.98 University of Sheffield
J. A. Crespo	Algebraic Topology, 14.04.98 – 17.07.98 Centre de Recerca Matemàtica
A. Viruel	Algebraic Topology, 15.04.98 - 15.08.98 Universidad de Málaga
G. C. Tan	Algebraic Topology, 16.04.98 – 07.05.98 National University of Singapore
J. Møller	Algebraic Topology, 01.04.98 – 31.07.98 Kobenhavns Universitet
W. Chachólski	Algebraic Topology, 03.05.98 – 10.06.98 Yale University
M. Santos	Algebraic Topology, 01.05.98 – 01.07.98 Universidad de Granada
D. Notbohm	Algebraic Topology, 01.05.98 – 31.07.98 Universität Göttingen
J. Berrick	Algebraic Topology, 01.05.98 – 31.07.98 National University of Singapore
D. Ravenel	Algebraic Topology, 01.05.98 – 31.07.98 University of Rochester
L. Schwartz	Algebraic Topology, 20.05.98 – 10.06.98 Université de Paris XIII
F. Cohen	Algebraic Topology, 01.05.98 – 31.07.98 University of Rochester

W. Dwyer	Algebraic Topology, 01.05.98 – 31.07.98 University of Notre Dame
B. Guerrero	Algebraic Topology, 26.05.98 – 31.07.98 Universidad Nacional de Colombia
H.-W. Henn	Algebraic Topology, 27.05.98 – 24.06.98 Université Louis Pasteur
B. Shipley	Algebraic Topology, 01.06.98 – 30.06.98 University of Chicago
S. Wilson	Algebraic Topology, 01.06.98 - 31.08.98 Hopkins University
R. Levi	Algebraic Topology, 01.06.98 – 15.07.98 University of Aberdeen
O. Cornea	Algebraic Topology, 03.06.98 – 05.07.98 Université de Lille 1
J. Milgram	Algebraic Topology, 04.06.98 – 04.07.98 Stanford University
B. Oliver	Algebraic Topology, 21.06.98 – 11.07.98 Université de Paris XIII
P. Kropholler	Algebra, 01.07.98 – 31.07.98 Queen Mary and Westfield College
M. Bestvina	Algebra, 01.07.98 – 31.07.98 University of California, Los Angeles
N. Kitchloo	Algebraic Topology, 01.07.98 – 31.07.98 MIT
E. Pardo	Algebra, 09.07.98 – 31.07.98 Universidad de Cádiz
L. Potyagailo	Algebraic Topology, 20.07.98 – 25.07.98 Université de Lille 1
S. van Strien	Dynamical Systems, 01.09.98 – 10.09.98 University of Warwick
R. Devaney	Dynamical Systems, 01.09.98 – 12.09.98 Boston University
A. van den Essen	Dynamical Systems, 01.09.98 – 10.09.98 University of Nijmegen
D. Hartig	Applied Mathematics, 01.09.98 – 31.01.99 California Polytechnical State University
F. Gautero	Dynamical Systems, 14.09.98 – 01.10.99 Université de Nice-Sophia Antipolis

L. Cherkas	Dynamical Systems, 15.09.98 – 15.12.98 Belarusian State University
B. Coll	Dynamical Systems, 15.09.98 – 30.09.98 Universitat de les Illes Balears
E. Pérez-Chavela	Dynamical Systems, 16.09.98 – 31.10.98 Universidad Autónoma Metropolitana de México
J. Guaschi	Dynamical Systems, 20.09.98 – 18.10.98 Université de Toulouse III
J. Los	Dynamical Systems, 21.09.98 – 21.11.99 Université de Nice-Sophia Antipolis
Ph. N. Anh	Algebra, 11.11.98 – 30.06.99 Hungarian Academy of Sciences
I. Morrison	Algebraic Geometry, 01.10.98 – 31.01.99 Fordham University
H. Giacomini	Dynamical Systems, 01.10.98 – 15.11.98 Université de Tours
V. Olevskii	Analysis, 01.10.98 - 31.08.99 Tel Aviv University
B. Branner	Dynamical Systems, 12.10.98 – 27.10.98 Technical University of Denmark
D. Ieşan	Applied Mathematics, 05.10.98 – 31.12.98 University of Iasi
W. Li	Dynamical Systems, 15.10.98 – 15.12.98 Peking University
Zh. Zhang	Dynamical Systems, 15.10.98 – 15.12.98 Peking University
E. Lacomba	Dynamical Systems, 21.10.98 – 01.12.98 Universidad Autónoma Metropolitana de México
Ch. Li	Dynamical Systems, 02.11.98 – 15.11.98 Peking University
J. A. Rodríguez	Dynamical Systems, 02.11.98 – 15.12.98 Universidad de Oviedo
K. Baranski	Analysis, 01.11.98 – 31.09.99 Uniwersytet Warszawski

5 Scientific Activities

5.1 Intensive Trimester on Mathematical Education

Under the scientific supervision of professors Alan J. Bishop (Monash University, Australia) and Núria Gorgorió (UAB), the CRM organized an Intensive Trimester on Mathematical Education from January 16 to March 30, 1998. The members of the local organizing committee were: J. Deulofeu (UAB), N. Gorgorió (UAB) and A. Vila (UAB).

The aims of this activity were various:

- To facilitate the development in the field of mathematical education in collaboration with professors of other countries.
- To promote the improvement of research on mathematical education in Catalonia.
- To facilitate innovative practices in relation to the teaching of mathematics in Catalan schools.
- To disseminate through lectures, seminars and publications results of the researches of mathematics professors and other educators.

In order to achieve these aims, specific work groups for the teaching of geometry and problem solving were organized. The following seminars were also given:

Innovation in Geometry teaching

- A. Bishop, Why must we teach Geometry in a world full of calculators and computers?
- N. Balacheff, From a computer surrounding to do geometry, to a computer surrounding to show geometry.
- K. Clements and B. Parzysz, Representations in geometry.
- P. Hilton and J. Pedersen, Non-standard topics to give life to the geometry resumé.
- B. Bolt, What is geometry?

Mathematics and its teaching in our country. Challenges and changes from an international point of view

- A. Bishop, How can mathematics teaching cater for all kind of pupils?
- N. Balacheff, Computer-based environments for the learning of mathematics, didactical complexity and promises.
- N. Presmeg, The power and pitfalls of imagistic thinking in problem solving.
- P. Nesher, Possible relations between natural language and mathematical language.

- K. Clements, School mathematics and questions of equity and justice.
- K. Clements, Problem posing and problem solving in school mathematics: Is Polya relevant to school mathematics in the 21st Century?
- P. Nesher, The role of schemes in solving word problems.
- F. Goffree, Principles and paradigms of realistic mathematics education in the Netherlands.
- T. Dreyfus, The role and nature of proof in high school.
- G. de Abreu, The role of the context in mathematical problem solving.
- R. Cantoral, Epistemología y didáctica del análisis matemático.
- P. Hilton, The need for reform.
- P. Hilton and J. Pedersen, Blending geometry and algebra through Pascal's triangle.
- B. Bolt, The magic of mathematics.

Seminar on Methodology of the Research on Mathematical Education

- A. Bishop, Issues in researching mathematics education: do we need more procedures or better methodologies?
- N. Balacheff, A priori analysis, or the role of theory in methodology.
- N. Presmeg, A semiotic framework for research in mathematical education.
- K. Clements, Linking mathematics education research with the classroom.
- G. de Abreu, Constructivism and social representations as frameworks for research in mathematical education.
- P. Hilton, Recent changes in research methods in mathematics.

5.2 Workshop on Current Trends in Research on Mathematical Education

Coinciding with the Intensive Trimester on Mathematical Education, a Workshop on Current Trends in Research on Mathematical Education was organized. It was coordinated by A. J. Bishop (Monash University, Australia) and N. Gorrió (UAB) and it took place at the CRM on February 19 to 21, 1998. 70 researchers from all over Spain attended this workshop.

The following lectures were given:

- A. J. Bishop, On collaborative research in Mathematics Education.

- E. Castro, K. Clements, A. Gutiérrez, B. Parzysz, Geometry and visualisation.
- M. Camacho, R. Cantoral, T. Dreyfus, M. Sierra, Advanced mathematical thinking.
- G. de Abreu, F. Goffree, L. Puig, E. Silver, Problem solving.
- R. Cantoral, T. Dreyfus, J. M. Fortuny, R. Luengo, The role of computers in mathematics education.
- R. Cantoral, K. Clements, G. de Abreu, F. Goffree, S. Linares, L. Rico, Research methodology on mathematical education. Implications.

5.3 The 4th Barcelona Logic Meeting

From February 5 to 7, 1998, the 4th Barcelona Logic Meeting took place at the CRM. The organizing committee was formed by professors J. Bagaria (UB), E. Casanovas (UB), R. Elgueta (UPC), S. Friedman (MIT), D. Mundici (Universita di Milano), B. Poizat (Universite Lyon I) and J. Rebagliato (UB). 50 researchers from all over the world attended this meeting. The following plenary lectures were given:

- M. Baaz, On the generalization of proofs and calculations.
- J. L. Balcázar, Refining logical characterizations of advice complexity classes.
- A. Baudisch, Mekler's construction preserves CM-triviality.
- G. Cherlin, Tame groups.
- V. A. Gorbunov, Universal horn logic: an algebraic approach.
- A. Louveau, The topological Vaught conjecture for polish group actions.
- T. Recio, Semialgebraic geometry: a personal tour.
- A. Torrens, Algebras of product logic.
- H. Woodin, Iteration strategies, Π^2_1-singletons, and pathological core models.

Other lectures given:

- R. Bomboy, Théorie de Galois des équations aux différences finies.
- R. Bosch, Solving models and ccc forcing extensions.
- R. Farré, An algebraic characterization of existentially closed embeddings of ordered abelian groups.
- G. Fernández Díez-Picazo, The interpretation of the intuitionistic logical constants, revisited.

- J. M. Font, On the construction of substructures in generalized matrices.
- A. Gil, Protoalgebraic Gentzen systems and the cut rule.
- J. Gispert, Embedding theorems preserving non divisibility properties in totally ordered abelian groups. Applications to MV-algebras.
- K. Jaber, Équations générétiques dans un groupe stable nilpotent.
- E. Jaligot, Groupes de type mixtes.
- R. Jansana, Bisimulations and positive modal logic.
- M. Junker, Equations in stable groups.
- V. Kanovei, Linearization of Borel and analytic order relations.
- V. Kanovei, What the internal set theory knows about standard sets.
- V. Krivtsov, The completeness of Heyting's predicate logic relative to a notion of intuitionistic validity in all structures.
- P. Kulicki, Axiomatic rejection in first order theories.
- J. Llopis, Borel partitions of products of finite sets and the Ackermann function.
- J. C. Martínez, A forcing version of the Jurdzińs-Weiss theorem.
- N. Portier, Le problème $P = NP$? dans les corps différentiels.
- K. Sasaki, An interpretation of implications in intuitionistic propositional logic and basic propositional logic.
- Z. Spasojević, Mutual diamond.

5.4 Semester on Algebraic Topology

Under the scientific supervision of professors J. Aguadé, C. Broto and C. Casacuberta of the UAB, the CRM organized a Semester on Algebraic Topology, held from April 14 to July 17, 1998.

This semester was structured in two different areas of research: homotopy theory and homotopy and theory of groups.

- **Homotopy theory:** Compact Lie groups from a homotopy point of view. Cohomology of classifying spaces. Homotopy uniqueness of classifying spaces. Classifying spaces of finite groups.

  p-compact groups. Representations of p-compact groups. Homogeneous spaces.

  Kac-Moody groups from a homotopy point of view. Cohomology of rank two Kac-Moody groups. Homotopy structure of rank two Kac-Moody groups. Cohomology of some higher

lem of homotopy uniqueness.

- **Homotopy and group theory:** Generalized homology theories. Homological localizations. Equivariant homology. Acyclic groups and acyclic spaces. Homotopy constructions using simplicial groups. Invariant algebraic structures under idempotent transformations. Idempotent radicals in group theory. Localization of fibrations. Cellular spaces and cellular groups. Homotopy limits in model categories.

The following seminars were organized:

Seminar on Algebraic Topology. Coordinador: C. Casacuberta.

- J. Greenlees, Rational equivariant cohomology theories, (2 sessions).
- W. Chachólski, Homotopy meaningful constructions, (2 sessions).
- A. J. Berrick, Construction of algebraic K-theory from the localization viewpoint.
- A. J. Berrick, Algebraic K-theory and localization: matters arising.
- O. Cornea, The Conley index, (2 sessions).

Seminar on Cohomology of Groups. Coordinador: A. Adem.

- D. Karagueuzian, Elementary cohomology of groups, (2 sessions).
- J. Scherer, The Kan-Thurston theorem.
- A. Adem, Cohomology and actions of finite groups.
- A. Adem, Group cohomology and representation theory.
- R. J. Milgram, Spherical space forms.
- F. Cohen, Groups obtained from Lie algebras.

Seminar on Homotopy Lie Group Theory. Coordinador: J. Møller

- C. Broto, Multiplicative structures on the three-sphere.
- A. Virtel, Homotopy decompositions of classifying spaces.
- D. Notbohm, p-compact groups.
- J. Møller, Classification of p-compact groups.
- J. Møller, Homotopy representations of homotopy Lie groups.
- N. Kitchloo, Topology of Kac-Moody groups.
- R. Levi, On the space of self homotopy equivalence of BG_p and homotopy group extensions.

- B. Oliver, Construction of fixed point free actions on acyclic 2-complexes.
- M. Bestvina, An infinitely presented FP group.
- P. Kropholler, Groups with finitely many reduced homology classes.

Seminar on Stable Homotopy Theory. Coordinador: D. Ravenel.

- D. Ravenel, Applying the Thomified Eilenberg-Moore spectral sequence to the telescope conjecture.
- B. Shipley, Equivariant stable homotopy theory.
- S. Wilson, Brown-Peterson cohomology from Morava K-theory; e.g. $Q S^n$ and $B\sigma_n$.

The general evaluation of this semester was strongly positive, not only because of the attendance of invited people but also of Ph.D. students and young postdocs from Catalan universities.

5.5 1998 Barcelona Conference on Algebraic Topology

Coinciding with the Semester on Algebraic Topology, the 1998 Barcelona Conference on Algebraic Topology was organized. The organizing Committee was J. Aguadé, C. Broto and C. Casacuberta of the UAB. This conference took place in the Science building of the UAB and in the CRM from June 4 to 10, 1998. 147 researchers from 21 countries attended this conference. The following plenary lectures were given:

- E. R. Cohen, On the homology of "almost embedding spaces".
- D. C. Ravenel, The Thomified Eilenberg–Moore spectral sequence.
- A. K. Bousfield, On the periodic homotopy theory of spaces and spectra.
- J. Greenlees, Equivariant borelism and equivariant formal group laws.
- R. J. Milgram, Relations between homotopy and finite group theory.
- L. Schwartz, Kuhn's non realization conjecture.
- W. Lück, The completion theorem in K-theory for proper actions of a discrete group.
- S. Stolz, Multiplicities of isoparametric hypersurfaces.
- G. Mislin, Groups acting on finite dimensional contractible spaces with finite stabilizers.
- J. Lannes, Lattices and cohomology of $O^n(\mathbb{Z}[\frac{1}{2}])$.

- J. M. Boardman, A noncommutative Hopf ring.
- B. Oliver, Finite group actions on acyclic 2-complexes.
- P. Fleischmann, On relative trace ideals and Cohen–Macaulay quotients of modular invariant rings.
- N. J. Kuhn, Characterizations of spectra which satisfy the Brown–Gitler property.
- M. Karoubi, Non commutative differential forms in topology.
- J. M. Møller, Toric morphisms between p-compact groups.
- U. Tillmann, The CFT-operad and infinite loop spaces.
- A. Virtel, Lusternik–Schnirelmann cocategory: a Whitehead dual approach.
- W. Chachólski, An A-complication, and an A-Blanc–Stover resolution.
- B. Shipley, A classification of stable model categories.
- J. Strom, Miller spaces.
- J. H. Smith, Constructing model categories.

Other lectures given:

- W. G. Dwyer, Symmetric powers and the Steinberg idempotent.
- B. Oliver, Finite group actions on acyclic 2-complexes.
- P. Fleischmann, On relative trace ideals and Cohen–Macaulay quotients of modular invariant rings.
- J. M. Boardman, A noncommutative Hopf ring.
- D. Blanc, Algebraic invariants of homotopy types.
- P. Turner, The homology of spaces representing exact cohomology theories.
- B. Guerrero, Quantization of the universal enveloping algebra $\mathcal{U}(\mathfrak{sT}(2))$.
- D. J. Green, Computing the cohomology of p-groups.
- K. Lesh, Identification of infinite loop spaces arising from group theory.
- S. Prassidis, Lower Nil and K-groups.
- N. Strickland, Duality in the Morava K-theory of groups.
- B. Johnson, Calculus of homotopy functors and universal degree n towers.
- O. Cornea, Homotopical dynamics: duality and smoothings.
- M. P. Carrasco, Schreier theory for extensions of categorical groups and homotopy classification.
- P. Salvatore, Configuration spaces with summable labels.
- P. Symonds, Cohomology of p-groups.
- H. Krause, Smashing subcategories and the telescope conjecture —an algebraic approach.
- D. Scevenels, Universal epimorphic equivalences for localizations.

- J. Hunton, Homological invariants for quasi-periodic tilings.
- A. Adem, Topological models and the cohomology of Galois groups.
- B. Gray, Composition methods in the homotopy groups of $V(0)$.
- I. Leary, A variation on a theme of Km–Thurston.
- W. S. Wilson, Unstable splittings related to BP.
- J. Rognes, Cohomology of the smooth Whitehead spectrum.
- D. Christensen, Pfaffian maps: all or nothing.
- D. Arlettaz, Spaces with torsion Postnikov invariants.
- S. Schwede, Formal groups and stable homotopy of commutative rings.
- R. Levi, On combinatorial models for iterated loop spaces and some possible applications.
- D. Stanley, Some examples in Lusternik-Schnirelmann category.

5.6 Semester on Dynamical Systems

Under the scientific supervision of professors Ll. Alsedà, A. Gasull and J. Llibre of the UAB, the CRM organized a semester on Dynamical Systems, held from September 15 to December 15, 1998.

The semester was structured in two different areas of research: discret dynamical systems and continuous dynamical systems.

- **Discret Dynamical Systems:** Study of the periodic structure, patterns, topological entropy and transitivity of several classes of maps in graphs, compact manifolds, ... Complex dynamics. Symbolic dynamics. Global injective maps.
- **Continuous Dynamical Systems:** qualitative theory of differential equations: centers, isochronous center, period functions, Liapunov constants, limit cycles, estructural stability, polynomial foliations, integrability and non-linear systems in control theory.

  Celestial Mechanics: Foliations of integrable Hamiltonian systems. Global description of the flw of restricted 3-body problems. Study of families of periodic orbits and of their bifurcations.

The lectures given during the semester were:

- F. Gautero, Dynamical CW-complexes.
- E. Pérez-Chavela, Different kinds of potentials in celestial mecbanics.

- R. Kooij, Uniqueness of limit cycles in quadratic systems with a weak and a strong focus.
- E. Pérez-Chavela, The quasihomogeneous collinear three body problem.
- L. Cherkas, Dulac functions for polynomial vector fields.
- Ll. Alsedà, Minimizing topological entropy for continuous maps on graphs.
- H. Giacomini, Bifurcations of limit cycles from Hamiltonian centers via the inverse integrating factor.
- Z. Zhifen, Different methods for estimating the number of zeros of Abelian integrals.
- L. Weigu, Smooth classification of the germs of one-dimensional vector fields or diffeomorphisms.
- E.A. Lacomba, Topological classification of real cubic surfaces in the 3-dimensional sphere.
- L. Cherkas, Some new approaches in the study of Abelian integrals.
- J. Guaschi, Fixed point classes, braids and combs.
- J.A. Rodríguez, Coexistence and persistence of infinitely many strange attractors.
- L. Cherkas, Unusual problems about limit cycles of quadratic systems.
- V. Mañosa, Stability of a class of planar degenerate singular points.
- J. Libre, Some results and open problems about the algebraic solutions of polynomial differential equations.
- A. Gasull, The isochronicity problem for several families of planar differential equations.

5.7 CRM Advanced Courses

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

During 1998 the following courses were given:

Advanced Course on Classifying Spaces and Cohomology of Groups: from May 27 to June 2, coordinated by C. Broto (UAB) and lectures given by:

- **W. G. Dwyer** (University of Notre Dame, USA). Finite groups, homotopy colimits, and homology decompositions (9 hours).

The main objective was to know how to use homotopy theory to study the problem of calculating the cohomology of the classifying space of a finite group. The approach is to express the classifying space, up to cohomology, as a homotopy colimit of classifying spaces of smaller groups. Doing this in a systematic way involves working with simplicial techniques, studying homotopy colimits, and analyzing the fixed-point set geometry of a space with an action of a finite group.

- **H.-W. Henn** (Université Louis Pasteur, Strasbourg). Unstable modules over the Steenrod algebra and cohomology of groups (9 hours).

  The presence of Steenrod operations in the mod-p cohomology ring $H^*(BG : \mathbb{F}_p)$ of the classifying space BG of a group G allows to understand qualitative features of this ring, at least for a large class of groups including all compact Lie groups but also for many discrete groups like arithmetic group, mapping class groups and automorphism groups of free groups. It was explained the relevant theory of unstable modules over the Steenrod algebra and showed how the general theory can be applied to do concrete calculations.

Other lectures given:

- D. Karagueuzian, The module structure of a symmetric algebra.
- K. Andersen, The normalizer splitting conjecture for p-compact groups.
- M. F. Anton, On a conjecture of Quillen .
- J. Martino, A Mimami-Webb formula for compact Lie groups.
- M. Brun, Topological Hochschild homology of $\mathbb{Z}/p^r$.
- S. Priddy, On stably decomposing products of classifying spaces.
- D. J. Pineda, Algebraic K-theory of discrete groups of isometries with finite volume orbit space.
- M. Cencelj, The Berrick–Casacuberta plus construction space is a wedge of grapes.

Advanced Course on Dynamical Systems: from September 1 to 10, coordinated by Ll. Alsedà, A. Gasull and J. Llibre of the UAB and lectures given by:

- **S. van Strien** (University of Warwick) Complex dynamics of real polynomials (7.5 hours).

  Metric tools in real one-dimensional dynamics. Julia sets and ways of estimating the shape of Yoccoz puzzle pieces. Big moduli in the quadratic case versus small moduli associated to polynomials of higher order. The topology and geometry of Julia sets of real polynomials.

- **R. Devaney** (Boston University) Dynamics and topology of entire functions (12 hours).

  Behavior of entire transcendental functions under iteration. Julia sets and bifurcations sets for such functions. Discussion of the rich topological structures such as Cantor bouquets and Knaster continua associated with these sets. Description in detail of some of the global bifurcations encountered in families of these functions.

- **A. van den Essen** (University of Nijmegen) The Jacobian conjecture and dynamical systems (7.5 hours).

  Invertible polynomial maps. The Jacobian Conjecture. Stability methods $H(n, A)$, $D(n, A)$. Linearization conjecture and a conjecture of LaSalle.

Other lectures given:

- Ll. Alseda, Dynamics of Hubbard trees.
- A. Cima, Isochronicity of planar systems and the Jacobian conjecture.
- N. Fagella, Quasiconformal surgery on Herman rings of the standard family.
- Cl. Innnger, Rational functions whose Julia sets are Jordan arcs or curves.
- X. Jarque, Non regular sequence for complex exponentials. The Misiurewicz case.
- M. Lakner, The One-Equator Property.
- J. Libre, Periodic orbits for holomorphic maps.
- J. S. Lynch, The medusa algorithm and polynomial matings.
- P. Petek, Circles and periodic points in quaeternionic Julia sets.
- P. Roesch, Local connectivity for Newton maps.
- M. Skapin, The dynamics of $\lambda + z + \exp(z)$.
- Ch. Stroh, On the connectedness of Julia sets of rational functions.
- J. C. Valverde, Local bifurcations of one-parameter families of maps whose zero zero non-degenerated conditions.
- J. Villadelprat, A Poincaré-Hopf theorem for non-compact manifolds.

5.8 Other Lectures and Seminars

January

- J. M. Burgués, Algunes aplicacions de l'anàlisi funcional (2 sessions).
- J. M. Sagrillo, Universo del discurso y propiedades omega.
- A. Haro, The primitive function of an exact symplectomorphism.
- J. Ortega Cerdà, Sobre la natura discreta de la transformada de Gabor.
- E. Casanovas, Stable theories with a new predicate.
- M. J. González, Quasiconformal maps and interpolating sequences.
- J. Smith, Rigidifying the Steenrod algebra.
- E. Formanek, Generic matrix rings.

February

- J. M. Ettinger, Introduction to Quantum Computing and the application of Harmonic Analysis on finite groups.
- K. Dyakonov, Approximate identities and geometric means of smooth positive functions.
- M. Chas, Teoría del punto frío y aplicaciones (2 sessions).
- S. Celani, Semánticas relacionales y algebraicas, y teoremas de dualidad, para lógicas de la relevancia.
- J. Mateu, Integral de Chouquet y teoría del potencial.
- J. Villadelprat, Potencials isocrons.
- M. Chas, Periodos mixtinos de hormomorfismos en superficies orientables.
- A. Torrens, Àlgebres de Stone lliures (2 sessions).
- L. Geyer, Siegel disks, Herman rings and the Arnold family.

March

- P. Mattila, Vitushkin conjecture: Nazarov-Treil-Volberg approach.
- A. Cima, Separatrius complexes sense singularitats (2 sessions).
- J. Torregrosa, Ciclicitat per a equacions de Liénard (2 sessions).
- J. Bruna, Transformada de Hilbert bilineal i operadors de Haenkel.
- M. Farré, Introducció als sistemes dinàmics olectoris (2 sessions).
- F. Esteva, Sistemes lògics basats en similaritats.
- E. Gallego, Geometria integral i singularitats complexes (VIII): fórmules cinemàtiques.
- P. Hilton, Calculating the genus of a class of topological spaces.

- J. M. Font, Versions fortes de lo-giques protoalgebraiques: conditions necessaries i/o suficients i teoremes de transfer.
- Yong Lin, Analitic capacity and curvature.
- J. Villadelprat, Isocronia per a algunes classes de camps hamiltonians (2 sessions).
- J. L. Balcázar, Refining logical characterizations of advice complexity classes.
- E. Gallego, Geometria integral i singularitats complexes (IX): fórmules cinemàtiques.
- F. Borodich, Some nonlinear effects of crack propagation in concrete and rock (fractal approach).
- V. Vershinin, Cohomology of Braids.
- R. Jansana, Ideals en quasivarietats d'àlgebres (2 sessions).
- N. Marco, Interpolation in weighted Bergman spaces and finite union of interpolating sequences.
- A. Calsina, Equacions diferencials asimptòticament autònomes.
- I. Jané, Sobre la paradoxa de Skolem.
- B. Wirtz, Points fixes de pseudo-groupes de Diff $(0, \mathbf{C})$ ó parametres.
- A. López, Límies de crestia i wall per a l'anàlisi d'imatges. Aplicació a la fusió d'imatges mèdiques CT i MR.
- B. Coll, Models matemàtics dins el món de les imatges.
- E. Hubbers, Stably tame automorphisms.

April

- S. Lamy, L'alternative de Tits pour $\mathrm{Aut}\ \mathbf{C}^2$.
- P. Viñolas, Utilització de mètodes quantitatius als mercats financers.
- R. Jansana, Logiques assercionals feblement algebritzables.
- Vl. Eidelman, Decrease of analytic functions on a sequence of points.
- X. Jarque, Estabilitat hamiltoniana al pla (2 sessions).
- J. Llopis, Particiones Borelianas de los números reales.
- J. A. Rodríguez, Codimensión máxima de una singularidad tridimensional desplegando genéricamente atractores extraños.
- A. Pumariño, Una familia de campos vectoriales con infinitos atractores persistentes.
- S. Ibáñez, Desplieges de singularidades.
- R. Adillon, Sobre el càlcul proposicional intuïcionista amb implicació, conjunció, disjunció, fusió i zero i sense contracció (I).

- J. Libre, Temció de desplaçament pels sistemes quadràtics (2 sessions).
- J. Sueiro, Càlcul estocàstic, risc de mercat i valoració d'opcions.
- J. M. Mazon, Atractores para problemas de difusión no lineal degenerados.

May

- V. Verdú, Sobre el càlcul proposicional intuïcionista amb simplicació, conjunció, disjunció, fusió i zero i sense contracció (II).
- J. C. Leger, Flatness and finiteness in the Mumford-Shah problem.
- T. Guillamón, Equacions amb retard: qüestions bàsiques i algunes aplicacions recents (2 sessions).
- E. Casanovas, Herederos y coherederos en teorías simples.
- J. P. Marco, Dynamical properties in the vicinity of double resonance for perturbations of integrable systems.
- V. Gelfreich, Splitting of separatrices near a saddle-node bifurcation.
- D. Gil, Geometria integral i singularitats complexes (X).
- J. L. Fernández, Riesgo de crédito en mercados financieros.
- A. Gil, Sistemes de Gentzen proposicionals.
- H. Joyce, Curvature, projections and analytic capacity.
- R. Martínez, Regularització en problemes de mecànica celeste (2 sessions).
- J. Libre, Cicles límit que bifurquen de l'infinit per a sistemes quadràtics.
- D. Gil, Geometria integral i singularitats complexes (XI).
- E. Casanovas, El orden fundamental en las teorías simples.
- D. Sauzin, Averaging and Borel transform.
- V. Rothos, Subharmonic Melnikov's function for 2D mappings.
- J. Montiló, Opcions exòtiques.
- J. Rebaglíato, Sistemes de Gentzen proposicionals (2 sessions).
- A. Cantón, Martingales y teoría geométrica de funciones.
- D. Gil, Geometria integral al pla hiperbòlic.
- J.-A. Weil, Some algebraic tools to study the differential Galois groups of parametrized families of linear differential systems.
- C. Simó, Accurate numerical integration of ODE. Multiprecision and parallelism.
- K. Goodearl, The Morelin-Rentschler-Vorenssen theorem: transitivity of algebraic group actions on sets of primitive ideals.

- X. Aguilà, Gestión y cálculo del riesgo de mercado en una cámara de compensación de futuros y opciones.
- S. Pinchuk, Reflection principle in higher dimensions.
- Ll. Alsedà, Transitivitat i entropia topològica (3 sessions).
- J. Libre, Sobre un teorema i un problema obert de Leonhard Euler.
- L. Halbeisen, Cardinal arithmetic in the absence of the axiom of choice.

June

- M. Rudnev, Splitting for a double resonance with symmetries. Small divisors may be worse than non-integrability.
- R. de la Llave, Estimaciones y cálculo numérico de variedades centro.
- J. M. Font, Filtres de Leibniz en lògiques multivaloradas.
- J. A. Raposo, Acotacións de operadores sobre funcions características.
- A. van den Essen, The differential equation $y' = f$.
- S. Wiggins, Lagrangian transport in geophysical fluid flows: a geometric approach using dynamical systems theory.
- R. de la Llave, A geometric approach to existence of orbits with large increases of energy in periodic perturbations of geodesic flows.

- J. Verdera, Teoria de Calderón-Zygmund quan la mesura base no doblia.
- J. Pau, El teorema de la corona a $H^\infty D$. Problemes relacionats.
- J. Torregrosa, Les funcions de Melnikov i la bifurcació de Hopf.

July

- A. van den Essen, The equation $Y''' = r(x)y$: a glimpse of differential Galois theory.

September

- O. Blasco, Funciones enteras integrables respecto a pesos exponenciales.
- R. Krikorian, The set of reducible smooth skew-products on $\mathbb{T}^1 \times SU(2)$ is (globally) dense.
- H. Broer, Hill's equation with periodic and quasi-periodic forcing.

October

- J. Cerdà, J. A. Raposo i el seu treball sobre multiplicadors de Fourier.
- VI. Lazutkin, Making fractals fat.
- H. Hanssmann, Bifurcations of normally parabolic tori in hamiltonian systems.
- S. Wilson, Hopf rings in algebraic topology (4 sessions).

- J. Bagaria, Bounded forcing axioms and the cardinality of the continuum.
- Y. Fedorov, Discretization of algebraic integrable systems.
- A. J. Maciejewski, Rotational motion of a rigid satellite in a circular orbit —certain open problems.
- L. Meersseman, Construcción geométrica de variedades complejas en dimensión arbitraria (2 sessions).
- R. Castaño-Bernard, Foliaciones Lagrangianas.
- D. Yost, Twisted sums of classical Banach spaces.
- D. Bambusi, On long time stability in hamiltonian perturbations of nonresonant linear PDE's.
- C. Simó, Meandering and laby rinthic rotational invariant curves in nontwist area preserving maps. Genericity results and examples (2 sessions).
- J. Ortega Cerdà, Multipliers and interpolation.
- D. Iesan, Thermal stresses in cylinders.
- D. Aspero, The bounded Martin's maximum.
- J. Los, Forcing relation and knots in 3-space.
- D. Gil, Nilvarietats complexes sense funcions holomorfes no constants.

November

- J. Orobitg, BMO per a mesures no-doblants.
- J. C. Martínez, Sobre el teorema de Baumgartner-Shelah para álgebras de Boole.
- M. Levi, Geometry and physics of averaging with applications.
- A. Delshams, KAM theory and a partial justification of Greene's criterion for non-twist maps.
- D. Marín, Un teorema de rigidez para foliaciones holomorfas.
- I. Gálvez, Álgebres de Lie de dimensió infinita.
- V. Olevskii, Multipliers and variations.
- R. Jansana, La versió forta d'una lògica proto algebraica.
- V. Sidorenko, Investigation of stability of long-period planar satellite motions in a circular orbit.
- E. Gallego, Geometria integral i singularitats complexes (XII): algunes consideracions sobre la fórmula de Crofton en espais hermítics.
- A. Ruiz, Álgebres de Kac-Moody.
- J. Verdera, Mesures amb curvatura finita sobre conjunts continus.
- I. Morrison, Moduli spaces of curves (5 sessions).

- P. Gutiérrez, Potencial de splitting i teoria de Melnikov per a tors amb bigotis en sistemes hamiltonians.
- C. Casacuberta, Motivació física.
- P. Viader, On a problem of Alfred Renyi.
- P. Haïssinsky, Parabolic surgery.
- N. Fagella, Dinàmica complexa.
- D. Iesan, The methods of potential in elastostatics.
- R. Farré, Immersions existencialment tancades de grups abelians ordenats (3 sessions).
- J. Schürer, L'homologia de BU.
- M. Mastyło, The Dunford-Pettis property for Banach spaces.

December

- J. Solà-Morales, El sistema mollassa com a límit singular d'una equació d'ones.
- S. Ibáñez, Bifurcacions en una família de camps en $\mathbb{R}^3$ con divergencia cero y una condición de simetría.
- C. Simó, Hill's equation I: the periodic case. Local vs global.
- J. Schürer, Àlgebres de vertexs.
- P. McCullagh, Quotient spaces and statistical models.
- C. Casacuberta, Moonshine.
- J. Ortega Aramburu, Embeddings d'espais de potencials en espais L^p.
- M. Baaz, Perspectives in the development of Gödel logics.
- Ch. Fermüller, Many-valued modal logics.
- G. Salzer, Automatic generation of many-valued calculi.
- C. Bonet, Les martingales són honestes.
- D. Aspero, Stationary reflection.
- J. J. Morales, Grupos discretos libres y dinámica caótica en teoría de Galois diferencial.
- P. Haïssinsky, Partial survey of 1-dimensional complex dynamics.
- N. Castellana, Una representació homotòpica de $D1_2$.
- J. J. Carmona, Conjunts excepcionals numerables.

5.9 Publications

During the year 1998 the CRM has continued the three series of publications, Preprints, Conferències and Quaderns

PREPRINTS. During this year, 22 preprints have been published:

- Borel partitions of products of finite sets and the Ackermann function, J. Llopis and S. Todorčević (n. 378).
- Hormotopy meaningful constructions: homotopy colimits, W. Chachólski and J. Scherer (n. 379).
- Self-similar models of multiple fracture and size effect, F. M. Borodich (n. 380).
- Exact solutions to some contact problems of anisotropic elastodynamics, F. M. Borodich (n. 381).
- Universal epimorphic equivalences for group localizations, J. L. Rodríguez and D. Scevenels (n. 382).
- On the parametrization of self-similar and other fractal sets, M. A. Martín and P. Mattila (n. 383).
- The module structure of a group action on a polynomial ring, D. Karagueuzian and P. Symonds (n. 384).
- On embeddings between classical Lorentz spaces, M. Carro, L. Pick, J. Soria and V. D. Stepanov (n. 385).
- Exit times from equilateral triangles, A. Alabert, M. Farré and R. Roy (n. 386).
- On a problem in cardinal arithmetic in the absence of the axiom of choice, L. Halbeisen (n. 387).
- Remarks on bases of Banach spaces, J. Bagaria, L. Halbeisen and N. Hungerbühler (n. 388).
- Counting involutions in groups of upper triangular matrices, D. B. Karagueuzian (n. 389).
- Symmetric and Zygmund measures in several variables, E. Doubtsov and A. Nicolau (n. 390).
- Relations between some cardinals in the absence of the Axiom of Choice, L. Halbeisen (n. 391).
- An symptotic behaviour of crosscorrelograms estimates of the response function, V. V. Buldygin and V. Zaiats (n. 392).
- Leibniz filters and the strong version of a protoalgebraic logic, J. M. Font and R. Jansana (n. 393).
- On the problem of propagation of heat in mixtures, D. Iesan and R. Quintanilla (n. 394).
- On the homotopy type of iterate stunted projective spaces, F. R. Cohen and R. Levi (n. 395).

- Tests of fit for the Laplace distribution, P. Puig and M. A. Stephens (n. 396).
- A theory of nonsimple microstretch fluids, D. Iesan and R. Quintanilla (n. 397).
- On a theory of thermoelasticity with microtemperatures, D. Iesan and R. Quintanilla (n. 398).
- Structure of mod p H-spaces with finiteness conditions, J. A. Crespo (n. 399).

CONFERENCIES. The third volume of this series has been published. It compiles the extended abstracts of the lectures and seminars given at the CRM during the year 1998.

QUADERNS They compile the content of specialized activities. The following volumes have been published:

- Workshop on Abstract Algebraic Logic, Editor: J. M. Font (n. 10).
- Stochastic evolution equations by semigroups methods, G. Da Prato (n. 11).
- Workshop on the Ramsey Theory of the Reals, Editor: J. Bagaria (n. 12).
- Advanced Course on Classifying Spaces and Cohomology of Groups, Editor: C. Broto (n. 13).

6 Ferran Sunyer i Balaguer Prize

The International Ferran Sunyer i Balaguer Prize was announced this year for the seventh time. This 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 1.800.000 pta and the winning monograph is published by Birkhäuser Verlag in the "Progress in Mathematics" series.

In the 1997 announcement, 7 monographs by authors from different countries were submitted. The scientific Committee consisting of Professors Friedrich Hirzebruch (Max-Planck Institut, Bonn), Paul Malliavin (Université de Paris VI), Joseph Oesterlé (Université de Paris VI), Joan Solà Morales (Universitat Politécnica de Catalunya) and Alan Weinstein (University of California at Berkeley) recommended that the Foundation should award the prize to the monograph:

Differential Galois theory and non-integrability of Hamiltonians systems

by J. J. MORALES RUIZ (Universitat Politécnica de Catalunya).

7 Finances

7.1 Institucionals awards

7.1.1 Visiting professors on sabbatical leave

A. Adem	01.12.97 – 31.07.98	P. Mattila	07.01.98 – 31.07.98
J. Berrick	01.05.98 – 31.07.98	J. Møller	01.04.98 – 31.07.98
A. Bishop	02.02.98 – 30.04.98	D. Notbohm	01.05.98 – 31.07.98
F. Cohen	01.05.98 – 31.07.98	D. Ravenel	01.05.98 – 31.07.98
W. Dwyer	01.05.98 – 31.07.98	J. Smith	01.03.98 – 30.09.98
D. Ieşan	05.10.98 – 31.12.98		

7.1.2 Visiting professors DGU

H. W. Henn	27.05.98 – 24.06.98
R. Levi	01.06.98 – 15.07.98
R. Roy	01.09.97 – 30.06.98

7.1.3 Postdoctoral fellowships

In December 1997, the CRM announced two postdoctoral fellowships available to young doctors with less than 3 years of postdoctoral research. 50 applications were submitted. Fellowships were awarded to:

K. Baranski	01.11.98 – 31.09.99
V. Olevskii	01.10.98 - 31.08.99

The CIRIT assigned to the Algebraic Topology Group a postdoctoral grant (1998SGR00118) which was awarded to:

D. Karagueuzian 01.09.97 – 31.07.98

7.1.4 Organization of Conferences and Seminars

The 4th Barcelona Logic Meeting (CIRIT[1], DGESeIC[2], UAB[3]).
Semester on Algebraic Topology (CIRIT, DGESeIC).
Advanced Course on Classifying spaces and cohomology of groups (DGESeIC, EU[4]).
1998 Barcelona Conference on Algebraic Topology (CIRIT, DGESeIC, EU, UAB).
Advanced Course on Dynamical Systems (CIRIT, DGESeIC, FCR[5], UAB).
Semester on Dynamical Systems (DGESeIC, FCR).

[1] Comissió Interdepartamental de Recerca i Innovació Tecnológica, Catalan Government.
[2] Dirección General de Enseñanza Superior e Investigación, Spanish Government.
[3] Universitat Autónoma de Barcelona.
[4] European Union.
[5] Fundació Catalana per a la Recerca.

7.2 Budget

Founding sources

CIRIT	15.000.000	PTA.
DGESeIC	20.625.000	"
Generalitat (applications)	5.550.000	"
UE	6.003.084	"
UAB (facilities)	3.470.000	"
UAB (activities)	1.097.000	"
Foundation FSB	1.800.000	"
FCR	1.000.000	"
UB (ICE)	300.000	"
Carried forward from 1997	2.750.000	"
Registration fees	2.150.000	"
Total	59.745.084	PTA.

Expenditure

Travels	1.925.300	PTA.
Visitors	16.425.000	"
Postdoctoral grants	4.400.000	"
Conferences and courses	8.426.000	"
Maintenance	3.470.000	"
Accommodation	9.830.573	"
Long-term material	1.070.328	"
Day-to-day material	916.256	"
Secretariat	9.308.000	"
Director	1.000.000	"
Publications	726.320	"
Prizes	1.800.000	"
Miscellanious	447.307	"
Total	59.745.084	PTA.