



**Center for Mathematical Analysis,
Geometry, and Dynamical Systems**

Report 2007

February 2008

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1 Visitors

The following researchers visited the Center in 2007:

- R. Abgrall, Univ. Bordeaux 1, 23–29.07.07.
- V. Afraimovich, Univ. Autónoma de San Luis Potosi, Mexico, 24–30.06.07.
- O. Akin, Gazi Univ., Turkey, 22–27.07.07.
- D. Alekseevsky, Univ. Edinburgh, UK, 5–8.09.07.
- L. Alsedá, Univ. Autònoma de Barcelona, Spain, 22–28.07.07.
- B. Audoux, Univ. Paul Sabatier, France, 5–8.07.07.
- J. Azcárraga, Univ. Valencia, Spain, 5–10.09.07.
- V. Baladi, Centre National de la Recherche Scientifique, France, 22–28.07.07.
- F. Balibrea, Univ. Murcia, 22–28.07.07.
- F. Barbero, Consejo Superior de Investigaciones Cientificas, Spain, 4–8.09.07.
- A. Bas, Univ. Murcia, Spain, 27–30.11.07.
- M. Benedicks, Royal Institute of Technology, Stockholm, Sweden, 25–30.06.07.
- I. Berg, Univ. Évora, Portugal, 23–24.11.07.
- J. Bloom, Columbia Univ., USA, 5–8.7.07.
- F. Boca, 31.08–5.09.07.
- D. Bonheure, Univ. Louvain-la-Neuve, Belgium, 8–12.07.07.
- V. Bonini, McMaster Univ., Canada, 28.05–3.06.07.
- L. Bunimovich, Georgia Institute of Technology, USA, 9.06–1.07.07.
- M. Bonner, Univ. Missouri, 22–27.07.07.
- A. Bruder, Utah State Univ., USA, 1–31.07.07.
- U. Bruzzo, Scuola Internazionale Superiore di Studi Avanzati, Italy, 3–9.12.07.
- E. Camouzis, The American College of Greece, Greece, 26–29.07.07.
- R. Caseiro, Univ. Coimbra, Portugal, 5–8.09.07.
- P. Cartier, Institut des Hautes Études Scientifiques, France, 4–14.06.07.
- W. Chacholski, KTH, Stockholm, Sweden, 23–27.10.07.
- S. Sun Cheng, Tsing Hua Univ., Taiwan, 20–29.07.07.
- J. Cholewa, Univ. Silesia, Poland, 22–28.01.07.
- C. Ciliberto, Univ. Roma 2, Italy, 31.01–02.02.07.
- R. Cockett, Univ. Calgary, Canada, 23–26.06.07.

J. Colombeau, Univ. Estadual de Campinas, Univ. São Paulo, and Univ. Federal do Rio de Janeiro, Brazil, 23–25.11.07.

J. Cushing, Univ. Arizona, USA, 22–28.07.07.

S. Czerwik, Silesian Univ. Technology, Poland, 22–29.07.07.

M. Dadarlat, Purdue Univ., USA, 05–10.06.07.

F. Dannan, Univ. Qatar, Qatar, 22–29.07.07.

E. D’Aniello, Seconda Università degli Studi di Napoli, Italy, 10.04–3.05.07.

V. Deaconu, Univ. Nevada, Reno, USA, 20–23.05.07.

R. Devaney, Boston Univ., USA, 22–29.07.07.

L. Diogo, Univ. Chicago, USA, 5–8.07.07.

O. Dragulette, Ecole Polytechnique Fédérale de Lausanne, Switzerland, 11–18.06.07.

E. Dryden, Bucknell Univ., USA, 8.05–23.06.07.

M. Efendiev, Technical Univ. Munich, Germany, 28.02–10.03.07.

R. El Harti, Univ. Hassan I, Morocco, 17.05.07.

S. Elaydi, Trinity Univ., USA, 2–31.07.07.

J. Elisseeva, Moscow State Univ. Technology, Russia, 20–28.07.07.

E. Farjoun, Hebrew Univ. Jerusalem, Israel, 19–25.04.07.

H. Feller, Univ. Nebraska-Lincoln, USA, 21–28.07.07.

E. Fernandez, Univ. la Laguna, Tenerife, Spain, 4–14.09.07.

B. Fiedler, Freie Univ. Berlin, Germany, 3–11.10.07.

J. Funk, Univ. West Indies, Barbados, 23.06–01.07.07.

S. Gabelli, Univ. Roma 3, Italy, 31.01–02.02.07.

A. Garmendia, Univ. Extremadura, Spain, 5–08.9.07.

H. Geiges, Univ. Cologne, Germany, 11–14.06.07.

V. Gontar, Ben-Gurion Univ., Israel, 22–27.07.07.

A. Grünrock, Univ. Wuppertal, Germany, 30.09–8.10.07.

S. Gukov, Univ. California, USA, 5–8.07.07.

M. Guzowska, Univ. Szczecin, Poland, 22–27.07.07.

B. Hasselblatt, Tufts Univ., USA, 22–29.06.07

M. Hilsun, Centre National de la Recherche Scientifique, France, 5–8.09.07.

M. Jakobson, Univ. Maryland, USA, 24–30.06.07

S. Jansou, Univ. Sciences et Techniques de Languedoc, France, 15.02–3.03.07.

V. Jurdjevic, Univ. Toronto, USA, 5–8.09.07.

A. Kahle, Univ. Texas at Austin, USA, 5–8.07.07.
Y. Kifer, Hebrew Univ. Jerusalem, Israel, 24–30.06.07.
P. Kloeden, Johann Wolfgang Goethe-Univ., Germany, 21–28.07.07.
K. Konno, Univ. Osaka, Japan, 30.10–06.11.07.
Y. Kostrov, Univ. Rhode Island, USA, 21–27.07.07.
D. Krasner, Columbia Univ., USA, 5–8.07.07.
D. Kruml, Masaryk Univ., Brno, Czech Republic, 23–30.06.07.
A. Kumjian, Univ. Nevada, Reno, USA, 03–10.06.07.
J. Ladas, Univ. Rhode Island, USA, 20–29.07.07.
K. Landsman, Radboud Univ. Nijmegen, The Netherlands, 04–07.09.07.
F. Ledrappier, Univ. Notre Dame, USA, 20–30.06.07.
M. Lemos, Univ. Federal de Pernambuco, Brazil, 25.06–07.07.07.
J. Lewandowski, Warsaw Univ., Poland, 5–8.09.07.
S. Leung, Univ. Toronto, Canada, 5–8.07.07.
P. Lima-Filho, Texas A&M Univ., USA, 30.05–15.06.07.
F. Lin, Univ. Southern California, USA, 22–27.07.07.
J. Llibre, Univ. Aut3noma de Barcelona, Spain, 16–18.12.07
A. Lopes, Univ. Federal do Rio Grande do Sul, Brazil, 2–31.01.07.
R. Lu3s, Univ. Madeira, Portugal, 11–24.02.07 and 16–31.07.07.
M. Mal3k, Silesian Univ. Opava, Czech Republic, 22–30.07.07.
J. Mallet-Paret, Brown Univ., USA, 21–28.07.07.
J. Marrero, Univ. La Laguna, Tenerife, Spain, 22–27.07.07 and 4–14.09.07.
J. Martens, Max Planck Institute, Bonn, Germany, 12–17.06.07.
E. Martinez, Univ. Zaragoza, Spain, 4–13.09.07.
M. Martinho, Univ. 3vora, Portugal, 23–27.07.07.
N. Martins, Univ. Aveiro, Portugal, 23–24.11.07.
J. Mawhin, Univ. Catholique de Louvain, Belgium, 22–28.07.07.
R. Medina, Univ. Los Lagos, Chile, 21–28.07.07.
M. Meiler, Technical Univ. Munich, Germany, 22–28.07.07.
H. Melo, Univ. A3ores, Portugal, 21–28.07.07.
F. Mena, Univ. Minho, Portugal, 14.03–31.09.07.
V. Mendes, Instituto Superior de Ci3ncias do Trabalho e da Empresa, Portugal, 23–27.07.07.

J. Merodio, Univ. Politécnica de Madrid, Spain, 4–8.09.07.
M. Migda, Poznan Univ. Technology, Poland, 23–27.07.07.
J. Miguel, Univ. Eduardo Mondlane, Mozambique, 21–28.07.07.
M. Misiurewicz, Indiana Univ. - Purdue Univ. Indianapolis, 2–31.07.07.
A. Moghaddam, Yasuj Univ., Iran, 20–31.07.07.
V. Muñoz, Consejo Superior de Investigaciones Científicas, Spain, 4–8.09.07.
R. Mustapha, Académie de Reims, France, 22–27.07.07.
C. Mulvey, Univ. Sussex and Cambridge Univ., UK, 21.10–03.11.07.
V. Neves, Univ. Aveiro, Portugal, 23–24.11.07.
P. Newstead, Univ. Liverpool, UK, 8–14.10.07.
K. Nishimura, Kyoto Univ., Japan, 22–25.07.07.
J. Nogueira, Univ. Texas at Austin, USA, 5–8.07.07.
R. Nussbaum, State Univ. New Jersey, USA, 22–28.07.07.
E. Oliveira, Univ. Federal do Rio Grande do Sul, Brazil, 6.11.07–28.02.08.
P. Ozsvath, Columbia Univ., USA, 4–9.07.07.
P. Padilla, National Autonomous Univ. Mexico, Mexico, 11–18.03.07.
E. Padron, Univ. La Laguna, Tenerife, Spain, 4–14.09.07.
J. Palis, Instituto Nacional de Matemática Pura e Aplicada, Brazil, 22–
24.02.07.
T. Petkova, Columbia Univ., USA, 5– 8.07.07.
M. Pollicott, Univ. Warwick, UK, 24–29.06.07.
R. Pardini, Univ. Pisa, Italy, 10–18.01.07.
F. Paugam, Institut de Mathématiques de Jussieu, France, 25–28.06.07.
A. Peterson, Univ. Nebraska-Lincoln, USA, 22–27.07.07.
A. Pinto, Univ. Porto, Portugal, 24–28.07.07.
D. Ponte, Instituto de Matemáticas y Física Fundamental, Spain, 9–16.02.07
and 4–14.09.07.
N. Pop, Univ. Nord Baia Mare, Romania, 22–27.07.07.
J. Porras, Univ. Salamanca, Spain, 8–12.05.07.
D. Pronk, Dalhousie Univ., Canada, 10–17.06.07.
J. Rasmussen, Princeton Univ., USA, 4–9.07.07.
M. Robnik, Univ. Maribor, Slovenia, 22–26.07.07.
F. Rodríguez Hertz, IMERL, Uruguay, 24.06–1.07.07.

M. Rodríguez-Olmos, École Polytechnique Fédérale de Lausanne, Switzerland, 4–14.02.07.

A. Rodkina, Univ. West Indies, Jamaica, 22–29.07.07.

A. Ruffing, Munich Univ. of Technology, Germany, 19–29.07.07.

D. Ruipérez, Univ. Salamanca, Spain, 8–12.05.07.

R. Sacker, Univ. Southern California, USA, 20–29.07.07.

E. Scmeidel, Poznan Univ. Technology, Poland, 22–29.07.07.

A. Sharkovsky, National Academy of Science of Ukraine, Ukraine, 2–31.07.07.

J. Scherer, Univ. Autònoma de Barcelona, Spain, 20–23.03.07.

J. Schmeling, Lunds Univ., Sweden, 24–30.06.07.

G. Sell, Univ. Minnesota Twin Cities, USA, 20–28.07.07.

S. Senti, Univ. Federal do Rio de Janeiro, Brazil, 23.06–14.08.07

E. Sernesi, Univ. Roma 3, Italy, 31.01–02.02.07.

J. Smital, Silesian Univ. Opava, Czech Rep. 21–28.07.07.

H. Smith, Arizona State Univ., USA, 22–29.07.07.

L. Snoha, Faculty of Natural Sciences, Matej Bel Univ., Slovakia, 19–28.07.07.

A. Sorrentino, Princeton Univ., USA, 8–17.06.07 and 19–26.11.07.

B. Steinberg, Carleton Univ., Canada, 25.06–01.07.07.

S. Stević, Serbian Academy of Sciences and Arts, Serbia, 22–29.07.07

S. Stirling, Univ. of Texas at Austin, USA, 5–8.07.07.

I. Struchiner, Univ. Estadual de Campinas, Brazil, 2–14.07.07.

A. Suhrer, Technical Univ. Munich, Germany, 8–31.07.07.

J. Szász, Budapest Univ. Technology, Hungary, 24–30.06.07.

H. Tehrani, Univ. Nevada, Las Vegas, USA, 1.10–30.11.07.

A.L. Thiel, Univ. Louis Pasteur, France, 5–8.07.07.

R. Thomas, Univ. California, Davis, USA, 5–8.07.07.

P. Tod, Oxford Univ., UK, 14.03–1.04.07.

T. Tokieda, Cambridge Univ., UK, 4–8.09.07.

E. Valdinoci, Univ. Roma 2, Italy, 5–13.05.07 and 15–21.09.07.

A. Vanderbauwhede, Univ. Gent, Belgium, 22–28.07.07.

P. Vieira, Ecole Normale Supérieure, France, 22–25.07.07.

E. Villaseñor, Univ. Carlos III, Spain, 4–8.09.07.

N. Virdee, Univ. Plymouth, UK, 5–8.07.07.

E. Wagner, Univ. Louis Pasteur, France, 5–8.07.07.

2 Seminars

Analysis, Geometry, and Dynamical Systems Seminar. This is the main seminar of the Center. It included the following talks in 2007:

- Hossein Tehrani (Univ. Nevada, Las Vegas), New and old results on semilinear elliptic equations with logistic type nonlinearities and harvesting, 20/11/07.
- Julien Keller (Institute for Mathematical Sciences, Imperial College), Kähler–Ricci flow: infinite and finite dimensional approach, 13/11/07.
- B. Fiedler (Freie Univ. Berlin), Planar attractors of Sturm type: dynamics and graph theory, 9/10/07.
- Axel Grünrock (Univ. Wuppertal), On well-posedness theory for nonlinear wave equations aside from the H^s -scale, 2/10/07.
- Denis Bonheure (Univ. Louvain-la-Neuve), Symmetry breaking in Moser–Trudinger inequalities and a Hénon type problem in dimension two, 10/7/07.
- Frédéric Paugam (Institut de Mathématiques de Jussieu, Paris), A survey of the geometry of the functional equation of Riemann’s zeta function, 28/6/07.
- Frédéric Paugam (Institut de Mathématiques de Jussieu, Paris), Non-commutative geometry and number theoretical dynamical systems, 27/6/07.
- Benjamin Steinberg (Carleton Univ.), Spectral computations for self-similar groups, 26/6/07.
- R. Czaja (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Transversality in scalar reaction-diffusion equations on a circle, 19/6/07.
- Alfonso Sorrentino (Princeton Univ.), On the total disconnectedness of the quotient Aubry set, 12/6/07.
- Marius Dadarlat (Purdue Univ.), Bundles, operator algebras and K -theory, 6/6/07.
- Alex Kumjian (Univ. Nevada, Reno), On Hausdorff measures and KMS states, 5/6/07.
- Rachid El Harti (Univ. Hassan I, Morocco), Operator algebras and amenability, 17/5/07.

- Emma D’Aniello (Seconda Univ. degli Studi di Napoli), Chaos, periodic orbits and ω -limit sets, 24/4/07.
- Messoud Efendiev (Technische Univ. München), On a new class of equations arising in the modelling of biofilms, 6/3/07.
- Jacob Palis (Instituto Nacional de Matemática Pura e Aplicada), A global scenario for chaotic systems from Poincaré to present time, 23/2/07.
- David Iglesias Ponte (Consejo Superior de Investigaciones Científicas), New geometric techniques in mechanics, 13/2/07.
- Gonzalo Contreras (Centro de Investigación en Matemáticas, A.C.), A generic property of families of Lagrangian systems, 8/2/07.
- Artur Lopes (Univ. Federal do Rio Grande do Sul), Holonomic probabilities and ergodic optimization, 30/1/07.
- Jan Cholewa (Univ. Silesia, Katowice), Dissipative equations in locally uniform spaces, 23/1/07.

Algebra Seminar. This included the following talks in 2007:

- J. Ventura (Instituto Superior Técnico), Classifying saturated fusion systems over 2-groups, 5/12/07.
- Wojtek Chacholski (KTH, Stockholm), How to quantify the complexity of fibrations of topological spaces, 22/11/07.
- Sean Lawton (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Minimal affine coordinates for $SL(3, \mathbb{C})$ character varieties of free groups, 11/10/07.
- Mike Paluch (Instituto Superior Técnico), Homotopy spectral sequences, pairing and cap products (II), 27/9/07.
- Mike Paluch (Instituto Superior Técnico), Homotopy spectral sequences, pairing and cap products (I), 17/9/07.
- Robin Cockett (Univ. Calgary, Canada), Applications of restriction categories, 26/6/07.
- David Kruml (Univ. Masaryk, Brno, Czech Republic), Girard couples of quantales, 26/6/07.
- Jonathon Funk (Univ. West Indies, Barbados), Toposes and P -semi-groups, 26/6/07.

- Paulo Lima-Filho (Texas A&M Univ.), Integral Deligne cohomology for real varieties, 11/6/07.
- Emmanuel Dror-Farjoun (Hebrew Univ. Jerusalem), Cellularization in Algebra and Topology, 24/4/07.
- Jérôme Scherer (Univ. Autònoma de Barcelona), Deconstructing Hopf spaces, 22/3/07.
- B. Oliver (Univ. Paris XIII), p -Local compact groups, 27/2/07.
- Luis Pereira (Univ. de Paris VII), How to see that a statement might be undecidable (II), 21/2/07.
- Luís Pereira (Univ. Paris VII), How to see that a statement might be undecidable, 15/2/07.

“Geometria em Lisboa” Seminar. This included the following talks in 2007:

- Ugo Bruzzo (Scuola Internazionale Superiore di Studi Avanzati), Semi-stable and numerically effective principal (Higgs) bundles, 4/12/07.
- Sean Lawton (Instituto Superior Técnico), Obtaining the one-holed torus from pants: duality in an $SL(3, \mathbb{C})$ -character variety, 20/11/07.
- Alessia Mandini (Instituto Superior Técnico), The cohomology ring of polygon spaces: an application of the Duistermaat–Heckman theorem, 6/11/07.
- Kazuhiro Konno (Univ. Osaka), Fibred algebraic surfaces and the localization of signature, 30/10/07.
- Alessia Mandini (Instituto Superior Técnico), The cobordism class and the symplectic volume of the moduli space of polygons in \mathbb{R}^3 , 23/10/07.
- Peter Newstead (Univ. Liverpool), Cliffords theorem for coherent systems, 9/10/07.
- Pedro Frejlich (Instituto Superior Técnico), Nahm transform for Higgs bundles — Part II, 2/10/07.
- Pedro Frejlich (Instituto Superior Técnico), Nahm transform for Higgs bundles, 25/9/07.
- Philippe Monnier (Univ. Paul Sabatier — Toulouse III), Rigidity of group actions on Poisson manifolds, 5/7/07.

- Marcos Alexandrino (Univ. São Paulo), Singular holonomy of singular Riemannian foliations with sections, 3/7/07.
- Johan Martens (Univ. Toronto and Max Plank Institute, Bonn), Equivariant volumes of non-compact quotients and instanton counting, 12/6/07.
- Dorette Pronk (Dalhousie Univ.), Translation groupoids and orbifold Bredon cohomology, 11/6/07.
- Vincent Bonini (McMaster Univ.), A positive mass theorem on asymptotically hyperbolic manifolds with corners along a hypersurface, 29/5/07.
- Daniel Hernández Ruipérez (Univ. Salamanca), Fourier–Mukai transforms for coherent systems on elliptic curves, 10/5/07.
- Markus Pflaum (Frankfurt Univ.), An algebraic index theorem for orbifolds, 10/4/07.
- Ana Cristina Casimiro (Univ. Nova de Lisboa), Mumford’s stability on the Sato grassmannian, 20/3/07.
- Sébastien Jansou (Univ. Montpellier II), Examples of invariant Hilbert schemes, 27/2/07.
- Henrique Bursztyn (Instituto Nacional de Matemática Pura e Aplicada), Pure spinors and moment maps, 12/2/07.
- Miguel Olmos (Ecole Polytechnique Fédérale de Lausanne), Nonlinear stability of Riemann ellipsoids with symmetric configurations, 6/2/07.
- Nuno Romão (Massachusetts Institute of Technology), Spectral curves and the mass of hyperbolic monopoles, 9/1/07.

Mathematical Physics Seminar. This included the following talks in 2007:

- J. Natário (Instituto Superior Técnico), General relativity VII, 22/11/07.
- J. Natário (Instituto Superior Técnico), General relativity VI, 19/11/07.
- J. Natário (Instituto Superior Técnico), General relativity V, 15/11/07
- J. Natário (Instituto Superior Técnico), General relativity IV, 12/11/07.

- J. Natário (Instituto Superior Técnico), General relativity III, 8/11/07.
- Jorge Drumond Silva (Instituto Superior Técnico), Hyperbolic partial differential equations III, 5/11/07.
- J. Natário (Instituto Superior Técnico), General relativity II, 31/10/07.
- Jorge Drumond Silva (Instituto Superior Técnico), Hyperbolic partial differential equations II, 29/10/07.
- J. Natário (Instituto Superior Técnico), General relativity I, 25/10/07.
- Jorge Drumond Silva (Instituto Superior Técnico), Hyperbolic partial differential equations I, 22/10/07.
- Paul Tod (Univ. Oxford), New results in black-hole uniqueness, 28/3/07.
- Paul Tod (Univ. Oxford), Lanczos potentials and a definition of gravitational entropy for perturbed FLRW space-times, 21/3/07.

Mathematics, Systems and Robotics Seminar. In collaboration with Instituto de Sistemas e Robótica. It included the following talks in 2007:

- (December 7)
 - Matthijs Spaan (Instituto Superior Técnico), Planning in partially observable environments.
 - Elismar Oliveira, Generalized Mather problem, viscosity solutions and Mather measures.
- (November 23)
 - Rita Cunha and Carlos Silvestre (Instituto de Sistemas e Robótica), Output feedback control for stabilization on $SE(3)$.
 - Adélia Sequeira (Instituto Superior Técnico), Modeling approach and simulations of blood coagulation dynamics.
- (October 12)
 - Diogo Gomes (Instituto Superior Técnico), New problems in control theory.
 - António Baptista, Tantas “ciências”.

- (June 1)
 - João Almeida (Instituto Superior Técnico), Rational trigonometry applied to robotics.
 - José Maria Gomes (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Geometrical aspects of least energy solutions for some variational problems.
- (April 20)
 - Luis Montesano (Instituto Superior Técnico), Optimal filtering for partially observed point processes using trans-dimensional sequential Monte Carlo.
 - José Félix Costa (Instituto Superior Técnico), Continuous time computation: a constructive approach.
- (March 9)
 - Juha Videman (Instituto Superior Técnico), Introduction to PDEs in geophysical fluid dynamics.
 - Francisco Melo (Instituto Superior Técnico), Reinforcement learning: general overview and some interesting challenges.
- (February 2)
 - Mário Figueiredo (Instituto Superior Técnico), Network inference from co-occurrences.
 - C. Rocha (Instituto Superior Técnico), An introduction to infinite dimensional dynamical systems.

Partial Differential Equations Seminar. This included the following talks in 2007:

- Andrei Biryuk (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Weak solutions of the Navier–Stokes system, singular sets and the question of uniqueness, 28/2/07.
- Andrei Biryuk (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), An abstract nonlinear Cauchy–Kowalewski theorem in a scale of Banach spaces — II, 30/1/07.
- M. Baía (Instituto Superior Técnico), Characterization of two-scale Young measures: application to homogenization, 17/1/07.
- Andrei Biryuk (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), An abstract nonlinear Cauchy–Kowalewski theorem in a scale of Banach spaces, 10/1/07.

String Theory Seminar. This included the following talks in 2007:

- Pedro Vieira (Ecole Normale Supérieure), Integrability and AdS/CFT V, 25/7/07.
- Pedro Vieira (Ecole Normale Supérieure), Integrability and AdS/CFT IV, 25/7/07.
- Pedro Vieira (Ecole Normale Supérieure), Integrability and AdS/CFT III, 24/7/07.
- Pedro Vieira (Ecole Normale Supérieure), Integrability and AdS/CFT II, 24/7/07.
- Pedro Vieira (Ecole Normale Supérieure), Integrability and AdS/CFT I, 23/7/07.
- Rui Lima Matos (Univ. Cambridge), Quantum dispersion of giant magnons II, 17/7/07.
- Rui Lima Matos (Univ. Cambridge), Quantum dispersion of giant magnons I, 17/7/07.

Topological Quantum Field Theory Club. This included the following talks in 2007:

- Ugo Bruzzo (Scuola Internazionale Superiore di Studi Avanzati), Instantons and framed bundles on rational surfaces, 6/12/07.
- Yassir Dinar (Scuola Internazionale Superiore di Studi Avanzati), Algebraic Frobenius manifolds and primitive conjugacy classes in Weyl group, 30/11/07.
- Pierre Cartier (Institut des Hautes Études Scientifiques), New methods in renormalization theories — III, 8/6/07.
- Pierre Cartier (Institut des Hautes Études Scientifiques), New methods in renormalization theories — II, 5/6/07.
- Pierre Cartier (Institut des Hautes Études Scientifiques), New methods in renormalization theories — I, 5/6/07.
- Special sessions: Quantum topology, gerbes and Khovanov homology, 22–23/2/07. Talks by Rui Carpentier (Instituto Superior Técnico), João Faria Martins (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Pedro Lopes (Instituto Superior Técnico), M. Mackaay (Univ. Algarve), Roger Picken (Instituto Superior Técnico), Paulo Semião (Univ. Algarve), M. Stosic (Instituto de Sistemas e Robótica).

Working Seminar on Contact/Symplectic Topology/Geometry. This included the following talks in 2007:

- Stavros Papadakis (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Topology of complex-analytic singularities, 20/11/07, 27/11/07, 04/12/07.
- Julien Keller (Imperial College), Balanced metrics and algebraic geometry, 13/11/07.
- Sheila Sandon (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Maximal tori in the group of contactomorphisms, 06/11/07.
- Sheila Sandon (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Contact toric manifolds, 30/10/07.
- Sheila Sandon (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Group actions on contact toric manifolds, 23/10/07.
- Sheila Sandon (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Generating functions, 08/05/07, 15/05/07, 22/05/07.
- Bart Van Steirteghem (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Simplest projective reductive varieties, 17/04/07, 24/04/07.
- Bart Van Steirteghem (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Representation theory of complex reductive groups, 27/03/07, 03/04/07.
- Sheila Sandon (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Contact Topology: orderability vs. squeezing, 06/03/07, 13/03/07, 20/03/07.

Working Seminar on Groupoids and Noncommutative Geometry. This included the following talks in 2007:

- Rogier Bos (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Topological approaches to groupoid cohomology (part II), 13/12/07.
- Rogier Bos (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Topological approaches to groupoid cohomology, 6/12/07.
- Rogier Bos (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Differentiable groupoid cohomology (part II), 29/11/07.
- Rogier Bos (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Differentiable groupoid cohomology, 22/11/07.

- Dmitry Matsnev (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Étale groupoids as germ groupoids and applications (part III), 15/11/07.
- Dmitry Matsnev (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Étale groupoids as germ groupoids and applications (part II), 8/11/07.
- Dmitry Matsnev (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Étale groupoids as germ groupoids and applications, 25/10/07.
- Alex Kumjian (Univ. Nevada, Reno), The Brauer group of a locally compact groupoid, 6/6/07.
- Radu Popescu (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Calculus of fractions and K -theory for C^* -algebras, 31/5/07.
- Valentin Deaconu (Univ. Nevada, Reno), Groupoids associated to a textile system, 21/5/07.
- Olivier Brahic (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), The restriction functor as a principal bundle, 22/2/07.
- Olivier Brahic (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Introduction to the classification of regular groupoids, 15/2/07.
- Olivier Brahic (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Extensions of Lie algebroids and Lie groupoids II, 8/2/07.
- Olivier Brahic (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), Extensions of Lie algebroids and Lie groupoids I, 1/2/07.
- Radu Popescu (Centro de Análise Matemática, Geometria e Sistemas Dinâmicos), More on Fell bundles, 25/1/07.
- P. Resende (Instituto Superior Técnico), Fell bundles over étale groupoids and their reduced C^* -algebras, 18/1/07.
- P. Resende (Instituto Superior Técnico), Circle extensions of groupoids, reduced C^* -algebras, and MASAS, 11/1/07.

Other seminars. The Center has also contributed to activities of the Department of Mathematics of Instituto Superior Técnico and of other research centers, in particular providing partial support to the Colloquium of the Department of Mathematics and to the Quantum Information and Computation Seminar of the Security and Quantum Information Group of Instituto de Telecomunicações.

3 Conferences and short courses

The following Conferences and Short Courses were organized or co-organized by members of the Center in 2007:

First Iberian Mathematical Meeting

Fundação Calouste Gulbenkian, Portugal, February 9–11, 2007

Plenary speakers:

- José Ferreira Alves (Univ. Porto),
- Manuel Ritoré (Univ. Granada),
- Henrique Bursztyn (Instituto Nacional de Matemática Pura e Aplicada),
- Luis Escauriaza (Univ. País Vasco),
- Luísa Mascarenhas (Univ. Nova de Lisboa),
- Tere M. Seara (Univ. Politècnica de Catalunya).

<http://www.spm.pt/encontroiberico>

The First Quantum Geometry and Quantum Gravity School

Zakopane, Poland, March 23 – April 3, 2007

Plenary speakers:

- Jan Ambjorn (Niels Bohr Institute and Institute for Theoretical Physics)
- Laurent Freidel (Perimeter Institute),
- Etera Livine (École Normale Supérieure, Paris),
- Paweł Kasprzak (Univ. Warsaw),
- Tomasz Pawłowski (Pennsylvania State Univ.),
- Martin Reuter (Johannes Gutenberg-Universität),
- Carlo Rovelli (Centre de Physique Theorique de Luminy),

- Jean-Marc Schlenker (Univ. Toulouse III),
- Thomas Thiemann (Albert Einstein Institute),
- Ruth Williams (Univ. Cambridge).

<http://www.fuw.edu.pl/QGGG1>

VIII Lisbon Summer Lectures in Geometry

Instituto Superior Técnico, Portugal, June 11–14, 2007

Lecturer: Hansjörg Geiges (Univ. Cologne, Germany).

<http://www.math.ist.utl.pt/~sanjos/SummerLectures/SummerLect07>

Nonuniformly Hyperbolic Dynamics and Smooth Ergodic Theory

Instituto Superior Técnico, Portugal, June 25–30, 2007

Speakers:

- Valentin Afraimovich (Univ. Autónoma de San Luis Potosí),
- Michael Benedicks (Royal Institute of Technology, Stockholm),
- Leonid Bunimovich (Georgia Institute of Technology),
- Dmitri Burago (Penn State Univ.),
- Keith Burns (Northwestern Univ.),
- Dmitry Dolgopyat (Univ. Maryland),
- Albert Fathi (École Normale Supérieure de Lyon),
- Boris Hasselblatt (Tufts Univ.),
- Michael Jakobson (Univ. Maryland),
- Vadim Kaloshin (Univ. Maryland and Penn State Univ.),
- Anatole Katok (Penn State Univ.),
- Svetlana Katok (Penn State Univ.),
- Yuri Kifer (The Hebrew Univ. Jerusalem),
- François Ledrappier (Univ. Notre Dame),
- Sheldon Newhouse (Michigan State Univ.),
- Mark Pollicott (Univ. Warwick),
- Federico Rodríguez Hertz (IMERL, Montevideo),
- Omri Sarig (Penn State Univ.),
- Jörg Schmeling (Lunds Univ.),

- Samuel Senti (Univ. Federal do Rio de Janeiro),
- Domokos Szász (Budapest Univ. Technology),
- Amie Wilkinson (Northwestern Univ.),
- Michiko Yuri (Hokkaido Univ.).

<http://www.math.ist.utl.pt/camgsd/pesin/>

XVIth Oporto Meeting on Geometry, Topology and Physics

Faro, Portugal, July 5–8, 2007

Main speakers:

- Sergei Gukov (California Institute of Technology),
- Peter Ozsváth (Columbia Univ.),
- Jacob Rasmussen (Princeton Univ.),
- Paul Turner (Heriot-Watt Univ.).

<http://www.ualg.pt/fct/omgtp/>

International Conference on Difference Equations and Applications

Lisbon, Portugal, July 23–27, 2007

Main speakers:

- Lluís Alsedà (Univ. Autònoma de Barcelona),
- Viviane Baladi (Centre National de la Recherche Scientifique),
- Francisco Balibrea (Univ. Murcia),
- Sui Sun Cheng (Tsing Hua Univ.),
- Jim Cushing (Univ. Arizona),
- Robert Devaney (Boston Univ.),
- Saber Elaydi (Trinity Univ.),
- Peter Kloeden (Macquarie Univ.),
- Gerry Ladas (Univ. Rhode Island),
- John Mallet-Paret (Brown Univ.),
- Jean Mawhin (Univ. Catholique de Louvain),
- Michal Misiurewicz (Indiana Univ.-Purdue Univ. Indianapolis),
- Kazuo Nishimura (Kyoto Univ.),
- Roger Nussbaum (State Univ. New Jersey),

- Alberto Pinto (Univ. Porto),
- Marko Robnik (Univ. Ljubljana),
- George Sell (Univ. Minnesota),
- Alexander Sharkovsky (National Academy of Sciences of Ukraine),
- Jaroslav Smital (Silesian Univ. Opava),
- Hal Smith (Arizona State Univ.),
- Lubomír Snoha (Matej Bel Univ.),
- André Vanderbauwhede (Univ. Gent).

<http://www.math.ist.utl.pt/icdea2007/>

XVI International Fall Workshop on Geometry and Physics

Instituto Superior Técnico, Portugal, September 5–8, 2007

Minicourses:

- Fernando Barbero (Consejo Superior de Investigaciones Científicas),
- Ana Cannas da Silva (Instituto Superior Técnico).

Invited speakers:

- Dmitri Alekseevsky (Univ. Edinburgh),
- José A. de Azcárraga (Univ. Valencia),
- Raquel Caseiro (Univ. Coimbra),
- Velimir Jurdjevic (Univ. Toronto),
- Klaas Landsman (Radboud Univ.),
- Jerzy Lewandowski (Warsaw Univ.),
- José Merodio (Univ. Politécnica de Madrid),
- Vicente Muñoz (Consejo Superior de Investigaciones Científicas),
- Tadashi Tokieda (Univ. Cambridge),
- Eduardo Villaseñor (Univ. Carlos III de Madrid).

<http://ifwgp2007.ist.utl.pt/>

Primeiro Encontro IST-IME

Univ. São Paulo, Brazil, September 10–15, 2007

<http://www.ime.usp.br/~istime/>

Mechanics and Lie Algebroids Day

Instituto Superior Técnico, Portugal, September 11, 2007

Speakers:

- David Iglesias Ponte (Consejo Superior de Investigaciones Científicas),
- Juan Carlos Marrero (Univ. La Laguna),
- Eduardo Martinez (Univ. Zaragoza),
- Eva Miranda (Univ. Autònoma de Barcelona),
- Edith Padrón (Univ. La Laguna),
- Miguel Rodríguez-Olmos (Ecole Polytechnique Fédérale de Lausanne),
- Patrícia Santos (Univ. Coimbra).

<http://www.math.ist.utl.pt/~rfern/AlgDay/>

Tarde SPM/CIM em Topologia Algébrica

Coimbra, Portugal, November 24, 2007

Speakers and panel moderators:

- Teresa Monteiro Fernandes (Univ. Lisboa),
- Peter Gothen (Univ. Porto),
- G. Granja (Instituto Superior Técnico),
- M. Mackaay (Univ. Algarve),
- Lucile Vandembroucq (Univ. Minho).

<http://www.spm.pt/static.php?orgId=397>

4 Postdoctoral program

The Center started a postdoctoral program in the academic year 1998/99. Positions are for one year, with the possibility of extension for a second year upon mutual agreement. Applicants must have earned a Ph.D. in mathematics preferably within a 2-year period before the opening date of the position. To be selected an applicant must show very strong research promise in one of the areas in which the members of the Center are currently active. There are no teaching duties associated with these positions. They are announced internationally including in the Notices and in the Data Base of the American

Mathematical Society. In addition, the Center hosts postdoctoral fellows supported directly by the FCT or by other research projects.

The following fellows have stayed in the Center during the whole or part of 2007:

- J. Agapito, PhD in Mathematics, Univ. California, Santa Cruz, USA, 2004. Research areas: symplectic geometry, discrete mathematics. Supported by an FCT postdoctoral grant (Jan. 2005–present).
- A. Biryuk, PhD in Mathematics, Heriot-Watt Univ., Edinburgh, 2002. Research areas: nonlinear partial differential equations, stochastic partial differential equations, differential geometry, harmonic analysis, numerical methods. Supported by the CAMGSD plurianual funding (Sep. 1, 2006–Aug. 31, 2007).
- R. Bos, PhD in Mathematics, Radboud Univ., Nijmegen, Holland, 2007. Research areas: representations of groupoids, geometric quantization, K -theory. Supported by the CAMGSD plurianual funding (Sep. 1, 2007–Aug. 31, 2008).
- J.O. Brahic, PhD in Mathematics, Univ. Montpellier II, France, 2004. Research areas: Poisson geometry, Lie groupoids and algebroids, representation theory. Supported by an FCT postdoctoral grant (Jan. 2006–present).
- R. Czaja, PhD in Mathematics, Univ. Silesia, Poland, 2004. Research areas: semilinear abstract parabolic equations. Supported by the CAMGSD plurianual funding (Sep. 1, 2005–Aug. 31, 2007).
- R. Dawe Martins, PhD in Mathematical Physics, Nottingham Univ., 2006. Research areas: Noncommutative geometry, spectral triples, standard model of particle physics, K -theory. Supported by an FCT postdoctoral grant (Oct. 2006–present).
- O. Dragulete, PhD in Mathematics, Ecole Polytechnique Fédérale de Lausanne, 2007. Research areas: Contact geometry, symplectic geometry. Supported by an FCT research grant (Nov. 2007–Oct. 2008).
- J. Faria Martins, PhD in Mathematics, Nottingham Univ., UK, 2004. Research areas: quantum topology, quantum groups, knot theory, applications of categorical groups to low dimensional topology. Supported by an FCT postdoctoral grant (Jan. 2005–present).
- J.M. Gomes, Doutoramento em Matemática, Faculdade de Ciências, Univ. Lisboa, Portugal, 2005. Research areas: partial differential equations, variational methods. Supported by an FCT postdoctoral grant (Dec. 2006–Nov. 2007).

- S. Hollander, PhD in Mathematics, Massachusetts Institute of Technology, 2001. Research areas: algebraic topology and algebraic geometry. Supported by the CAMGSD plurianual funding (Nov. 1, 2006–Oct. 31, 2008).
- G. Iommi, PhD in Mathematics, Univ. Warwick, UK, 2004. Research areas: dynamical systems. Supported by an FCT postdoctoral grant (Jan. 2006–Jul. 2007).
- S.S. Kim, PhD in Mathematics, Stanford Univ., USA, 2001. Research areas: symplectic and contact geometry. Supported by an FCT postdoctoral grant (Jul. 2005–present).
- S. Lawton, PhD in Mathematics, Univ. Maryland, USA, 2006. Research areas: algebraic geometry, invariant theory, moduli theory. Supported by an FCT postdoctoral grant (Aug. 2007–present).
- H. Li, PhD in Mathematics, Univ. Illinois, Urbana-Champaign, USA, 2003. Research area: symplectic geometry. Supported by an FCT postdoctoral grant (May 2006–Feb. 2007).
- N. Luzia, Doutorado em Matemática, Instituto Nacional de Matemática Pura e Aplicada, Brazil, 2004. Research areas: dynamical systems. Supported by an FCT postdoctoral grant (May 2005–present).
- A. Mandini, PhD in Mathematics, Univ. Bologna, Italy, 2007. Research areas: symplectic geometry. Supported by the CAMGSD plurianual funding (Sep. 1, 2007–Aug. 31, 2008).
- D. Matsnev, PhD in Mathematics, Penn State Univ., 2005. Research areas: operator algebra K -theory, noncommutative geometry, coarse geometry, Baum–Connes conjecture. Supported by the CAMGSD plurianual funding (Sep. 1, 2006–Aug. 31, 2008).
- E. Oliveira, Doutorado em Matemática, Univ. Federal do Rio Grande do Sul, Brazil, 2007. Research areas: dynamical systems, Aubry–Mather theory. Supported by an FCT postdoctoral grant (Nov. 2007–Feb. 2008).
- M. Panthee, Doutorado em Matemática, Instituto Nacional de Matemática Pura e Aplicada, Brazil, 2004. Research areas: partial differential equations, harmonic analysis. Supported by the CAMGSD plurianual funding (Dec. 15, 2004–Jan. 14, 2006) and an FCT postdoctoral grant (Jan. 15, 2006–Dec. 2008).
- S. Papadakis, PhD in Mathematics, Warwick Univ., UK, 2002. Research areas: birational geometry, commutative algebra, computer al-

gebra methods in algebraic geometry, algebraic surfaces, unprojection. Supported by an FCT postdoctoral grant (Jul. 2006–present).

- R. Popescu, Doctorat de Mathématiques, Univ. Claude Bernard, Lyon 1, France, 2000. Research areas: C^* -algebras, bivariant K-theory, groupoids, foliations, quantales. Supported by an FCT postdoctoral grant (Apr. 2005–present).
- N. Sousa, PhD in Physics, Katholieke Univ. Nijmegen (now Radboud Univ.), The Netherlands, 2003. Research areas: string theory, conformal field theory, topological string theory, geometric quantization, matrix models. Supported by an FCT postdoctoral grant (Mar. 2006–present).
- C. Valls, Doctor in Matemáticas, Univ. Barcelona, Spain, 1999. Research areas: dynamical systems. Supported by two FCT postdoctoral grants (Oct. 2003–Jan. 2008).
- B. Van Steirteghem, PhD in Mathematics, Columbia Univ., USA, 2004. Research areas: algebraic groups, symplectic geometry. Supported by the CAMGSD plurianual funding (Nov. 1, 2004–Jan. 31, 2006) and an FCT postdoctoral grant (Feb. 1, 2006–present).

5 Publications in 2007

Publications which appeared in 2007

Books

L. Barreira and Ya. Pesin, *Nonuniform Hyperbolicity: Dynamics of Systems With Nonzero Lyapunov Exponents*, Encyclopedia of Mathematics and Its Applications, vol. 115, Cambridge University Press, 2007.

A. Cannas da Silva, *Introduction to Symplectic and Hamiltonian Geometry* (Revised printing), Publicações Matemáticas do IMPA, Rio de Janeiro, 2007.

J. Mourão, J. Nunes, R. Picken, and J.-C. Zambrini (eds.), *Prospects in Mathematical Physics*, Papers from the Young Researchers Symposium of the 14th International Congress on Mathematical Physics, Lisbon, July 28–August 2, 2003, Contemp. Math., 437, Amer. Math. Soc., Providence, RI, 2007.

Articles in international journals with referees

J. Agapito and L. Godinho, New polytope decompositions and Euler–Maclaurin formulas for simple integral polytopes, *Adv. Math.* **214** (2007), no. 1, 379–416.

- S. Anjos and F. Lalonde, The topology of the space of symplectic balls in $S^2 \times S^2$, *C. R. Math. Acad. Sci. Paris, Ser. I* **345** (2007), 639–642.
- M. Baía and I. Fonseca, The limit behavior of a family of variational multi-scale problems, *Indiana Univ. Math. J.* **56** (2007), no. 1, 1–50.
- L. Barreira and L. Radu, Multifractal analysis of nonconformal repellers: a model case, *Dyn. Syst.* **22** (2007), 147–168.
- L. Barreira and C. Valls, Conjugacies for linear and nonlinear perturbations of nonuniform behavior, *J. Funct. Anal.* **253** (2007), 324–358.
- L. Barreira and C. Valls, Hölder Grobman–Hartman linearization, *Discrete Contin. Dyn. Syst.* **18** (2007), no. 1, 187–197.
- L. Barreira and C. Valls, Nonuniform exponential dichotomies and Lyapunov regularity, *J. Dynam. Differential Equations* **19** (2007), no. 1, 215–241.
- L. Barreira and C. Valls, Reversibility and equivariance in center manifolds of nonautonomous dynamics, *Discrete Contin. Dyn. Syst.* **18** (2007), no. 4, 677–699.
- L. Barreira and C. Valls, Smooth center manifolds for nonuniformly partially hyperbolic trajectories, *J. Differential Equations* **237** (2007), 307–342.
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- L. Barreira and C. Valls, Stability theory and Lyapunov regularity, *J. Differential Equations* **232** (2007), no. 2, 675–701.
- L. Barreira and C. Wolf, Dimension and ergodic decompositions for hyperbolic flows, *Discrete Contin. Dyn. Syst.* **17** (2007), no. 1, 201–212.
- J. Barrett, J. Faria Martins, and J. García-Islas, Observables in the Turaev–Viro and Crane–Yetter models, *J. Math. Phys.* **48** (2007), no. 9, 093508, 18 pp.
- J. Buescu and A. Paixão, Eigenvalue distribution of positive definite kernels on unbounded domains, *Integral Equations Operator Theory* **57** (2007), 19–41.
- J. Buescu and A. Paixão, Eigenvalue distribution of Mercer-like kernels, *Math. Nachr.* **280** (2007), no. 9–10, 984–995.
- A. Calabri, C. Ciliberto, and M. Mendes Lopes, Numerical Godeaux surfaces with an involution, *Trans. Amer. Math. Soc.* **359** (2007), no. 4, 1605–1632.

- M. Câmara, A. Ferreira dos Santos, and P. Ferreira dos Santos, Lax equation, factorization and Riemann–Hilbert problems, *Port. Math. (N.S.)* **64** (2007), no. 4, 509–533.
- N. Caporaso, L. Griguolo, M. Mariño, and S. Pasquetti, Phase transitions, double-scaling limit, and topological strings, *Phys. Rev. D* **75** (2007), no. 4, 046004, 24 pp.
- C. Ciliberto, M. Mendes Lopes, and R. Pardini, Surfaces with $K^2 < 3\chi$ and finite fundamental group, *Math. Res. Lett.* **14** (2007), no. 6, 1081–1098.
- L. Cornalba, M. Costa, J. Penedones, and R. Schiappa, Eikonal approximation in AdS/CFT: conformal partial waves and finite N four-point functions, *Nuclear Phys. B* **767** (2007), no. 3, 327–351.
- C. Correia Ramos, N. Martins, and J. Sousa Ramos, Finite dimensional representations of $*$ -algebras arising from a quadratic map, *Chaos Solitons Fractals* **34** (2007), no. 4, 1202–1212.
- C. Correia Ramos, N. Martins, P. Pinto, and J. Sousa Ramos, Orbit equivalence and von Neumann algebras for expansive interval maps, *Chaos Solitons Fractals* **33** (2007), no. 1, 109–117.
- F. da Costa, Dynamics of a differential system using invariant regions, *Enseign. Math.* **53** (2007), no. 2, 3–14.
- F. da Costa, M. Grinfeld, N. Mottram, J. Pinto, A mathematical study of a bistable nematic liquid crystal device, *Math. Models Methods Appl. Sci.* **17** (2007), no. 12, 2009–2034.
- B. Eynard, N. Orantin, and M. Mariño, Holomorphic anomaly and matrix models, *J. High Energy Phys.* **2007**, no. 6, 058, 20 pp.
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- J. Faria Martins, On the homotopy type and the fundamental crossed complex of the skeletal filtration of a CW-complex, *Homology Homotopy Appl.* **9** (2007), 295–329.
- J. Faria Martins and T. Porter, On Yetter’s invariant and an extension of the Dijkgraaf–Witten invariant to categorical groups, *Theory Appl. Categ.* **18** (2007), no. 4, 118–150.
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- T. Grimm, A. Klemm, M. Mariño, and M. Weiss, Direct integration of the topological string, *J. High Energy Phys.* **2007**, no. 8, 058, 78 pp.
- A. Grünrock, M. Panthee, and J. Silva, A remark on global well-posedness below L^2 for the gKdV-3 equation, *Differential Integral Equations* **20** (2007), no. 11, 1229–1236.
- S. Hollander, Descent for quasi-coherent sheaves on stacks, *Algebr. Geom. Topol.* **7** (2007), 411–437.
- S. Lawton, Generators, relations and symmetries in pairs of 3×3 unimodular matrices, *J. Algebra* **313** (2007), 782–801.
- J. Llibre and C. Valls, Global analytic first integrals for the real planar Lotka–Volterra system, *J. Math. Phys.* **48** (2007), 033507, 13 pp.
- J. Llibre and C. Valls, On the integrability of the Einstein–Yang–Mills equations, *J. Math. Anal. Appl.* **336** (2007), 1203–1230.
- P. Lopes, Hyperfinite knots via the CJKLS invariant in the thermodynamic limit, *Chaos Solitons Fractals* **34** (2007), no. 5, 1450–1472.
- M. Mackaay and P. Turner, Bar-Natan’s Khovanov homology for coloured links, *Pacific J. Math.* **229** (2007), no. 2, 429–446.
- M. Mackaay, P. Turner, and P. Vaz, A remark on Rasmussen’s invariant of knots, *J. Knot Theory Ramifications* **16** (2007), no. 3, 333–344.
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- R. Martins, Finite temperature corrections and embedded strings in non-commutative geometry and the standard model with neutrino mixing, *J. Math. Phys.* **48** (2007), no. 8, 083509, 28 pp.
- J. Matias, Differential inclusions in $SBV_0(\Omega)$ and applications to the calculus of variations, *J. Convex Anal.* **14** (2007), no. 3, 465–477.

- M. Mendes Lopes and R. Pardini, On the algebraic fundamental group of surfaces with $k^2 \leq 3\chi$, *J. Differential Geom.* **77** (2007), 189–199.
- M. Mendes Lopes and R. Pardini, The degree of the bicanonical map of a surface with $p_g=0$, *Proc. Amer. Math. Soc.* **135** (2007), no. 5, 1279–1282.
- F. Moura and R. Schiappa, Higher-derivative-corrected black holes: perturbative stability and absorption cross section in heterotic string theory, *Classical Quantum Gravity* **24** (2007), no. 2, 361–386.
- J. Natário, Quasi-Maxwell interpretation of the spin-curvature coupling, *Gen. Relativity Gravitation* **39** (2007), no. 9, 1477–1487.
- A. Neves, Singularities of Lagrangian mean curvature flow: zero-Maslov class case, *Invent. Math.* (2007), no. 168, 449–484.
- B. Oliver and J. Ventura, Extensions of linking systems with p -group kernel, *Math. Ann.* **338** (2007), no. 4, 983–1043.
- M. Paluch, Homotopy spectral sequences of pointed simplicial spaces, *Homology Homotopy Appl.* **9** (2007), no. 2, 1–17.
- M. Panthee and J. Silva, Well-posedness for the Cauchy problem associated to the Hirota-Satsuma equation: periodic case, *J. Math. Anal. Appl.* **326** (2007), 800–821.
- S. Papadakis, Towards a general theory of unprojection, *J. Math. Kyoto Univ.* **47** (2007), no. 3, 579–598.
- M. Perlmutter, M. Rodríguez-Olmos, and E. Dias, On the geometry of reduced cotangent bundles at zero momentum, *J. Geom. Phys.* **57** (2007), 571–596.
- P. Pinto, Simple current modular invariants from braided subfactors, *Chaos Solitons Fractals* **33** (2007), 135–142.
- P. Pinto, Twisted quantum \mathbb{Z}_n modular data and braided subfactors, *J. Phys. A* **40** (2007), no. 31, 9387–9397.
- P. Resende, Étale groupoids and their quantales, *Adv. Math.* **208** (2007), no. 1, 147–209.
- C. Rito, On surfaces with $p_g = q = 1$ and non-ruled bicanonical involution, *Ann. Sc. Norm. Super. Pisa Cl. Sci. (5)* **6** (2007), no. 1, 81–102.
- C. Rocha, Realization of period maps of planar Hamiltonian systems, *J. Dynam. Differential Equations* **19** (2007), no. 3, 571–591.

J. Santos, Dirac operators coupled to instantons on positive definite four-manifolds, *Math. Z.* **257** (2007), no. 4, 845–870.

R. Schiappa, L. Cornalba, M. Costa, and J. Penedones, Eikonal approximation in AdS/CFT: conformal partial waves and finite N four-point functions, *Nuclear Phys. B* (2007), 327–351.

R. Schiappa, L. Cornalba, M. Costa, and J. Penedones, Eikonal approximation in AdS/CFT: from shock waves to four-point functions, *J. High Energy Phys.* (2007).

J. Silva, An accuracy improvement in Egorov’s theorem, *Publ. Mat.* **51** (2007), no. 1, 77–120.

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J. Alves and J. Fachada, On the Ruelle zeta function of an expanding interval map, S. Elaydi, J. Cushing, R. Lasser, A. Ruffing, V. Papageorgiou, and W. Van Assche (eds.), *Proc. International Conference Difference Equations, Special Functions and Orthogonal Polynomials (Munich, Germany, 25–30 July 2005)*, World Scientific, 2007.

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6 Partnership and outreach

In October 2004 the Center submitted to the Minister of Science, Innovation and Higher Education a request for the Statute of Associate Laboratory, with a strategic project entitled “Internationalization of the Research and Promotion of Mathematics in Portugal”. Besides pursuing the strategy of further development and internationalization of the research activities, in particular through the Postdoctoral Program and a Program for career development and employment of new researchers, the Center signed partnership protocols with the Institute for Systems and Robotics - Lisbon (Instituto de Sistemas e Robótica-Lisbon) and with the Institute of Telecommunications (IT) regarding interdisciplinary research cooperation, and also signed partnership protocols with 44 secondary and primary schools, which together enroll more than 38000 students, aiming at the promotion of Mathematics at these education levels through a set of activities oriented towards students and teachers.

While the evaluation of the request for the Statute of Associate Laboratory is still in progress, the Center has nevertheless started to develop various activities in collaboration with the secondary schools and it has also pursued its past collaboration with the “Ciência Viva” Program and with the “Programa Gulbenkian Novos Talentos em Matemática”. Some of these activities are listed below.

Lecture in secondary school. “Qual a forma do Universo” (João Pimentel Nunes), Colégio do Vale, February, 2007.

Science exhibition. Participation in “Ciência 2007 — Encontro Público com a Ciência”, Lisbon, April 14, 2007. http://www.pavconhecimento.pt/-destaques/index.asp?acao=shownot&id_noticia=247.

Summer school for undergraduates. “Escola Diagonal 2007”, Lisbon, September 3–7, 2007, <http://www.math.ist.utl.pt/talentos/edicao7.html#escola>.

Mathematics conference for undergraduates. “Encontro Nacional do Programa Gulbenkian Novos Talentos em Matemática”, Lisbon, September 7–8, 2007, <http://www.math.ist.utl.pt/talentos/edicao7.html#encontro>.