



Instituto Superior Técnico



Center for Mathematical Analysis,  
Geometry, and Dynamical Systems

# Report 2016

March 2017

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# 1 Research Projects and Special Grants

The following research projects were coordinated by CAMGSD members in 2016:

## **Asymptotic study of reaction-diffusion systems with competition terms**

(Started: July 2, 2014, duration 50 months)

*Funding agency:* Fundação para a Ciência e a Tecnologia

*Reference:* Exploratory research project associated to the "FCT Investigator" Program, Ref. IF/00584/2012

*Researcher:* Hugo Tavares

*Number of Participants:* 1

The main aim of this project is to understand and characterize the solutions of a certain type of elliptic systems with competition terms. The questions addressed are the existence and multiplicity of solutions, its qualitative properties (symmetry, sign, regularity,...) and an asymptotic study when the competition becomes the prevailing phenomenon. Another aim is to show the connection between these systems and shape optimization problems.

## **Brazilian-European Partnership in dynamical systems**

(Started: January 1, 2013, duration: 4 years)

*Funding agency:* EU - Marie Curie Action IRSES

*Reference:* PIRSES-GA-2012-318999

*Coordinator:* Jeroen Lamb (Imperial College)

*Coordinator at IST:* Miguel Abreu

*Number of Participants:* 21 European partners and 11 Brazilian partners

In recent years progress has been made to understand the dynamics of low-dimensional dynamical systems, leading to the identification of new challenges, including high-dimensional dynamical systems, dynamical systems with particular structure and intrinsically nonautonomous dynamical systems. This joint research programme between Europe and Brazil relies on strong traditions in dynamical systems at both ends, and complementary expertise that will drive innovation and resolve open problems at the forefront of modern dynamical systems research.

## **CoLab Program UT Austin | Portugal**

*Funding agency:* Fundação para a Ciência e a Tecnologia

The Center for Mathematical Analysis, Geometry, and Dynamical Systems has been one of the main participants in this collaborative program between Portuguese Universities and the University of Texas at Austin since the program was initiated in 2007.

### **Defects: a bridge between Geometry and Physics**

(Started: February 1, 2015, duration: 60 months)

*Funding agency:* Fundação para a Ciência e a Tecnologia

*Reference:* Exploratory research project associated to the "FCT Investigator" Program, Ref. IF/01426/2014/CP1214/CT0001

*Researcher:* Michele Cirafici

*Number of Participants:* 1

The aim of this project is to investigate the mathematical structures associated with defects in quantum field theory. The question addressed are the properties of BPS enumerative invariants which arise in the presence of defects and their relation with wall-crossing structures.

### **Geometry and Mathematical Physics Project**

(Started: May 1, /2013, duration: 3 years)

*Funding agency:* Fundação para a Ciência e a Tecnologia

*Reference:* EXCL/MAT-GEO/0222/2012

*Principal investigator:* Miguel Abreu

*Number of participants:* 30

This project aims at fostering the interaction of research in Geometry and Mathematical Physics within the Department of Mathematics of IST and throughout the country, through the stimuli for interaction among researchers, the reinforcement of international connections, the attraction of post-docs and doctoral students, and the organization of seminars, short courses and international meetings.

## **Dispersive Evolution Equations**

(Started: March 1, 2016, duration: 2+1 years)

*Funding agencies:* FCT-Portugal and CAPES-Brazil (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior)

*Coordinator at IST:* Jorge Drumond Silva

*Number of participants:* 3 (Portugal) + 7 (Brazil)

The project is concerned with wave propagation in dispersive media. The aim is to investigate dispersive models arising, e.g., in Fluid Mechanics and Plasma Physics, and study their properties such as local and global well-posedness, stability of solutions and finite time singularities.

## **Global Properties of Solutions of the Einstein Equations**

(Started: January 1, 2016, duration: 3 years)

*Funding agency:* Fundação para a Ciência e a Tecnologia

*Reference:* TDC/MAT-ANA/1275/2014

*Principal investigator:* João L. Costa

*Local Coordinator at IST:* Jorge Drumond Silva

*Number of participants:* 13

The main goal of the project is the study of global properties of solutions of the Einstein equations, especially in what concerns cosmic censorship and the formation of singularities in general relativity. This requires the use of techniques of geometry and analysis, particularly hyperbolic partial differential equations.

## **Hydrodynamic Limits and Equilibrium Fluctuations: universality from stochastic systems**

(Started: December 1, 2016, duration: 5 years)

*Funding agency:* European Research Council - Starting Grant

*Contract number:* 715734

*Principal investigator:* Patricia Gonçalves

*Other participants:* 7 (3 postdoctoral, 2 PhD and 2 MSc students)

The research project aims at characterizing the universality of the macroscopic behavior of some physical systems from underlying microscopic stochastic dynamics, by deriving the macroscopic laws, namely, (stochastic) partial differential equations, which govern the space-time evolution of the thermodynamic quantities of those physical systems.

### **Phase Transitions and Free Boundary Problems**

(Started: September 1, 2014, duration: 24 months)

*Funding agency:* FCT (through the CoLab Program at UT Austin)

*CAMGSD participants:* Margarida Baía, Farid Bozorgnia, Léonard Monsingeon and Juha Videman

Phase transitions and free boundary problems cover a wide range of applications, from segregation dynamics to the evolution of fluid liquid interfaces, tumor growth, ground pollution invasion with obstacles, gas, water and oil flow in porous media and adsorption processes in subsurface environments. This project brings together a significant effort of applied non-linear analysts and numerical and scientific computing experts in the areas of non-linear and non-local PDEs.

### **Quantization and Kahler Geometry**

(Started: April, 1, 2016, duration: 36 months)

*Funding agency:* Fundação para a Ciência e a Tecnologia

*Reference:* PTDC/MAT-GEO/3319/2014

*Principal investigator:* João Pimentel Nunes

*Number of participants:* 7

The project studies the relations between Kahler geometry and geometric quantization. The focus is on degenerating families of Kahler metrics, in the space of Kahler metrics for a fixed cohomology class equipped with the Mabuchi metric, and relations to both Kahler and real polarizations in quantization.

## **Quantum Structure of Spacetime**

(Started: April 30, 2015, duration 48 months)

*Funding agency:* EU

*Reference:* COST Action MP1405

*Member of the Management Committee:* José Mourão

*Number of CAMGSD participants:* 7

Noncommutative geometry (NCG) is at the heart of quantum physics, and its many facets and developments have widely influenced both physics and mathematics. This Action aims to create a Network with world experts from across Europe in the interconnected research subjects of NCG and gravity. As data emerges from Cosmic Microwave Background and quantum interferometry experiments, a prime objective of the Action will be to seek measurable signatures of quantum spacetime.

## **Riemannian and Kähler Geometry on Toric Manifolds**

(Started: May 1, 2016, duration: 3 years)

*Funding agency:* Fundação para a Ciência e a Tecnologia

*Reference:* PTDC/MAT-GEO/1608/2014.

*Principal investigator:* Rosa Sena-Dias

*Other participant:* Miguel Abreu

Toric Manifolds are particular Kähler Manifolds but have extremely rich geometric behavior. This project's motto is to use Toric Manifolds as testing ground for two of the main questions in Geometry, namely: is a Riemannian Manifold determined by its spectrum? And, what is the best metric on a Manifold?

## **Two Related Topics in Clifford Analysis**

(Started: January 1, 2015, duration: 36 months)

*Funding agency:* Macao Government, Fundo para o Desenvolvimento das Ciências e da Tecnologia (FDCT)

*Reference:* FDCT 099/2014/A2

*CAMGSD participants:* José Mourão (Co-PI) and João P. Nunes

The main objective of the project, in broad terms, is to understand the role of Clifford time in quantization. It is expected that this will also find an interesting application of the (existing and developing) research in Clifford analysis, by linking it to geometry and quantization. These developments are expected to be analogs of the important role of complex time in quantization and geometry.



## 2 Visitors

The following researchers visited the Center in 2016:

Janko Bracic, University of Ljubljana, January 18-28

Marcel de Jeu, Leiden University, January 21

David Matrínez, PUC - Rio de Janeiro, January 25-30

Urs Schreiber, Czech Academy of Sciences, January 26 - March 18

Yasuyuki Kawahigashi, Tokyo University, February 7-17

Marco Chiodaroli, Albert Einstein Institut in Potsdam-Golm, February 7-9

Jonathan Partington, University of Leeds, February 24-28

Thomas Gallouet, Université de Liège, February 29- March 4

Clément Cancés, INRIA, Lille, February 29 - March 4

Simone Calogero, Chalmers Tekniska Högskola, February 29 - March 5

Ernesto Nungesser, Universidad Autónoma de Madrid, March 3-7

Geoffroy Horel, MPI, Bonn, March 3

Nicola Soave, Justus-Liebig-Universität Giessen, March 6-12

Cho-Ho Chu, Queen Mary College, University of London, March 8-20

Bernold Fiedler, Freie Universität Berlin, March 11 - April 17

Paolo Benincasa, Universidad Autónoma de Madrid, March 15-22

C. Martin Edwards, University of Oxford, March 30 - April 6

Brien Nolan, Dublin City University, March 29 - April 2

José Gustavo Rebelo, SISSA, April 4

Spyros Alexakis, University of Toronto, April 5

Alvaro Veliz-Osorio, Queen Mary College London, April 8-12

Moritz Reintjes, IMPA, April 12-17

Dominic Dold, University of Cambridge, April 18-22

Pietro Pirola, Università degli studi di Pavia, April 26

Kadir Emir, Eskisehir Osmangazi University, April 29

Yuri Rogovchenko, Universitetet Agder, April 30 - June 5

Vishnu Jejjala, University of Witwatersrand, April 30 - June 14

Dejan Gajic, University of Cambridge, May 3-6

Teresa Bautista, Intern. Centre for Theoretical Physics, Trieste, May 8-10

Kamila Klis-Garlicka, University of Agriculture of Krakow, May 8-13

Gonçalo Oliveira, Duke University, May 10  
Leron Borsten, Dublin Institute for Advanced Studies, May 10-13  
Omer Gurdogan, Institut de Physique Theorique CEA, May 22-25  
Bernardus Wit, May 22-28  
Jan Sbierski, University of Cambridge, May 29 - June 2  
Hugh Hilden, University of Hawaii, June 1-8  
Alfonso Zamora, CSU Channel Islands, June 5-9  
Sergei Aleksandrov, University of Montpellier, June 5-9  
Hisham Sati, University of Pittsburgh, June 8-21  
Lloyd Demetrius, Harvard University, June 13-25  
Laurent Dietrich, Carnegie Mellon University, June 14-17  
Volker Schlue, Université Pierre et Marie Curie, June 14-18  
Johannes Ebert, Wilhelms-Universität Münster, June 16 - July 3  
Karen Vogtmann, University of Warwick, June 17 - July 1  
Nathalie Wahl, Københavns Universitet, June 17 - July 1  
Leaonardo Macarini, Universidade Federal do Rio de Janeiro, June 18-21  
Kowshik Bettadapura, Australian National University, June 19-24  
Eva Gutiérrez, Universidad Complutense de Madrid, June 19-24  
Jonathan Partington, University of Leeds, June 19-26  
Sean Lawton, George Mason University, June 20-27  
Andreas Hartmann, Université Bordeaux I, June 20-24  
Boris Mityagin, Ohio State University, June 20-24  
Brett D. Wick, Washington University - St. Louis, June 20-24  
Chafiq Benhida, Université Lille 1, June 20-24  
David Krejcirik, Nuclear Physics Institute, Czech Republic, June 20-27  
Franciszek Szafraniec, Jagiellonian University, Poland, June 20-24  
Gustavo Corach, Instituto Argentino de Matemática, June 20-24  
Hakan Hedenmalm, Royal Institute of Technology in Stockholm, June 20-24  
Ilya Spitkovsky, College of William and Mary, June 20-24  
László Kérchy, University of Szeged, Hungary, June 20-24  
Michael Dritschel, Newcastle University, June 20-24  
Alejandra Maestriperi, Universidad de Buenos Aires, June 20-24  
Petr Siegl, University of Bern, June 20-24

Raul Curto, University of Iowa, June 20-24  
Rongwei Yang, State University of New York at Albany, June 20-24  
Sérgio Mendes, Instituto Universitário de Lisboa, June 20-24  
Zenon Jablonski, Jagiellonian University, Poland, June 20-24  
Anibal Mardones, Stony Brook University, June 24 - July 3  
Ulrike Tilmann, University of Oxford, June 26 - July 1  
Simon Philipp, University of Oxford, June 26 - July 2  
Oscar Randal-Williams, Cambridge University, June 26 - July 1  
Martina Rovelli, EPFL, June 26 - July 2  
Mauricio Lopez, CENAM, Mexico, June 26 - July 2  
Ederson Moreira, Universidade de São Paulo, July 3-8  
Daniel Berwick-Evans. Univ. Illinois, Urbana-Champaign, July 5  
Stefan Wagner, University of Hamburg, July 5  
Xavier Cabré, Universitat Politècnica de Catalunya, July 6  
Janko Bracic, University of Ljubljana, July 6-14  
Michael Berry, Bristol University, July 7-17  
Teresa Malheiro, CMAT-Universidade de Minho, July 11-13  
Volodymyr Mazorchuk, Uppsala Universitet, July 11-13  
Kevin Goldstein, University of the Witwatersrand, July 11-16  
Ricardo Monteiro, CERN Geneva, July 13-19  
Ana Rita Pires, Fordham University, July 14  
Alberto Saldaña, Université Libre de Bruxelles, July 14  
Nick Sheridan, Princeton University, July 14  
Yael Karshon, University of Toronto, July 17-23  
Simeon Hellerman, University of Tokyo, July 18-23  
Bruno Oliveira, University of Miami, July 25-27  
Gonçalo Oliveira, Duke University, July 28-29  
Rui Loja Fernandes, Univ. Illinois, Urbana-Champaign, August 29 - September 8  
Radoslaw Czaja, University of Silesia, Poland, August 30 - September 17  
Mahendra Panthee, Universidade Estadual de Campinas, September 1-10  
Sérgio Oliva, Universidade de São Paulo, September 3-11  
Xavier Carvajal, Universidade Federal do Rio de Janeiro, September 3-9

Ademir Pastor, UNICAMP, September 3-10  
Fábio Natali, Universidade Estadual de Maringá, September 4-9  
Jaume Llibre, U. Autònoma de Barcelona, September 4-10  
Jair Koiller, INMETRO, Brazil, September 4-10  
Fábio Tal, Universidade de São Paulo, September 4-10  
Phillipo Lappicy, FU Berlin, September 4-10  
Pedro Salomão, Universidade de São Paulo, September 4-10  
Ronaldo Garcia, Universidade Federal de Goiás, September 4-10  
Clodoaldo Ragazzo, Universidade de São Paulo, September 4-10  
Gláucio Terra, Universidade de São Paulo, September 4-11  
Alexandre Carvalho, Universidade de São Paulo, September 5-9  
Juan Solà-Morales Universitat Politècnica de Catalunya, September 5-9  
Paolo Piccione Universidade de São Paulo, September 5-9  
Marco A. Teixeira, UNICAMP, September 5-10  
Giorgio Fusco, Università degli Studi dell'Aquila, September 5-11  
Antonio Galves, Universidade de São Paulo, September 6-10  
Bernold Fiedler, Freie Universität Berlin, September 7 - October 6  
Gustav Holzegel, Imperial College London, September 11-16  
Roberto Emparan, Universitat de Barcelona, September 11-15  
Gonzalo Olmo, Universidad de Valencia, September 13-15  
Elvira Zappale, Università di Salerno, September 23 - October 2  
Teresa Malheiro, CMAT-Universidade de Minho, September 23-25  
Adán Corcho, IM-UFRJ, September 27  
Gary Gibbons, Cambridge University, September 27 - October 2  
Michail Dafermos, Cambridge University, September 28 - October 2  
Simon Henry, Collège de France, September 29 - October 2  
Leron Borsten, Dublin Institute for Advanced Studies, October 9-12  
Mijiddorj Renchin-Ochir, National University of Mongolia, October 10  
Björn Gohla, GFM-UL, October 19 and December 7  
Grigorios Fournodavlos, Cambridge University, October 27 - November 1  
Claes Ugglá, Karlstads Universitet, October 30 - November 6  
Benjamin Alarcán Heredia, Universidade Nova de Lisboa, November 2  
Miguel Tierz, FCUL, November 7

Hugo Ferreira, INFN Pavia, November 9  
Umberto Hryniewicz, Univ. Federal do Rio de Janeiro, November 9-16  
Marko Djikic, University of Niš, November 12-18  
Martin Pinsonnault, University of Western Ontario, November 16-22  
Jaroslav Kedra, University of Aberdeen, November 16-23  
Rui Loja Fernandes, Univ. Illinois, Urbana-Champaign, November 18-23  
Valeria Ricci, Università di Palermo, November 23 - December 4  
Georgios Moschidis, Cambridge and Princeton Universities, November 23-27  
Byron Oviedo, Université de Nice, November 26- December 16  
Jacob Borujaily, Niels Bohr Institute, November 27 - 29  
Jara Milton, IMPA, November 27 - 30  
Marzia Bisi, Università di Parma, November 27 - 30  
François Huveneers, Université Paris-Dauphine, November 27 - 30  
Cinzia Soresina, Università di Milano, November 27 - December 1  
Hendrik Weber, University of Warwick, November 27 - December 1  
Maria Groppi, Università di Parma, November 27 - December 1  
Christophe Bahadoran, Univ. Blaise Pascal, November 27 - December 1  
Gyögy Gehér, University of Reading, November 27 - December 2  
Cedric Bernardin, Université Côte d'Azur, November 27 - December 3  
François Delarue, Université Nice-Sophia Antipolis, November 28 - 30  
François Golse, Ecole Polytechnique, November 29 - December 4  
Thibaut Delcroix, Institut Fourier, Grenoble, December 3-8  
Nicolò Petri, University of Milano-Bicocca, December 5  
Edgard Pimentel, Universidade Federal de São Carlos, December 6  
Leonardo Macarini, Universidade Federal do Rio de Janeiro, December 7-14  
Nasir Sohail, Wilfrid Laurier University, December 8-16  
André Lisibach, Princeton University, December 10-16.  
Rui Loja Fernandes, Univ. Illinois, Urbana-Champaign, December 17-22  
Dan Timotin, Romanian Academy of Sciences, December 24-27

## 3 Seminar Series & Working Seminars

### 3.1 Algebra

Jan 21

**Marcel de Jeu.** *Leiden University.* Positive representations.

Mar 3

**Geoffroy Horel.** *MPI, Bonn.* The operad of little disks, differential topology and Galois theory.

Jul 5

**Daniel Berwick-Evans.** *University of Illinois at Urbana-Champaign.* Elliptic cohomology, loop group representations, and 2-dimensional field theories.

Sep 30

**Simon Henry.** *Collège de France.* On the homotopy hypothesis and new algebraic model for higher groupoids and homotopy types.

Dec 12

**Nasir Sohail.** *Wilfrid Laurier University.* Epimorphisms and amalgamation for ordered monoids.

### 3.2 Analysis, Geometry, and Dynamical Systems

Mar 1

**Thomas Gallouët.** *CMLS, École Polytechnique, Université Paris-Saclay.* Discretization of the incompressible Euler Equation: a Lagrangian approach based on semi discrete optimal transport.

May 2

**Yuriy Rogovchenko.** *University of Agder, Norway.* On asymptotic integration of ordinary differential equations.

May 10

**Kamila Klis-Garlicka.** *University of Agriculture of Krakow.* Reflexivity of bilattices.

Jun 28

**Patrícia Gonçalves.** *Instituto Superior Técnico.* Boundary effects on heat conduction.

Sep 27

**Elvira Zappalle.** *Università Degli Studi di Salerno.* Some recent results about dimensional reduction.

Sep 28

**Simon Henry.** *Collège de France.* The convolution algebra of a topos.

Nov 17

**Marko Djikic.** *University of Niš.* Range additivity, partial orders and some interesting classes of operators on Hilbert spaces.

Nov 22

**Jarek Kedra.** *University of Aberdeen.* On groups which do not admit faithful Hamiltonian actions on closed symplectic manifolds.

Nov 29

**Gyögy Gehér.** *University of Reading.* Asymptotic behaviour of operators which are similar to normal operators.

Dec 6

**Edgard Pimentel.** *Universidade Federal de São Carlos.* Geometric regularity theory for fully nonlinear elliptic equations.

Dec 13

**Byron Oviedo.** *Université de Nice.* Fractional Fick's law for the boundary driven exclusion process with long jumps.

### 3.3 Geometria em Lisboa

Jan 28

**David Martínez Torres.** *PUC-Rio.* Coadjoint orbits and standard symplectic structures.

Mar 15

**Cho-Ho Chu.** *Queen Mary, University of London.* Jordan algebras and geometry.

Apr 26

**Pietro Pirola.** *Università degli studi di Pavia.* Massey product and fibered surfaces.

May 10

**Gonçalo Oliveira.** *Duke University.* Gerbes on  $G_2$  manifolds.

May 13

**Jaime Silva.** *Instituto Superior Técnico, Universidade de Lisboa.* Mixed Hodge Structures of Abelian Character Varieties.

Jun 21

**Leonardo Macarini.** *Universidade Federal do Rio de Janeiro.* Reeb flows with positive topological entropy and connected sums.

**Jul 5**

**Stefan Wagner.** *University of Hamburg.* Free Group Actions on  $C^*$ -Algebras: Classification and Applications.

**Jul 14**

**Ana Rita Pires.** *Fordham University.* Symplectic embeddings and infinite staircases.

**Jul 14**

**Nick Sheridan.** *Princeton University.* Homological mirror symmetry for Greene-Plesser mirrors.

**Jul 25**

**Bruno Oliveira.** *University of Miami.* Twisted symmetric differentials and quadric envelopes.

**Jul 27**

**Bruno Oliveira.** *University of Miami.* Twisted symmetric differentials and quadric envelopes II.

**Jul 28**

**Gonalo Oliveira.** *Duke University.* Random complexes in Riemannian manifolds.

**Jul 29**

**Bruno Oliveira.** *University of Miami.* Twisted symmetric differentials and quadric envelopes III.

**Nov 10**

**Umberto Hryniewicz.** *Universidade Federal do Rio de Janeiro, Brasil.* Negative and positive results in the intersection between systolic and symplectic geometry.

**Nov 18**

**Martin Pinsonnault.** *University of Western Ontario.* Finite Hamiltonian actions on 4-manifolds.

**Dec 6**

**Thibaut Delcroix.** *Institut Fourier.* K-stability of Fano spherical varieties.

### 3.4 Partial Differential Equations

**Feb 11**

**Anne Franzen.** *Instituto Superior Tecnico.* Boundedness of massless scalar waves on Reissner-Nordstrom interior backgrounds.



**Feb 17**

**Anne Franzen.** *Instituto Superior Técnico.* The wave equation in black hole backgrounds I.

**Mar 2**

**Clément Cancés.** *INRIA Lille-Nord-Europe.* A time compactness result of Aubin-Simon's type for strongly degenerate parabolic equations.

**Mar 7**

**Ernesto Nungesser.** *Instituto de Ciências Matemáticas, Universidad Autónoma de Madrid.* Stability of homogeneous cosmological solutions without cosmological constant.

**Mar 9**

**Anne Franzen.** *Instituto Superior Técnico.* The wave equation in black hole backgrounds II.

**Mar 31**

**Brien Nolan.** *Dublin City University.* Cauchy horizon (in)stability in self-similar collapse.

**Apr 5**

**Spyros Alexakis.** *University of Toronto.* The Black Hole uniqueness problem, old and new.

**Apr 6**

**Anne Franzen.** *Instituto Superior Técnico.* The wave equation in black hole backgrounds III.

**Apr 13**

**Moritz Reintjes.** *Instituto Nacional de Matemática Pura e Aplicada.* Is Spacetime Locally Inertial for General Relativistic Shock Wave Solutions?

**Apr 20**

**Dominic Dold.** *University of Cambridge.* Exponentially growing mode solutions to the Klein-Gordon equation in Kerr-AdS spacetimes.

**May 4**

**Dejan Gajic.** *University of Cambridge.* Linear waves on extremal black holes.

**May 11**

**Anne Franzen.** *Instituto Superior Técnico.* The wave equation in black hole backgrounds IV.

**May 24**

**Anne Franzen.** *Instituto Superior Técnico.* The wave equation in black hole backgrounds V.

**May 30**

**Jan Sbierski.** *University of Cambridge.* Instability results for the wave equation in the interior of black holes.

**Jun 15**

**Volker Schlue.** *Université Pierre et Marie Curie.* On the stability of Schwarzschild de Sitter cosmologies.

**Jun 16**

**Laurent Dietrich.** *Carnegie Mellon University.* Enhancement of propagation in reaction-diffusion equations by a line of fast diffusion.

**Jun 24**

**Anne Franzen.** *Instituto Superior Técnico.* The wave equation in black hole backgrounds VI.

**Jun 29**

**João Costa.** *ISCTE - IUL.* Bounded energy waves in the black hole interior of Reissner-Nordström-de Sitter spacetimes.

**Jul 1**

**João Costa.** *ISCTE - IUL.* Bounded energy waves in the black hole interior of Reissner-Nordström-de Sitter spacetimes II.

**Jul 6**

**Xavier Cabré.** *Universitat Politècnica de Catalunya Barcelona Tech.* Curves and surfaces with constant nonlocal mean curvature.

**Jul 14**

**Alberto Saldaña.** *Université Libre de Bruxelles.* On the extended Allen-Cahn equation.

**Sep 27**

**Adán Corcho.** *IM-UFRJ.* On the Unboundedness of Sobolev Norms of Solutions for the Critical Schrödinger-Debye System with Small Relaxation Delay.

**Oct 10**

**Mijiddorj Renchin-Ochir.** *Department of Informatics, Mongolian National University of Education; Institute of Mathematics, National University of Mongolia.* Numerical solution of Burgers, Å equation and some properties of integro cubic splines.

**Oct 28**

**Grigorios Fournodavlos.** *University of Cambridge.* Dynamics of the Einstein equations near a Schwarzschild singularity.

**Nov 4**

**Claes Uggla.** *Karlstads Universitet, Karlstad.* On the structure of generic singularities and underlying reasons for that structure.

**Nov 9**

**Hugo Ferreira.** *INFN Pavia / Pavia University.* Application of the Sturm-Liouville theory to classical and quantum field theory in anti-de Sitter spacetime.

**Nov 18**

**Anne Franzen.** *Instituto Superior Técnico.* The wave equation in black hole backgrounds VII.

**Nov 25**

**Georgios Moschidis.** *University of Cambridge and Princeton University.* The scalar wave equation on general asymptotically flat spacetimes: Stability and instability results.

**Dec 14**

**André Lisibach.** *Princeton University.* Shock Development in Spherical Symmetry.

### 3.5 String Theory

**Feb 8**

**Marco Chiodaroli.** *AEI Golm.* Scattering amplitudes in  $N = 2$  Maxwell-Einstein and Yang-Mills-Einstein supergravities.

**Mar 21**

**Paolo Benincasa.** *Universidad Autónoma de Madrid.* Correlators, Amplitudes and Polytopes.

**Apr 4**

**José Rebelo.** *International School for Advanced Studies.* Symplectic Field Theory and Quantum Integrable Systems.

**Apr 11**

**Alvaro Veliz-Ororio.** *Queen Mary College London.* Scrambling without chaos.

**May 2**

**Vishnu Jejjala.** *University of the Witwatersrand.* Consistency and derangements.

**May 9**

**Teresa Bautista.** *International Centre for Theoretical Physics.* Weyl Anomalies and Quantum Cosmology.

**May 23**

**Omer Gurdogan.** *Institut de Physique Theorique CEA.* Integrable chiral scalars and Feynman integrals.

**Jun 6**

**Sergei Alexandrov.** *University of Montpellier.* D-instantons, mock modular forms and BPS partition functions.

**Jul 15**

**Ricardo Monteiro.** *CERN Geneva.* Black holes and the double copy.

**Oct 10**

**Leron Borsten.** *Dublin Institute for Advanced Studies.* Gravity as the square of Yang-Mills.

**Oct 24**

**Gianluca Inverso.** *Instituto Superior Técnico.* Doubled, exceptional and new generalised geometries.

**Nov 7**

**Miguel Tierz.** *Faculdade de Ciências, Universidade de Lisboa.* Quantum phase transition in many-flavor supersymmetric QED in three dimensions.

**Nov 28**

**Jacob Bourjaily.** *Niels Bohr Institute.* Stratifying On-Shell Cluster Varieties.

**Dec 5**

**Nicolò Petri.** *University of Milano-Bicocca.* Gauged supergravities and Hamilton-Jacobi.

### **3.6 Topological Quantum Field Theory**

**Jan 22**

**Marko Stosic.** *CAMGSD, Instituto Superior Técnico.* Homological knot invariants, A-polynomial and integrality properties.

**Jan 26**

**Urs Schreiber.** *Czech Academy of Sciences, Prague.* Structure Theory for Higher WZW Terms I.

**Jan 29**

**Urs Schreiber.** *Czech Academy of Sciences, Prague.* Structure Theory for Higher WZW Terms II.

**Feb 15**

**Yasuyuki Kawahigashi.** *University of Tokyo.* Moonshine, conformal field theory and operator algebras.

**Feb 23**

**Urs Schreiber.** *Czech Academy of Sciences, Prague.* Structure Theory for Higher WZW Terms III.

**Feb 26**

**Urs Schreiber.** *Czech Academy of Sciences, Prague.* Structure Theory for Higher WZW Terms IV.

**Mar 15**

**Urs Schreiber.** *Czech Academy of Sciences, Prague.* Structure Theory for Higher WZW Terms V.

**Mar 18**

**Urs Schreiber.** *Czech Academy of Sciences, Prague.* Structure Theory for Higher WZW Terms VI.

**Apr 29**

**Kadir Emir.** *Eskisehir Osmangazi University, Turkey.* Simplicial Cocommutative Hopf Algebras.

**Jun 8**

**Hisham Sati.** *University of Pittsburgh and New York University.* M-theory via rational homotopy theory.

**Jun 21**

**Hisham Sati.** *University of Pittsburgh and New York University.*  $L_\infty$ -algebra of sphere-valued supercocycles in M-theory.

**Jun 22**

**Kowshik Bettadapura.** *Australian National University.* Deformations of Super-Riemann Surfaces.

**Jul 7**

**John Huerta.** *CAMGSD, Instituto Superior Técnico.* M-theory from the superpoint.

**Oct 19**

**Björn Gohla.** *Grupo de Física Matemática, Universidade de Lisboa.* Poincaré Duality as Duality of Categories.

Nov 2

**Benjamin Alarcán Heredia.** *Universidade Nova de Lisboa.* On the representations of 2-groups in Baez-Crans 2-vector spaces.

Nov 16

**Roger Picken.** *Instituto Superior Técnico.* Invariants and TQFTs for cut cellular surfaces from finite groups and 2-groups.

Dec 7

**Björn Gohla.** *Grupo de Física Matemática, Universidade de Lisboa.* 2+1 TQFTs with Defects.

## 4 Conferences and short courses

The following Conferences and Short Courses were organized or co-organized by members of the Center in 2016:

### **Workshop on Operator Theory, Complex Analysis, and Applications 2016 / WOTCA 2016**

*Universidade de Coimbra, Portugal, June 21–24, 2016*

*Organizing committee:* Cristina Câmara (CAMGSD-IST), Cristina Diogo (ISCTE-IUL and CAMGSD-IST), Teresa Malheiro (CMAT-Universidade de Minho), Ana Cristina Nata (IPT-Tomar and CMUC-Coimbra).

### **Topology of Manifolds. A conference in honour of Michael Weiss' 60th birthday**

*Lisbon, Portugal, June 27 – July 1, 2016*

*Organizing committee:* Pedro Boavida (CAMGSD-IST), Soren Galatius (Stanford University), Gustavo Granja (IST), Pascal Lambrechts (Université catholique de Louvain)

### **Resurgence in Gauge and String Theories**

*Instituto Superior Técnico, Lisbon, Portugal, July 18–22, 2016*

*Organizing committee:* Gerald Dunne (University of Connecticut), José Mourão (CAMGSD-IST), João Pimentel Nunes (CAMGSD-IST), Ricardo Schiappa (CAMGSD-IST), Mithat Ünsal

## **6th IST-IME Meeting on Ordinary and Partial Differential Equations and Related Topics**

*Instituto Superior Técnico, Lisbon, Portugal, September 5–9, 2016*

*Organizing committee:* Pedro Girão, Pedro G Henriques, Luis Magalhães, João P Matos, José Matias, Henrique Oliveira, Carlos Rocha, Jorge Silva (CAMGSD-IST)

## **Spanish-Portuguese Relativity Meeting 2016**

*Lisbon, Portugal, September 12-15, 2016*

*Organizing committee:* S. Almeida, V. Cardoso (IST), S. Carloni (IST), J. P. S. Lemos (IST), F. Lobo (FCUL), J. Natário (CAMGSD-IST), R. Sousa (IAUP)

## **Particle Systems and PDEs V**

*Universidade do Minho, Braga, November 28-30, 2016*

*Organizing committee:* Benjamin Anwasia (CMAT, Universidade do Minho), Filipe Carvalho (CMAT, Universidade do Minho), M. Conceição Carvalho (CMAF, Universidade de Lisboa), Patrícia Gonçalves (CAMGSD-IST), Ana Jacinta Soares (CMAT, Universidade do Minho),

## 5 Seminars given by members of the Center

The following seminar talks, invited lectures or short courses were given by members of the Center in 2016:

Miguel Abreu, Examples of low dimensional symplectic cobordisms, Mini-workshop on Symplectic Geometry, IM-UFRJ Summer School, Rio de Janeiro, Brazil, February 18-19, 2016.

Miguel Abreu, Cuts, surgeries and toric contact manifolds, Joint Symplectic Seminar IMPA-UFRJ-UFF-PUC, Rio de Janeiro, Brazil, March 29, 2016.

Miguel Abreu, On the mean Euler characteristic of Gorenstein toric contact manifolds, Workshop on Symplectic Geometry and Topology, International Center for Mathematical Sciences, Edinburgh, UK, July 25-29, 2016, and 6th IST-IME Meeting, IST, September 5-9, 2016.

Miguel Abreu, Multiplicity of periodic orbits on prequantizations: dynamically convex contact forms, Scientific meeting on the minimal number of closed Reeb orbits, Paris, France, December 15-16, 2016.

Artur Alho, On dynamical systems approaches and methods in  $f(R)$  cosmology, EREP 2016, Fundação Calouste Gulbenkian, Lisboa, Portugal, September 13, 2016.

Artur Alho, A stellar model with diffusion in general relativity, IX Black Holes Workshop, Universidade do Minho, Guimarães, Portugal, December 19, 2016.

Sílvia Anjos, Seidel's morphism of toric 4-manifolds, Seminar, CMUP, Porto, January 22, 2016.

Margarida Baía, A model for phase transitions with competing terms, CMUC, Universidade de Coimbra, May 12, 2016.

Pedro Boavida de Brito, Mini-course on Spaces of smooth embeddings, Goodwillie-Weiss calculus and the little discs operad, ETH/Universität Zurich, Switzerland, April 5 - 8, 2016.

Pedro Boavida de Brito, Classifying spaces of homotopy sheaves, University of Muenster, Germany, June 13, 2016.

Pedro Boavida de Brito, Configuration categories and spaces of embeddings, Alpine Algebraic and Applied Topology Conference, Switzerland, August 20, 2016.

Pedro Boavida de Brito, Configuration categories and spaces of embeddings, Max Planck Institute Bonn, Germany, November 21, 2016.



- Cristina Câmara, Mini-course on Wiener-Hopf factorisation and Toeplitz operators, ACOTCA 2016, Lyon, France, June 13-15, 2016.
- Cristina Câmara, Spectral properties of a class of truncated Toeplitz operators, 26th International Conference in Operator Theory, Timisoara, Romania, June 16–July 2, 2016.
- Cristina Câmara, Asymmetric truncated Toeplitz operators and their symbols, SWOT 2016, Cracow, Poland, July 5-7, 2016.
- Cristina Câmara, Wiener-Hopf factorisation and Q-classes, Encontro Nacional da Sociedade Portuguesa de Matemática, ESTB, Barreiro, July 11-13, 2016.
- Cristina Câmara, Spectral properties of a class of truncated Toeplitz operators, OTAMP 2016, Euler Institute, St. Petersburg, Russia, August 2-7, 2016.
- Michele Cirafici, Persistent Homology and String Vacua, University of Barcelona, Spain, January 21, 2016.
- Michele Cirafici, Persistent Homology and the problem of vacuum selection in string theory, Encontro Nacional da Sociedade Portuguesa de Matemática, ESTB, Barreiro, July 11-13, 2016.
- Michele Cirafici, Framed BPS states and framed BPS quivers, Institut des Hautes Études Scientifiques, Bures-sur-Yvette, France, October 20, 2016.
- Michele Cirafici, Topological data analysis and string theory vacua, University of Seville, Spain, November 24, 2016.
- João L. Costa, Global uniqueness in general relativity: the strong cosmic censorship conjecture, Encontro Nacional de Ciência 2016, Parallel Session on Investigação em Matemática e Aplicações, Lisbon, July 4-6, 2016.
- João L. Costa, On strong cosmic censorship in the presence of a positive cosmological constant, Spanish-Portuguese Relativity Meeting, Lisboa, Portugal, September 12-15, 2016.
- João L. Costa, On the decay of linear waves in Reissner-Nordström-de Sitter, IX Black Holes Workshop, Guimarães, Portugal, December, 2016.
- Luís Filipe Costa, Gravitomagnetism and the significance of the curvature scalar invariants, Spanish-Portuguese Relativity Meeting 2016, Lisbon, Portugal, September 12-15, 2016.

- Ricardo Couso-Santamaria, Resurgence in topological string theory, String theory seminar, Bethe Center for Theoretical Physics, Bonn, Germany, February 9, 2016.
- Ricardo Couso-Santamaria, Latest news on resurgence applied to topological strings, Resurgence in Gauge and String Theories, IST, Lisbon, Portugal, July 19, 2016.
- Fernando Pestana da Costa, Bifurcations in twist-Freedericksz transitions in a nematic liquid-crystal cell with non-homogeneous Dirichlet conditions, Contributed Session CS-07-C: Dynamical Systems and Ordinary Differential Equations, 7th European Congress of Mathematics, Technische Universität Berlin, Berlin, Germany, July 21, 2016.
- Jorge Drumond Silva, Short Course - The initial value problem for Einstein's equations, spherically symmetric black holes and the cosmic censorship conjecture, King Abdullah University of Science and Technology (KAUST), Saudi Arabia, January 26-February 4, 2016?.
- Jorge Drumond Silva, On black holes and the strong cosmic censorship in spherical symmetry, 6th IST-IME meeting, in honor of Prof. Waldyr Oliva, IST, Lisbon, September 9, 2016.
- Jorge Duarte, Differential Equations and Mathematical Biology: Anatomy of Some Applications, MatRIC Modeling Colloquium, Agder University, Kristiansand, Norway, August 10, 2016.
- Jorge Duarte, A validated mathematical model of cell-mediated immune response to tumor growth, ECMTB 2016 - 10th European Conference on Mathematical and Theoretical Biology, University of Nottingham, England, UK, July 12, 2016.
- Anne Franzen, Stability of black hole interiors and the Strong Cosmic Censorship Conjecture, Spanish-Portuguese Relativity Meeting, Lisbon, Portugal, September 14, 2016.
- João N. Esteves, Hopf Algebras and Topological Recursion, 2016 AMS von Neumann Symposium on Topological Recursion and its Influence in Analysis, Geometry and Topology, Charlotte Hilton University Place, USA, July 6, 2016.
- Pedro Girão, On the occurrence of mass inflation for the Einstein-Maxwell-scalar field system with a cosmological constant and an exponential Price law., 6th IST-IME meeting, in honor of Prof. Waldyr Oliva, IST, Lisbon, September 9, 2016.

- Leonor Godinho, Circle actions in symplectic geometry, A Symplectic geometry day in Milan, Università degli Studi di Milano, Milan, Italy, November 21, 2016.
- Leonor Godinho, Circle actions in symplectic geometry, 7th European Congress of Mathematics 2016 - Invited Lecture, Technische Universität Berlin, Berlin, Germany, July, 20, 2016.
- Leonor Godinho, Fermat e o número mínimo de pontos fixos de um fluxo periódico, Plenary Session, Encontro Nacional da Sociedade Portuguesa de Matemática, ESTB, Barreiro, July 11-13, 2016.
- Patrícia Gonçalves, On the asymptotic behavior of slowed exclusion processes, talk at "Large Deviations for Interacting Particle Systems and Partial Differential Equations", March, Eindhoven, 2016.
- Patrícia Gonçalves, On the crossover fluctuations of the symmetric simple exclusion with a slow bond, talk at "Probabilistic models - from discrete to continuous", April, Warwick, UK, 2016.
- Patrícia Gonçalves, A universal law behind growth patterns from microscopic stochastic dynamics, Seminar at the University of Lille, May 18, 2016.
- Patrícia Gonçalves, On the scaling limits of symmetric exclusion with slowed boundary, Seminar at the University of Leiden, June 21, 2016.
- Patrícia Gonçalves, Universality from microscopic stochastic dynamics, Encontro Nacional de Ciência 2016, Parallel Session on Investigação em Matemática e Aplicações, Lisbon, July 4-6, 2016.
- Patrícia Gonçalves, The symmetric simple exclusion with slow boundaries, Seminar at the University of Bristol, UK, October 7, 2016.
- Patrícia Gonçalves, The symmetric simple exclusion with slow boundaries, Seminar at the University of Bath, UK, October 11, 2016.
- Gustavo Granja, El índice de Maslov no lineal para los espacios lenticulares, XXIII Encuentro de Topología, Malaga, Spain, October 22, 2016.
- Gianluca Inverso, Doubled, exceptional and new extended field theories, GGI Workshop "Supergravity, what next?", Florence, Italy, September 30, 2016.
- Gianluca Inverso, Deformed and new extended field theories, Seminar at ENS Lyon, France, November 21, 2016.
- Pedro Lopes, Generalized Pallete Graph, Quantum Topology Seminar, University of Illinois at Chicago, USA, March 3, 2016.

- Pedro Lopes, Generalized Pallete Graph, Special Session on Algebraic Structures, AMS Meeting, University of Georgia, Athens, USA, March 5-6, 2016.
- Gabriel Lopes Cardoso, Nernst branes with Lifshitz asymptotics in  $N=2$  gauged supergravity, Iberian Strings 2016, Madrid, Spain, January 27-29, 2016.
- Gabriel Lopes Cardoso, Lifshitz backgrounds and Nernst branes, Wits seminar, University of the Witwatersrand, Johannesburg, South Africa, February 19, 2016.
- Gabriel Lopes Cardoso, Lifshitz backgrounds and Nernst branes, University of Cape Town seminar, Cape Town, South Africa, February 26, 2016.
- Gabriel Lopes Cardoso, Deformed special geometry and topological string theory, IPMU seminar, Institute of the Physics and Mathematics of the Universe, Tokyo, Japan, April 19, 2016.
- Gabriel Lopes Cardoso, A Riemann-Hilbert approach to rotating attractors, WOTCA 2016, Coimbra, Portugal, June 21-24, 2016
- Gabriel Lopes Cardoso, Deformed special geometry and the holomorphic anomaly equation, Encontro Nacional da Sociedade Portuguesa de Matemática, ESTB, Barreiro, July 11-13, 2016.
- Gabriel Lopes Cardoso, Logarithmic corrections to BPS black hole entropy, IX Black Holes Workshop, Guimarães, Portugal, December 19-20, 2016.
- Rafael Luís, Recent advances in global stability of monotone maps: Application to population Dynamics, 2nd International Satellite Conference on Difference Equations and Applications, Okayama University of Science, Japan, July 22-23, 2016.
- Rafael Luís, Recent advances in global stability of monotone maps: Application to population Dynamics (Revisited), 22nd International Conference on Difference Equations and Applications - ICDEA2016, Osaka Prefecture University, Osaka, Japan, July 24-29, 2016.
- Marco Mackaay, Categorized quantum groups, representations and intertwiners. Algebra and Geometry Seminar, Uppsala University, Sweden, January 19, 2016.
- Marco Mackaay, Simple transitive 2-representations of Soergel bimodules. Representation Theory Seminar, University of Bonn, Germany, June 10, 2016.

- Marco Mackaay, The 2-representation theory of Soergel bimodules. Séminaire de Topologie Algébrique, Université Catholique de Louvain, Belgium, November 9, 2016.
- José Matias, Some results in the context of structured deformations, CMUC Seminar, Coimbra, May, 2016.
- José Matias, Explicit Formulas for Relaxed Disarrangement Densities for Structured Deformations, 9th European Conference on Elliptic and Parabolic Problems, Gaeta, Italy, May, 2016.
- José Matias, Optimal Design of Fractured Media with Prescribed Macroscopic Strain, 6th IST/IME Meeting, Lisbon, September, 2016.
- José Matias, Optimal Design of Fractured Media with Prescribed Macroscopic Strain, 6º Encontro Ibérico de Matemáticas, Santiago de Compostela, Spain, October, 2016.
- Margarida Mendes Lopes, Searching for surface, Workshop Mathematics under Construction, University of Potsdam, Germany, July 15, 2016.
- José Mourão, Complex Time Evolution in Geometry and in Quantum Physics, Amílcar Sernadas Conference, Instituto Superior Técnico, April 23, 2016.
- José Mourão, Complexified Hamiltonian symplectomorphisms and solutions of the homogeneous complex Monge-Ampere equation, Geometry and Topology Seminar, Centro de Matemática da Universidade do Porto, September 23, 2016.
- José Mourão, Geometric Quantization of Kähler manifolds and the role of polarizations, Geometry Seminar, The University of Hong Kong, December 2, 2016.
- José Mourão, Complexified Hamiltonian symplectomorphisms and solutions of the homogeneous complex Monge-Ampere equation, Hong Kong Geometry Colloquium, The University of Hong Kong, December 3, 2016.
- Silvia Nagy, Supergravity (and Gauge Theories) as Double Copies, Iberian Strings, Madrid, Spain, January 27, 2016.
- Silvia Nagy, Hidden Structures in Supergravity, National Meeting of the Portuguese Mathematical Society, Barreiro, Portugal, July 11, 2016.
- Silvia Nagy, A new construction for BPS black hole solutions, Dublin Institute for Advanced Studies, Dublin, Ireland, November 1, 2016.

- Silvia Nagy,  $N = 2$  BPS black holes from the double copy, QCD Meets Gravity workshop, University of California, Los Angeles, USA, December 7, 2016
- Silvia Nagy, Multi-centered black hole solutions from the double copy, IX Black Hole Workshop, Guimarães, Portugal, December 18, 2016.
- Suresh Nampuri, Riemann-Hilbert formulation of Einstein gravity, University of Montpellier, November 2016.
- José Natário, A Minkowski-type inequality for convex surfaces in the hyperbolic 3-space, Seminário de Geometria da FCUL, March 4, 2016.
- Lina Oliveira, Lie modules of nest algebras, Seminar, Department of Applied Mathematics, University of Agriculture in Kraków, Poland, May 30, 2016.
- Lina Oliveira, Lie modules and Lie ideals of operator algebras, Workshop on Operator Theory, Complex Analysis and Applications WOTCA 2016, Universidade de Coimbra, June 21–24, 2016.
- Lina Oliveira, Lie structures in operator algebras – Special Session 94, AIMS 2016, The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando, FL, USA, July 1–5, 2016.
- Roger Picken, The action of a 2-group on a category and its application in higher gauge theory, Algebra, Logic and Topology Seminar, Coimbra, Portugal, February 1, 2016.
- João Pimentel Nunes, Complexified symplectomorphisms in geometry and quantization, Encontro Nacional da Sociedade Portuguesa de Matemática, ESTB, Barreiro, July 11-13, 2016.
- Pedro Resende, Stably Gelfand quantales and  $C^*$ -algebras, Fields Institute Workshop on New Directions in Inverse Semigroups, University of Ottawa, Canada, June 1-4, 2016.
- Carlos Rocha, Sturm global attractors which are 3-balls. Part 1, Dynamics of Evolution Equations, CIRM, Luminy, France, March 24, 2016.
- Carlos Rocha, A permutation characterizing unbounded attractors of slowly nondissipative systems, International Conference on Patterns of Dynamics, Freie Universität Berlin, Berlin, Germany, July 26, 2016.
- Carlos Rocha, On a definition of Morse-Smale evolution processes, 6th IST-IME Meeting, IST, Lisbon, September 9, 2016.

- Rafael Sasportes, Rates of Convergence to Scaling Profiles in a Submonolayer Deposition Model and the Preservation of Memory of the Initial Condition, Applied Analysis Seminar, Strathclyde University, Glasgow, Scotland March 15, 2016.
- Rafael Sasportes, Rates of Convergence to Scaling Profiles in a Submonolayer Deposition Model and the Preservation of Memory of the Initial Condition, PIMS/AMI Seminar, University of Alberta, Edmonton, Canada, May 20, 2016.
- Rafael Sasportes, Rates of Convergence To Scaling Profiles and the Preservation of Memory of the Initial Condition, Contributed Session, 7th European Congress of Mathematics, Technische Universität Berlin, Germany July 20, 2016.
- Esmeralda Sousa Dias, Poisson structures and the dynamics of the cluster maps, DynamIC seminar, Imperial College (UK), May 24, 2016.
- Esmeralda Sousa Dias, Poisson structures and the dynamics of the cluster maps, University of Surrey (UK), May 26, 2016.
- Esmeralda Sousa Dias, Estruturas de Poisson e dinâmica de aplicações cluster, Thematic Session on Geometry and its Applications, Encontro Nacional da Sociedade Portuguesa de Matemática, ESTB, Barreiro, July 11-13, 2016.
- Esmeralda Sousa Dias, The geometric organization of the dynamics of some cluster maps, Seminar at CEMAPRE-ULisboa, September 16, 2016.
- Marko Stosic, Colored HOMFLY-PT polynomial, categorification, and BPS numbers, Joint Topology Seminar, Paris VII - Paris XIII, Paris, France, April 14, 2016.
- Marko Stosic, Knots, categorification, and mathematical physics, Conference "70 years of Mathematical Institute SANU", Mathematical Institute SANU, Belgrade, Serbia, May 12-13, 2016.
- Marko Stosic, Thick calculus, colored HOMFLY-PT homologies, and beyond, Categorification Workshop, University of Bonn, Bonn, Germany, May 16-20, 2016.
- Marko Stosic, Some applications of representation theory in categorifications and knot theory, Workshop "Seminar on Representation Theory and Related Areas", Faculdade Ciências, Universidade de Lisboa, Portugal, December 17, 2016.

- Hugo Tavares, Asymptotic Study of Nonlinear Elliptic Systems with Strong Competition, minicourse at the Conference IX Jornada de EDP: DM-UFSCar Conference on Analysis of PDE's, São Carlos, Brazil, January 18-20, 2016.
- Hugo Tavares, Um modelo de competição entre espécies, Oficina Diagonal - Gulbenkian Foundation Program: New Talents in Mathematics. FCT-UNL, Caparica. February 20, 2016.
- Hugo Tavares, Spiked solutions for Schrödinger systems with Sobolev critical exponent, Conference PDEs at the Grand Paradis - 1st International Conference on Variational Methods and PDEs, Cogne, Aosta Valley, Italy, June 20-24, 2016.
- Hugo Tavares, Phase Separation in Competitive Nonlinear Systems and Applications to Shape Optimization Problems, Encontro Nacional de Ciência 2016, Parallel Session Investigação em Matemática e Aplicações, Lisbon, July 4-6, 2016.
- Hugo Tavares, Como dividir a circunferência em  $n$  partes (mais coisa, menos coisa), Thematic Session on Mathematics and Art Composition, Encontro Nacional da Sociedade Portuguesa de Matemática, ESTB, Barreiro, July 11-13, 2016.
- Hugo Tavares, Paths to uniqueness of critical points and applications, Workshop Asymptotic Patterns in Variational Problems: PDE and Geometric Aspects - CMO, Casa Matematica Oaxaca (a BIRS - Banff International Research Center - event), Oaxaca, Mexico, September 25-30, 2016.
- Giorgio Trentinaglia, Proper Cartan groupoids, Seminario de Matemática, CMUC, Universidade de Coimbra, Portugal, December 16, 2016.
- Juha Videman, On Mixed and Stabilized Finite Element Methods for the Obstacle Problem, Numerical Analysis/Analysis Seminar, CMUC, Universidade de Coimbra, February 12, 2016.
- Juha Videman, Nonlinear Reynolds equation for hydrodynamic lubrication, Seminar, Department of Mechanical Engineering, Texas A&M University, USA, May 5, 2016.
- Juha Videman, Stabilized Finite Element Methods for the Stokes and Obstacle Problems, UTAustin|Portugal Workshop on Nonlinear Mechanics and Applications in Life Sciences, IST, Lisbon, October 27, 2016.



## 6 Postdoctoral program and research fellows

The Center started its own postdoctoral program in the 1998-99 academic year. Positions are granted for 12 months, with possibility for extension for a second year. Applicants must hold a PhD degree in mathematics, or in another field relevant to the research interests of the Center, awarded preferably less than two years before the opening date of the position. To be considered for a position, an applicant must show very strong research promise in one of the main areas of activities of the Center. No teaching duties are associated with these positions. The vacancies are advertised internationally in the European Commission Euroaxess, the European Mathematical Society and the American Mathematical Society web sites, leading yearly to about 100 applications.

The Center also hosts research fellows and postdocs funded by other programs. The list of all our postdoctoral trainees since 1998 is available at:

<http://camgsd.ist.utl.pt/posdoc.php.en>

The following postdoctoral students or research fellows were hosted by the Center in 2016:

**Artur Alho**, PhD in Mathematics, Universidade do Minho, 2012. Research areas: General Relativity – future and past asymptotics of cosmological models, spherically symmetric collapse with positive cosmological constant. Supported by an FCT postdoctoral grant (April 2013–March 2016).

**Thomas Baier**, PhD in Mathematics, Instituto Superior Técnico, 2009. Research areas: Kahler geometry and quantization. Supported by an FCT project grant (April 2016–March 2019).

**Pedro Boavida de Brito**, PhD in Mathematics, WWU-Münster & University of Aberdeen, 2014. Research areas: algebraic topology. Supported by an FCT postdoctoral grant (Dec. 2015–Nov. 2018).

**Farid Bozorgnia**, PhD in Applied Mathematics, Royal Institute of Technology, Stockholm, Sweden, 2009. Research Areas: partial differential equations, calculus of variations, spectral theory. Supported by the UT Austin/Portugal Program (August 2010–Nov. 2011) and by an FCT postdoctoral grant (June 2012–March 2017).

**Michele Cirafici**, PhD in Physics, SISSA Trieste, 2004. Research areas: string theory, quantum field theory, geometry. Supported by the CIÊNCIA 2008 Program (Sep. 2009–Aug. 2014), by CAMGSD (Oct.-Dec. 2015) and by an FCT Investigador Grant (Feb. 2015- Jan. 2020).

- Luís Filipe Costa**, PhD in Physics, Universidade do Porto, 2012. Research areas: General Relativity – gravitomagnetic effects, dynamics of extended test bodies, gravito-electromagnetic analogies. Supported by an FCT postdoctoral grant (May 2013–April 2016).
- Ricardo Couso-Santamaria**, PhD in Physics, Universidad de Santiago de Compostela, 2014. Research areas: topological string theory, resurgence theory, matrix models and supersymmetric gauge theories. Supported by an FCT project grant (Nov. 2014–Oct. 2015) and by CAMGSD (Nov. 2015–July 2016).
- Gonçalo Aprá Dias**, PhD in Theoretical Physics, IST, 2008. Research areas: fluid mechanics, water waves. Supported by an FCT postdoctoral grant (Oct. 2010–Sep. 2016).
- João Esteves**, PhD in Physics, IST, 2011. Research area: combinatorics and its applications to Topological Quantum Field Theory. Supported by a CAMGSD postdoctoral grant (Nov. 2011–Jan. 2012) and by an FCT postdoctoral grant (Feb. 2012–Jan. 2018).
- Anne Franzen**, PhD in Theoretical Physics, Utrecht University, 2015. Research areas: General Relativity: wave equation in black hole backgrounds, perturbations of black holes. Supported by a CAMGSD postdoctoral grant (Jan. 2016–Dec. 2017).
- John Huerta**, PhD in Mathematics, University of California, Riverside, 2011. Research areas: foundations of supersymmetry, applying higher gauge theory to superstrings, supermembranes and supergravity. Supported by a CAMGSD postdoctoral grant (Jan. 2013–June 2014) and by an FCT postdoctoral grant (July 2014–June 2017).
- Gianluca Inverso**, PhD in Physics, Università di Roma Tor Vergata, 2013. Research areas: String Theory. Supported by a CAMGSD postdoctoral grant (Sept. 2016–August 2017).
- Leonard Monsaingeon**, PhD in Mathematics, Université de Toulouse 3, 2011. Research areas: elliptic-parabolic PDE's, free boundaries and wave propagation, reaction-diffusion, mass transport methods. Supported by an FCT postdoctoral grant (Sep. 2013–August 2016).
- Silvia Nagy**, PhD in Physics, Imperial College London, 2015. Research areas: mathematical physics, string theory. Supported by a CAMGSD postdoctoral grant (Sept. 2015–March 2017).
- Suresh Nampuri**, PhD in Physics, TIFR, 2012. Research areas: uncovering mathematical structures in the Hilbert space of quantum gravity. Supported by an FCT project grant (June 2015–May 2018).

**Milena Pabiniak**, PhD in Mathematics, Cornell University, 2012. Research areas: equivariant cohomology for Hamiltonian group actions, Gromov width of coadjoint orbits, displaceable and non-displaceable Lagrangian subspaces. Supported by an FCT postdoctoral grant (Jan. 2013–Feb. 2016).

**Alberto Saldaña**, PhD in Mathematics, Frankfurt University, 2014. Research areas: Partial differential equations. Supported by a CAMGSD postdoctoral grant (August 2016–April 2017).

**Marco Stosic**, PhD in Mathematics, IST, 2006. Research areas: knot invariants and categorification. Supported by an ERC grant and by CAMGSD (Jan. 2015–Dec. 2017).

**Hugo Tavares**, PhD in Mathematics, Universidade de Lisboa, 2010. Research areas: partial differential equations, variational methods. Supported by the FCT Investigator 2012 Program through a Starting Grant (Sept. 2013–August 2016)

**Giorgio Trentinaglia**, PhD in Mathematics, Utrecht University, 2008. Research areas: complex analytic geometry, Hodge theory, Mumford-Tate groups, Lie groups and groupoids, orbifolds, foliations, differentiable stacks, representation theory, Tannaka duality, categorical algebra. Supported by an FCT postdoctoral grant (Oct. 2012–Sept. 2018).

## 7 Student supervision

### 7.1 Doctoral theses

The following doctoral theses were completed in 2016 under the supervision of members of the Center (the name of the student and of the CAMGSD supervisor(s) are marked in **bold** characters):

**Sinan Eden**. PhD in Mathematics, Instituto Superior Técnico. November 2016. *The Homotopy Lie Algebra of Symplectomorphism Groups of 3-Fold Blow-Ups of  $(S^2 \times S^2, \sigma_{\text{std}} \oplus \sigma_{\text{std}})$* . Supervised by **Sílvia Anjos**.

### 7.2 Graduate students

The following graduate students were supported by CAMGSD or FCT project fellowships in 2016:

**Rodrigo Vicente** MSc student, fellowship supervised by José Natário (01/07/2015 - 30/04/2016).

**Diana Macedo** MSc student, fellowship supervised by Rosa Sena-Dias (04/07/2015 - 31/10/2016) e Roger Picken (01/11/2016 - 31/12/2016).

**Nuno Alves** MSc student, fellowship supervised by João Pimentel Nunes  
(05/07/2015 - 30/04/2016).

**Azizeh Nozad** PhD student, fellowship supervised by Carlos Florentino  
(01/06/2015 - 30/04/2016).

**Miguel Pereira** MSc student, fellowship supervised by João Pimentel Nunes  
(01/09/2016 - 31/08/2017)

**Frederico Toulson** MSc student, fellowship supervised by Juha Videman  
(15/11/2016 - 14/11/2017)

**Luís Duarte** MSc student, fellowship supervised by Lina Oliveira (15/11/2016  
- 14/11/2017)

**Miguel Santos** LMAC student, fellowship supervised by Henrique Oliveira  
(12/12/2016 - 11/12/2017)

**Miguel Moreira** LMAC student, fellowship supervised by Miguel Abreu  
(12/12/2016 - 11/12/2017)

## 8 Publications in 2016

### 8.1 Publications which appeared in 2016

#### Books & Monographs

- [1] L. Barreira and C. Valls. *Exercises in Linear Algebra*. World Scientific, 2016.

#### Articles in refereed international journals

- [1] J. Agapito and L. Godinho. Cone decompositions of non-simple polytopes. *J. Symplectic Geom.*, 14(3):737–766, 2016.
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- [3] L. Barreira, D. Dragicevic, and C. Valls. A version of a theorem of Pliss for nonuniform and noninvertible dichotomies. *Proc. Roy. Soc. Edinburgh Sect. A*, 147(2):225–243, 2016.
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## Book chapters

- [1] M. Mendes Lopes and R. Pardini. Godeaux surfaces with an Enriques involution and some stable degenerations. In G. Casnati, A. Conte, L. Gatto, L. Giacardi, M. Marchisio, and A. Verra, editors, *From*

*Classical to Modern Algebraic Geometry: Corrado Segre's Master-ship and Legacy*, Trends in the History of Science. Birkhäuser, 2016.  
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## Other publications

- [1] D. Bragança and R. Picken. Invariants and TQFT's for cut cellular surfaces from finite groups. *Bol. Soc. Port. Mat.*, 74:17–44, 2016. arXiv:1512.08263.
- [2] R. Picken. Moduli spaces in higher gauge theory. *Bol. Soc. Port. Mat.*, Special Issue:59–62, May 2016. Actas de Encontro Nacional da SPM (July 2014).

## 8.2 Accepted publications (submitted or accepted in 2016)

### Articles in refereed international journals

- [1] M. Abreu and L. Macarini. Multiplicity of periodic orbits for dynamically convex contact forms. *J Fix Point Theory A*. To appear. arXiv:1509.08441.
- [2] K. K. Andersen, B. Oliver, and J. Ventura. Reduced fusion systems over 2-groups of small order. *J Algebra*. To appear. arXiv:1606.05059.
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- [4] M. Baía, A. C. Barroso, and J. Matias. A model for phase transitions with competing terms. *Q. J. Math.* To appear.
- [5] F. Balibrea, H. M. Oliveira, and J. C. Valverde. Topological equivalences for one-parameter bifurcations of scalar maps. *J. Nonlinear Sci.* To appear. arXiv:1503.03700.
- [6] L. Barreira, D. Dragicevic, and C. Valls. Nonuniform spectrum on the half line and perturbations. *Results Math.* To appear.
- [7] L. Barreira, D. Dragicevic, and C. Valls. Nonuniform exponential dichotomies and Fredholm operators for flows. *Aequationes Math.* To appear.
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- [9] L. Barreira and C. Valls. Relations between regularity coefficients. *Math. Nachr.* To appear.

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- [17] M. C. Câmara, J. Jurais, K. Kliš-Garlicka, and M. Ptak. Characterizations of asymmetric truncated Toeplitz operators. *Banach J. Math. Anal.* To appear. arXiv:1607.03342.
- [18] M. C. Câmara and J. R. Partington. Asymmetric truncated Toeplitz operators and Toeplitz operators with matrix symbol. *J. Operator Theory.* To appear. arXiv:1504.06446.
- [19] I. Colak, J. Llibre, and C. Valls. Bifurcation diagrams for Hamiltonian nilpotent centers of linear plus cubic homogeneous polynomial vector fields. *J. Differential Equations.* To appear.
- [20] I. Colak, J. Llibre, and C. Valls. On the Bifurcation of Limit Cycles Due to Polynomial Perturbations of Hamiltonian Centers. *Mediterr. J. Math.* To appear.
- [21] A. J. Corcho and J. Drumond Silva. On the unboundedness of higher regularity Sobolev norms of solutions for the critical Schrödinger-Debye system with vanishing relaxation delay. *Nonlinearity.* To appear. arXiv:1510.02434.
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- [38] M. Mackaay and V. Mazorchuk. Simple transitive 2-representations for some 2-subcategories of Soergel bimodules. *J. Pure Appl. Algebra.* To appear. arXiv:1602.04314.
- [39] J. Matias, M. Morandotti, and E. Zappale. Optimal design of fractured media with prescribed macroscopic strain. *J. Math. Anal. Appl.* To appear. arXiv:1607.08728.
- [40] L. Monsaingeon. Numerical investigation of the free boundary regularity for a degenerate advection-diffusion problem. *Interfaces Free Bound.* To appear. arXiv:1603.03352.
- [41] J. Mourão, J. P. Nunes, and T. Qian. Coherent state transforms and the Weyl equation in Clifford analysis. *J. Math. Phys.* To appear. arXiv:1607.06233.
- [42] L. Oliveira and M. Santos. Weakly closed lie modules of nest algebras. *Oper. Matrices.* To appear. arXiv:1512.03408.
- [43] A. Pistoia and H. Tavares. Spiked solutions for Schrödinger systems with Sobolev critical exponent: the cases of competitive and weakly cooperative interactions. *J. Fix Point Theory A,* To appear. arXiv:1605.03776.
- [44] C. Valls. Algebraic traveling waves for the generalized Newell-Whitehead-Segel equation. *Nonlinear Anal. Real World Appl.* To appear.
- [45] C. Valls. Complete characterization of algebraic traveling wave solutions for the Boussinesq, Klein-Gordon and Benjamin–Bona–Mahony equations. *Chaos Solitons Fractals.* To appear.

## Book chapters

- [1] J. N. Esteves. Hopf algebras and topological recursion. In M. Mulase, editor, *Topological Recursion and its Influence in Analysis, Geometry and Topology*, Proceedings of Symposia in Pure Mathematics. AMS. To appear.

### 8.3 Manuscripts submitted (but not yet accepted) in 2016

- [1] M. Abreu and L. Macarini. On the mean Euler characteristic of Gorenstein toric contact manifolds, 2016. arXiv:1611.00735.
- [2] A. Alho and S. Calogero. A stellar model with diffusion in general relativity, 2016. arXiv:1602.02663.
- [3] A. Anastasiou, L. Borsten, M. J. Duff, M. J. Hughes, A. Marrani, S. Nagy, and M. Zoccali. Twin supergravities from Yang-Mills squared, 2016. arXiv:1610.07192.
- [4] S. Anjos and R. Leclercq. Non-contractible Hamiltonian loops in the kernel of Seidel's representation, 2016. arXiv:1602.05787.
- [5] A. Arakelyan and F. Bozorgnia. On the uniqueness of the solution to a strongly competing system, 2016. arXiv:1609.00986.
- [6] M. Araújo and G. Granja. Symplectic embeddings in infinite codimension, 2016. arXiv:1404.2433.
- [7] A. C. Barroso, J. Matias, and P. M. Santos. Differential inclusions and A-quasiconvexity, 2016. Submitted.
- [8] A. C. Barroso, J. Matias, M. Morandotti, and D. R. Owen. Second-order structured deformations: relaxation, integral representation and applications, 2016. arXiv:1607.02311.
- [9] M. Baía, F. Bozorgnia, L. Monsaingeon, and J. Videman. A degenerate elliptic-parabolic system arising in competitive contaminant transport, 2016. Submitted.
- [10] D. Bonheure, J. Földes, E. Moreira dos Santos, A. Saldaña, and H. Tavares. Paths to uniqueness of critical points and applications to partial differential equations, 2016. arXiv:1607.05638.
- [11] C. Cancès, T. Gallouët, and L. Monsaingeon. Incompressible immiscible multiphase flows in porous media: a variational approach, 2016. arXiv:1607.04009.
- [12] G. L. Cardoso, S. Nagy, and S. Nampuri. Multi-Cantered  $\mathcal{N} = 2$  BPS black holes: a double copy description, 2016. arXiv:1611.04409.
- [13] C. Correia Ramos, N. Martins, and P. R. Pinto. Toeplitz algebras arising from escape points of interval maps, 2016. Submitted.
- [14] F. Cicero, G. Dibitetto, J.J. Fernandez-Melgarejo, A. Guarino, and G. Inverso. Double field theory at  $SL(2)$  angles, 2016. arXiv:1612.05230.

- [15] J. L. Costa and A. T. Franzen. Bounded energy waves on the black hole interior of Reissner-Nordström-de Sitter, 2016. arXiv:1607.01018.
- [16] L. F. O. Costa, L. Wylleman, and J. Natário. Gravitomagnetism and the significance of the curvature scalar invariants, 2016. arXiv:1603.03143.
- [17] R. Couso-Santamaría, R. Schiappa, and R. Vaz. On asymptotics and resurgent structures of enumerative Gromov-Witten invariants, 2016. arXiv:1605.07473.
- [18] I. Cruz, H. Mena-Matos, and M. E. Sousa-Dias. Multiple reductions, foliations and the dynamics of cluster maps, 2016. arXiv:1607.03664.
- [19] P. Dang, J.P. Nunes, J. Mourão, and T. Qian. Clifford coherent state transforms on spheres, 2016. arXiv:1612.01319.
- [20] M. de Jeu, R. El Harti, and P. R. Pinto. Amenable crossed product Banach algebras associated with a class of  $C^*$ -dynamical systems, 2016. arXiv:1606.06004.
- [21] J.-P. Dias, F. Oliveira, and H. Tavares. On a coupled system of a Ginzburg-Landau equation with a quasilinear conservation law, 2016. arXiv:1606.02640.
- [22] B. Fiedler and C. Rocha. Sturm 3-ball global attractor 1: Dynamic complexes and meanders, 2016. arXiv:1611.02003.
- [23] T. Franco, P. Gonçalves, and A. Neumann. Non-equilibrium and stationary fluctuations of a slowed boundary symmetric exclusion, 2016. arXiv:1608.04317.
- [24] T. Franco, A. Neumann, and P. Gonçalves. Equilibrium fluctuations for the slow boundary exclusion process, 2016. arXiv:1612.01004.
- [25] T. Galloüet and L. Monsaingeon. A JKO splitting scheme for Kantorovich-Fisher-Rao gradient flows, 2016. arXiv:1602.04457.
- [26] L. Godinho, F. von Heymann, and S. Sabatini. 12, 24 and beyond, 2016. arXiv:1604.00277.
- [27] P. Gonçalves and M. Jara. Stochastic Burgers equation from long range exclusion interactions, 2016. arXiv:1606.06655.
- [28] T. Gustafsson, R. Stenberg, and J. Videman. Mixed and stabilized finite element methods for the obstacle problem, 2016. arXiv:1603.04257.
- [29] I. Halacheva and M. Pabiniak. The Gromov width of coadjoint orbits of the symplectic group, 2016. arXiv:1601.02825.

- [30] G. Inverso, H. Samtleben, and M. Trigiante. Type II origin of dyonic gaugings, 2016. arXiv:1612.05123.
- [31] T. Kildetoft, M. Mackaay, V. Mazorchuk, and J. Zimmermann. Simple transitive 2-representations of small quotients of Soergel bimodules, 2016. arXiv:1605.01373.
- [32] A. Macchia, J. Neves, M. Vaz Pinto, and R. H. Villarreal. Regularity of the vanishing ideal over a parallel composition of paths, 2016. arXiv:1606.08621.
- [33] M. Mackaay, V. Mazorchuk, V. Miemietz, and D. Tubbenhauer. Simple transitive 2-representations via (co)algebra 1-morphisms, 2016. arXiv:1612.06325.
- [34] M. Mackaay and D. Tubbenhauer. Two-color Soergel calculus and simple transitive 2-representations, 2016. arXiv:1609.00962.
- [35] T. A. Reis and R. Sena-Dias. Recovering  $U(n)$ -invariant toric Kähler metrics on  $\mathbb{C}\mathbb{P}^n$  from the torus equivariant spectrum, 2016. arXiv:1604.06146.
- [36] M. Stosic. On extended graphical calculus for categorified quantum  $sl(n)$ , 2016. arXiv:1605.06810.

## 9 Editorialships

### Luís Barreira

- Chaos, Solitons & Fractals
- Dynamical Systems: An International Journal
- Revista Matemática Iberoamericana

### Pedro Lopes

- Open Mathematics

### Waldyr Oliva

- São Paulo Journal of Mathematical Sciences

### Pedro Resende

- Surveys in Mathematics and Applications

### Claudia Valls

- Chaos, Solitons & Fractals
- Nonlinear Analysis: Real World Applications

## 10 Partnership and outreach

### Participation in the Programme **Novos Talentos em Matemática**

Supervision of research projects carried out by talented undergraduate students funded by ten month scholarships from the Gulbenkian Foundation.

### Participation in the **IST Winter School for Undergraduates**

*Escola de Inverno de Matemática (EIM2016)*, IST, February 2–4, 2016.

### Outreach activities by individual members

**Luis Filipe Costa** presented the oral communication "O movimento dos corpos segundo a Teoria da Relatividade Geral" at the "II Jornadas de Ciência de Arouca", December 16-17, 2016.

**Gustavo Granja** is member of the steering committee of the undergraduate research program of the Gulbenkian Foundation: **Novos Talentos em Matemática**.

**Gustavo Granja** organized a Gulbenkian Summer School for undergraduates on Partial Differential Equations, IST, July 4-8, 2016.

**Hugo Tavares** was (together with P. J. Freitas - FCUL) scientific reviewer of the 12th grade high school Mathematics manual for the Publisher Santillana.

**Hugo Tavares** gave a seminar talk about the new high school math curricula in Colégio Pedro Arrupe (Lisbon), July 21, 2016.

**Hugo Tavares** spoke at the workshop “Jornadas Pedagógicas Santillana”, aimed at high school teachers, about the new high school math curricula, Porto, January 30, 2016.

## 11 Personal notes

**Miguel Abreu** visited the Universidade Federal do Rio de Janeiro, Brazil, from January 23 to April 23, 2016, as a Special Visiting Professor funded by a CNPq grant.

**Miguel Abreu**, together with Jean Gutt, Jungsoo Kang and Leonardo Macarini, received one Prix du Concours annuel 2016, Groupe I - Mathématiques, from the Classe des Sciences of the Académie Royale de Belgique, for work “On the minimal number of periodic Reeb orbits on a contact manifold”.

**Sílvia Anjos** was member of the Scientific Committee of the “Workshop on Symplectic Geometry, Contact Geometry and Interactions X”, Aussenburg, Germany, February 25 – 27, 2016.

**Michele Cirafici** visited the Institut Henri Poincaré, Paris, France, as part of the Program on the Mathematics of String Theory, in April 24 - July 6, 2016.

**Michele Cirafici** was member of the organizing committee of a Special Session on Recent Developments in String Theory, at the Encontro Nacional da Sociedade Portuguesa de Matemática, Barreiro, Portugal, July 11-13, 2016.

**Fernando Pestana da Costa** acted as a Visiting Academic at the African Institute for Mathematical Sciences, Cape Town, South Africa, in April 11-29, 2016.

**Fernando Pestana da Costa** is President (of the General Assembly) of the Portuguese Mathematical Society in the biennium 2016–18.

**Fernando Pestana da Costa** was President of the Directive Board of the Portuguese Mathematical Society in the biennium 2014–16.

**Leonor Godinho** was Invited Lecturer at 7th European Congress of Mathematics 2016, TU Berlin, Berlin, Germany, July, 20, 2016.

**Patrícia Gonçalves** was consultant for the agencies FAPESP (Brazil) and CNPq (Brazil) for the evaluation of post doc grants and research projects.

**Patrícia Gonçalves** was awarded an ERC starting grant with the budget of 1.179.496€ from 1st December 2016 to 30th November 2021.

**Patrícia Gonçalves** was editor of the conference proceedings *From particle systems to partial differential equations III* of the international conference *Particle Systems and Partial Differential Equations* held in Braga from 17th to 19th December 2014.

**Gabriel Lopes Cardoso** was on sabbatical leave at the the University of the Witwatersrand, Johannesburg, South Africa, February 9 - March 15, 2016, and at the Institute of the Physics and Mathematics of the Universe (IPMU), Tokyo, Japan, April 13-28, 2016.

**Gabriel Lopes Cardoso** was member of the Defense Committee of Valentin Reys's PhD Thesis *Quantum Black Hole Entropy and Localization in Supergravity*, University of Utrecht, the Netherlands, June 13, 2016.

**José Mourão** and **Roger Picken** organized a Special Session on Quantum Physics and Geometry at the Encontro Nacional da Sociedade Portuguesa de Matemática, Barreiro, Portugal, July 11-13, 2016.

**José Natário** served as President of the Portuguese Society on Relativity and Gravitation.

**Roger Picken** was a member of the Scientific Committee of the XXV International Fall Workshop on Geometry and Physics, Madrid, Spain August 29 - September 2.

**Carlos Rocha** was member of the evaluation panel of the Fulbright Visiting Scholar Program for Advanced Research and University Lecturing Awards.

**Carlos Rocha** co-organized the Parallel Session *Investigação em Matemática e Aplicações* at the Encontro Nacional de Ciência 2016, July 4-6, 2016.

**Rafael Sasportes** co-organized a Special Session on Mathematical Modelling of Agglomeration Phenomena at the Encontro Nacional da Sociedade Portuguesa de Matemática, Barreiro, Portugal, July 11-13, 2016.

**Esmeralda Sousa Dias** was evaluator of the H2020-MSCA European projects.

**Marko Stosic** organized a Special Session on Categorification at the Encontro Nacional da Sociedade Portuguesa de Matemática, Barreiro, Portugal, July 11-13, 2016.

**Hugo Tavares** was member of the scientific committee of the conference “IX Jornada de EDP: DM-UFSCar Conference on Analysis of PDE’s”, São Carlos, Brazil, January 18-20, 2016.

**Hugo Tavares** was speaker at the debate “Situação das Mulheres Matemáticas (e não só) em Portugal” (about the situation of Women Mathematician in Portugal), National meeting of the Portuguese Mathematical Society, ESTB, Barreiro, July 11-13, 2016,

**Juha Videman** was member of the scientific committee of the Colab Workshop on Mathematics of Complex Systems: from precision medicine to smart cities, Coimbra, Portugal, December 5-6, 2016.