Department of Mathematics

University of Rome Tor Vergata

MATH@TOV

Excellence Project 2018-2022

NEWSLETTER

N°6 - July - September 2019

Edited by: M. Abundo, L. Arosio, D. Bartolucci, L. Caramellino, T. D'Aprile, F. Flamini, E. Gandola.

Presentation

The Department of Mathematics of the University of Rome Tor Vergata is distinguished by first class research, often motivated by applications from theoretical physics, astronomy, aerospace, finance, technology and medical science, a high level educational system, and the organization of events in the context of the so-called third mission of the University. For details we refer to the Department's website, http://www.mat.uniroma2.it

The Department aims to increase its leading role in research, math education and math culture. The recently awarded national Excellence Project 2018-2022, denoted by MATH@TOV, offers the opportunity to face new challenges, and its main objectives are:

- foster new collaborations between staff members on advanced research themes
- hire excellent staff members, able to participate in multiple research projects
- stimulate the interaction with excellent math groups, both in public research institutions and industry, and transform the Department into a strategic asset for the development of highly advanced mathematics and its application to specific problems
- increase the international visibility of the Department
- improve the Master and PhD Programs in Mathematics
- intensify the spreading of Math Culture.

See the web page of the project MATH@TOV: http://www.mat.uniroma2.it/Progetto/

Recruitment
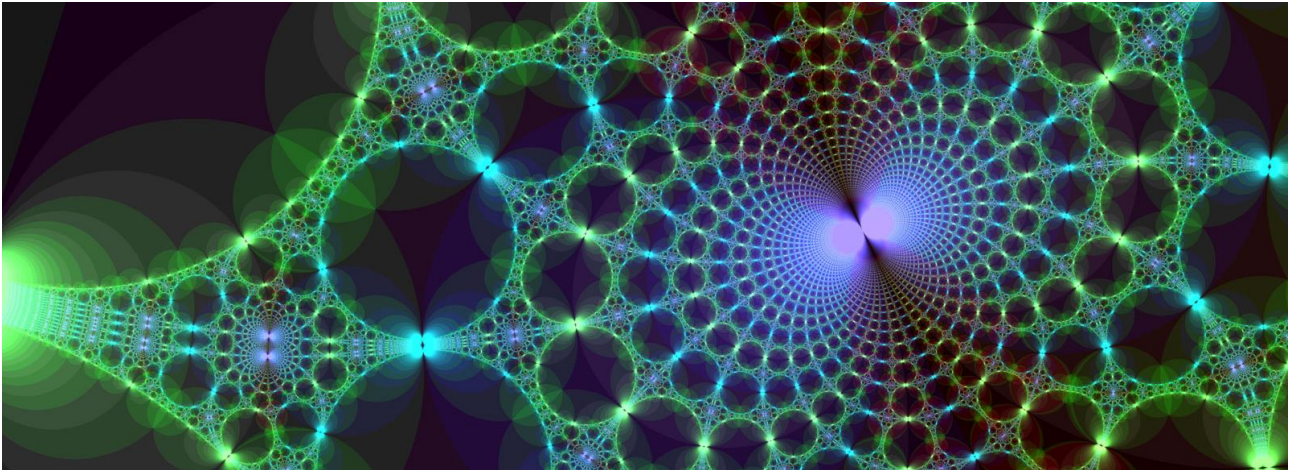
The MIUR Excellence Grant (CUP E83C18000100006, 2018-2022), awarded by the Mathematics Department of the University of Rome Tor Vergata (project MATH@TOV), provides funds for Assistant and Associate Professorships as well as for Postdoc Positions.

Professorships

In January 2019, the Central Administration of the University confirmed 2 "Tenure-Track" Assistant Professorships (RTD-B) as follows:

- 1 position in Probability and Mathematical Statistics (Settore concorsuale 01/A3-Settore Scientifico Disciplinare MAT/06); http://www.uniroma2.it/ammin/cda/2019/29-01-19/10_8.pdf

- 1 position in Mathematical Physics (Settore concorsuale 01/A4-Settore Scientifico Disciplinare MAT/07) http://www.uniroma2.it/ammin/cda/2019/29-01-19/10_9.pdf

  Both positions are for three years and, after evaluation, can be converted in tenured Associate Professorships; they will be opened soon and will be awarded through a public competition. Applicants must have at least three years of experience after PhD completion or have the *Abilitazione* for Associate Professor http://abilitazione.miur.it/public/index.php?lang=eng

  and an already established research record. More information will appear on http://www.mat.uniroma2.it/Progetto/recruitment.php

The following 2 Associate Professor selection procedures are in progress:

- 2 positions in Mathematical Analysis (Settore concorsuale 01/A3-Settore Scientifico Disciplinare MAT/05)

  http://web.uniroma2.it/module/name/Content/newlang/italiano/action/showpage/navpath/CON/content_id/72482/section_id/6225

  http://web.uniroma2.it/module/name/Content/newlang/italiano/action/showpage/navpath/CON/content_id/71038/section_id/6225

The position will be awarded through a public competition. Applicants should have an established track-record of publications in top international journals and evidence of leadership and recognition in the international academic community, including grant applications and project management. Standards of excellence in teaching are also expected.

More information will appear on http://www.mat.uniroma2.it/Progetto/recruitment.php

Post-doc positions

We congratulate Dr. Mayer Martin Gebhard, winner of the (one -year) Postdoc position (Assegni di Ricerca - III Fascia) in Mathematical Analysis (Settore Scientifico Disciplinare MAT/05).

Research

Thematic Semesters

During the period April 2019 - September 2019, MATH@TOV organized a thematic semester with a series of seminar talks on the following main areas (cf. also http://www.mat.uniroma2.it/Progetto/short-visit.php):

Operator Algebras and Quantum Field Theory

- Among others, we mention the talks of G.A. Garcia (Universidad Nacional de La Plata), C. D. Jäkel (University of São Paulo), M. Demers (Fairfield University), J. Tener (Australian National University), F. Radulescu (University of Rome "Tor Vergata"), F. Arici (Leiden University), D. Cadamuro (Leipzig University), D. Ueltschi (University of Warwick), K. Beanland (Washington and Lee University), A. Maffei (University of Pisa), C.A. Finocchiaro (University of Catania), R. Fioresi (University of Bologna), M. Boos (RHUR Universität, Bochum), K. Zaynulli (University of Ottawa).

Holomorphic dynamics and geometry of complex manifolds and spaces, and their interplay

- Among others, we mention the talks of G. Popescu (University of Texas at San Antonio), E. Wold (University of Oslo), H. Samuelsson (University of Göteborg), E. Bedford (Stony Brook).

Mathematical techniques for Earth and Space Science

- Among others, we mention the talks of G. Tinetti (University College London), W. Cheng (University of Nanjing), A. Fathi (Georgia Institute of Technology), I. Melbourne (Warwick University), D. Souza (Federal University of Pernambuco), M. Tanzi (University of Victoria), Alexander Ioffe (Technion).

PDE's of Liouville type in Physics and Geometry

- Among others, we mention the talks of C. Mercuri (Swansea University), N. Gigli (S.I.S.S.A.), J. Xiong (Beijing Normal University), Y.Hu (University of Texas at San Antonio), A. Farina (University Picardie - Amiens), Hugo Tavares (University of Lisboa).

Algebraic Geometry

- Among others, we mention the talks of C. Camere (University of Genova), G. Marzo (University of Rome "Tor Vergata"), A. Sarti (University of Poitiers), S. Boissere (University of Poitiers), B. Bolognese (University of Sheffield).

Numerical analysis - aeronautic and aerospace design.

- Among others we mention the talks of M. Benzi (S.N.S. Pisa), M. S. Floater (University of Oslo), R. T. Farouki (University of California Davis), Y. J. Zhang (Carnegie Mellon).

Probability theory and statistics - data analysis in cosmology

- Among others we mention the talks of J. Franchi (I.R.M.A. Strasbourg), M. Franchi (University of Rome "Sapienza"), A. Caponera (University of Rome "Sapienza"), V. Bally (University of Paris-Est), V. Cammarota (University of Rome "Sapienza"), Yen-Chi Chen (University of Washington, Seattle), Ian Sloan (University of New South Wales).

Conferences and Workshops

MATH@TOV is funding a wide activity of conferences/workshops/advanced lecture series/schools. Recent and next events are listed below.

1) **Workshop – "New Trends in Celestial Mechanics"**
   Venue and Period Cogne: Val D'Aosta, Italia 24-28/6/2019

   Speakers: https://sites.google.com/view/ntcm2019/speakers

   Scientific and Organising Commitee
   Vivina Barutello, Alberto Boscaggin, Alessandra Celletti, Walter D'ambrosio, Susanna Terracini

2) **Workshop – "Holomorphic Functions, Complex Manifolds and CR Geometry**
   Venue and Period: Dipartimento di Matematica Roma Tor Vergata, Italia 24-25/10/2019

   Speakers: Giuseppe Tomassini (SNS, PISA), Egmon Porten (Mid Sweden University), Vincenzo Ancona (Firenze), Denny Hill (Sony Brook), Nikolai Tarkhanov (Potsdam), Antonio Lotta, Andrea Siro (Camerino), Dmitri Zaitsev (Trinity College, Dublin)

   Scientific and Organising Commitee
   Filippo Bracci, Giuseppe Pareschi, Costantino Medori

3) **Workshop - "A Representation Theory Summit (ARTS) in Rome"**
   Link: https://sites.google.com/view/representation-theory-in-rome/speakers
   Venue and Period: University of Rome "Tor Vergata", Via Lucullo, Rome, Italy, 15-16/11/2019

The conference will start after lunch on Friday and end around lunch time on Saturday.

The deadline for registration is the 15th of October, 2019. To register, send an email to artsinrome2019@gmail.com. Due to the venue capability, a limited number of places is available. Registration is compulsory and it might be closed before the 15th of October, once the limit has been reached.

Scientific and Organising Commitee
Fabio Gavarini, Eugenio Giannelli, Martina Lanini

4) **Workshop – "INdAM Workshop: Geometric Challenges in Isogeometric Analysis"**
Venue and Period: INDAM ROMA, Italia 27-31/01/2020

Speakers: Annalisa Buffa (EPFL, Svizzera), Tor Dokken (SINTEF, Norvegia), Bert Jüttler (Johannes Kepler University, Austria), Jorg Peters (University of Florida, Stati Uniti), Xiaoping Qian (University of Wisconsin-Madison, Stati Uniti), Ulrich Reif (TU Darmstadt, Germania), Giancarlo Sangalli (Università degli Studi di Pavia, Italia), Yongjie Jessica Zhang (Carnegie Mellon University, Stati Uniti)

Scientific and Organising Commitee
Carla Manni, Hendrik Speleers

Advanced Lecture Series

D. Ueltschi, University of Warwick
"Quantum spin systems and their loop representations"

Abstract: http://www.mat.uniroma2.it/Progetto/seminars.php?inizio=10&pagina=2

Publications

Publications realized, within the excellence Department project MATH@TOV, by members of the Department and their co-authors during the first year of the project have been listed in the web-page http://www.mat.uniroma2.it/Progetto/publications.php

High level teaching activities

Degree prizes

- It has just been closed the call for applications for 10 degree prizes financed by MATH@TOV, for an amount of 2,000.00 euros each, for master's graduates in Pure and Applied Mathematics from Tor Vergata in the period July 2018 - May 2019.

Applicants must have produced a master thesis that contains at least one of the following requirements: a relevant original result; an efficient implementation and/or a particularly significant numerical experimentation; a clear and in-depth presentation of highly relevant results. Next newsletter will report the winners.

Information at: http://www.mat.uniroma2.it/~dida2/Borse/premi_Laurea_magistrale.pdf

- For the second year, MATH@TOV will fund up to 3 INdAM scholarships, for an amount of 2,500 euros each, for students enrolled in the Curriculum of Excellence of the Master Programme in Pure and Applied Mathematics at Tor Vergata. The Curriculum of Excellence involves additional training activities, consisting of in-depth studies, seminars, or participation in external courses, according to a programme that will be tailored to each student. Next newsletter will report the winners.

Information at: http://www.mat.uniroma2.it/didattica/eccellenza.php

Scholarships

- It has just been closed the call for applications for 3 additional scholarships, financed by MATH@TOV, for the winners of the research competition organised by the National Institute of High Mathematics (INdAM) "Francesco Severi" and reserved for students enrolled in the first year of the Master Programme in Pure and Applied Mathematics at Tor Vergata (such students will automatically be enrolled in the Curriculum of Excellence). Next newsletter will report the winners.

Deadline: September 13, 2019
Information at: https://www.altamatematica.it/wp-content/uploads/2019/05/BANDO-8-borse-di-studio-laurea-magistrale-19-20.pdf

PhD School in Mathematics - Courses

Special courses for the Ph.D. School in Mathematics, to be held in the period April-October 2019, organized within the excellence Department project MATH@TOV are the following:

- Vlad Bally (Université Paris-Est, France)
  - o Title: "Malliavin calculus and regularity properties" (Probability theory and Statistics, PDE)
- Barbara Bolognese (University of Sheffield, UK)
  - o Title: "Introduction to Bridgeland stability and applications" (Algebraic Geometry)
- Sylvain Cappell (New York University, USA)
  - o Title: " Theories of characteristic classes for singular varieties and their roles and computations in geometrical topology and algebraic geometry" (Algebraic Geometry)
- Dejan Slepcev (Carnegie-Mellon University, USA)
  - o Title: "Variational problems of Machine Learning and their continuum limits" (PDE)

General Activities

MATH@TOV is also meant to fund renovations of rooms/laboratories of the Department, acquisition of modern equipment, research books, etc. The list below covers some of the activities in the first year of the project.

- BUILDING:
    o "Computing Center Area" renovation, where the multi-core "Single System Image" will be located for CPU parallel computing;
    o Realization of a "Department Common Room".

- SOFTWARE:
    it is now possible to install and use *Mathematica* on desktops or laptops connected to the University network. The procedure is still under experimental evaluation, however installation on PCs of an IT laboratory classroom have been worked.

- COMPUTATIONAL EQUIPMENT:
    The two new servers have arrived, together with the support hardware: two racks, a UPS module, equipment to build a local network. All the resources will be available in the next few months.