TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

Department of Mathematics
University of Rome Tor Vergata

MATH@TOV
Excellence Project 2018-2022
NEWSLETTER
N°12 January – March 2021

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Due to the Covid-19 emergency some scheduled activities have been suspended/postponed.
We will promptly report about these activities in the next newsletters.

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

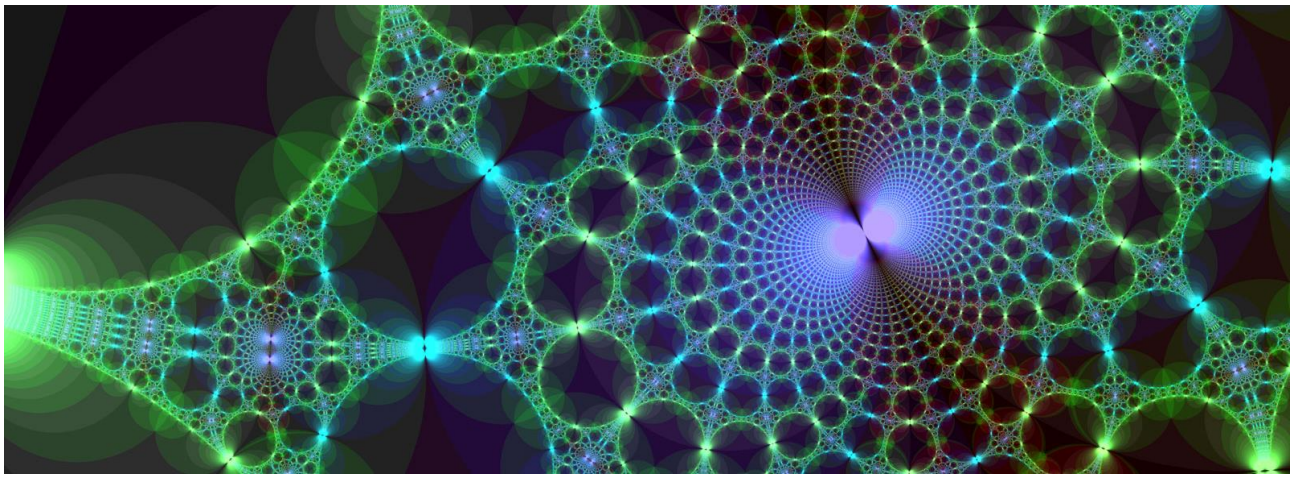
The Department aims to increase its leading role in research, math education and math culture. The recently awarded national Excellence Project 2018-2022, denoted by MATH@TOV, offers the opportunity to face new challenges, and its main objectives are:

- 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/

Since April 2020 the former P.I. of the project
Prof. A. Celletti is member
of the ANVUR governing council.
The Department would like to express his warmest thanks to Prof. A. Celletti for Her invaluable effort in the project planning and development.
She has been succeeded by the new P.I.
Prof. D. Marinucci.

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

The following "Tenure-Track" Assistant Professorships (RTD-B) selection procedure is in progress:

- 1 position in Algebra (Settore concorsuale 01/A2 - Settore Scientifico Disciplinare MAT/02)

http://web.uniroma2.it/module/name/Content/newlang/italiano/action/showpage/navpath/CON/content_id/91408/section_id/6206

The position is for three years and, after evaluation, can be converted in tenured Associate Professorships; it will be awarded through a public competition. Applicants must have at least three years of experience after PhD completion, and an already established research record. Selection procedures are in progress. More information will appear soon on http://www.mat.uniroma2.it/Progetto/recruitment.php

Postdoc positions

The following Postdoc positions selection procedures are in progress:

- 1 (one-year) Postdoc position (Assegni di Ricerca - III Fascia) in Mathematical Analysis (Settore concorsuale 01/A3 - Settore Scientifico Disciplinare MAT/05) – Title: "Algebre di Operatori e Teoria Quantistica dei Campi"

- 1 (one-year) Postdoc position (Assegni di Ricerca - II Fascia) in Geometry (Settore concorsuale 01/A2 - Settore Scientifico Disciplinare MAT/03) – Title: "Geometria Algebrica"

- 1 (one-year) Postdoc position (Assegni di Ricerca - II Fascia) in Geometry (Settore concorsuale 01/A2 - Settore Scientifico Disciplinare MAT/03) – Title: "Dinamica olomorfa e iperbolicità di Gromov"

- 1 (one-year) Postdoc position (Assegni di Ricerca - I Fascia) in Mathematical Physics (Settore concorsuale 01/A4 - Settore Scientifico Disciplinare MAT/07) – Title: “Teoria KAM sulla stabilità dei sistemi planetari caratterizzati da ampie eccentricità”

  See http://concorsionline.uniroma2.it

  We also congratulate:

- Dr. Alessio Cipriani, winner of the (one-year) Postdoc position (Assegni di Ricerca - I Fascia) in Algebra-Geometry (Settore concorsuale 01/A2 - Settore Scientifico Disciplinare MAT/02-MAT/03) – Title: “Teoria di Lie, Teoria delle Rappresentazioni e loro aspetti geometrici”

- Dr. Lorenza D'Elia, winner of the (one-year) Postdoc position (Assegni di Ricerca - III Fascia) in Mathematical Analysis (Settore concorsuale 01/A3 - Settore Scientifico Disciplinare MAT/05) – Title: “Omogeneizzazione di problemi variazionali non-locali”

- Dr. Simone Del Vecchio, winner of the (one-year) Postdoc position (Assegni di Ricerca - III Fascia) in Mathematical Physics (Settore concorsuale 01/A4 - Settore Scientifico Disciplinare MAT/07) – Title: “Metodi operatoriali per sistemi quantistici a un numero infinito di gradi di libertà”

- Dr. Josias Reppekus, winner of the (one-year) Postdoc position (Assegni di Ricerca - I Fascia) in Geometry (Settore concorsuale 01/A2 - Settore Scientifico Disciplinare MAT/03) – Title: “Dinamica Olomorfa e Analisi Complessa”

Research

Thematic Semesters

During the period October 2020 - March 2021, 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 V. Morinelli (University of Rome "Tor Vergata"), B. Wegener (University of Rome "Tor Vergata"), A. Stottmeister (University of Hannover), L. Panebianco (University of Rome "Tor Vergata").

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

- Among others, we mention the talks of O. Roth (University of Wuerzburg), A. Aleman (Lund University), A. Baranov (St. Peterburg State University), A. Bufetov (CNRS Marseille), P. Mozolyako (St. Peterburg State University), M. Calzi (University of Milano), A. Monguzzi (University of Milano-Bicocca),W. Zwonek (Jagiellonian University), L. Kosinski (Jagiellonian University), M. Abate (University of Pisa), D. Girela (University of Malaga), S. Mongodi (Politecnico di Milano).

Mathematical techniques for Earth and Space Science

- Among others, we mention the talks of A.P. Bustamante (Georgia I.T.), S. Daneri (G.S.S.I.), B. Kumar (Georgia I.T.), E. Marchini (Politecnico di Milano), G. Benedetti (Ruprecht-Karls Universität), G. Pucacco (University of Rome "Tor Vergata"), L. Valvo (University of Rome "Tor Vergata"), T. Vartolomei (University of Rome "Tor Vergata"), D. Serra (University of Pisa).

- Mini-series of seminars on topological data analysis: S. Vigogna (University of Genova), A. Troiani (University of Padova), N. Otter (University of California at Los Angeles).

PDE's of Liouville type in Physics and Geometry

- Among others, we mention the talks of C. Alvez (Universidade Federal de Campina Grande), V. Moroz (Swansea University), M. Muratori (Politecnico di Milano), A. Pluda (University of Pisa), L. Martinazzi (University of Padova), J. Bellazzini (University of Pisa), W. Ao (Wuhan University), M.

Ahmedou (Geißen University), M. Santilli (University of Augsburg), M. Caponigro (University of Rome "Tor Vergata").

Algebraic Geometry

- Among others, we mention the talks of A. Okounkov (Columbia University), T. Kobayashi (University of Tokio), F. Catanese (University of Bayreuth).

Probability theory and statistics - data analysis in cosmology

- Among others, we mention the talk of E. Persichetti (Florida Atlantic University).

Conferences and Workshops

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

- **May 12: Celebrating Woman in Mathematics**
  An initiative in memory of Maryam Mirzakhani.
  Online event: www.mat.uniroma2.it/may12/12.php
  May 14th : M. Colombo (Swiss Federal Institute of Technology).
  Organizers: M. Lanini, D. Marinucci, A. Sorrentino, E. Strickland

- **Entropy and QFT**
  Date: May 19-20 2021
  https://sites.google.com/view/entropy-qft
  Organizers: G. Ruzzi, R. Longo, V. Morinelli

- **Machine learning and computer-assisted techniques in Celestial Mechanics and Astrodynamics**
  Date: 18 June and 25 June 2021
  Organizers: C. Lhotka, U. Locatelli

- **Dimension of multivariate splines: an algebraic approach**
  Date: one day to be fixed around May-June 2021
  Organizers: C. Manni, H. Speleers

- **Algebraic Combinatorics and Mathematical Physics**
  Date: 13 and 14 January 2022
  Organizer: F. Brenti

- **Dynamic programming methods in aerospace engineering**
  Date: tba
  Organizers: P. Cannarsa, L. Mazzini (Thales)

Colloquia

The seminars are online. We use the Teams platform.

April 26th : T. J. R. Hughes (The University of Texas at Austin)

Link: http://www.mat.uniroma2.it/Progetto/seminars.php

Complex Analysis Seminars

The seminars are online. We use the Teams platform.
Link: https://sites.google.com/view/complex-analysis-seminar/home-page

Organizers:
Filippo Bracci (University of Rome "Tor Vergata")
Marco Peloso (University "Statale di Milano")
Nicola Arcozzi (University of Bologna)

Publications

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

High level teaching activities

PhD Courses – Advanced Lecture series

MATH@TOV is funding a wide activity of Ph.D. courses/advanced lecture series

- **Canonical metrics and Kähler-Ricci flow**
  V. Guedj (Institut de Mathématiques de Toulouse)
  Period: April 2021

- **Graph-complexes, operads and embedding spaces**
  V. Turchin (Max Planck Institut Bonn/Kansas State University)
  Period: April 2021

- **Structure-preserving methods: finite element exterior calculus and isogeometric generalizations**
  D. Toshniwal (Delft Institute of Applied Mathematics), E. Sande (University of Rome "Tor Vergata")
  Period: April 2021

- **Questioni e metodi di storia della scienza**
  L. Russo.
  Period: April-May 2021

- **Topological data analysis and applications**
  Anibal Medina-Mardones (Max-Planck-Institut Bonn)
  Period: May 2021

- **Optimal transport and applications**
  F. Santambrogio (University of Lyon)
  Period: May 2021, http://www.mat.uniroma2.it/~dott/Santa.html

- **Modern Classical and Statistical Mechanics**
  G. Gallavotti
  Period: May 2021

- **On rationality of complex algebraic varieties**
  T. de Fernex (University of Utah)
  Period: May-June 2021, http://www.mat.uniroma2.it/~ricerca/geomet/Lect2021_de_Fernex.html

- **Weak KAM theory and Hamilton-Jacobi equations**
  Albert Fathi (Georgia Tech)
  Period: May-June 2021

- **An introduction to Liouville Equations with Applications**
  D. Bartolucci (University of Rome "Tor vergata"), D. Ruiz (University of Granada), R. Soriano-Lopez (University of Granada), A. Jevnikar (University of Udine).
  Period: Autumn 2021

- **Thermodynamics and Statistical Mechanics of the Climate System**
  V. Lucarini (University of Reading)
  Period: Autumn 2021

- **Weak KAM on Wasserstein spaces**
  Wilfrid Gangbo (UCLA)
  Period: November 2021

- **Topics on Bridgeland stability conditions**
  E. Macrì (University Paris-Sud)
  Period: tba

- **Mean field games**
  D. Gomes (KAUST)
  Period: tba

- **Large Deviations and Asymptotic Methods in Finance**
  Gulisashvili (Ohio University)
  Period: tba

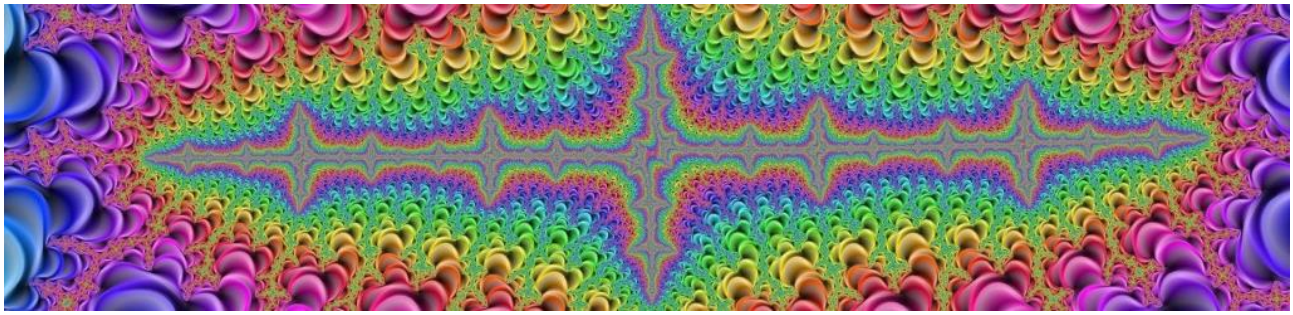
Master's Curriculum of Excellence

MATH@TOV provides funds for students enrolled in the Master's Curriculum of Excellence in Pure and Applied Mathematics at Tor Vergata. The following students have been admitted to the Curriculum of Excellence during the 2020/2021 academic year:

- Gabriele SALVADEI
- Edoardo SCRIMA
- Alessandro TRASATTI
- Arianna VICARI

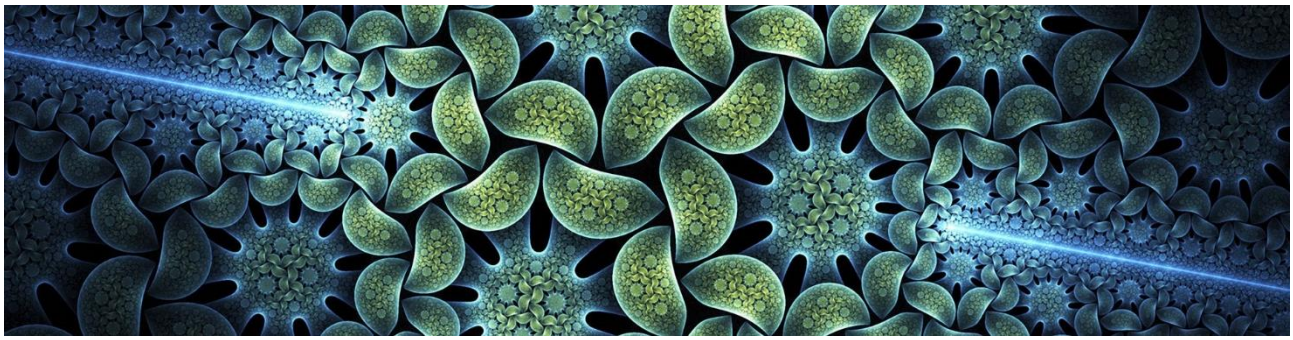
In addition, students Francesco MALIZIA and Roberto VACCA have successfully completed the first year of the Curriculum of Excellence and are now enrolled in the second year.

General Activities



We completed the procedure for the assignment of hardware supplies and related contracts for assistance and training, which are aimed at the expansion of the computer center of the department.
Asystel Italia SpA will deliver and install a computer which is a clone of the one we called Ipazia. Both will be equipped with two GPGPU cards each, thus quadrupling the computing power available to us on this particular type of peripheral unit.
Asystel will organize various training activities specifically dedicated to High Performance Computing addressed to the members of the department.

Third mission



Collective training meetings for the Liceo Matematico were held monthly. The activities were also presented in a joint seminar series with the Universities of Rome Sapienza and Rome 3, as well as in national seminars.

Activities related to projects dedicated to high school students and called “Percorsi per le competenze trasversali e per l'orientamento” continued. An additional project was included in this framework.

Finally, a short training course for secondary school teachers was organized and publicized. It will take place in April.