



Department of Mathematics
University of Rome Tor Vergata



MATH@TOV
Excellence Project 2018-2022
NEWSLETTER
N°14 July – September 2021



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

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

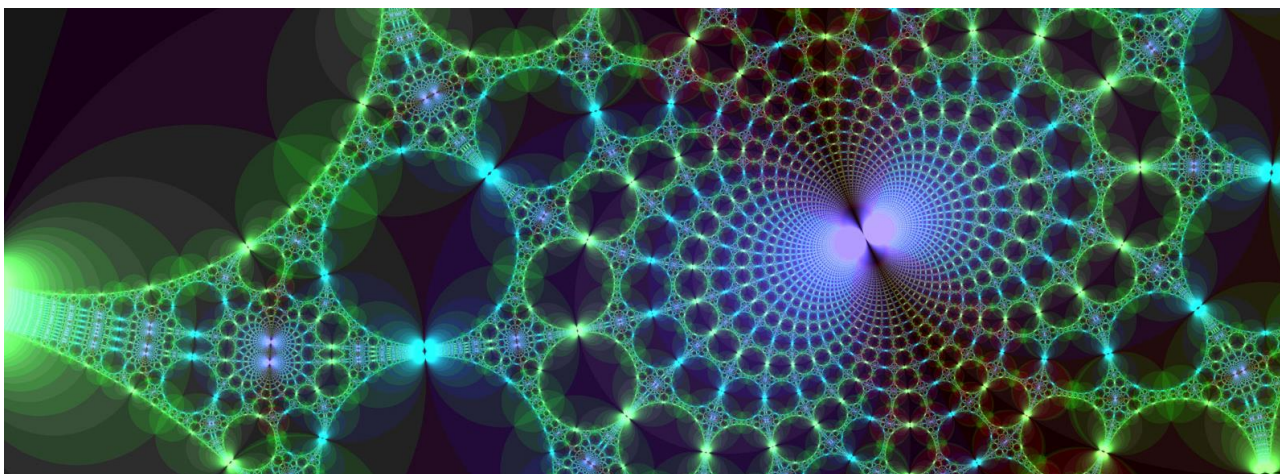
The Department of Mathematics of the University of Rome Tor Vergata is distinguished by first class research, often motivated by applications from theoretical physics, astronomy, aerospace, finance, technology and medical science, a high level educational system, and the organization of events in the 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/>

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 to 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 - II Fascia) in Mathematical Analysis (Settore concorsuale 01/A3 - Settore Scientifico Disciplinare MAT/05) – Title: “Analisi Geometrica in problemi differenziali della Geometria e della Fisica”
- 1 (one-year) Postdoc position (Assegni di Ricerca - III Fascia) in Mathematical Physics (Settore concorsuale 01/A4 - Settore Scientifico Disciplinare MAT/07) – Title: “Soluzioni quasi-periodiche di sistemi dissipativi e loro domini di analiticità”
- 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 Mathematical Analysis (Settore concorsuale 01/A3 - Settore Scientifico Disciplinare MAT/05) – Title: “Operator algebras with

applications to quantum field theory”

- 1 (one-year) Postdoc position (Assegni di Ricerca - III Fascia) in Mathematical Physics (Settore concorsuale 01/A4 - Settore Scientifico Disciplinare MAT/07) – Title: “New Computational Challenges in Applied Mathematics”
- 1 (six-months) scholarship in History of Science (Settore concorsuale 01/A1 - Settore Scientifico Disciplinare MAT/04) – Title: “Proprietà fisiche e fluidodinamiche dei rostri della battaglia delle Egadi”

See <http://concorsionline.uniroma2.it>

We also congratulate:

- Dr. Gian Marco Canneori, 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: “Metodi variazionali, geometrici e PDE per lo studio di sistemi Hamiltoniani e dell'equazione di Hamilton-Jacobi”
- Dr.ssa Cristina Urbani, 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: “Controllo di equazioni a derivate parziali con applicazioni ai modelli climatologici”.

Research



Thematic Semesters

During the period October 2020 - September 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”), N. Pinamonti (University of Genova), D. Buchholz (University of Goettingen), L. Zsido (University of Rome “Tor Vergata”), F. Cipriani (Politecnico di Milano), N. Pinamonti (University of Genova), D. Guido (University of Rome “Tor Vergata”), M.S. Adamo (University of Rome “La Sapienza”).

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), A. Nicolau (UAB Barcelona), D. Betsakos (Aristotle University of Thessaloniki), A. Dayan (Washington University at St. Louis), I. Chalendar (University Paris-Eiffel), A.M. Benini (University of Parma), H. Gaussier (University of Grenoble Alpes).

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), M. Saillenfest (IMCCE, Observatoire de Paris), M. Sansottera (University of Milano), C. Bellettini (University College London), F.C. Chittaro (University of Toulon), S. Ferraz Mello (University of Sao Paulo) .

- Mini-series of seminars on topological data analysis: S. Vignola (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”), L. Jeanjean (Bourgogne Franche-Comté), R. Ghezzi (University of Rome “Tor Vergata”), A. Jevnikar (University of Udine), M. Nolasco (University of L’Aquila), S. Secchi (University of Milano-Bicocca), G. Molica Bisci (University of Urbino), F. Palmurella (ETH Zurich).

Algebraic Geometry

- Among others, we mention the talks of A. Okounkov (Columbia University), T. Kobayashi (University of Tokyo), F. Catanese (University of Bayreuth), J. Bassi (University of Rome “Tor Vergata”), R. Fringuelli (University of Rome “Tor Vergata”), R. Miranda (Colorado State University).

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.

- **Seminal interactions between mathematics and physics. II**
Date: September 28th - October 1th 2021
Organizers: F. Ciolli, C. de Concini, A. De Sole, S. Doplicher, G. Gallavotti, A. Giuliani, G. Jona-Lasinio, R. Longo, G. Morsella, C. Procesi, A. Pizzo, G. Ruzzi
<https://sites.google.com/view/sibmp2-lincei2020/home>
- **Algebraic Combinatorics and Mathematical Physics**
Date: January 13th and 14th 2022
Organizer: F. Brenti
- **Dynamic programming methods in aerospace engineering**
Date: tba
Organizers: P. Cannarsa, L. Mazzini (Thales)

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

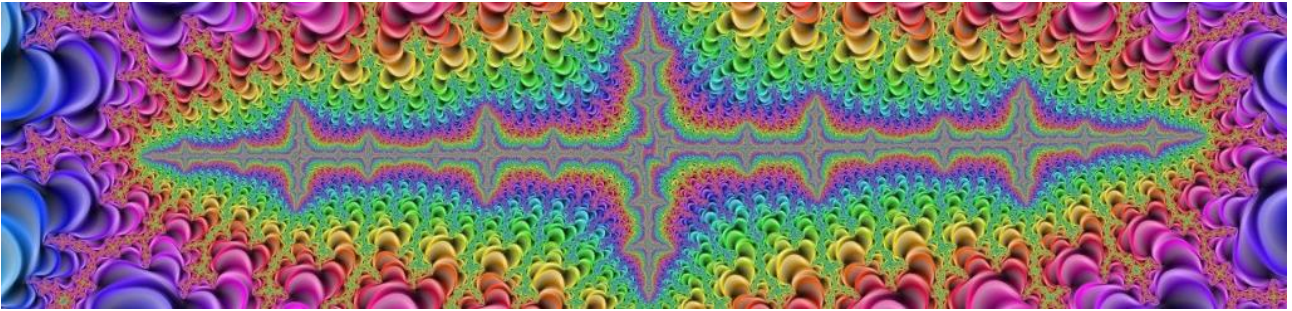
- **An introduction to Liouville Equations with Applications**
D. Bartolucci (University of Rome "Tor Vergata"), D. Ruiz (University of Granada),
R. Soriano-Lopez (University of Granada), A. Jevnikar (University of Udine).
Period: November 8 - December 2, 2021
<https://www.mat.uniroma2.it/~bartoluc/Liouville2122.html>
- **Thermodynamics and Statistical Mechanics of the Climate System**
V. Lucarini (University of Reading)
Period: November - December 2021
- **Weak KAM on Wasserstein spaces**
Wilfrid Gangbo (UCLA)
Period: November 2021
- **Topics on Bridgeland stability conditions**
E. Macrì (University Paris-Sud)
Period: February - March 2022
- **Mean field games**
D. Gomes (KAUST)
Period: tba

Grants and Curriculum of Excellence

- Some MATH@TOV funds have been employed to tackle the economic and social emergency caused by the COVID-19 pandemic. More precisely, the Department has financed the following grants:
 - special prizes for a total of 10,000 euros for students enrolled in the AY 2020/21 of the Bachelor's Degree Course in Mathematics;
 - special prizes for a total of 15,000 euros for students enrolled in the AY 2020/21 of the Master's Degree Course in Pure and Applied Mathematics;

- special prizes for a total of 6,400 euros for all students enrolled in the AY 2020/21 of the Bachelor's Degree in Science and Technology for the Media.
- All prizes have variable amounts starting from 400 euros. As for the similar awards funded by MATH@TOV in 2020, the competition closed recently and the following students were awarded:
 - for the Master's Degree Course in Pure and Applied Mathematics: Letizia Ambrosetti, Marina Canalis, Manuel Capozzi, Edoardo Ferraro, Alessandro Filippo, Dario Ghigiarelli, Lorenza Gobbi, Giulia Iezzi, Alice Ippoliti, Francesco Malizia, Simone Marrocco, Antonio Martucci, Gilda Masi, Daniele Milana, Denise Novelli, Gabriele Salvadei, Maria Ludovica Sarandrea, Edoardo Scrima, Alessandro Trasatti
 - for the second year of the Master's Degree Course in Pure and Applied Mathematics: Marina Canalis, Manuel Capozzi, Edoardo Ferraro, Dario Ghigiarelli, Lorenza Gobbi, Daniele Milana, Denise Novelli, Gabriele Salvadei, Edoardo Scrima, Alessandro Trasatti;
 - for the Bachelor's Degree Course in Mathematics: Valentina Altamura, Marco Aragona, Tiziano Bigazzi, Andrea Cecconi, Mattia D'Andrea, Giorgia Di Luzio, Leonardo Federici, Aurora Iovine, Elisa Martuscelli, Matteo Pacitto, Ilaria Papazzo, Gianluca Pastorini, Dario Pelone, Marco Riccardi, Michela Rossi, Fabrizio Tomeo;
 - for the Bachelor's Degree in Science and Technology for the Media: Barbara Brighel, Davide Di Pietro, Arianna Martinelli, Letizia Pennè, Jacopo Proietti Savina, Federica Raule, Lidia Rugiero, Sara Santilli, Martina Stivala, Irena Urbanetti, Stefano Vinaccia.

General Activities



7 departmental classrooms and laboratories: 1200, Dal Passo, D'Antoni, De Blasi, 2001, 26 and 25 have been equipped with a standard multimedia kit consisting of: HDMI projector, condenser microphone and a motorized webcam. All the connections have been brought into a convenient 504 outdoor box placed directly on the desk which also contains a power socket for the laptop.

The second floor of the Department has been renewed with a new conference room and 5 new multimedia rooms.

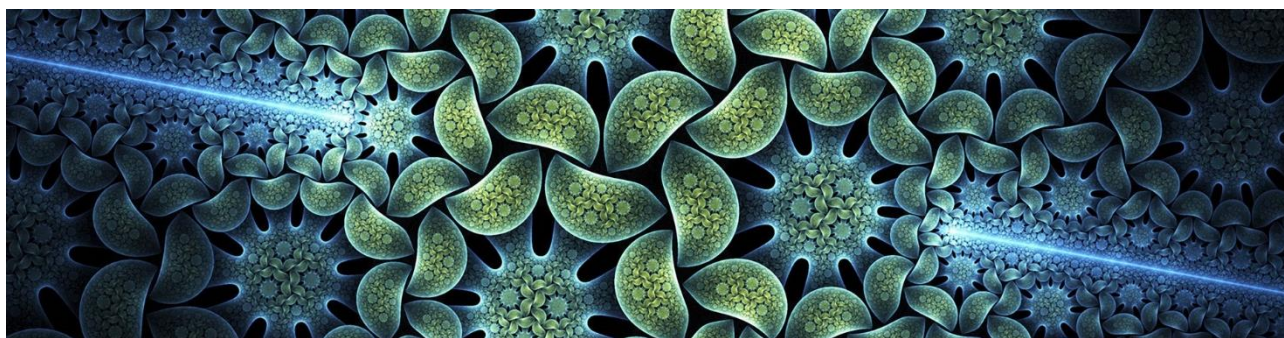
A study group named "TC: Training to high performance Computing" has been created on Microsoft Teams. The code to join the group is 75x5zdw. Everybody interested is invited to join.

The first meeting, coordinated by Hendrik Speleers, took place at the end of September and was an introduction to Python.

The second meeting will take place in the first days of October, the speaker Dr. Costantino Zazza will talk about "Infrastrutture per calcolo numerico intensivo in accademia: da una loro definizione tassonomica agli esempi concreti".

This second talk is the first of a series of meetings organized in collaboration with Asystel Italy which will be coordinated by experts on issues related to training for High Performance Computing (HPC) in academia.

Third mission



The Department of Mathematics continued various initiatives aimed at school students. Moreover, it took part in the events related to the European Researchers' Night, within the NET project. Conferences were held for the general public and schools. In particular, Piermarco Cannarsa held a seminar entitled 'Understanding the climate of the remote past from the near past'.

On September 9th and 10th, the National Conference of Mathematical High Schools took place; the Liceo Scientifico Gullace Talotta, which has an agreement with our department, held a workshop entitled 'From spherical geometry to remarkable limits'.