



Department of Mathematics
University of Rome Tor Vergata



MatMod@TOV
Excellence Project 2023-2027
NEWSLETTER
N°5 January 2025 – April 2025



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Presentation

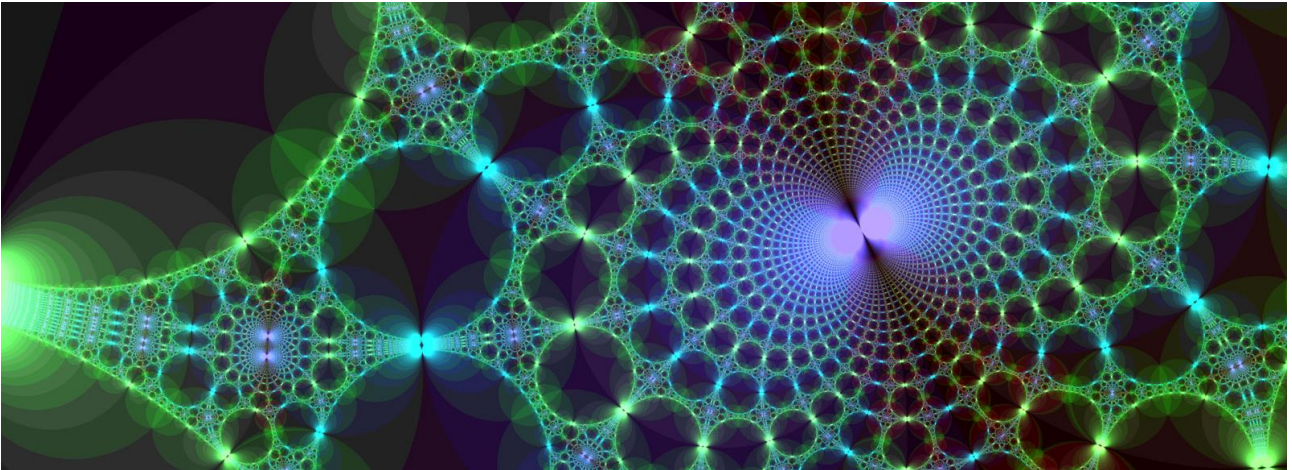
The Department of Mathematics of the University of Rome Tor Vergata is distinguished by first class research, often motivated by applications from theoretical physics, astronomy, aerospace, finance, technology and medical science, a high-level educational system, and the organization of events in the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

The Department aims to increase its leading role in research, math education and math culture. The recently awarded national Excellence Project 2023-2027, denoted by MatMod@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 MatMod@TOV: <https://www.mat.uniroma2.it/progetto/>

Recruitment



The MIUR Excellence Grant (CUP E83C23000330006, 2023-2027), awarded to the Mathematics Department of the University of Rome Tor Vergata (project MatMod@TOV), provides funds for Assistant and Associate Professorships as well as for Postdoc Positions.

All details at <https://www.mat.uniroma2.it/progetto/recruitment.php>

Professorships

We congratulate:

- Prof. Efthymios Sofos, winner of the Associate Professor position in Geometry (Gruppo Scientifico Disciplinare 01/MATH-02 – Settore Scientifico Disciplinare MATH-02/B).

Postdoc positions

We congratulate:

- Dr. Tiziano Gaudio, winner of the (one year) Postdoc position (Assegni di Ricerca - II Fascia) in Mathematical Analysis (Gruppo Scientifico Disciplinare 01/MATH-03 – Settore Scientifico Disciplinare MATH-03/A) – Title: “Algebre di operatori e teoria quantistica dei campi conformi”;
- Dr. Leonardo Maini, winner of the (one year) Postdoc position (Assegni di Ricerca - II Fascia) in Probability (Gruppo Scientifico Disciplinare 01/MATH-03 – Settore Scientifico Disciplinare MATH-03/B) – Title: “Geometria dei campi aleatori e applicazioni”;
- Dr. Paolo Cosentino, winner of the (one year) Postdoc position (Assegni di Ricerca - I Fascia) in Mathematical Analysis (Gruppo Scientifico Disciplinare 01/MATH-03 – Settore Scientifico Disciplinare MATH-03/A) – Title: “Analisi geometrica e problemi ellittici differenziali in geometria e fisica”.

Research



Research Topics

During the period October 2024 – December 2024, MatMod@TOV organized a series of seminar talks/collaborations about the following main research topics:

- 1) Dynamical Systems and Statistical Physics
- 2) Quantum Field Theory and Quantum Information Theory
- 3) Mathematical Modelling and PDE's
- 4) Topological Data Analysis
- 5) Algebraic Geometry and Applications
- 6) Mathematical Modelling in Celestial Mechanics and Space Applications
- 7) Mathematical Modelling, Probability, Statistics and Machine Learning
- 8) Mathematical Modelling and Numerical Analysis
- 9) Mathematical Modelling and Climate Change

This is a partial list of the invited speakers/collaborators during the period: F. Tropeano (University of Rome "Tre"), R. Montalto (University of Milano-Statale), F. Carocci (University of Rome "Tor Vergata"), M. Guardia (University of Barcelona), A. Casarotti (University of Ferrara), F. Bracci (University of Rome "Tor Vergata"), F. Schulze (University of Warwick), P. Albano (University of Bologna), T. Blomme (University of Geneva), R. Schoof (University of Rome "Tor Vergata"), J. Schino (University of Warsaw), A. Guidolin (University of Southampton), A. Carotenuto (University of Parma), D. Weissmann (IMPAN Warsaw), P. Esposito (University of Rome "Tre"), P. Spelier (University of Utrecht), D. Mugnai (Tuscia University), D. Simon (University of "Paris-Saclay"), A. Pizzi (University of Rome "Tor Vergata"), N. Mascot (Trinity College Dublin), A. Garroni (University of Rome "Sapienza"), M. Palladino (University of L' Aquila), R. Volpato (University of Padova), L. Gössmann (Ruhr-Universität Bochum), G. Mikhalkin (University of Geneva), G. Verzini (Polytechnic of Milano), E. Fatighenti (University of Bologna), F. Ambrosio (Friedrich-Schiller-Universität Jena), A. Scagliotti (Technical University of Munich), A. Bajravani (Humboldt

Universität zu Berlin), X. Lü (East China Normal University), F. Cipriani (Polytechnic of Milano), H. Casini (Istituto Balseiro, Bariloche), T. Scognamiglio (Universität Heidelberg), N. Alvarado (University of Rome “Tor Vergata”), M. Ghimenti (University of Pisa), S. Murro (University of Genova), C. Mendico (University of Borgogne), L. Mari (University of Milano), G. Huisken (M.F.O. Oberwolfach and University of Tubinga). (cf. also <https://www.mat.uniroma2.it/seminari-new2.php?inizio=0&pagina=1>)

Colloquia

- **Felix Schulze** (University of Warwick)
Title “Mean curvature flow with generic initial data”
Date: January 1th, 2025
- **Gerhard Huisken** (M.F.O. Oberwolfach and University of Tubinga)
Title “Concepts of quasi-local mass and quasi-local radius in Mathematical Relativity”
Date: April 30th, 2025

Conferences and Workshops

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

- **Workshop: Mathematical Modeling of the Human Brain**
Date: January 15th-22th 2025
Place: Department of Mathematics
Organizer: F. Bracci (University of Rome “Tor Vergata”),
https://www.mat.uniroma2.it/progetto/Events_pages/2025/Mmh2025/page-mmhb2025.php
- **Workshop (INdAM): Far Methods for Isogeometric Analysis**
Date: May 5th-9th 2025
Place: National Institute of High Mathematics (INdAM) “Francesco Severi”
Organizers: M. Mazza & H. Speleers (University of Rome “Tor Vergata”), M. Montardini (University of Pavia), <https://www.mat.uniroma2.it/~speleers/indam2025/>
- **Workshop (INdAM): Mathematical Perspectives in Scientific Modeling**
Date: May 28th-30th 2025
Place: Department of Mathematics and Villa Mondragone “Tor Vergata”
Organizers: F. Bracci, C. Manni, D. Marinucci, A. Porretta (University of Rome “Tor Vergata”),
https://www.mat.uniroma2.it/progetto/Events_pages/2025/Maps2025/page-maps2025.php
- **May 12: Celebrating Women in Mathematics, Shedding Light on Black Holes**
Date: June 6th 2025
Place: Department of Mathematics
Organizers: M. Lanini, D. Marinucci, E. Strickland (University of Rome “Tor Vergata”),
<https://www.mat.uniroma2.it/may12.php>

RoMaDS

(Rome Center on Mathematics for Modeling and Data Sciences)

Recently founded by MatMod@TOV project, the aim of the center is to contribute to the development of mathematical research in the field of modelling and data science through the organization of seminars, conferences and doctoral courses (<https://www.mat.uniroma2.it/~rds/events.php>).

Even more important is the possibility of establishing a permanent forum for the interaction between mathematical research and actual applications. In particular, the interdisciplinary nature of the center allows the creation of stable interactions between those involved in mathematical techniques of data analysis in different departments of the University. At the same time, our goal is to foster interactions with other research centers and even outside the strictly academic sphere.

<https://www.mat.uniroma2.it/~rds/about.php>

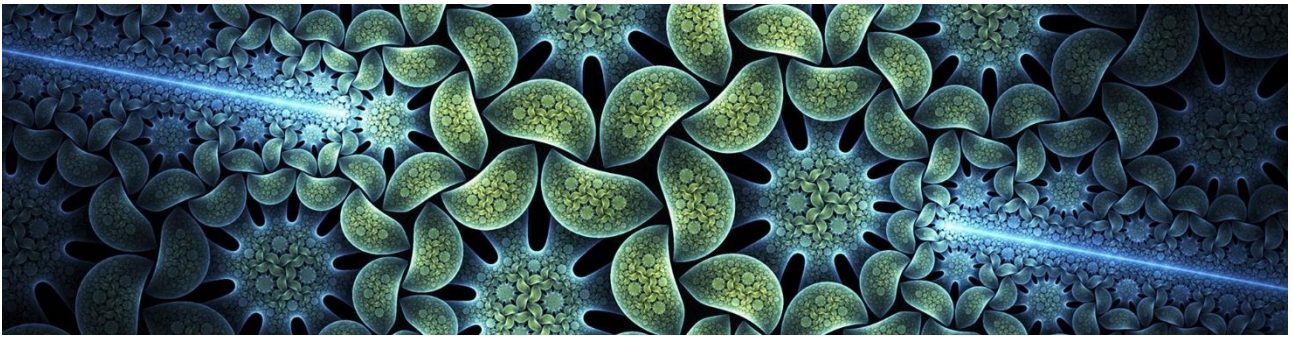
High level teaching activities



PhD Courses

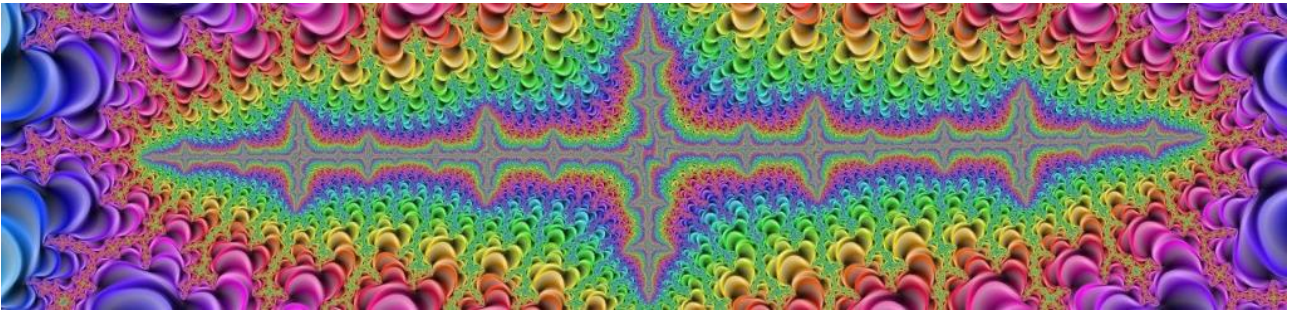
- **Mini course: Emanuele Natale (Université Côte d'Azur)**
Title: Parallel Machine Learning in Julia
Date: March-April 2025
Place: Department of Mathematics
- **PhD course: Quentin Berger (Université Sorbonne Paris Nord)**
Title: Statistical mechanics and disordered systems
Date: May-June 2025
Place: Department of Mathematics

Third mission



- From March 14 to May 11, our department hosted the exhibition "Émile Borel Matematico plurale", in collaboration with the Institut Henri Poincaré. The exhibition illustrates the contribution of the French mathematician to European mathematics between the 19th and 20th centuries. In particular, Borel collaborated with some of the most important Italian mathematicians of the period and contributed to the construction of scientific relations between Italy and France. On March 17, 2025, in room 2001, an inauguration event of the exhibition was organized with the reports of Laurent Mazliak (Sorbonne Université, LPSM): "Émile Borel's mathematics in the transition between the 19th and 20th centuries", and Rossana Tazzioli (Université de Lille): "The Rome of scientists: from Vito Volterra to Tullio Levi-Civita". The local organization was curated by Riccardo Bellé, Benedetto Scoppola and Francesca Tovenà. The Italian translation of the French original is by Laurent Mazliak and Rossana Tazzioli.

General Activities



MatMod@TOV is also meant to fund renovations of rooms/laboratories of the Department, acquisition of modern equipment, research books, etc.

The first half of 2025 was characterized by the increase in performance of servers for high-performance scientific computing.

- The following machine was purchased:

Workstation ThinkStation PX Motherboard Intel Eagle Stream C741 Dual Processor configured as follows:

- 2x Intel Xeon Gold 6438Y+ (2x32-core, 60MB Cache, up to 4GHz)
 - 1TB RAM 16x64GB DDR5 4,800 MHz (RDIMM ECC)
 - n.ro 2 NVIDIA RTX A6000 ADA 48GB (4xDP) GDDR6
 - n.ro 2 2TB SSD M.2 2280 PCIe Gen4 perf.
 - n.ro 2 4TB SSD M.2 2280 PCIe Gen4 perf.
- Professional consulting services dedicated to high-performance scientific computing have been purchased. 12 months – service period ends 01/31/2026 - On-site support - on-site presence - on-site training package.
 - In the first half of 2025, 22 new computer stations for research and multiple portable electronic devices for research purposes were purchased through the “2025 IT Call”.