

Department of Mathematics University of Rome Tor Vergata



MatMod@TOV Excellence Project 2023-2027 NEWSLETTER N°1 January – October 2023



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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: <u>https://www.mat.uniroma2.it/index.php</u>

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 by the Mathematics Department of the University of Rome Tor Vergata (project MathMod@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

Call of interest

The Department of Mathematics of the University of Rome Tor Vergata welcomes expressions of interest for academic openings at Associate and/or Full Professor level from any field in Mathematics covered through a "direct call" procedure.

The Direct Calls program of the Italian Ministry of University and Research (MUR), provides opportunities to fund academic positions for scientists and scholars who have been working abroad with an equivalent position for at least three years, or for recipients of grants for Programs of Excellence funded by the European Research Council or Italian Ministry of University and Research (for instance ERC grants).

Since the present action will be open for the period 2023-2026, also candidates who do not meet the requirements for being eligible for a Direct Call yet, but will do before 2026, are encouraged to apply.

Early career candidates can express their interest to be hired as tenure track Researchers (Italian RTDB/RTT), since the Department of Mathematics is aiming to open such positions as well.

Successful candidates will be expected to actively contribute to the department's academic program, its strategy and governance, as well as to provide scientific leadership and to apply to national and international research funding schemes.

Applications must be submitted electronically filling the following form: <u>https://forms.office.com/e/wrXb5tEwpj</u>

The Department of Mathematics is committed to increasing the gender balance of its faculty and particularly welcomes applications from women mathematicians.

More information can be found at https://www.mat.uniroma2.it/progetto/recruitment.php

Professorships

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

 1 position in Mathematical Analysis (Settore concorsuale 01/A3 - Settore Scientifico Disciplinare MAT/05) <u>http://web.uniroma2.it/it/contenuto/20232124</u>

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 at https://www.mat.uniroma2.it/progetto/recruitment.php

Postdoc positions

The following Postdoc positions selection procedures are in progress:

 4 (two-years) Postdoc positions (Assegni di Ricerca - III Fascia) in Algebra, Geometry, Mathematical Analysis, Probability and Mathematical Statistics, Mathematical Physics, Numerical Analysis (Settori concorsuali 01/A2-01/A3-01/A4-01/A5 - Settore Scientifico Disciplinare MAT/02-MAT/03-MAT/05-MAT/06-MAT/07-MAT/08) – Title: "Modelli matematici a Tor Vergata MatMod@ToV"

We also congratulate:

 Dr. Veronica Tora, winner of the (one-year) Postdoc position (Assegni di Ricerca - II Fascia) in Mathematical Analysis (Settore concorsuale 01/A3 - Settore Scientifico Disciplinare MAT/05) – Title: "Equazioni di reazione-diffusione e applicazioni: modellistica matematica e simulazione numerica"

Research



Research Topics

During the period January 2023 – October 2023, 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: M.S. Adamo (University of Rome "Sapienza"), J. Ben-Artzi (Cardiff University (UK)), G. Benomio (Princeton University), A. Bianchi (University of Copenaghen), R. Bianchini (IAC-CNR), G. Biroli (LPENS Paris), M. Carfagnini (University of California San Diego), B. Cassano (University of Campania "Luigi Vanvitelli"), S. Chemla (University Sorbonne-Paris Cité), W. Cheng (Nanjing University (China)), E. Cinti (University of Bologna), C. Dappiaggi (University of Pavia), E. Di Nezza (IMJ-PRG, Sorbonne University), M. Feigin (University of Glasgow), L. Francone (University "Claude Bernard" Lyon 1), F. Grotto (University of Pisa), A. Laking (University of Verona), L. Lanzani (University of Bologna), E. Latini (University of Bologna), L. Martinazzi (University of Rome "Sapienza"), F. Neumann (University of Pavia), P. Oprocha (AGH University of Krakow), L. Palmisano (KTH Stockholm), R. Pagaria (University of Bologna), G. Pipoli (University of L'Aquila), F. Pratali (Université Sorbonne - Paris Nord), A. Ram (University of Melbourne), J.L. Sauvageot (CNRS, IMJ Paris), V. Schleis (University of Tübingen-Bonn), R. Sun (NUS, Singapore), V. Tora (University of Rome "Tor Vergata"), R. Verch (University of Leipzig), T. Weber

(University of Turin), M. Weiner (BME Budapest), A. Zampini (University of Naples "Federico II"), I. Ziccardi (BIDSA Bocconi), M.P. Wyart (EPFL Paris). (cf. also https://www.mat.uniroma2.it/seminari-new2.php?inizio=0&pagina=1)

Conferences and Workshops

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

- Workshop: A day on Statistical Physics for Machine Learning
 Date: September 15th, 2023
 Place: Department of Mathematics, University of Rome "Tor Vergata"
 Organizers: D. Marinucci, M. Salvi, S. Vigogna (University of Rome "Tor Vergata")
 <u>https://www.mat.uniroma2.it/~rds/statphyml.php</u>
- Workshop: Where Mathematics Meets Quantum Physics: Date: June 21th-23th, 2023 Place: Enrico Fermi Research Center (CREF), Rome Organizers: S. Carpi, F. Ciolli, R. Conti, F. Fidaleo, L. Giorgetti, D. Guido, T. Isola, V. Morinelli, G. Morsella, A. Pizzo, F. Radulescu, G. Ruzzi, Y. Tanimoto (University of Rome "Tor Vergata"), A. Gabrielli (University of Rome "Tre") <u>https://sites.google.com/view/wmmqp2023/home</u>
- INdAM Meeting: Symplectic Dynamics
 Date: May 22 th-26 th, 2023
 Place: Istituto Nazionale di Alta Matematica "Francesco Severi", Rome, Italy
 Organizers: V. Ginzburg (University of California Santa Cruz), B. Gurel (University of Central Florida), M. Mazzucchelli (CNRS and École normale supérieure de Lyon), A. Sorrentino (University of Rome "Tor Vergata")
 https://perso.ens-lyon.fr/marco.mazzucchelli/events/2023/Symplectic_dynamics/
- May 12: Celebrating Women in Mathematics
 Date: May 12th, 2023
 Place: Department of Mathematics, University of Rome "Tor Vergata"
 Organizers: M. Lanini, D. Marinucci, A. Sorrentino, E. Strickland (University of Rome "Tor Vergata")
 <u>https://www.mat.uniroma2.it/may12.php</u>

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 modeling and data science through the organization of seminars, conferences and doctoral coursers (<u>https://www.mat.uniroma2.it/~rds/events.php</u>).

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 – Advanced Lecture Series

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

Neural Networks and Gaussian Processes
 B. Hanin (Princeton University, in partnership with RoMaDS)
 Period: January 10 – January 13, 2023.
 https://www.mat.uniroma2.it/~rds/pastevents.php

Grants and Curriculum of Excellence

 MatMod@TOV funded 3 degree prizes, for an amount of 2,000.00 euros each, for master's graduates in Pure and Applied Mathematics at Tor Vergata from July 2022 to April 2023. The award is aimed at master's theses satisfying at least one of the following conditions: a significantly original result; an efficient implementation and/or a particularly significant numerical experimentation; a clear and in-depth presentation of highly significant results.

The competition is now over and the following master's graduates have been awarded:

- 1. Gabriele SALVADEI: "Seasonal models for forward energy markets"
- 2. Edoardo FERRARO: "Empirical Measure for the SPHAR(1) process: Chaotic Expansion and Gaussian Fluctuations"
- 3. Alessandro TRASATTI: "Cointegration and application to oil markets"
- MatMod@TOV funded 3 prizes, for an amount of 2,000.00 euros each, for master's students enrolled in the academic year 2023/2024.
- MatMod@TOV funded Lorenzo FIORITO, student of the Master's Curriculum of Excellence in Pure and Applied Mathematics at Tor Vergata, for the participation in the Summer School Hokkaido-Pisa-Roma Tor Vergata-Torino, held in Turin, August 28 - September 8, 2023.

Third mission



In the period between January and May 2023, 13 orientation courses (PCTO) were completed, for a total amount of 415 hours. The courses involved 332 students from 6 different schools.

In addition, training activities were completed as part of the national project **"National Indications 10 years later: to each his own time and way of learning"**. The project involved a network of 10 primary and secondary schools, led by the Istituto Comprensivo 'Fontanile Anagnino' in Rome. On May 23, 2023 the presentation of the didactic interventions experimented and reworked by the trainees took place in the Aula Magna as a concluding event: several students took part in the presentation and animated an accompanying exhibition.

With the beginning of the new year school 2023-2024, a new cycle of PCTOs began and the activities related to the "Liceo Matematico" resumed, with the signing of a memorandum of understanding with two additional schools.

General Activities



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

During the period January – October 2023, the Mathematics Department carried out a series of major technical updates to the departmental infrastructure:

- Acquisition of a RAID array for the data centre
- Supply and installation of multimedia equipment in room 1016
- Supply and installation of 30 blackboards in research rooms
- Supply of a new set of chairs for the 2001 classroom
- Supply and installation of shading awnings for research rooms
- Supply of hardware devices following the "IT Call 2023"