



SIMGBM
Società Italiana di
Microbiologia Generale
e Biotecnologie Microbiche

MICROBIOLOGY 2025

XXXV SIMGBM Congress

University Roma Tre
September 17-20



Programme and abstracts

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Programme

Wednesday, 17th September 2025

(Rectorate, Via Ostiense 133, Tower A, Main Hall)

14.00 Registration

15.40-16.00 Welcome and introductory information

16.00-17.00 | OPENING LECTURE (Supported by FEMS)

Chairs: **P. Landini** and **M. Ventura**

Jan Michiels (*VIB, Center for Microbiology, KU Leuven, Belgium*)

Antibiotic persistence: exploring mechanisms and evolutionary pathways

17.00-19.00 | PLENARY SESSION 1

Planetary microbiology: the role of microorganisms in a changing earth

Chairs: **E. Tamburini** and **L. Vezzulli**

17.00 **Marcela Hernández** (*University of East Anglia, UK*)

Microbiology of volcanic gases and the metabolism of one carbon compounds

17.35 **Samuel Chaffron** (*University of Nantes, France*)

Community network models to reveal marine plankton systems ecology and evolution

18.10 **Donato Giovannelli** (*University of Naples Federico II, Italy*)

Geosphere-biosphere coevolution: the role of trace metal availability in the evolution of biogeochemistry

18.35 **Paola Quatrini** (*University of Palermo, Italy*)

The role of the soil microbiota in mitigating desertification in Southern Europe

19.00 Welcome reception

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Thursday, 18th September 2025

(Dept of Law, Via Ostiense 159 - Main Hall and Hall 8)

09.00-11.00 | PLENARY SESSION 2

Multidisciplinary approaches to tackle antibiotic resistance

Chairs: **S. Buroni** and **E. Perrin**

- 09.00 **Mattia Zampieri** (*University of Basel, Switzerland*)
Unlocking new drug modes of action by multidimensional high-throughput metabolic profiling
- 09.35 **Francesco Imperi** (*University of Roma Tre, Italy*)
Genetics and evolution of polymyxin resistance in *Pseudomonas aeruginosa*
- 10.00 **Marco Fondi** (*University of Florence, Italy*)
Microbial interactions and antibiotic resistance
- 10.25 **Santiago Ramón-García** (*University of Zaragoza/ARAID Foundation, Spain*)
Novel *in vitro* tools to inform pre-clinical and clinical progression of tuberculosis combination therapy

11.00 Coffee Break

11.30-13.30 | PLENARY SESSION 3

New frontiers in human and animal microbiome research

Chairs: **F. Turrone** and **C. Viti**

- 11.30 **David Berry** (*University of Vienna, Austria*)
Development of the gut microbiota-immune-brain axis in extremely premature infants
- 12.10 **Carlotta de Filippo** (*CNR, Institute of Agricultural Biology and Biotechnology, Pisa, Italy*)
Gut microbiota drives colon cancer risk associated with diet: a comparative analysis of meat-based and pesco-vegetarian diets
- 12.30 **Gabriele Andrea Lugli** (*University of Parma, Italy*)
Bifidobacteria as a model microbial group of the human gut microbiome
- 12.50 **Matteo Daglio** (*University of Florence, Italy*)
Polyphenol-rich by-products to modulate the activity of rumen microbiota
- 13.10 **Emilia Ghelardi** (*University of Pisa, Italy*)
In vitro models as cutting-edge tools for studying the gut microbiota: from static bioreactors to pocket dynamic platforms

13.30 Lunch and Posters viewing (odd numbers)

15.00-15.50 | PLENARY LECTURE 1 (Supported by FEMS)Chairs: **B. Colonna** and **P. Visca****Eric Cascales** (*Institut de Microbiologie de la Méditerranée, Aix Marseille Univ, Centre National de la Recherche Scientifique, Marseille, France*)

Architecture, assembly and mechanism of action of an antibacterial speargun: the type VI secretion system

15.50-17.10 | PLENARY SESSION 4**“Survive, escape, and kill”: mechanisms of host-pathogen interactions**Chairs: **G. Prosseda** and **L. Leoni**15.50 **Giovanni Delogu** (*Università Cattolica del Sacro Cuore, Rome, Italy*)
Host directed therapies for mycobacterial infections16.10 **Marco R. Oggioni** (*University of Bologna, Italy*)
Not macrophages but sinusoids capture bacteria in the human spleen16.50 **Vittorio Venturi** (*ICGEB, Trieste, Italy*)
LuxR solos represent a major family of cell-cell signaling regulators in the plant microbiome17.10 **Arianna Tavanti** (*University of Pisa, Italy*)
Fatal Attraction: role of adhesins in the virulence of the opportunistic pathogen *Candida parapsilosis*

THURSDAY

17.30 Coffee Break

18.00-19.00 | PLENARY LECTURE 2Chairs: **E. Ricca** and **P. Visca****Bianca Colonna** (*Sapienza University of Rome, Italy*)

Hiking the trails of bacterial regulation

Friday, 19th September 2025

(Dept of Law, Via Ostiense 159 - Main Hall and Hall 8)

09.00-11.00 | PLENARY SESSION 5

Virus and host cell interplay

Chairs: **R. De Francesco** and **F. Esposito**

- 09.00 **Urs Greber** (*University of Zurich, Switzerland*)
Dissecting viruses - From stepwise entry to assembly by x-scale imaging
- 09.30 **Lara Manganaro** (*University of Milan, Italy*)
HIV reshapes the transcriptome of CD4+ memory stem cells, silencing cytotoxic programs
- 10.00 **Enzo Tramontano** (*University of Cagliari, Italy*)
A Multi-Omics approach to unveil West Nile Virus interplay with the cellular host
- 10.20 **Marta Giovanetti** (*Università Campus Bio-Medico, Rome, Italy*)
Emerging pathogens: unveiling the impact of climate change on global disease dynamics
- 10.40 **Anna Luganini** (*University of Turin, Italy*)
Calcium-conducting viroporins in viral replication and pathogenesis

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11.00 Coffee Break

11.30-13.30 | PLENARY SESSION 6

Phage Biology: from basics to applications

Chairs: **M. Di Luca** and **A. Danielli**

- 11.30 **Luisa De Sordi** (*Sorbonne Paris, France*)
Of phages and flames: virus-host interactions in inflammatory bowel disease
- 12.00 **Federica Briani** (*University of Milan, Italy*)
Elucidating key steps and players in the adsorption of DEV phage to its *Pseudomonas aeruginosa* host
- 12.25 **Marco Maria D'Andrea** (*University of Rome Tor Vergata, Italy*)
Lytic bacteriophages against *Klebsiella pneumoniae* and their impact on bacterial virulence
- 12.50 **Francesco Santoro** (*University of Siena, Italy*)
Liaisons dangereuses: lysogenic phages, antibiotic resistance, virulence and horizontal gene transfer in *Streptococcus pyogenes*
- 13.10 **Martina Cappelletti** (*University of Bologna, Italy*)
Phages in the dark: exploring the viral diversity and functional potential in subterranean environments

13.30 Lunch and posters viewing (even numbers)**15.00-15.50 | PLENARY LECTURE 3**Chairs: **G. Prosseda** and **L. Leoni****Andres Floto** (*Cambridge University, UK*)

How bacteria evolve from environmental organisms into specialized human pathogens

15.50-16.40 | PLENARY LECTURE 4 (Supported by FEMS)Chairs: **L. Baccigalupi** and **P. Alifano****William Martin** (*Heinrich Heine University, Düsseldorf, Germany*)

Carbon and energy first: Hydrothermal vents and the origin of microbial metabolism

16.40 Coffee Break**17.10 | SHORT PRESENTATION****Matteo Salina** (*Consorzio Italbiotec, Milan, Italy*)**17.20-18.30 | PRIZE PRESENTATIONS****FRANCO TATÒ Prize 2025** (Supported by Consorzio Italbiotec)

Ex aequo:

Claudia Campobasso (*University of Pisa / KU Leuven*)Evolutionary interplay between *Staphylococcus aureus* and phages: strategies to target biofilm and overcome bacterial resistance**Vittorio Giorgio Senatore** (*University of Milano-Bicocca*)

Yeast fermentation and process engineering for the upcycling of PET monomers and agricultural waste

GENPROBIO Prize 2025 (Supported by GenProbio srl)**Lapo Doni** (*University of Genoa*)Global biogeography and ecology of *Vibrio* in a warming planet**SIMGBM Prize 2025 - Best paper****Matteo Cervoni** (*University of Roma Tre*)The diadenosine tetraphosphate hydrolase ApaH contributes to *Pseudomonas aeruginosa* pathogenicity**SIMGBM Prize 2025 - PhD Thesis 2025****Sonia Mirjam Rizzo** (*University of Parma*)

Insights into factors influencing the colonization and composition of the human intestinal microbiota

ADVISE Prize**Giulia Sibille** (*University of Turin*)

Targeting viruses using a novel hDHODH inhibitor

GIUSEPPINA CATTANI Prize**Giovanna Riccardi** (*University of Pavia*)**18.30 Annual assembly of SIMGBM members****20.30 Social dinner****Saturday, 20th September 2025**

(Dept of Law, Via Ostiense 159 - Halls 3, 4 and 9)

9.30-12.30 | PARALLEL SESSIONS - Short talks from selected abstracts**Session A: Microbial genetics and genomics**Chairs: **R. Isticato** and **A. Martorana****Valerio Baldelli** (*University of Milan*)The *Pseudomonas aeruginosa* *sirB2* gene controls fitness in anaerobic conditions and its inactivation leads to increased virulence and small colony variants emergence via secondary mutations in the *wsp* operon**Matteo Calcagnile** (*University of Salento, Lecce*)Hydroxyl radical generation by PirA connects β -oxidation to oxidative stress: an evolutionarily conserved mechanism?**Marina De Stefano** (*University of Naples*)The *ydaJKLMN* operon mediates the adhesion properties of *Bacillus subtilis* spores**Sarah Hijazi** (*University of Urbino*)Starving the invader: disrupting iron uptake to defeat *Staphylococcus aureus***Giulia Longhi** (*University of Parma*)

The role of teichoic acids in bifidobacteria in mediating the interaction with the human host

Alessia Marotta (*University of Genoa*)*memod-s*: a standardised workflow to explore and analyse prokaryotic methylation patterns for Nanopore sequencing data**Diego Marco Minore** (*University of Milan*)

Exploring bacterial evolution across the genome architecture landscape

Riccardo Polani (*Sapienza University of Rome*)Conjugative CRISPR-Cas vector to cure KPC-encoding plasmids in *Klebsiella pneumoniae*

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Cinzia Spagnoli (*University of Roma Tre*)

Molecular mechanisms implicated in the resuscitation of *Acinetobacter baumannii* Viable But Non-Culturable (VBNC) cells induced by desiccation

Davide Sposato (*University of Roma Tre*)

Role of DedA proteins in *Pseudomonas aeruginosa*

Giovanni Stelitano (*University of Pavia*)

Repurposing FDA approved drugs to disrupt *Mycobacterium abscessus* iron acquisition pathway by targeting the salicylate synthase Mab-SaS

Mariana Tirziu (*University of Siena*)

Genome analysis and mobilome characterization of *Trichomonas vaginalis*-associated *Mycoplasma hominis* isolates through whole genome sequencing

Session B: Environmental and industrial microbiology

chairs: **E. Bona** and **T. Rinaldi**

Silvia La Scala (*University of Palermo*)

Plant growth-promoting Actinomycetota modulate bioactive metabolites profiles in mediterranean plants

Daniela Sateriale (*University of Sannio, Benevento*)

Plant growth-promoting rhizobacterial consortium from the Rhizosphere of *Vitis vinifera* cv. Falanghina: a terroir-oriented approach to sustainable agricultural biocontrol

Eleonora Metta (*University of Cagliari*)

Preliminary characterization of the microbial community living in a multi-pond solar saltern located in south Sardinia

Jacopo Brusca (*University Ca' Foscari of Venezia*)

Climate change impact on soil microbial communities of the West Antarctic Peninsula

Alessandro Russo (*University of Florence*)

Bioplastic in sandy beaches: the involvement of gut bacterial communities from supralittoral amphipods in polymers degradation

Flavia Cannizzaro (*University of Palermo*)

Extracellular membrane vesicles from *Streptomyces violaceoruber*: a promising natural strategy for enhancing plant growth and health

Marta Nerini (*University of Florence*)

Developing a drone-based system for rapid bioaerosol sampling

Silvia Abbà (*University of Turin*)

Dissecting molecular, physical, and chemical factors of wasps' gut shaping *Saccharomyces cerevisiae* survival

Melinda Mandaresu (*University of Cagliari*)

Study of microbial diversity associated to *Helichrysum microphyllum* subsp. *tyrrhenicum*, a metallophyte endemic of Sardinian mining areas

Filippo Pasquale Riggio (*University of Roma Tre*)

Spatiotemporal variations of the bacterial communities colonizing five pyroclastic caves located in the Rome metropolitan area

Session C: Interactions between microbes/viruses and their hosts

chairs: **F. Iannelli** and **R. Provvedi**

Alessia Avesani (*University of Genoa*)

First insights into bacterial and microalgal endosymbiont communities of various coral morphotypes from Maldives

Andrea Bonacorsi (*University of Pisa*)

Pisa 4: *in vitro* characterization and genetic engineering of a novel mycobacteriophage for therapeutic use

Elena Capuzzo (*Institut Pasteur, Paris, France*)

Control of *Staphylococcus aureus* infection in burn wounds by physical plasma

Antonella Congiargiu (*University of Sassari*)

Unraveling the microbial and immune landscape of Prostate Cancer

Umberto Gabriele D'Oria (*University of Trento*)

Investigating Flavivirus tropism and entry mechanisms in human cells

Stefano Nenciarini (*University of Florence*)

Isolation source shapes the cargo of *Saccharomyces cerevisiae* extracellular vesicles

Tommaso Olimpieri (*University of Roma Tor Vergata*)

Enhanced clearance of phage-resistant *Klebsiella pneumoniae* strains by the innate immune system

Silvia Caterina Resta (*University of Salento, Lecce*)

Emricasan (IDN-6556) inhibition of caspase-3/gasdermin-E pyroptosis pathway during *Neisseria meningitidis* infection could block bacterial epithelial barrier crossing

Alessandro Stamilla (*University of Pavia*)

Granuloma-like structures in tuberculosis: a hybrid experimental and modeling approach for drug testing

Debora Stelitano (*Telethon Institute of Genetics and Medicine, Pozzuoli*)

Unveiling the role of peroxisomes in SARS-CoV-2 Pathogenesis

Chiara Tarracchini (*University of Parma*)

Biogeography of the infant gut microbiota and identification of key microbial members

Rita Triocco (*Sapienza University of Rome*)

Loss of FadD reduces *Shigella flexneri* invasiveness by impairing of the Type III Secretion System

eMV, ranging from 100–200 nm in size, contain RNA and the whole *S. violaceoruber* genomic DNA. Additionally, they contain proteins, but their metabolic cargo has yet to be fully characterized. Interestingly, eMV exhibited antibacterial properties and showed PGP effects on tomato seedlings. Experiments are underway to evaluate their capability to mitigate plant biotic stresses, testing their effect against phytopathogens (*i.e.* *Verticillium* sp.) infections.

Therefore, this research aims to provide new evidence on the role of *Streptomyces*-derived eMV in trans-kingdom communication (microbe-microbe and plant-microbe interactions), and to lay the groundwork for the development of new eMV-based biofertilizers.

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Plant growth-promoting Actinomycetota modulate bioactive metabolites profiles in mediterranean plants

S. La Scala¹, S. Amata¹, T. Faddetta¹, C. Rizzo¹, L. Abbate⁶, A. Carrubba⁴, A. Palumbo Piccionello¹, R. Karlova⁵, G. Gallo^{1,3}, P. Quatrini²

¹STeBiCeF Department, University of Palermo, Italy

²DiSTeM Department, University of Palermo, Italy

³National Biodiversity Future Center, Palermo, Italy

⁴SAAF Department, University of Palermo, Italy

⁵Wageningen University & Research (WUR), Wageningen, Netherlands

⁶National Research Council of Italy (CNR) - Institute of Biosciences and BioResources (IBBR)

Plant-derived bioactive compounds are abundant in Mediterranean plant species like oregano and tomato, offering valuable applications in human health-related fields. Microbial-based biostimulants (MBBs), particularly those rich in microbes from the phylum Actinomycetota (previously Actinobacteria), represent a promising strategy to modulate both the quantity and quality of bioactive compounds in the inoculated plants. In this study, two soil Actinomycetota - *Streptomyces violaceoruber* and *Kocuria rhizophila* - were assayed as Plant Growth-Promoting Bacteria (PGPB) on oregano and tomato plants under controlled laboratory conditions and greenhouse cultivations, while open field experiments were carried out only for oregano. The aim was to assess their influence on plant growth and metabolite yield. Overall, the results show that these two bacteria positively influenced several morpho-physiological parameters of the investigated plants: inoculations improved germination rate, shoot heights, and chlorophyll content in oregano and shoot heights, leaf area and biomass yield in tomato. Furthermore, both species exhibited significant changes in their metabolic profiles following PGPB inoculations. Indeed, in oregano, Gas Chromatography-Mass Spectrometry (GC-MS) analyses revealed a modulation in terpenes production, both in flower volatilome and essential oils, while, in tomato, an increased proline content was detected. Transcriptomic analyses suggested a different involvement of the two Actinomycetota in the modulation of tomato biosynthetic pathways. These results provide evidence that *S. violaceoruber* and *K. rhizophila* enhance plant growth and modulate the metabolome in oregano and tomato plants. Therefore, they represent promising tools for improving crop performance and, potentially, for the targeted modulation of secondary metabolite production in mediterranean plants.

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