

2nd Summer School of MIKROBIOKOSMOS 2020

Advances in understanding the multiple role of microbiome in
agro-food, energy production, environmental protection
and human health



Venue: Conference and Cultural Centre in the old Monastery Paou, Argalasti Pelion
Greece (<http://mpaou.uth.gr/en/>)

Time: 6 July – 10 July 2020

Website MIKROBIOKOSMOS: <http://www.mikrobiokosmos.org/>

Contact: info@mikrobiokosmos.org

A few words about the 2nd Summer School of MIKROBIOKOSMOS

The Hellenic Society of MIKROBIOKOSMOS was founded in 2008 and it is now considered the podium and niche of environmental microbiologists, food microbiologists, bioengineers, environmental biotechnologists in Greece. Following up on the 1st Summer School of Mikrobiokosmos in 2018, we are now organizing the 2nd Summer School of the Society of Mikrobiokosmos in the frame of a series of events devoted to the training of the young members of the Society. The title of the 2nd Summer School "**Advances in understanding the multiple role of microbiome in agro-food, energy production, environmental protection and human health**" is a reflection of the major advances in our understanding of the key role of microbiome on different process enabling its application in various sectors.

Venue: The Summer School will be hosted in the Conference and Culture Centre of the Monastery Paou, Argalasti Pelion (<http://mpaou.uth.gr/en/>) which belongs to the University of Thessaly.

Attendees: The Summer School aims to attract PhD students who study the microbiome at different environmental matrices or the symbiome of different organisms (insects, animals, humans). The students attending the Summer School will be offered accommodation in the double bedrooms of the Monastery (include en-suite facilities). Lunch and coffee will be offered to the attendees and a social dinner will be organized for the participants in a local restaurant by the sea.



Lectures and Presenters: A list of top-class researchers from Greece and abroad working in academia and industry will present topics on food microbiome and impact on food safety and health, vine and wine microbiome, human and fish gut microbiome, metagenomics and amplicon sequencing approaches to study environmental microbiomes, plant-microbe interactions, bioremediation and environmental clean up, bioenergy production processes and synthetic biology. In view of the increasing interest and use



of bioinformatic tools in studying the microbiome, practicals on amplicon sequencing analysis will be offered to the attendees in three afternoon sessions. You can find a full list of the presenters accompanied by a brief personal description below in the flyer.

Registration Fees: A fee of 100 € for members of the Society and 150 € for non-members applies.

Contact: Students interesting in attending the Summer School should send a CV and a brief cover letter to the following email info@mikrobiokosmos.org with a subject title "Summer School MIKROBIOKOSMOS". **Deadline for submission of expression of interest: 15th April 2020**

More information for the Summer School will be announced and communicated through the website www.mikrobiokosmos.org and facebook page of the Society.

Prof. Víctor de Lorenzo (Madrid, 1957) is a Chemist by training and he holds a position of Research Professor in the *Spanish National Research Council* (CSIC), where he currently heads the Laboratory of *Environmental Molecular Microbiology* at the *National Center for Biotechnology*. After his PhD at the UAM Madrid (1983), he worked at the Pasteur Institute (1984), the UC Berkeley (1985-1987), the Univ of Geneva (1988) and the Federal Center for Biotechnology in Braunschweig (GBF) until 1991, the year in which he joined the CSIC in Spain. He is an EMBO Member and was awarded in 2008 the *Grand Prix de L'Academie des Sciences de L'Institut Français du Pétrole*. He specializes in Molecular Biology and Biotechnology of soil microorganisms (particularly *Pseudomonas putida*) as agents for the decontamination of sites damaged by industrial waste. His current research—at the interface between Synthetic Biology and Environmental Biotechnology—attempts to develop the genetic software and the agents for bioremediation that can be applicable at a very large scale.

Website: <http://www.cnb.csic.es/~synbio>

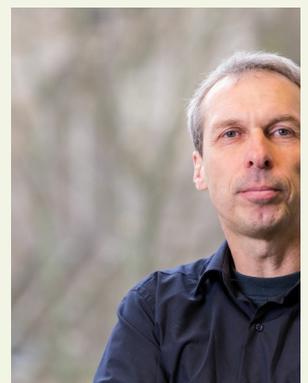


Dr. Kostas Konstantinidis is the Maulding Fellow Professor in the School of Civil and Environmental Engineering and the School of Biological Sciences at Georgia Tech. He earned his BS (1999) in Agricultural Sciences from the Aristotle University of Thessaloniki, Greece and his PhD (2004) from the Center for Microbial Ecology at Michigan State University, under the supervision of James Tiedje. Prior to joining the faculty at Georgia Tech, he was a Postdoctoral Fellow in the Department of Civil and Environmental Engineering at MIT under the supervision of Ed DeLong. He develops bioinformatics approaches and algorithms and wet-lab omics techniques, and applies them to understand important questions in evolution and ecology of microbial systems and/or provide biotechnological solutions. He has published 113 papers in these areas, 12 in PNAS alone, and received several international distinctions and awards for his work, including the 2010 International Skerman Award from the World Federation for Culture Collections, and a 2014 Kavli Frontier Fellowship. His bioinformatics approaches are available for online analysis of microbial genome and metagenome data through the lab webserver, which receives >3,000 visitors each month.

Website: <http://enve-omics.gatech.edu>

Prof. Lorenz Adrian

Studied biology in Bonn (Germany) and Biochemistry with Applied Molecular Biology in Manchester (UK); finalized his doctoral thesis (Dr. rer. nat.) in 1999 on microbial reductive dehalogenation of chlorobenzenes at the TU Berlin (Germany). Then worked on his habilitation on the biochemistry and genomics of organohalide-respiring bacteria until 2006. Became head of an ERC group in 2008 and moved with his own group to the Helmholtz Centre for Environmental Research – UFZ in Leipzig, department Isotope Biogeochemistry, working on marine sediment *Dehalococcoides*-related *Chloroflexi*. Between 2010-2012 guest professor for Applied Biochemistry at TU Berlin. Since 2013 research group leader in Geobiochemistry at UFZ Leipzig. Since 2017 full professor on a joint professorship on Geobiotechnology at TU Berlin.





Dr. Spyros Pavlostathis is Professor of Environmental Engineering at the School of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta, GA, USA. He completed his MS and Ph.D. in Environmental Engineering at Cornell University after obtaining his Diploma in Agricultural Engineering at the Agricultural University of Athens, Greece. He is a Board Certified Environmental Engineer (BCEEM) by the American Academy of Environmental Engineers and a Fellow of International Water Association (IWA), Water Environment Federation (WEF), and American Society of Civil Engineers (ASCE). He has 39 years of research experience in the area of applied environmental biotechnology and bioprocess engineering for the bioremediation of contaminated natural systems

and the treatment of municipal and industrial wastewater. His recent research focuses on bioenergy production via co-digestion of high-strength waste and municipal sludge, as well as bioelectrochemical systems for hydrogen production and the upgrade of anaerobic digestion biogas. Dr. Pavlostathis has published over 160 peer-reviewed papers and authored over 200 publications, including books and book chapters. He has served on the Editorial Boards of the *Journal of Environmental Engineering, Water Science & Technology, Biotechnology Letters, Journal of Hazardous Materials, Water Environment Research, and Water Quality Research Journal*. More details on Dr. Pavlostathis' work can be found at <http://www.ce.gatech.edu/people/faculty/961/overview>.

Dr Fotini Kokou is a biologist, interested in the interactions between fish physiology and the microbiome. She completed my studies (BSc, MSc, PhD) in the Department of Biology at the University of Crete and worked in several European, national and industry-funded projects at the Hellenic Centre for Marine Research in Greece (HCMR - Institute of Marine Biology, Biotechnology and Aquaculture). After completing her PhD, she joined as a postdoctoral researcher the Agriculture Research Organization in collaboration with the National Institute for Biotechnology (NIBN – Ben Gurion University of the Negev) in Israel. Her work there mainly involved the study of microbial interactions within the fish gut, as well as evaluating the impact of environmental factors (temperature, diet, gut digesta conditions), host genetic background and stress response on the associated microbiome communities. In 2019, she did a short research stay at the School of Biotechnology of the Catholic University of Portugal as a researcher working on *in vitro* fish cell models to evaluate functional ingredients coming from fermentation by-products. Since January 2020, she joined the Aquaculture and Fisheries group in WUR as an Assistant Professor, focusing on the interactions between aquaculture systems and fish microbiota. Her main research interests focus on understanding fish-microbiome and microbe-microbe interactions in relation to fish nutrition and welfare, utilizing principles from microbial ecology, microbiology and physiology in combination with genomics and bioinformatics.



Dr. Kimon Andreas Karatzas is Associate Professor in Food Microbiology, School of Chemistry, Food & Pharmacy, University of Reading, UK. His work focuses on molecular mechanisms of stress resistance in foodborne pathogens and other food-related bacteria. He also utilises the knowledge produced to modulate stress resistance and either enhance or reduce survival according to the application. He has authored more than 46 papers in peer-reviewed journals and secured more than 2 million Euros in grants as main PI or co-PI from private companies and major funding agencies such as the EU, BBSRC, EPSRC, Royal Society and SIRG-Ireland.

Dr. Aspasia Nisiotou is Senior Researcher in Oenology and Wine Microbiology with additional research and academic background in Food Microbiology and Food Biotechnology. She received a Bsc in Enology (Technological Educational Institute of Athens), her MSc in Food Biotechnology (University of Reading) and a PhD in Food Microbiology (Agricultural University of Athens). She has been awarded the National Scholarship Foundation for graduate studies. Since 2011, she has been working as a Researcher at Institute of Technology of Agricultural Products, ELGO-DEMETER. Her work focuses on wine and food microbiology with emphasis on alcoholic fermentation and molecular microbiology and biotechnology. She has been studying the fermentation courses in respect to both microbial and chemical successions as well as spoilage and safety aspects of foods. She has served as coordinator/scientific leader for several national and European research projects, focusing on wine microbiology. She also teaches at the Department of Oenology of University of West Attica and has supervised or co-supervised several post-doctorate researchers, PhD students, MSc students and under-graduate students. She has > 70 papers in prestigious international journals, collective volumes and conference proceedings and is a member of national committees for the management of the wine sector.



Dr Kalliope Papadopoulou (Associate Prof. in Plant Biotechnology) has a first degree in Biology, Aristotle University of Thessaloniki and a PhD in Plant Molecular Biology from the Department of Agricultural Biotechnology, Agricultural University of Athens. She is in the Department of Biochemistry and Biotechnology since October 2005. Before that she was an Associate Researcher at the National Agricultural Research Foundation and a Marie-Curie Grant Holder at the John Innes Centre, Norwich, U.K. Her main research interests are in plant specialized metabolism (biosynthesis, production in heterologous systems, biological activities) and in plant-microbe interactions, with emphasis on endophytic fungi, symbiotic relationships and multi-partite interactions. KP has 56 publications in

leading journals in the field of plant sciences, an *h*-index of 24 and >1800 citations and holds a Greek patent (Code 1006119). She has contributed in a textbook on Molecular Development of Plants and the greek translation of Plant Physiology (Taiz & Zeiger) as well as in the translation of Synthetic Biology, A primer (Baldwin, Kitney, Bayer, Freemont, Ellis, Polizzi, Stan). She has acted as Editor for Annals of Applied Biology, she is in the Advisory Editors Board of New Phytologist and is a regular reviewer for peer-reviewed journals and EU and National funding bodies. She has coordinated and participated in projects funded by the EU, National Bodies (GSRT-Greece, Ministry of Education, RPF-Cyprus) and projects funded by agro-industries. with an international one pending. She is the Director of the MSc Programme “Applications of molecular biology” and currently, also acts as Deputy Director of the OMIC-ENGINE Research Infrastructure on Synthetic Biology in the Agrofood Sector.

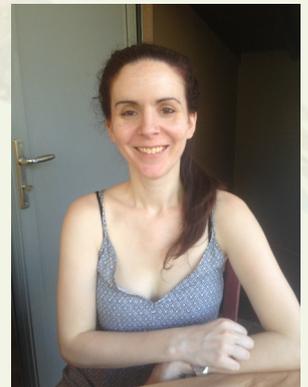
Dr. Panagiotis Gkorezis obtained his Bachelor and MSc Degree as an Agronomist from the Department of Agriculture at Aristotle University of Thessaloniki Greece in 2002. He continued his studies at the University of Ioannina to obtain a second Master of Science degree in 2007, and then in 2009 he moved on to Belgium to continue for his Doctoral studies, at the Hasselt University (Belgium). He defended his PhD Thesis on 2014 titled “Diesel degradation triggered by plant-associated bacteria” under the supervision of Professor Jaco Vangronsveld. Since 2015 he works as a Project Remediation Manager to the Belgian company Terra Correct (www.terracorrect.be), which is specialized in the remediation of soils and groundwater contaminated by various organic and inorganic pollutants.



Dr Panagiotis Kougias is senior researcher in the Hellenic Agricultural Organisation- DEMETER, Institute of Soil and Water Resources. Before joining HAO-Demeter in 2018 he was a postdoc, research and Associate Prof. in the Bioenergy Research Group of the Technical University of Denmark (DTU). His main research focus on agro-industrial waste treatment, bioreactor configuration, optimization of anaerobic bioprocesses, and development of sustainable solutions for organic waste and wastewater management. He is currently involved in projects related to biogas upgrading, nutrient upcycle and genome-based characterization of biogas reactors. He has more than 65 ISI publications, H-index=25. He has been involved in projects funded by the General Secretariat of Research and Technology, Greece, InnovationFonden, Denmark, Energinet, Denmark and the EU (FP7, Horizon2020)



Dr Alexandra Meziti studied Biology at the University of Athens, received her M.Sc. on Marine Microbiology from the Max Planck Institute in Bremen and her PhD from the University of Thessaly in the lab of Prof. K. Kormas. Currently she is a postdoctoral Scientist at Hellenic International University and a Research assistant at K. Konstantinidis lab at Georgia Institute of Technology. Her research interests concern microbial ecology and genomics in various environments (mostly aquatic) but also the study of gut microbial communities in relation to various environmental factors and to their hosts. The main goal of her research is the deeper understanding of genetic and metabolic diversity of microbiota in different environments and how this could assist on the monitoring, prevention and handling of environmental and/or human health associated perturbations.



Dr Sotirios Vasileiadis performed his studies in Greece (diploma in Agricultural Sciences at Aristotle UR, Thessaloniki), the Netherlands (MSc, Wageningen UR/NIOO-KNAW, Wageningen/Heteren) and Italy (PhD, Università Cattolica del Sacro Cuore - UniCatt, Piacenza). During his postgraduate studies, he was trained in the fields of plant-microbe interactions and microbial molecular ecology (MSc), stress microbial ecology and pesticides risk assessment (PhD). In his PhD and post-doctoral studies (UniCatt, University of South Australia and University of Thessaly - UTh) he specialized in sequence-based screening of (meta-)genomes/transcriptomes via high-throughput sequencing approaches, and also in the associated bioinformatics and statistical tools and

methods. Sotirios was an MSCA IF fellow at the Laboratory of Plant and Environmental Biotechnology of the Biochemistry and Biotechnology department of UTh where he is currently working as a lecturer and researcher. Sotirios' research interests reside in the areas of: stress microbial ecology; antibiotic resistance in built and natural environments; microbial control of the levels of persistent organic molecules with toxic potential *in vitro* and *in situ*.

PROGRAM

Monday 6.7.2020.

10:00 - 12.00 Arrival of Attendees

12.00-13.00 Lunch break

13.00-15.00 5-min presentations by the students

15.30-16.00 Coffee break

16.00- 17.00 *SynBio-based bioremediation at a global scale: from the test tube to planet Earth*

(Dr Victor de Lorenzo, Centro Nacional de Biotecnología, Madrid, Spain)

Tuesday 7.7.2020. The role of microbiome in health and food safety

9.30-10.30 *Using modern technologies to understand and predict the behaviour of microbes with major impact on health. Lessons from understanding the microbial GAD system impacting on Food Safety and the Gut-Brain Axis* (Ass. Prof. Kimon-Andreas Karatzas, Reading University UK)

10.30-11.00 Coffee Break

11.00-12.00 *Grape and wine microbial communities: structure, function and dynamics*

(Dr Aspasia Nisiotou, Hellenic Agricultural Organisation DEMETER, Greece)

12.00-14.00 Lunch Break

14.00-17.00 *Practical Bioinformatics - "Analysis of amplicon sequencing data I"*

(Dr Sotirios Vasileiadis, Thessaly University, Dr Alexandra Meziti, Thessaly University)

Wednesday 8.7.2020. Microbiome and ecosystem functioning

9.30-10.30 *Potential drivers of the gut microbiome plasticity and persistence: lessons from the fish gut* (Dr. Foteini Kokou, Wageningen University, The Netherlands)

10.30-11.00 Coffee break

11.00-12.00 *Analysis of microbiome BIG DATA and career opportunities*

(Prof. Kostas Konstantinidis, Georgia Tech, USA)

12.00-14.00 Lunch Break

14.00-17.00 *16S rRNA gene amplicon vs. whole-genome shotgun omics,*

(Prof. Kostas Konstantinidis, Georgia Tech, USA)

Thursday 9.7.2020. Microbiome and interactions with plant, insects & other organisms

9.30-10.30 *Endophytic microorganisms: a hidden treasure*

(Dr. Kalliope Papadopoulou, University of Thessaly, Greece)

10.30-11.00 Coffee Break

11.00-12.00 *On-site stimulated phyto-management approaches of contaminated sites*

(Dr Panagiotis Gorezis, TerraCorrect, Belgium)

12.00-14.00 Lunch Break

14.00-17.00 *Practical Bioinformatics - "Analysis of amplicon sequencing data III – Statistical analysis using R"*

(Dr Sotirios Vasileiadis and Dr Alexandra Meziti, Thessaly University)

Friday 10.7.2020. Microbiome in environmental clean-up and energy production

9.00 - 10.00 *Metabolic coupling as the guiding principle in the application of environmental microbial processes* (Prof. Lorenz Adrian, UFZ-Leipzig & TU Berlin, Germany)

10.00-10.30 Coffee Break

10.30 - 11.30 *Energy-Efficient Innovative Biological Nitrogen Removal Processes*

(Prof. Spyros Pavlostathis, Georgia Tech, USA)

11.30 - 12.30 *Deciphering the microbial "black box" of anaerobic digestion for bioenergy production*

(Dr Panagiotis Kougias, Hellenic Agricultural Organisation DEMETER, Thessaloniki, Greece)

13.00 Take-away lunch and closure of the Summer School

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