

Paraschos D. Melidis

Work Position: Professor

Laboratory:

Laboratory of Wastewater Management & Treatment Technologies

Research Area:

Process optimization and control of wastewater treatment plants

Education

1991: University of Stuttgart Germany, Department of Inorganic Chemistry, Ph.D. in Chemistry

1988: University of Stuttgart Germany, Department of Chemistry, BSc degree in Chemistry (5 years) (Diplom-Universität), April 1988

Research interests

Current research activity is the development of innovative technologies that complement and improve the performance of conventional wastewater treatment technologies. It covers topics such as:

1. Research, development, optimisation and control of aerobic and anaerobic biological processes for wastewater treatment.
2. Research and development of methods for biological nutrient removal.
3. Enhanced biogas production by Anaerobic Sludge Digestion and Co-digestion with agricultural wastewaters (olive mill effluents, wastewater from biodiesel production) by mechanical (ultra sound), chemical and biological processes.
4. Development and implementation of microbial sensors for efficient process control in wastewater treatment plants.
5. Solar drying of sewage sludge and its reuse in the ceramic industry.
6. Solids Handling and Processing.
7. Enhanced wastewater treatment by membranes for water reuse.
8. Dewatering of primary settled urban sludge in vertical flow wetland Filters.
9. Identification, quantification and treatment of micro-pollutants in sewage treatment plants
10. Treatment and management of municipal landfill leachate.

Teaching courses

Graduate courses

1. Water treatment technologies, 8th semester mandatory course
2. Wastewater management and treatment technologies I
3. Wastewater management and treatment technologies II
4. Process optimization and control of wastewater treatment plants, 9th semester, optional course
5. German language I, 2th semester optional course
6. Laboratory courses
 - 6.1 Wastewater management and treatment technologies I
 - 6.2 Wastewater management and treatment technologies II
 - 6.3 Environmental microbiology

Post graduate courses

1. Program for postgraduate studies (MSc) "Environmental Engineering and Science", Department of Environmental Engineering of the Democritus University

1. Wastewater treatment, 1st semester, mandatory course
 2. Advanced technologies in wastewater treatment and reuse, 2nd semester, optional course
 3. Modeling and automatic process control of biological processes, 2nd semester, optional course
2. Program for postgraduate studies (MSc) “Environmental technologies in the legislation on the Environment”, Department of Environmental Engineering of the Democritus University
 1. Treatment technologies in the drinking water regulation
 3. Inter-University and inter-departmental Post Graduate Program “Systems Engineering Management”, organized from the Department of Civil Engineering and Electrical Engineering & Computer Engineering and Environmental Engineering of the Democritus University in collaboration with the Department of Business Management & Administration of the University of Macedonia
 1. Course C3 (Water and Wastewater Treatment): “Water and wastewater treatment”
 2. Course C1 (Environmental Systems Management and Modeling): «Modeling of wastewater treatment plants»
 4. Inter-departmental Post Graduate Program “Hydraulic mechanic” organized from the Department of Civil Engineering, Section of Hydraulics and Environmental Engineering of the Democritus University
 1. “Nutrient removal from wastewater - Biosolids treatment”

Research projects

Development of anaerobic biosensors for toxic detection and control of biogas production Funded by the research center Julich, member, 07/1997-10/1998

Innovation for the development of new environment protection technologies and exploitation of natural resources General Secretariat Research and Technology, member 06/2006-04/2007

Anaerobic co-digestion of wastewater treatment plant waste sludge and agro-industry wastes Funded by the National Technical Chamber of Greece, coordinator, 09/2006-12/2011

Integrated management wastewater treatment plant waste sludge and wastewater treatment using natural systems Community Support Framework 2000-2006 of the Region of Eastern Macedonia-Thrace 03/2007-06/2008

Solar drying of excess sludge from the municipal wastewater treatment plant Kavala, Funded by the Municipality of Kavala, 06/2007-09/2008

Analytical and technical support of the company Environmental Engineering – (ENYA) during disinfections experiments of the SBR effluent by UV in Gerakas Xanthis, Funded by the company Environmental Engineering (ENYA), coordinator, 09/2007-12/2009

Anaerobic sludge co-digestion with glycerin (byproduct of biodiesel production) to boost the biogas production, Funded by the company Hellenic Biodiesel SA, coordinator, 07/2009-07/2010

Advisory support “Problem solving in the wastewater treatment plants of the Municipality of Moudania Funded by the Municipality of Moudania, coordinator, 04/2009-06/2011

Wastewater treatment process optimization using membranes Funded by the National Technical Chamber of Greece, coordinator, 05/2011-05/2014

Wastewater treatment process optimization using intermittent aeration and periodic feeding, Funded by the National Technical Chamber of Greece 03/2012-03/2015

Advisory support of the inter-municipal Waste Management Company of the 2nd Administrative Unit Pref. of Chalkidiki (DEDA 2nd D.E.) by the biological treatment optimization of the landfill leachate Funded by the DEDA 2nd D.E. Prefecture of Chalkidiki, coordinator, 02/2013-02/2014

Advisory support of the company “Analytical Laboratories Athens SA” in the implementation of program “Drinking water control” in the Thassos Municipality, Funded by the Company Analytical Laboratories Athens SA, coordinator, 04/2013-until today.

Investigation of the coagulation-flocculation and sedimentation system following by ultrafiltration in order to improve the landfill leachate treatment process from the municipal solids landfill Anthemountas (inter-municipal Waste Management Company of the 2nd Administrative Unit Pref. of Chalkidiki), Funded by the Company Solid Waste Management Entity of Central Macedonia (FoDSA), Coordinator, 12/2013-10/2016

Control automation of the activated sludge processes in a membrane bioreactor operated with intermittent aeration and periodical feeding, Funded by the National Technical Chamber of Greece, Coordinator, 4/2015-4/2018

“MARE NOSTRUM” Bridging the legal institutional gap in Mediterranean coastline management, Joint Managing Authority ENPI CBCMed, member, 11/2013-12/2015

Control automation of the activated sludge processes in a membrane bioreactor operated with intermittent aeration and periodical feeding, Funded by the National Technical Chamber of Greece, Coordinator, 04/2015-03/2020

“Cultivation of the medfly gut symbiont *Enterobacter* sp. AA26 in a suspension bioreactor for mass rearing and sterile insect technique application”, funded by International Atomic Energy Agency – IAEA, member, 06/2013-01/2016

“Scientific support of the company ERGASIS TECHNIKI SA by optimizing the operation of the biological treatment plant treating the leachate of the solid waste landfill of EDESSA, funded by ERGASIS TECHNIKI S.A., Coordinator, 09/2015-05/2016

“Cultivation of the medfly gut symbiont *Providencia* sp. AA1 in a suspension bioreactor for mass rearing and sterile insect technique application, funded by International Atomic Energy Agency – IAEA, member, 02/2016-12/2016

Scientific support to the company "Hydrochimiki-Tsolakis N. & Co S.A." to treat and manage the leachate of the solid waste landfill of Komotini, funded by Hydrochimiki-Tsolakis N. & Co S.A, Coordinator, 05/2016-03/2019

“Evaluation and control of sanitary sewer system problems of the Municipality of Monemvasia”, funded by Municipality of Monemvasia, Coordinator, 09/2016-08/2017

Supervisor of Partner Organization DUTH - Dept. of Environmental Engineering: in MARIE SKŁODOWSKA-CURIE ACTION “Exploring Microbial networking in pesticides biodeGRAdation: novel inocula and biocatalysts for biodepuration of agro-industrial Effluents” EMIGRATE, H2020-MSCA-IF-2016 (EU funded – granted to D.G. Karpouzas, University of Thessaly), member, 07/2017 (for a period of 2 years)

Project «MINOTAUR», in “INVESTIGATE - CREATE – INNOVATE” - EYDE-ETAK, Intervention II, NSRF 2014-2020, co-funded by EU 2018- today.

Examples of recent publications

Associate Professor P. Melidis is the author of 64 papers in international journals and of 57 international and national conference papers. According to Scopus his published work has received more than 1397 citations (h index = 22)

Mavriou, Z., Alexandropoulou, I., Melidis, P., Karpouzas, D.G., Ntougias, S., Biotreatment and bacterial succession in an upflow immobilized cell bioreactor fed with fludioxonil wastewater (2021) *Environmental Science and Pollution Research*, 28 (4), pp. 3774-3786.

Mavriou, Z., Alexandropoulou, I., Melidis, P., Karpouzas, D.G., Ntougias, S. Biotreatment and bacterial succession in an upflow immobilized cell bioreactor fed with fludioxonil wastewater (2020). *Environmental Science and Pollution Research*, 28(4), pp. 3774-3786.

Azis, K., Ntougias, S., Melidis, P. Fouling control, using various cleaning methods, applied on an mbr system through continuous tmp monitoring (2019) *Desalination and Water Treatment*, 167, pp. 343-350.

Azis, K., Ntougias, S., Melidis, P. Evaluation of fouling prevention methods in a submerged membrane bioreactor treating domestic wastewater (2019) *Desalination and Water Treatment*, 170, pp. 415-424.

Azis, K., Ntougias, S., Melidis, P. NH_4^+ -N versus pH and ORP versus NO_3^- -N sensors during online monitoring of an intermittently aerated and fed membrane bioreactor (2020) *Environmental Science and Pollution Research*, Article in Press.

Bezirgiannidis, A., Chatzopoulos, P., Tsakali, A., Ntougias, S., Melidis, P. Renewable energy recovery from sewage sludge derived from chemically enhanced precipitation (2020) *Renewable Energy*, 162, pp. 1811-1818.

Efstathia Navrozidou, Paraschos Melidis, Spyridon Ntougias, Biodegradation aspects of ibuprofen and identification of ibuprofen-degrading microbiota in an immobilized cell bioreactor, (2019), *Environmental Science and Pollution Research*, article in Press.

Navrozidou, E., Remmas, N., Melidis, P., Karpouzas, D.G., Tsiamis, G., Ntougias, S. Biodegradation potential and diversity of diclofenac-degrading microbiota in an immobilized cell biofilter (2019) *Processes*, 7 (9), art. no. 554.

Bezirgiannidis, A., Plesia-Efstathopoulou, A., Ntougias, S., Melidis, P. Combined chemically enhanced primary sedimentation and biofiltration process for low cost municipal wastewater treatment (2019) *Journal of Environmental Science and Health - Part A Toxic/Hazardous Substances and Environmental Engineering*, 54 (12), pp. 1227-1232.

Bezirgiannidis, A., Marinakis, N., Ntougias, S., Melidis*, P. Membrane Bioreactor Performance during Processing of a Low Carbon to Nitrogen Ratio Municipal Wastewater (2018) *Environmental Processes*, 5, pp. 87-100

Remmas, N., Ntougias, S., Chatzopoulou, M., Melidis, P. Optimization aspects of the biological nitrogen removal process in a full-scale twin sequencing batch reactor (SBR) system in series treating landfill leachate (2018) *Journal of Environmental Science and Health - Part A Toxic/Hazardous Substances and Environmental Engineering*, 53 (9), pp. 847-85

Azis, K., Vardalachakis, C., Ntougias, S., Melidis, P. Microbiological and physicochemical evaluation of the effluent quality in a membrane bioreactor system to meet the legislative limits for wastewater reuse (2017) *Water Science and Technology*, 76 (7), pp. 1796-1804

Paraschos Melidis, Spyridon Ntougias, Varvara Vasilatou, George Skouteris, Konstantinos Azis, Vasileios Diamantis, Alexandros Alexandridis Biofouling Aspects and Critical Flux Evaluation in an Intermittently Aerated and Fed Submerged Membrane Bioreactor (2016) *Environ. Process.* Article in Press

Ntougias, S., Melidis, P., Navrozidou, E., Tzegkas, F. Diversity and efficiency of anthracene-degrading bacteria isolated from a denitrifying activated sludge system treating municipal wastewater (2015) *International Biodeterioration and Biodegradation*, 97, pp. 151-158.

Skouteris, G., Saroj, D., Melidis, P., Hai, F.I., Ouki, S. The effect of activated carbon addition on membrane bioreactor processes for wastewater treatment and reclamation - A critical review (2015) *Bioresource Technology*. Article in Press.

Paraschos Melidis, Landfill leachate nutrient removal using intermittent aeration. *Environ. Process.* (2014) 1:221–230.

Diamantis, V.I., Kapagiannidis, A.G., Ntougias, S., Tataki, V., Melidis, P., Aivasidis, A. Two-stage CSTR-UASB digestion enables superior and alkali addition-free cheese whey treatment (2014) *Biochemical Engineering Journal*, 84, pp. 45-52.

Athanasoulia, E., Melidis, P., Aivasidis, A. Co-digestion of sewage sludge and crude glycerol from biodiesel production (2014) *Renewable Energy*, 62, pp. 73-78.

Melidis, P., Kapagiannidis, A.G., Ntougias, S., Davididou, K., Aivasidis, A. Performance and metabolic aspects of a novel enhanced biological phosphorus removal system with intermittent feeding and alternate aeration (2014) *Water Science and Technology*, 69 (8), pp. 1612-1619.

Melidis, P., Ntougias, S., Sertis, C. On-line monitoring of a BNR process using in situ ammonium and nitrate probes and biomass nitrification-denitrification rates in an intermittently aerated and pulse fed bioreactor (2014) *Journal of Chemical Technology and Biotechnology*, 89 (10), pp. 1516-1522.

Mathioudakis, V.L., Kapagiannidis, A.G., Athanasoulia, E., Paltzoglou, A.D., Melidis, P., Aivasidis, A. Sewage Sludge Solar Drying: Experiences from the First Pilot-Scale Application in Greece (2013) *Drying Technology*, 31 (5), pp. 519-526.

Athanasoulia, E., Melidis, P., Aivasidis, A. Optimization of biogas production from waste activated sludge through serial digestion (2012) *Renewable Energy*, 47, pp. 147-151.

Athanasoulia, E., Melidis, P., Aivasidis, A. Anaerobic waste activated sludge co-digestion with olive mill wastewater (2012) *Water Science and Technology*, 65 (12), pp. 2251-2257.

Vaiopoulou, E., Melidis, P., Aivasidis, A. Process control, energy recovery and cost savings in acetic acid wastewater treatment (2011) *Journal of Hazardous Materials*, 186 (2-3), pp. 1141-1146.

Kantartzi, S., Melidis, P., Aivasidis, A. Intermittent feeding of wastewater in combination with alternating aeration for complete denitrification and control of filaments (2010) *Water Science and Technology*, 61 (9), pp. 2259-2266.

Mathioudakis, V.L., Kapagiannidis, A.G., Athanasoulia, E., Diamantis, V.I., Melidis, P., Aivasidis, A. Extended Dewatering of Sewage Sludge in Solar Drying Plants, (2009) 248 (1-3), pp. 733-739.

Melidis, P., Vaiopoulou, E., Aivasidis, A., Development and implementation of microbial sensors for efficient process control in wastewater treatment plants, (2008) 31 (3), pp. 277-282.

Vaiopoulou, E., Melidis, P., Aivasidis, A., Growth of filamentous bacteria in an enhanced biological phosphorus removal system, (2007) 213 (1-3), pp. 288-296.

Vaiopoulou, E., Melidis, P., Aivasidis, A., An activated sludge treatment plant for integrated removal of carbon, nitrogen and phosphorus, (2007) 211 (1-3), pp. 192-199.

Vaiopoulou, E., Melidis, P., Kampragou, E., Aivasidis, A., On-line load monitoring of wastewaters with a respirographic microbial sensor, (2005) 21 (2), pp. 365-371.

Vaiopoulou, E., Melidis, P., Aivasidis, A., Sulfide removal in wastewater from petrochemical industries by autotrophic denitrification, (2005) 39 (17), pp. 4101-4109.

Georgiou, D., Melidis, P., Aivasidis, A., Gimouhopoulos, K., Degradation of azo-reactive dyes by ultraviolet radiation in the presence of hydrogen peroxide, (2002) 52 (2), pp. 69-78.