

Interreg

Ελλάδα-Κύπρος

Ευρωπαϊκό Ταμείο Περιφερειακής Ανάπτυξης



ΕΥΡΩΠΑΪΚΗ ΕΝΩΣΗ



16th -18th June 2023

Limassol, Cyprus

hybrid event

www.anelixi.tuc.gr



ΑΝΕΛΙΞΗ

Τελικό Συνέδριο Πράξης ΑΝΕΛΙΞΗ

ANELIXI Final Conference

Πρόγραμμα Συνεργασίας Interreg V-A για αναβάθμιση ΕΕΛ
Συγχρηματοδοτείται από την Ευρωπαϊκή Ένωση (ΕΤΠΑ) και
από Εθνικούς Πόρους της Ελλάδας και της Κύπρου

Συντονιστής | Coordinator



ΠΟΛΥΤΕΧΝΕΙΟ ΚΡΗΤΗΣ
TECHNICAL UNIVERSITY
OF CRETE

Εταίροι | Partners



Δ.Ε.Υ.Α.Π.

ΣΥΜΒΟΥΛΙΟ
ΑΠΟΧΕΤΥΞΕΩΝ
ΚΥΠΡΟΥΝΤΑΣ
Κυπριακή Δημοκρατία



Design of
Environmental
Processes Lab

PROGRAMME

2nd International Conference on Sustainable Chemical & Environmental Engineering



SUST
ENG
2023

14th -18th June 2023

Limassol, Cyprus

hybrid event

www.susteng2023.tuc.gr



spirito
business & communication group



Design of
Environmental
Processes Lab



Technical University of Crete
School of Chemical and
Environmental Engineering



Cyprus
University of
Technology

Dear friends and colleagues,

I am pleased to welcome you to the **Final Conference of the ANELIXI Project “Upgrade of WWTPs for the management of increased demands and the reduction of the operational cost”**, in the frame of **Interreg V-A Greece-Cyprus 2014-2020** between **16th to 18th June 2023**. Parallel to ANELIXI Final Conference we organize the **2nd International Conference on Sustainable Chemical and Environmental Engineering (SUSTENG 2023)**, between **14th to 18th June 2023**. Both events will be held in Limassol, Cyprus and you may participate in either event with **physical** or **virtual** presence.

The **purpose of the ANELIXI final conference** is to describe and present the outcomes of ANELIXI project, an innovative wastewater treatment process. Additionally, hot issues on water and wastewater management and reuse will also be discussed with water specialists in an **open forum**.

The **main objectives of the ANELIXI project are:**

- Increase the capacity of existing WWTPs
- Low construction and operation cost compared to alternative technologies
- Reduction of energy cost of existing WWTPs by approximately 35%
- Production of biosolids with solids content over 35%

SUSTENG 2023 aims to encourage the exchange of knowledge between academicians, scientists and engineers on hot issues and current developments **in chemical and environmental engineering through sustainable perspective**. The participants will have the opportunity to present their recent research findings on an extended spectrum of conference topics and be informed about new challenges, future trends, and technological innovations on sustainable processes following the principles of circular economy.

The **ANELIXI project** of the Cooperation Program INTERREG V-A Greece - Cyprus 2014-2020 is co-financed by the **European Regional Development Fund (ERDF) and national resources of Greece and Cyprus**.

The SUSTENG 2023 is organized by the "Design of Environmental Processes Laboratory", of the School of Chemical and Environmental Engineering, **Technical University of Crete**, the **Cyprus University of Technology** and the **Company Spirito Group**.

After the completion of the both events all abstracts/full papers will be published in the Final Conference of the ANELIXI | SUSTENG 2023 Conference Proceedings with **ISBN number**.

The conference Chair

Petros Gikas

Professor

Head of the "Design of Environmental Processes Lab"
School of Chemical and Environmental Engineering
Technical University of Crete



TOPICS

1. Nanomaterials
2. Air emissions/ CO₂ separation
3. Policies, regulatory and social acceptance
4. Adsorption Processes
5. Solid waste management/ Biosolids management and valorization
6. Water resources management
7. Wastewater treatment & bioremediation (part I & part II)
8. Biochemical and Biomedical Engineering & Biotechnology
9. Waste to Energy/Hydrogen production
10. Industrial waste management
11. Environmental Economics/ Industrial Economics
12. Agricultural Engineering/ Agricultural & livestock waste

Draft





Prof. Soteris Kalogirou
Professor, University of
Technology, Limassol,
Cyprus



Prof. Maria Cristina Fragkou
Associate professor,
Universidad de Chile



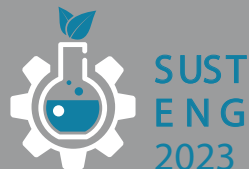
Prof. Hassan Azaizeh
Professor, Tel Hai Academic
College & Institute of
Applied Research, Tel Hai,
Israel



Prof. Isam Janajreh
Professor and the
associate chair in the
Mech, Khalifa
University, Abu Dhabi



Prof. Ezio Ranieri
Professor, University
of Bari, Italy



Organizing Committee

Head of Organizing Committee

Dr. Petros Gikas, Professor, Director of the Design of Environmental Processes Laboratory, School of Chemical and Environmental Engineering, Technical University of Crete.

Members of Organizing Committee

Dr. Michalis Koutinas, Associate Professor, Department of Chemical Engineering, Cyprus University of Technology.

Dr. Ioannis Vyrides, Assistant Professor, Department of Chemical Engineering, Cyprus University of Technology.

Konstantinos Tsamoutsoglou, PhD candidate, Environmental Engineer, Design of Environmental Processes Laboratory, School of Chemical and Environmental Engineering, Technical University of Crete.

Xanthi-Evangelia Manaroli, Architect Engineer M.Sc., School of Chemical and Environmental Engineering, Technical University of Crete.

Anthoula Manali, PhD candidate, Chemist M.Sc. Design of Environmental Processes Laboratory, School of Chemical and Environmental Engineering, Technical University of Crete.

Scientific Committee

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Alexandros Stefanakis, Technical University of Crete, Greece
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Antonios Papadakis, Region of Crete, Greece
Apostolos Gianni, Technical University of Crete, Greece
Apostolos Voulgarakis, Technical University of Crete, Greece
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George Karatzas, Technical University of Crete, Greece
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Gerasimos Lyberatos, National Technical University of Athens, Greece
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Herve Boileau, University of Savoie Mont-Blanc, France
Hery Tiana Rakotondramiarana, University of Antananarivo, Madagascar
Ioannis Kalavrouziotis, Hellenic Open University, Greece
Ioannis Manariotis, University of Patras, Greece

Ioannis Tsanis, Technical University of Crete, Greece

Ioannis Vyrides, Cyprus University of Technology

Ioannis Yentekakis, Technical University of Crete, Greece

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Keisuke Kuroda, Toyama Prefectural University Japan

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Konstantinos Komnitsas, Technical University of Crete, Greece

Lazaros Papageorgiou, University College, UK

Lesly Tejeda, University of Cartagena, Colombia

Manish Kumar, University of Petroleum and Energy Studies, India

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Michael Kornaros, University of Patras, Greece

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Mohamed Elhag, King Abdulaziz University, Saudi Arabia

Muhammad Arslan Ashraf, Government College University Faisalabad, Pakistan

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Nikolaos Diangelakis, Technical University of Crete, Greece

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Stratow Pistikopoulos, Texas A&M University, USA

Stylianos Rozakis, Technical University of Crete, Greece

Theocharis Tsoutsos, Technical University of Crete, Greece

Therese Lee Chan, The University of the West Indies, Trinidad and Tobago

Timothy Ginn, Washington State University, USA

Tonni Agustiono Kurniawan, Xiamen University, China

Vasileios Takavakoglou, Hellenic Agricultural Organization – DEMETER, Greece

Vassilios Tsihrintzis, National Technical University of Athens, Greece

Wei-Qin Zhuang, University of Auckland, New Zealand

Yaoyu Zhou, Hunan Agricultural University, China

Wednesday 14 June Susteng 2023

Registration 14:00 - 16:00

Welcome 16:00 - 16:15

PLENARY LECTURE: Prof. S. Kalogirou 16:15 - 17:00
Renewable Energy Systems: Current status in the World and Prospects
Chair: P. Gikas, M. Koutinas

Welcome Banquette 17:00 - 19:00

Thursday 15 June Susteng 2023

Greetings | Welcome Speeches 09:30 - 11:00

Andreas Georgiou, Director, Ministry of Agriculture Rural Development and the Environment, Cyprus

Maria Panayiotou, Environment Commissioner, Cyprus

Lia Georgiou, Acting Director, Water Development Department, Cyprus

Nikolaos Nikolaidis, Mayor of Limassol, Cyprus

Yiannis Tsouloftas, General Manager, Sewerage Board Limassol Amathus, Cyprus

Panayiotis Zaphiris, Rector, Cyprus University of Technology

Michalis Zervakis, Rector, Technical University of Crete, Greece

PLENARY LECTURE: Prof. P. Gikas 11:30 - 12:15
Upgrade of overloaded wastewater treatment plants: The ANELIXI project
Chair: P. Gikas, M. Koutinas

SESSION 1: Nanomaterials

12:15 - 13:15

Chair: F. Galatopoulou & P. Pochwatka

Solution Processed Perovskite Nanocrystal Photovoltaics

12:15 - 12:30

F. Galatopoulou, P. Papagiorgis, A. Ioakeimidis, C. Christodoulou, A. Chrusou, E. Charalambous, A. Manoli, C. Bernasconi, M. I. Bodnarchuk, M. V. Kovalenko, G. Itskos and S. A. Choulis

12:30 - 12:45

Metal nanoparticles as pesticide alternatives

A. Malandrakis, N. Kavroulakis, C. Chrysikopoulos

High Mechanical Strength Carbon Nanofibers Fabrication: A Comparative Study of Biomass Electrospun Nanofibers and CVD Synthesized Nanofibers Over Nickel Decorated RANR

12:45 - 13:00

F. Dziike, T. D. Ntuli, and O. A. Olagunju

13:00 - 13:15

Fabrication of Ceramic Composite Films for Solid Oxide Electrochemical Cells (SOEC) by Solution Spray Pyrolysis (SSP)

C. Ziazias, C. Matsouka, C. Tsanaktsidis and N. E. Kiratzis

Break

13:15 - 14:45

SESSION 2: Air emissions/ CO₂ separation

14:45 - 15:30

Chair: A. Agapiou & M. D. Damaceanu

Effect of the polymer blend-based membranes composition on CO₂ separation efficiency

14:45 - 15:00

M.-D. Damaceanu, I. Butnaru, C.P. Constantin, and A. Wolińska-Grabczyk

15:00 - 15:15

Reliable fugitive emissions measurements at a gas transmission network

N. Tsochatzidis, N. Katsis

Monitoring of goat cheese whey wastewater VOCs by extraction techniques 15:15 - 15:30
S. Elia, M. Stylianou and A. Agapiou

SESSION 3: Policies, regulatory and social acceptance 15:30 - 16:15
Chair: N. Tsochatzidis & F. Dziike

Decontamination of antibiotics from aqueous solution using citrus fruit waste biochar – silicate composite adsorbents 15:30 - 15:45
M. Gamble and C. Mangwandi

Social acceptance of sustainable bioenergy transition policies for public health 15:45 - 16:00
E. Lakioti, A. Itziou, I. Vasiliadou, V. Karayannis and C. Tsanaktsidis

Sustainable siting of offshore wind farms. Application in Crete (Sustainable siting of offshore wind Parks. Application in Crete) Step – Ap 16:00 - 16:15
P. Gkeka-Serpetsidaki, T. Tsoutsos

SESSION 4: Adsorption Processes 16:15 - 17:00
Chair: K. Tsamoutsoglou & P. Gkeka-Serpetsidaki

Studies on rare earth elements recovery on alginate sorbent modified with ion exchanger with phosphonic groups 16:15 - 16:30
D. Fila, Z. Hubicki and D. Kołodyńska

Adsorption of arsenic in aqueous solutions using FeS₂ 16:30 - 16:45
T. Kurniawan

Column adsorption of polyphenols from olive mill wastewater by activated biochar 16:45 - 17:00

E. Karefylaki, C. Galanakis, A. Veksha, G. Lisak and A. Giannis

Break - Posters viewing

17:00 - 17:30

PLENARY LECTURE: Prof. E. Ranieri

17:30 - 18:15

Influence of climate change on wastewater treatment plants performances and energy costs in Apulia, south Italy

Chair: P. Gikas & M.C. Fragkou

SESSION 5: Solid waste management/ Biosolids management and valorization
Chair: H. Azaizeh & G. Gatidou

18:15 - 19:30

Challenges with Strategic Planning for Disaster Waste Management in Developing Countries
May M. Massoud and L. Al Tawil

18:15 - 18:30

Pretreatment of cotton stalk residues for biogas production
A. Makri, P. Melidis and S. Ntougias

18:30 - 18:45

Usefulness of waste from the cultivation of tobacco for energy production
M. Piłuła, A. Kowalczyk-Juško, P. Pochwatka and **J. Dach**

18:45 - 19:00

Hydrotalcite modified biochar as a sorbent to remove cerium ions from water media
J. Bąk and D. Kołodyńska

19:00 - 19:15

Biodegradation of phenolic compounds from grape pomace of Vitis vinifera Asyrtiko by Chlamydomonas reinhardtii
M. Belenioti, **E. Mathioudaki**, E. Spyridaki, D. Ghanotakis, N. Chaniotakis

19:15 - 19:30

Valorization of spent coffee grounds for removal of chromium from wastewater
R. Campbell and **C. Mangwandi**

19:30 - 19:45

Friday 16 June Anelixi | Susteng 2023

Greetings | Welcome Speeches

09:30 - 11:00

Dr. Petros Gikas, Professor, School of Chemical and Environmental Engineering, (Scientific leader of the project ANELIXI), Technical University of Crete, Greece

Tsiagande Vaya, Communication Officer & Technical Assistance JS, INTERREG V-A Greece-Cyprus 2014-2020

Nikolas Karamanes, Director General, Water Supply and Sewerage of Paros, Greece

George Panayiotou, Vice President, Kyperounta Sewerage Board, Cyprus

Angeliki Larcou Yiannakou, Coordinator, Division of Waste Water and Reuse, Water Development Department, Cyprus

Break – Posters viewing

11:00 - 11:30

PLENARY LECTURE: Prof. I. Janajreh
Low Energy Desalination: Direct Contact Membrane Distillation (DCMD) and Freeze Desalination (FD)
Chair: P. Gikas & E. Ranieri

11:30 - 12:15

SESSION 6: Water resources management
Chair: N. Tsochatzidis & M. Karim

12:15 - 13:15

Smart Irrigation recommendation system using Machine Learning
K. Dolaptsis, X.E. Pantazi, G.Tziotzios, D.Stavridou, A.Morellos, C.Paraskevas, S. Arslan, Y. Tekin and A. Mouazen

12:15 - 12:30

HRES: The solution to cover water and energy needs in a Greek arid island

12:30 - 12:45

S. Skroufouta, A. Lemonis and E. Baltas

Environmental, Health and Safety Challenges of 300MW Floating Solar Plant 12:45- 13:00
M.Karim and R. Rimsa

Assessing the value of seasonal forecasts for improved reservoir operations in a water-stressed Mediterranean basin: A case study in the Faneromeni reservoir, Crete 13:00 - 13:15
A. Tsilimigras, N. Crippa, M. Grillakis, G. Yang, M. Giuliani, and A. Koutroulis

Break 13:15 - 14:45

SESSION 7: Wastewater treatment & Bioremediation (part I) 14:45 – 15:45
Chair: J. Dach & M Vatiliotou

Presentation of the Wastewater Treatment Plants of Paros, Greece 14:45 - 15:00
M. Mavri

Benzotriazoles and perfluorinated substances removal using thermal pretreatment and biochemical methane potential (BMP) test 15:00 - 15:15
G. Gatidou, A. Koukoura, E. Gkalipidou, E. Zkeri, M. Fountoulakis, A. Stasinakis

Sustainable municipal wastewater treatment through novel pilot-scale aerated Vertical Flow Constructed Wetlands 15:15 - 15:30
P. Regkouzas, I. Asimakoulas, K. Paragioudakis, E. E. Koukouraki and A. Stefanakis

Sustainable Innovations in Wastewater Management: Upgrading Facilities for Environmental Conservation and Operational Excellence 15:30 - 15:45
T. Makrygiannis

**SESSION 7: Wastewater treatment &
Bioremediation (part II)**
Chair: J. A. Makri & K. Tsamoutsoglou

15:45 - 17:15

Removal of chromium from aqueous solution using CeO₂@starch nanocomposite material and olive stone in a continuous system
O. Jaiyeola and C. Mangwandi

15:45 - 16:00

Reclaimed Water Reuse in Cyprus
M. Vatyliotou

16:00 - 16:15

Presentation of Sewage Treatment Plant at Kyperounta
Member of Water Development Department of Cyprus

16:15 - 16:30

Primary Filtration Systems for upgrade of overloaded municipal Wastewater Treatment Plants in the Mediterranean Countries
K. Tsamoutsoglou, I. Maniaki and P. Gikas

16:45 - 17:00

The rehabilitation of the main sewer collector of Limassol - An innovative approach
G. Panayiotou

17:00 - 17:15

Break - Posters viewing

17:15 - 17:30

Round table (in Greek) | Hall 2
Hot issues on water and wastewater management and reuse
Chair: P. Gikas, A. Larkou, I. Tsouloftas

17:30 - 19:00

Gala Event

20:00 - 23:00

**SESSION 8: Biochemical and Biomedical
Engineering & Biotechnology**
Chair: M. Koutinas & A. Nicodemou

09:30 - 11:00

**Development of biochar-based biocatalysts for fermentative
bioethanol overproduction via whole-cell immobilisation under
multiple environmental stresses**

09:30 - 09:45

M. Kyriakou, M. Christodoulou, A. Ioannou, V. Fotopoulos, M.
Koutinas

**Can biodiesel become a determinant Bioeconomy factor towards
sustainability: Mixture physicochemical composition and Input-
Output (I-O) indicators of biodiesel sector**

09:45 - 10:00

M.E. Kyriklidis, C. Kyriklidis, V. Vasileiadis, E. Loizou and C.
Tsanaktsidis

**Cultivation of Clorella sorokiniana in a flat-plate gas-lift
photobioreactor and harvesting with the use of Pleurotus
ostreatus fungal pellets**

10:00 - 10:15

S. Schiza, A. S. Stasinakis and M. S. Fountoulakis

**Optimization of microalgae bio-products under industrial flue gas
exposure**

10:15 - 10:30

G. Makaroglou and P. Gikas

**CO₂ utilization in a system of anaerobic granular sludge and
magnesium ribbon for acetic acid production**

10:30 - 10:45

C.G. Samanides and I. Vyrides

**Optimal Biodiesel Mixtures: Cost and Density Evaluation
Function Application by Genetic Algorithm**

10:45 - 11:00

V. Vasileiadis, M.E. Kyriklidis, C. Kyriklidis, E. Terzopoulou and C.
Tsanaktsidis

Break - Posters viewing

11:00 - 11:30

PLENARY LECTURE: Prof. H. Azaizeh

11:30 - 12:15

Biomass valorization for lactic acid production to produce polylactic acid as a biodegradable plastic

Chair: P. Gikas & I. Janajreh

SESSION 9: Waste to Energy/Hydrogen production

12:15 - 13:30

Chair: I. Vyridis & D. Constantinou

The impact of a biogas plant on the energetic and economic situation of a dairy farm

12:15 - 12:30

J. Dach, P. Pochwatka, A. Kowalczyk-Juško and A. Mazur

Spent coffee grounds and orange peel residues based biorefinery development towards biolubricants production and biodiesel properties estimation

12:30 - 12:45

E. Stylianou, K. Zygouraki, M. Carmona-Cabello, N. Giannakis, M.P. Dorado and A. Koutinas

Hydrogen gas generation by anaerobic oxidation of metallic iron Fe⁰ or scrap iron under low-temperature carbonates conditions and the role of citric acid

12:45 - 13:00

D. Constantinou and I. Vyrides

In situ hydrogen peroxide (H₂O₂) production in carbonaceous electrodes with different interfacial properties

13:00 - 13:15

P. Petsi, K. Plakas, Z. Frontistis and A. Karabelas

Biosolids gasification: state-of-the-art and industrial-scale application at the WWTP of Rethymno

13:15 - 13:30

K. Pothoulaki, A. Manali and P. Gikas

Break

13:30 - 15:00

SESSION 10: Industrial waste management

13:30 - 15:00

Chair: M. Patsalou & T. Thodosiadis-Thomaidis

Artificial Neural Network for the quantification of cobalt recovered from Li-ion batteries 15:00 - 15:15
I.I. Pérez Juárez, B.M. González Contreras, M.A. Munive Rojas, J.A. Guevara-García and E. Bonilla Huerta

A citrus processing wastewater-based biorefinery approach for production of high-added value commodities 15:15 - 15:30
P. Karanicola, M. Patsalou, P. Christou, G. Panagiotou and M. Koutinas

Molybdenum recovery in a sulphate-reducing bioreactor 15:30 - 15:45
D. A. Strongyli, P. Kousi, A. Hatzikioseyian, E. Remoundaki

Valorization of olive processing industry waste through biorefinery development for sustainable production of polyphenols, algal biomass, and lipids 15:45 - 16:00
A. Nicodemou, M. Kallis and M. Koutinas

**SESSION 11: Environmental Economics/
Industrial Economics** 16:00 - 16:45
Chair: A. Pournara & E. Stylianou

Sustainable blue economy and ecosystem services in transitional water bodies: Case study of a lagoon and a river delta in Northern Greece 16:00 - 16:15
A. Pournara and F. Sakellariadou

The role of standards for the transition to a Sustainable Blue Economy 16:15 - 16:30
A. Pournara

Techno-economic learning in biorefinery research – a meta-level perspective on three exemplary cases 16:30 - 16:45
P. Krassnitzer

Break - Posters viewing 16:45 - 17:15

PLENARY LECTURE: Prof. M. C. Fragkou
An interdisciplinary approach towards seawater desalination for human consumption in the Atacama desert, Chile
Chair: P. Gikas & J. Dach

17:15 - 18:00

**SESSION 12: Agricultural Engineering/
Agricultural & livestock waste**
Chair: P. Pochwatka & K. Tsamoutsoglou

18:00 - 19:00

Machine Learning based Prediction of Fusarium Head Blight spatial distribution in wheat fields

18:00 - 18:15

A. Morellos, X.E. Pantazi, C. Tsitsopoulos, K. Dolaptsis, G. Tziotzios, D. Stavridou, C. Paraskevas, O.E. Apolo-Apolo, M.B. Almoujahed, R. Whetton, Z. Kriauciuniene, M. Kazlauskas, E. Šarauskiš and A. Mouazen

Valorisation of agricultural waste towards enhanced biopolymer via cathodic electrofermentation

18:15 - 18:30

O. Vittou, M. Sarafidou, O. Psaki, C. Pateraki and A. Koutinas

Modeling of methane production with the application of artificial intelligence techniques

18:30 - 18:45

P. Pochwatka, A. Kowalczyk-Juško, A. Mazur and J. Dach

Treatment and technology of rural domestic wastewater in China
J. Zhang, S. Lu, Yungeng Jiang and H. Zhang

18:45 - 19:00

Closing Ceremony

19:00 - 20:00

Chair: P. Gikas, E. Ranieri, H. Azaizeh, I. Janajreh, M. C. Fragkou, I. Vyridis, M. Koutinas

Sunday 18 June Anelixi | Susteng 2023

Field visit at Troodos mountain and Kyperounta wastewater treatment plant

09:30 - 16:00

Posters

Biogas upgrading with membrane gas separation; Construction and operation of a pilot-scale polyimide membrane system

P. Gkotsis, C. Koutsiantzi, T. Deligiannis, A. Zouboulis, M. Mitrakas, E. Kikkinides

Digestate from agriculture biogas plants as a potential source of tetracycline antimicrobials and antibiotic resistance genes

E. Korzeniewska, I. Wolak, M. Harnisz, Magdalena Męcik, K. Stando and S. Bajkacz

Variations of Organic Characteristics for Influent and Effluent of BAC Filter in AOC Bioassay Using SFS with Integrated Areas

S. C. Chen, W. L. Lai, T.Y. Hong

The energetic potential of surgical masks: a possible approach as solid recovered fuels S. Pinho

A nanopore long-read sequencing points out a modification of hospital wastewater microbiome after chlorine disinfection

D. Rolbiecki, Ł. Paukszto, K. Krawczyk, E. Korzeniewska, J. Sawicki, and M. Harnisz

Experimental and Mathematical study on CO₂ separation performance of biogas using commercial polyimide hollow membrane in a 2-stage process.

C. Koutsiantzi, P. Gkotsis, A. Zouboulis, M. Mitrakas, E. Kikkinides

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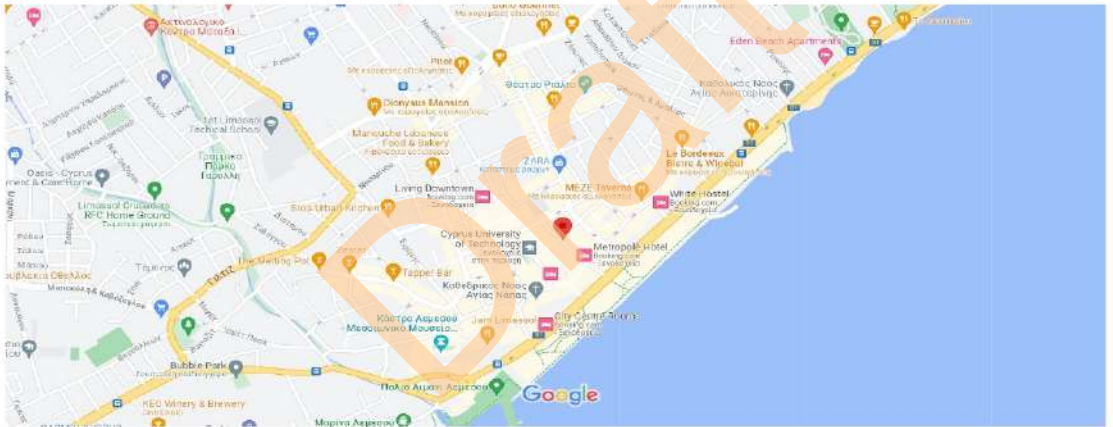


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