

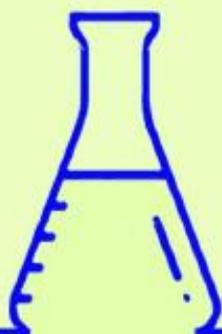


# ATHENS CONFERENCE ON ADVANCES IN CHEMISTRY

10-14 MARCH 2021



NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS  
DEPARTMENT OF CHEMISTRY



## BOOK OF ABSTRACTS

### Chairs

**Prof. Christiana Mitsopoulou**  
Laboratory of Inorganic Chemistry,  
Department of Chemistry, NKUA

**Prof. Ermolaos Iatrou**  
Laboratory of Industrial Chemistry,  
Department of Chemistry, NKUA



### Organizing Committee

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Assoc. Prof. Patrina Paraskevopoulou  
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Asst. Prof. Athanassios Tsekouras



## A welcome to Chemistry Department of NKUA and acac2020

On behalf of the Scientific and Organizing committees, we are delighted to 'welcome' you to Athens for the "*Athens Conference on Advances in Chemistry (acac2020)*".

This conference is the 2<sup>nd</sup> of a series of international conferences and is held remotely due to the current Coronavirus Pandemic. Despite that, we are delighted that more than 250 participants from Europe and USA and over 400 students all over the world have join our meeting.

We hope this conference to be highly active and a forum for exchange of the latest knowledge concerning chemistry and related areas among researchers. We anticipate fruitful discussions on the latest topics during several plenary, and invited lectures, contributed talks, and flash presentations. In addition, there will be an Early Career Researcher competition for young researchers.

Organizing this conference took a lot of effort. Colleagues who have helped are under organizing committee, but a special thanks must be given to Margarita Chatzichristidi, Vicky Magrioti, Thanos Tsekouras and Patrina Paraskevopoulou, for all their hard work and good cheer.

We are looking forward to meet all of you and wish everyone a most successful meeting.

**Christiana Mitsopoulou and Ermolaos Iatrou**

Co-Chairs of acac 2020.

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## Saturday March 13<sup>th</sup> 2021

SESSION 7a: Chair: Sotirios Karavoltsos	
9:30-10:00	Iron and hemoprotein abundance in the Atlantic Ocean; link to global biogeochemical cycles and climate change <b>Evangelia Louropoulou</b> ( <i>GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel, Germany</i> )
10:00-10:15	Air filtration systems for controlling fungal contamination in pear warehouses: an overview of the REPEAR project <u>Vasilis P. Valdramidis</u> , Davide Sardella and Ruben Gatt ( <i>University of Malta, Malta</i> )
10:15-10:30	Occurrence and distribution of trace metals in the marine surface microlayer of coastal areas in the Aegean sea Sotirios Karavoltsos, <u>Aikaterini Sakellari</u> and Manos Dassenakis ( <i>NKUA, Greece</i> )
10:30-10:45	Comparison of the water quality of three rivers under different environmental pressures with the use of robotic boats <u>Georgios Katsouras</u> , Nikos Tsalas, Alekos Dosis, Marina Despotidou, Stylianos Samios, Efthymios Lytras, Kostas Papadopoulos, Sotirios Karavoltsos, Emmanouil Dassenakis, Michael Scoullas, and Elias Dimitriou ( <i>E.Y.D.A.P., Greece</i> )
10:45-11:00	Application of robotic boats to the water quality control through Greece: EYDAP's success story <u>Efthymios Lytras</u> , Nikos Tsalas, Alekos Dosis, Georgios Katsouras, Marina Despotidou, Stylianos Samios, and Kostas Papadopoulos ( <i>E.Y.D.A.P., Greece</i> )
11:00-11:15	Upgrade of EYDAP's water quality control with the use of robotic boats <u>Marina Despotidou</u> , Nikos Tsalas, Alekos Dosis, Georgios Katsouras, Stylianos Samios, Efthymios Lytras and Kostas Papadopoulos ( <i>E.Y.D.A.P., Greece</i> )
11:15-11:30	COFFEE BREAK
SESSION 7b Chair: Evangelos Bakeas	
11:30-11:45	Sewer Mining technology: a sustainable solution for urban recreation areas irrigation <u>Stylianos Samios</u> , Kostas Papadopoulos, Efthymios Lytras, Marina Despotidou, Aggeliki Derlere, Georgios Katsouras, Nikos Tsalas, Noutsopoulos C., Mamais D., Makropoulos C. ( <i>E.Y.D.A.P., Greece</i> )
11:45-12:00	PVAdapt: A cost-effective, smart, sustainable and multifunctional Building Integrated Photovoltaics (BIPV) system <u>Mantha Schismenou</u> , Marina Despotidou, Stylianos Samios, Efthymios Lytras and Konstantinos Papadopoulos ( <i>E.Y.D.A.P., Greece</i> )
12:00-12:15	Honey, as the "time capsule" of long term environmental change – acacia bee products

# Comparison of the water quality of three rivers under different environmental pressures with the use of robotic boats

Georgios Katsouras<sup>1</sup>, Nikos Tsalas<sup>1</sup>, Alekos Dosis<sup>1</sup>, Marina Despotidou<sup>1</sup>, Stylianos Samios<sup>1</sup>, Efthymios Lytras<sup>1</sup>, Kostas Papadopoulos<sup>1</sup>, Sotirios Karavoltsos<sup>2</sup>, Emmanouil Dassenakis<sup>2</sup>, Michael Scoullou<sup>2</sup>, and Elias Dimitriou<sup>3</sup>

<sup>1</sup>Athens Water and Sewerage Company S.A (E.Y.D.A.P.), Research and Development, Oropou 156, 11146, Galatsi, Athens, Greece

<sup>2</sup>Laboratory of Environmental Chemistry (LEC), Department of Chemistry, National and Kapodistrian University of Athens, Zografou GR-15784, Greece

<sup>3</sup>Institute of Marine Biological Resources and Inland Waters, Hellenic Centre for Marine Research (HCMR), 19013 Anavyssos, Greece  
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Robotic boats equipped with basic and innovative sensors were employed for the first time in Greece by EYDAP, in collaboration with HCMR and LEC, in three rivers namely Acheloos, Asopos and Kifissos, representing different conditions and environmental pressures. The objective of this research was to obtain reliable, real time monitoring of chemical (DO, pH), physical (EC, T), and biological (Chlorophyll) parameters related to water quality.

The monitoring strategy applied was also innovative, combining a more thorough monitoring campaign both in terms of space and time, providing a significantly more comprehensive set of water quality data without labour-intensive and costly monitoring schemes, demonstrating that it could record even minute variations due to anthropogenic (urban, agricultural, industrial etc) or natural causes.

The use of autonomous boats optimizes water quality monitoring strategies and contributes substantially to an improved operation of the National Monitoring Water Network, under the supervision of the Special Secretariat for Water, in accordance with the requirements of the Water Framework Directive (2000/60/EC).

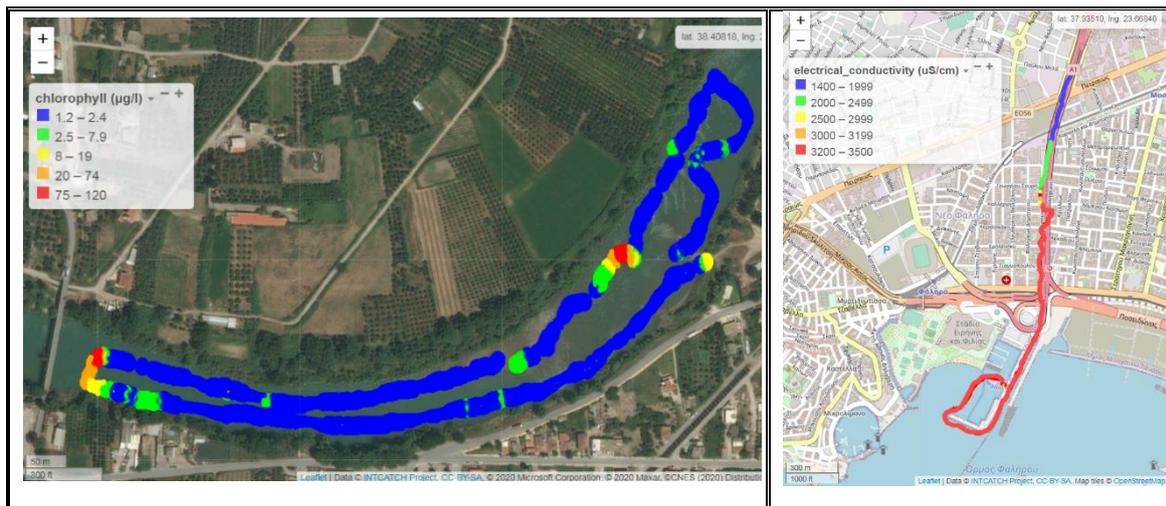


Figure 1: Chl-a in Acheloos River (left) and Conductivity in Kifissos estuaries (right)

## Acknowledgment:

This work is funded by the European Union's Horizon 2020 research and innovation program as the project "INTCATCH" under grant agreement No 689341.

# Application of robotic boats to the water quality control through Greece:

## EYDAP's success story

Efthymios Lytras, Nikos Tsalas, Alekos Dosis, Georgios Katsouras, Marina Despotidou, Stylianos Samios, and Kostas Papadopoulos

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EYDAP's autonomous boats were deployed to a wide range of Greek catchments and demonstrated clearly the benefits that are derived by their application in water monitoring. The boats equipped with basic and innovative sensors, were tested in \*\*\* lakes and rivers and proved to be a valuable tool to Research Institutes, Management Bodies and even sports events organizations, because:

- They achieved a more thorough monitoring campaign both in space and time and provided significantly higher amount of water quality data without requiring labour-intensive and costly monitoring schemes.
- They allowed the monitoring of ecological status more accurately with emphasis on phytoplankton growth. Monitoring by robotic boats provided valuable insights into the distribution and the responses of phytoplankton to environmental pressures.
- They allowed fast & flexible data collection of many discrete samples and provided with a representative coverage of the whole lake required for chemical classification.
- They received a very high public acceptance, social and environmental impact, adding a positive value to water security.

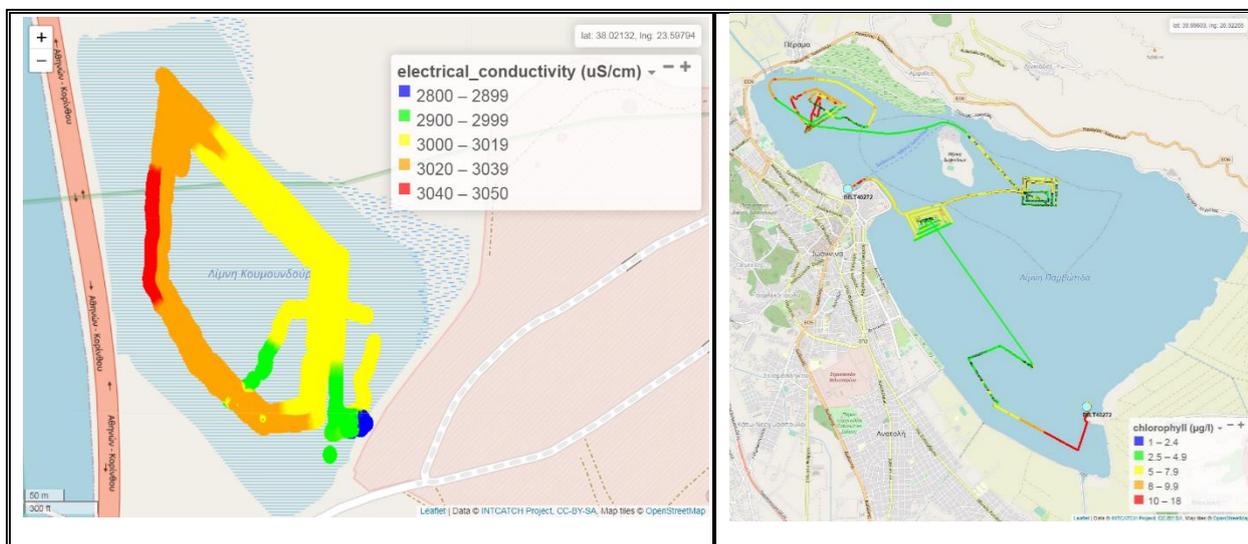


Figure 1: Conductivity in Lake Koumoundourou (left) and Chl-a in Lake Pamvotis (right)

### Acknowledgment:

This work is funded by the European Union's Horizon 2020 research and innovation program as the project "INTCATCH" under grant agreement No 689341.

## Upgrade of EYDAP's water quality control with the use of robotic boats

Marina Despotidou, Nikos Tsalas, Alekos Dosis, Georgios Katsouras, Stylianos Samios, Efthymios Lytras and  
Kostas Papadopoulos

Athens Water and Sewerage Company S.A (E.Y.D.A.P.) – Research and Development – Oropou 156, 11146,  
Galatsi, Athens, Greece, e-mail: [mades@eydap.gr](mailto:mades@eydap.gr)

The Research and Development Department of EYDAP (R&D), as a result of participation in the INTCATCH project, is responsible for the operation of two autonomous robotic boats. The autonomous boats applied in 2020 in all four Reservoirs of EYDAP (Yliki, Marathon, Mornos and Evinos) and with their integrated sensors (chl-a, dissolved oxygen, conductivity, pH, temperature, total nitrogen and phosphorus) collected more than 290,000 data along the perimeter of the Reservoirs covering more than 90 kilometers. The data evaluated in real time in the field and in the office (via tablet, mobile and PC), through appropriate applications, providing at the same time a safer working environment against COVID-19.

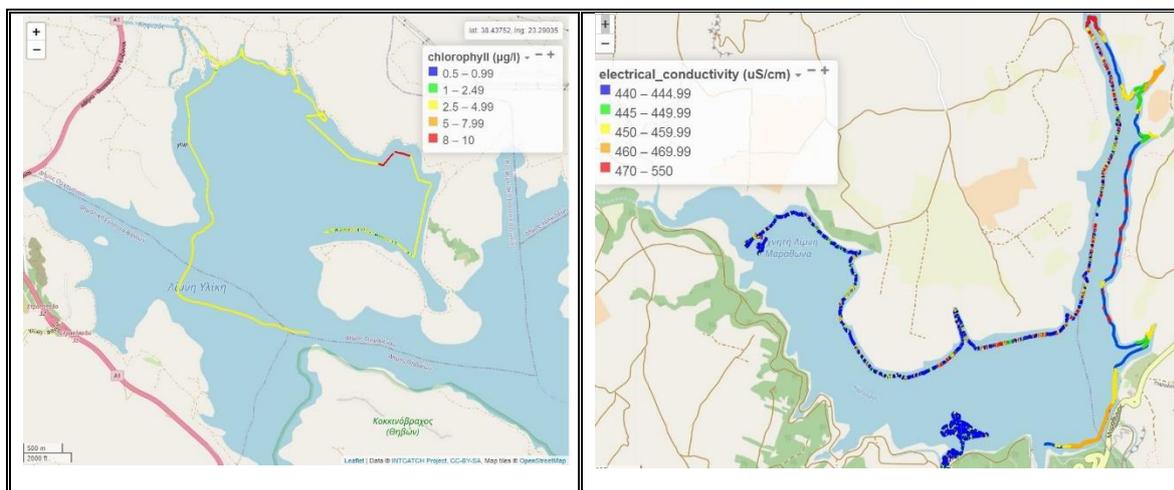


Figure 1: Chl-a in Lake Yliki (left) and Conductivity in Marathon (right), 2020

By using the continuous monitoring system, potential sources and pathways of pollution could be identified and the results provided EYDAP with the opportunity to have a more comprehensive picture of the quality of the catchment in real time and take immediate countermeasures if necessary. The possible effect from anthropogenous pollution can be thoroughly investigated with the use of the robotic boats. Additionally, the systematic, full scale application of autonomous boats in the future can collaboratively complete the current monitoring program of a catchment, greatly reducing the cost. It achieved a more thorough monitoring strategy both in space and time and optimized solutions for monitoring of water bodies. The Vision is that EYDAP will operate a service for people interested in assessing water quality in relation to catchment management and the traditional spot sampling protocols.

### Acknowledgment:

This work is funded by the European Union's Horizon 2020 research and innovation program as the project "INTCATCH" under grant agreement No 689341