



Frontiers International Conference
on Wastewater Treatment



PROCEEDINGS
Frontiers International Conference on
Wastewater Treatment (FICWTM)

May 21–24, 2017
Palermo, Italy



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Foreword

Today multidisciplinary is a key and a must for solving issues in the water field. The works in several International Water Association Specialist Groups have demonstrated the importance of both innovative technologies and mathematical modelling, and that the exchange of scientific and technical information among researchers and practitioners involved in these fields is crucial for effectively advancing knowledge.

Mathematical modelling has the advantage of allowing scenario analysis before designing the real plant in order to ensure an optimised system.

To foster the multidisciplinary collaboration among different water specialists the dialogue is a must in order to better share specific knowledge.

With this final aim with the support of the International Water Association (IWA) and the University of Palermo (Palermo, ITALY) it has been organized the FICWTM 2017, Frontiers International Conference on Wastewater Treatment from 21 to 24 of May 2017.

The FICWTM final aim is to create a forum for promoting the discussion amongst scientists, professionals and academia in different areas of the broader theme of environmental engineering and sciences. To facilitate discussion no parallel sessions were organized and the number of participants was limited to highly motivated professionals.

The conference is organized in nine sessions and for each of them a keynote by a referral researcher was presented. Specifically, the keynotes were held by the following professors, whose contributions are highly inspiring: Damien Batstone, Bruce Jefferson, George A. Ekama, Ulf Jeppsson, Piet Lens, Ingmar Nopens, Hallvard Ødegaard, Gustaf Olsson and Mark C.M van Loosdrecht.

The wealth of information exchanged during FICWTM are of great benefit to all involved in challenging environmental issues caused by the increase of pollutants loads discharged into natural environment ecosystems. Those challenges require the building of a regulatory framework as well as control strategies. This framework needs to be based on scientific evidence associated with exposure and health risk for pollution prevention and remediation strategies. The application of innovative remedial techniques and new scientific methods is key in order to reach sustainable development. It is therefore crucial to address the existing pollution problems, and protect public health as well as preserve the welfare of the environment.

The application of cost-effective technologies for waste treatment and controls is much needed in order to make possible the implement of appropriate regulatory measures that insure success of broader policy in pollution prevention.

Engineers and scientists working in water sector area need to be familiar with a wide range of issues including the physical processes of mixing and dispersion, biological developments and mathematical modelling. Hence, a continuous exchange of information between water professionals in different parts of the world is essential.

Protection of the environment, one of the pillars of sustainable development, is an absolute priority for the international community. In this context, the FICWTM conference is aimed to focus on relevant experiences, up-to-date scientific research and findings carried out all over the world to protect and preserve the environment.

Foreword

FICWTM 2017 is also a part of the three years research project PRIN-GHG which was about the reduction of greenhouse gas from wastewater treatment plants. The financial support by the Italian Ministry of Education, University and Research is acknowledged. The research project has also an educational goal which aim was to train, throughout seminars and advanced courses, young researchers involved in the project.

In particular, three editions of the Advanced course on wastewater treatment and mathematical modelling were organized at Palermo University, Palermo (ITALY) and four international seminars on the binomial between water and energy.

During the project, both experimental and mathematical activities were carried out on pilot plant and real wastewater treatment plants with the final aim to wide and strengthen the knowledge on energy optimization and emission reduction from wastewater treatment plants. Both the conference proceedings and the Springer book contain also several contributions of the project researches.

A total of 218 extended abstracts have been submitted. Each of these was assessed by at least three members of the scientific committee. Overall, 166 extended abstracts have been selected for presentation at the conference, of which 27, 90 and 44 as platform, flash and poster presentation, respectively.

This also involved a detailed review with suggestions for the improvement of the abstracts that may be considered for post-event publication in selected journals. This strict selection was guided by the desire to maintain an high quality of the presented papers. The review process involved nearly 60 individuals who shared their expertise and time, thus providing an invaluable contribution to the scientific and technical excellence papers.

High quality extended abstracts have been selected for the book: *Frontiers in wastewater treatment and modelling* – published by Springer. The book is published and available also on-line as e-book and will contribute to spur novel research directions and foster multidisciplinary collaboration among different water specialists.

The conference would have never been organized without the support and great input of professors and friends: George A. Ekama (University of Cape Town, South Africa), Hallvard Ødegaard (Norwegian Institute of Technology, Norway), Gustaf Olsson (Lund University, Sweden) and Peter Vanrolleghem (Laval University, Canada).

Finally, my sincere gratitude goes to the members of the local organizing committee for their assistance in shaping and organizing the conference.

I do hope that all participants will find the conference a source of inspiration for both research and professional life.

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Session A

Carbon nutrient removal and recovery