

## AQUASENSE SUMMMER SCHOOL 2019

on

# Sensor Technologies for Water Monitoring

25<sup>th</sup> - 27<sup>th</sup> September 2019

Fondazione Bruno Kessler, Trento, Italy

## Final Program and Book of Abstract

## Innovative Network for Training in wATER and Food QUality monitoring using Autonomous SENSors and IntelligEnt Data Gathering and Analysis

### Summer School Program

Fondazione Bruno Kessler Via Sommarive, 18—Trento, Italy

27 September 2019

#### SESSION III

#### Systems and Applications

(Chairs. V. Mulloni)

8.45 - 9.00 Introduction to the program of the day

9.00 – 10.00

**Nico Salmaso** - IASMA Research and Innovation Centre, Fondazione Mach - Istituto Agrario di S. Michele all'Adige. Via E. Mach, 1 - I-38010, S. Michele all'Adige (Trento), Italy

#### Rationale and application of high throughput sequencing approaches in the study of biodiversity and water quality assessment

The lecture is aimed to provide the rationale and examples of applications of high throughput sequencing (HTS) technologies in aquatic ecology, with a focus on the analysis of environmental DNA (eDNA) in biological and environmental samples (aquatic environments and biological hosts). These topics are relevant not only for the advancement of freshwater ecology, but also for the monitoring and management of water resources and the associated biological communities. HTS approaches in ecology have a wide range of applications, for example in the quantitative assessment and biodiversity in a variety of ecosystems and habitats; in the evaluation of the impact of climate change, anthropogenic stressors and pollutants on biodiversity and ecosystem functionality; in the early identification of alien species and monitoring of toxigenic cyanobacteria. Specific topics of the lecture include: i) the state of the art of modern HTS technologies and their role in the advancement of aquatic ecology; ii) the field of application of HTS approaches, with practical applied ecological case studies from aquatic microbiota and "algal culture" ecosystems; iii) identification of pros and cons of different methods and their possible combinations; iv) the inclusion of HTS in research projects and in different ecological / environmental "problem solving" issues, complementing or challenging traditional monitoring approaches. In this regard, the lecture will provide a broad overview of the project Eco-AlpsWater (Interreg Alpine Space). The project is based on a wide EU collaboration among 6 participating countries. One of the main objectives of the project is to develop and apply state of the art methods for the monitoring of cyanobacteria and bacteria, microalgae and fish based on the use of HTS techniques, complementing traditional approaches and anticipating the route in the development of next generation water monitoring systems.



Senior Researcher and head of the "Hydrobiology" Research Group at the Edmund Mach Foundation (FEM) - Agricultural Institute of S. Michele all'Adige (Trento, Italy). Nico Salmaso coordinated numerous scientific investigations in freshwater ecosystems in the Alpine and subalpine region. He is currently coordinator of the project Eco-AlpsWater (2018-2021; 6 member states), funded by the Interreg Alpine Space program. The project is focused on the application of high throughput sequencing techniques in the study of aquatic biodiversity and assessment of water quality. Further research interests include the study of anthropogenic and climate change impact on planktic communities and toxigenic cyanobacteria. The results of the scientific activities have been published in several international journals and book chapters. Co-Editor in Chief for *Advances in Oceanography and Limnology*; associated Editor for *Cryptogamie Algologie*; review Editor for *Frontiers Microbiology*; member of the Editorial Board of the *Journal of Limnology*; guest editor in *Special Issues of Hydrobiology (2012 and 2018)* and *Journal of Great Lakes Research (in progress)*. He has worked as a referee for over 50 international journals and for the evaluation of national and international research projects. Member of the Board (2004-2015) and vice-president (2016-2019) of AIOL, Italian Association of Oceanology and Limnology. Organizer of the "1st Meeting of the Italian PhD students in Ecological and Environmental Sciences" (Padua, 2003). Chair in the organization of international congresses (*International Association of Phytoplankton Taxonomy and Ecology, S. Michele all'Adige, 2012*) and several special sessions. Since 2006, responsible of the limnological research station LTER (Long Term Ecological Research) Lake Garda. Since 2013, contact person of the macrophyte "IT08-000-A" "Laghi Sudalpini" (Garda, Maggiore, Como, Iseo, Orta, Candia). He was a member of the group of experts coordinated by the Ministry of Health for the definition of the "Guidelines on cyanobacteria in bathing waters", and Italian member of the Management Committee of COST action CYANOCOST (2012-2016).