

## AZTI - SOPHIE project SUMMER SCHOOL 2019

5<sup>th</sup> to 7<sup>th</sup> June 2019. Aquarium of San Sebastian (Spain)

*Does Human Health and Wellbeing  
depend on a Healthy Ocean?*

### Introduction to the course

AZTI organizes annually (since 2004) an international 'Summer School' on marine research related cutting-edge topics, always trying to bridge the gap between research and policy. The course is taught by about 5-12 professors and attended by around 60-90 students from 15-20 countries. Some years we have organized the school back to back with European projects, such as DEVOTES, MARS, as well as other organizations (e.g. Euromarine, European Environment Agency...). This year the school is organized by AZTI, with the support of the [European H2020 Seas, Oceans and Public Health in Europe \(SOPHIE\) Project](#), the [Oceans & Human Health Chair](#), [GlobalHAB](#), the [European Environment Agency](#) and [BlueHealth](#).

For 2019, coinciding with the 16<sup>th</sup> anniversary of the courses, the topic proposed is "**Does Human Health and Wellbeing depend a Healthy Ocean?**". This course will build on, and go beyond, the 2018 course focused on Blue Growth and the European Marine Board 2018 Position Paper on "Linking Oceans and Human Health: A Strategic Research Priority for Europe." We will examine the exposures and pathways through which humans interact with the seas and global ocean, leading to both risks and benefits to human health and wellbeing as well as for the "health" of the marine environment.

The attendees will acquire knowledge in the new meta-discipline of Oceans and Human Health research growing on both sides of the Atlantic, in particular focusing on the current and future impacts for the seas and coasts of Europe. This summer school will benefit from the inter/transdisciplinary integration of different sciences (e.g. marine biology, toxicology, microbiology, public health, psychology, medicine) necessary to understand the complex interactions between the "health" of the oceans and human health and wellbeing. This course will explore this through different topics, particularly emphasizing communication, engagement and co-creation with diverse stakeholder communities (including Small and Medium Enterprises (SMEs)). There will also be an opportunity to contribute as Stakeholders to the development of the future H2020 SOPHIE Strategic Research Agenda on Oceans and Human Health for Europe. The main objective of the school is to give an overview on the challenges, tensions and opportunities presented by the growing understanding that humans can both benefit from, and be impacted by, the coasts, seas and global oceans, and vice versa.

As an outcome of this course (in addition to the presentations, which will be freely available after the school), the professors participating in the course will prepare an open access position

paper on this topic, to be submitted to a broad scope scientific journal (e.g. PlosOne, Frontiers in Marine Science, etc.). This will be a cross-cutting review. This position paper will have an impact on another key audience, i.e. research funders, marine policy makers, and managers. In addition to such impact, it is expected that students participating in this summer school will implement the knowledge gained through this summer school in their professional careers.

## Contents of the course

June 5<sup>th</sup>

### Oceans and Human Health: THE RISKS

**9:00 - 9:15**     ***Introduction to the course.***

Angel Borja, AZTI

Brief overview of the courses organized until now and the objectives behind them, with an introduction to the course in 2019.

**9:15 - 10:15**     ***Overview of Oceans and Human Health.***

Mat White, University of Exeter/SOPHIE, UK/USA

The study of the global Ocean and human health is an emerging area of increasing global importance. A growing body of evidence indicates that the “health” of the Ocean and humans are inextricably linked; and how we interact with and impact on our seas and ocean will significantly influence our future on Earth. The global ocean has provided livelihoods, expansion, trade, food, and other resources. However, environmental change, rapidly increasing global population and continuing alterations of the coastal environment are placing increasing pressure on coastal seas and Ocean. Negative human impacts (e.g. pollution, habitat destruction and overfishing) affect not only ecosystem health, but also human health. Conversely, human health and wellbeing may be promoted through sustainable interactions with the coasts and oceans, including the restoration and preservation of coastal and marine ecosystems. The study of the ocean and human health is inherently interdisciplinary, bringing together the medical, natural and social sciences, as well as diverse stakeholder communities. Reviewing the history, policies, and known and potential risks and benefits of these interactions, provides insights into new avenues of global cooperation with the potential for collaboratively addressing the local and global challenges of our interactions with the Ocean, both now and in the future.

**10:15 - 11:00**     ***Harmful Algal Blooms are a paradigm of the interconnection between human health and oceans and seas.***

Elisa Berdalet, Institute of Marine Sciences, Spain.

“Harmful Algal Blooms” (HABs) are proliferations of certain aquatic algae (including cyanobacteria, micro- and macroalgae) that have different negative impacts on humans and/or ecosystems. Excessive algal biomass accumulation can cause harm due to oxygen limitation in the water, when the blooms decay. Massive fish kills (in aquaculture or natural fisheries) can be produced by the proliferation of microalgae that synthesize ichthyotoxins or physically damage gills. Other microalgae synthesize toxic compounds that cause harm to humans by direct contact, inhalation or consumption of contaminated seafood. Human health impacts can only be prevented through intensive monitoring of the harmful organisms and their toxins, and by the detailed understanding of the blooms dynamics, which can in some cases help to predict their occurrence. While HABs are essentially natural phenomena, these events may be incentivised by some human activities especially in the coastal zone (eutrophication, alteration of the water circulation patterns by harbors, habitats destruction, overfishing, ...). Superimposed, climate change may also influence HABs occurrence, intensity and impacts, although future trends are still uncertain. This lecture will highlight representative HAB challenges and explore strategies involving stakeholders, general public and researchers to alleviate the negative impacts of HABs, and if possible, to reduce their occurrence.

**11:00 - 11:30 Coffee-Break**

**11:30 - 12:30 Microbial Pollution, Pharmaceuticals, Antimicrobial Resistance.**

Anne Leonard University of Exeter, UK

Faecal pollution regularly contaminates surface waters, introducing pharmaceutical chemicals, and microorganisms, including bacteria resistant to antibiotics, to coastal waters. People can come into contact with these potentially harmful microbes when they enjoy recreational activities in the sea. Understanding the risk to bathers of acquiring infections from the sea is important for developing effective intervention strategies to protect human health. Three studies will be presented: first, a systematic review and meta-analysis on the risk of experiencing symptoms of illness associated with recreational use of coastal waters. Second, the development of methods to quantify the risk of ingesting antibiotic resistant bacteria among various UK coastal water users. Finally, we present the results of the first study to combine surveillance of antimicrobial resistant bacteria in coastal bathing waters in England and Wales, estimates of human exposure in this environment, and association between seawater exposure and faecal colonisation by antimicrobial resistant bacteria in water users.

**12:30 - 13:30 Marine Plastic Pollution: Changing behavior, engaging communities.**

Sabine Pahl, Plymouth University/SOPHIE, UK

The accumulation of plastic litter in the marine environment is entirely the consequence of human decisions, behaviours and existing socio-technical systems of consumption (Pahl et al., 2017), and a range of potential impacts of plastic pollution on human health and well-being have been discussed. In this session we will discuss the need to understand this human dimension in order to make changes that can reduce marine litter at macro- and micro-levels (Pahl & Wyles, 2016). Applying insights and research methods from the Social and Behavioural Sciences, alongside the natural and technical sciences, will help us identify effective solutions to the issue. Drawing on a range of studies on microplastics, marine litter and sustainable behaviour, I will a) present data on societal perceptions of microplastics and marine litter, b) show how social and psychological factors are connected to concern and behavioural intentions (e.g., the role of perceived risk, values, social norms), c) discuss the effects educational and creative interventions can have. We will discuss how communications and interventions can be based on scientific insights into human thought and behaviour and how they can be evaluated systematically. Finally we will discuss the limitations and challenges that are unique to research with people.

June 6<sup>th</sup>

Oceans and Human Health: BENEFITS AND OPPORTUNITIES

**9:00 - 11:00 INTERACTIVE WORKSHOP**

***Governance of Oceans and Health Interactions:  
Where and how does it fit into policy agendas?***

Susanne Wuijts, National Institute of Public Health and the Environment (RIVM), The Netherlands

In European water policy making, a paradigm shift from government to governance can be identified since the introduction of the European Water Framework Directive. Governance approaches, with the involvement of stakeholders and authorities at multiple levels, are often considered to be more effective in dealing with complex water issues, compared to conventional legal frameworks with top-down central steering mechanisms. In essence, such an approach favours the inclusion of added benefits, such as the benefits of rivers, lakes and coastal water to human health and wellbeing. So far however, Member States face difficulties in achieving water quality objectives as they are. Bringing in the added value to human health could add to existing complexities or bring in new momentum by these co-benefits. During the lecture, the principles of water governance will be introduced, as well as an overview of European policies related to water (marine and fresh water) and health and current challenges. Based on this information, the participants will be asked to reflect upon the challenges and opportunities introduced by bringing human health benefits to the water policy table in an interactive session.

**11:00 - 11:30 Coffee-Break**

**11:30 - 12:15 *The European Bathing Water Directive.***

Peter Kristensen, EEA

**12:15 - 13:00 *Beyond the Blue Gym: Human Health and Wellbeing.***

Lora Fleming, University of Exeter/SOPHIE, UK

Although there is a long history of research into the risks to health and wellbeing from our seas and oceans, this systematic study of potential benefits is much more recent and a growth area of research globally. In his talk on Day 1 Mat White gave a brief overview of some of these risks and benefit, and in this talk I will unpack the benefits side of the scales in more detail. Drawing on evidence from around the world the talk will review findings linking living near to the coast to reduced mortality rates, reduced rates of common mental health issues, and increased rates of physical activity. It will also consider recreational use of our seas and coasts (e.g. watersports, fishing, wildlife watching etc.), and review data on how many people perform these activities (and how often), and the associated implications for health and wellbeing for both adults and children in terms of disease prevalence and economic savings. Some of the mechanisms explaining these associations will be explored including reductions in the urban heat island effect for coastal cities and greater uptake of UV radiation which is important for Vitamin D synthesis.

**15:30-17:30 PRESENTATION OF POSTERS from attendees and GENERAL DISCUSSION.**

June 7<sup>th</sup>

**Oceans and Human Health: THE FUTURE**

**9:00 - 10:00 *Future outlooks on Oceans and Health for Europe's marine waters.***

Susanne Wuijts, National Institute of Public Health and the Environment (RIVM), The Netherlands.

The majority of Europe's population lives in urban areas characterised by inland waterways and coastal margins. Future trends, like climate change, migration, an ageing population, pollution and technology, will have a great impact on societies in Europe. So far, the impacts of these trends have been studied at a continental or national level and policy development is often based on these high level studies. The implications of global trends on a local level, are barely understood so far. However, local authorities need to take action now to anticipate the impacts of future trends to keep their citizens healthy and safe. For the H2020 projects BlueHealth (<https://bluehealth2020.eu/>) and SOPHIE (<https://sophie2020.eu/>) a participatory approach has been developed and tested to identify challenges at a local level arising from global trends. During an interactive workshop, the participants will discuss on the relevancy of different trends for different European sea basins, their perspectives on how to deal with these trends and potential research gaps. The outcomes of the workshop will serve as input for the research agenda to be delivered by H2020 SOPHIE project, but may also support questions regarding transferability of cases from one location to another and input for policy plans.

**10:00 - 11:00 *The Oceans and Human Health Chair in Roses (Catalonia, Spain): a collaborative model between stakeholders, marine ecosystem managers, town council and university to foster research and transfer of knowledge in OHH.***

Josep Lloret, University of Girona, Chair Oceans & Human Health, Spain

The Oceans and Human Health Chair was created in 2017 by the University of Girona (UdG) and the City of Roses, both of which continue to provide support along with sponsorship from the Fishermen's Association of Roses and the Fishmongers Guild of Catalonia. The Chair promotes and carries out studies on the complex relationships that exist between marine ecosystems and human health, and contributes to the transfer of this knowledge to society. The Chair will not only contribute to a better understanding of the relationships between marine ecosystems and human health, but will also help disseminate something which is not widely known, namely, that marine ecosystems and their fishing resources must be protected in order to preserve the health and the well-being of people. The Oceans and Human Health Chair enjoys the collaboration of more than 50 experts, including marine biologists, physicians, veterinarians, environmental educators, social anthropologists, environmental and public health managers, and members of patient and environmental associations. The Oceans and Human Health Chair is based in Roses, a quintessential Mediterranean city with a notable fishing, tourist and seafaring tradition that is part of the Natural Park of Cap de Creus, one of the most emblematic marine reserves on the Catalan coast that constitutes an excellent testing ground for studying how a marine reserve (or the protection of marine ecosystems) can contribute to human health.

**11:00 - 11:30 *Coffee-Break***

**11:30 - 12:30 *Weaving alliances between blue tourism and Oceans and Human Health research, through citizen science.***

Julia Vera Prieto & Mariluz Parga, Submon/Travelecoology SME/SOPHIE, Spain

Citizen science is emerging as a very useful ally of both research and education efforts directed at better understanding our natural environment and managing our relationship with it. Within this broad framework, the emerging discipline of Ocean and Human Health (OHH) – which looks into the connections between the health of marine ecosystems and our own – not only can benefit tremendously from the engagement of civil society in data collection efforts that support research and decision-making processes, but actually needs that engagement to facilitate the implementation of measures geared at minimizing the risks and maximizing the benefits of people’s interaction with the Ocean. Marine ecotourism operators have been identified as key stakeholders that can potentially play a role both as contributors to research data collection efforts and as awareness generators amongst the general public on the connections between Ocean & Human Health. This presentation will explore the concept of citizen science and provide insight into how the “Seas, Oceans and Public Health in Europe (SOPHIE)” Project is seeking to work with key stakeholders of the Blue Tourism industry to win them as allies of the OHH discipline, through engagement in citizen science initiatives.

**12:30 - 13:30 *Future Priorities in Oceans and Human Health Research.***

All participants

**13:30 - 14:00 *Closure.***