

## MAINSTREAMING MOLECULAR APPROACHES IN NATIONAL ENVIRONMENTAL MONITORING PROGRAMS OF AQUATIC ECOSYSTEMS AND BIODIVERSITY: OPPORTUNITIES AND CHALLENGES IN PORTUGAL

Under the scope of the ERA Chair EnvMetaGen (<https://inbio-envmetagen.pt/>), funded by the European Commission (H2020), CIBIO-InBio (Research Centre in Biodiversity and Genetic Resources - Associate Laboratory; <https://cibio.up.pt/>) is organizing, together with the EDP Biodiversity Chair and the Cost Action DNAqua-net (<http://dnqua.net/>), a workshop to be held at its headquarters in Vairão, on new methods of molecular monitoring of aquatic ecosystems.

### Program of Day 1 – December 18th, 2018 - Open to the general public

<b>8h15</b> - Reception of participants at CIBIO-InBio – Vairão
<b>9h00</b> - Opening session
<ul style="list-style-type: none"> <li>Welcome and presentation of CIBIO/InBio - <i>Pedro Beja, Vice-Director CIBIO, EDP Biodiversity Chair</i></li> <li>Presentation of the ERA Chair in Environmental Metagenomics - <i>Nuno Fonseca, ERA Chair holder, CIBIO</i></li> <li>Presentation of the Cost Action DNAqua-net - <i>Florian Leese, Chair DNAqua-Net, University of Duisburg-Essen</i></li> </ul>
<b>9h40</b> - Session 1 – European and Portuguese framework of ecological quality assessment of aquatic ecosystems
<ul style="list-style-type: none"> <li>Monitoring of aquatic ecosystems in Portugal under the Water Framework Directive: Rivers and reservoirs - <i>Verónica Pinto, Agência Portuguesa do Ambiente</i></li> <li>Monitoring of aquatic ecosystems in Portugal under the Water Framework Directive: Transitional and coastal waters - <i>Susana Nunes, Agência Portuguesa do Ambiente</i></li> <li>Practical challenges of biomonitoring under the WFD: the case of hydroelectric reservoirs in Portugal - <i>João Pádua, Labelec</i></li> </ul>
<b>11h00</b> - Coffee Break
<b>11h30</b> - Session 2 – Next generation biomonitoring in Portugal
<ul style="list-style-type: none"> <li>Monitoring of cyanobacteria - <i>Elisabete Valério, I.N.S. Ricardo Jorge</i></li> <li>Implementation of DNA metabarcoding-based approaches for micro and macrobenthic invertebrate monitoring in Portuguese marine and transitional waters: status and prospects - <i>Filipe Costa, Universidade do Minho</i></li> <li>Early steps in the molecular biomonitoring of freshwaters in Portugal - <i>Ana Filipa Filipe, CIBIO-InBio</i></li> </ul>
<b>12h45</b> - Lunch
<b>14h00</b> - Session 3 – Molecular biomonitoring of freshwater and marine water – case-studies, recent developments and best practices (Part 1)
<ul style="list-style-type: none"> <li>Biotic Indices – How to change from conventional to molecular approaches? - <i>Jan Pawłowski, Dep. Genetics &amp; Evolution, University of Geneve</i></li> <li>DNA tools to monitor freshwater ecosystems, the case of diatoms - <i>Agnes Bouchez, INRA</i></li> <li>Molecular approaches to Macroinvertebrate monitoring - <i>Rosetta Blackman, Eawag</i></li> <li>Undertaking molecular biomonitoring and assessment of marine macroinvertebrates in the Basque Country (Spain) - <i>Angel Borja, AZTI</i></li> <li>Molecular biomonitoring of freshwater fish - <i>Bernd Haenfling, University of Hull</i></li> </ul>
<b>16h00</b> - Coffee break
<b>16h30</b> - Session 4 – Molecular biomonitoring of freshwater and marine water – case-studies, recent developments and best practices (Part 2)
<ul style="list-style-type: none"> <li>Feeding the atlas of everything: Environmental DNA sample and data archiving for the future - <i>Taylor Wilcox, National Genomics Center for Wildlife and Fish Conservation</i></li> <li>Implementation options for DNA-based identification into ecological status assessment under the European Water Framework Directive - <i>Pieter Boets, University of Ghent / East-Flanders Regional Government</i></li> <li>SCANDNA.net a validation milestone on the road towards routine use of genetic methods in monitoring of Nordic freshwaters - <i>Kristian Meissner, Finnish Environment Institute</i></li> <li>The application of molecular techniques for environmental monitoring in the UK - <i>J. Iwan Jones, Queen Mary University of London</i></li> </ul>
General Discussion with all speakers: what is still limiting the wide application of molecular methods in aquatic biomonitoring?
<b>18h45</b> - Closing of Day 1

**Objective:** The advent of powerful high throughput DNA sequencing has the potential to revolutionize the monitoring of ecosystems and biodiversity, but the uptake of molecular techniques in official monitoring programs at the national and regional scales has remained slow. To address these issues, the objective of this workshop is to disseminate among stakeholders in Portugal the power of new molecular techniques for assessing biodiversity and ecological quality in freshwater, transitional and marine waters. The main targets are national and regional authorities involved in aquatic monitoring, but also large business corporations, SMEs, NGOs and other stakeholders interested in these issues. We want to provide information of state of the art molecular approaches and how they are starting to be used across Europe to address biomonitoring challenges, particularly those related to the Water Framework Directive. In the end, we want to discuss what steps would be needed to apply these new methods in Portugal, namely considering how to address policy and regulatory issues, overcome technical problems, and design and implement pilot studies. Ideally, the meeting should set the basis for identifying bottlenecks in the application of these methodologies and to designing key pilot projects, which in a few years may scale up to full environmental monitoring programs.

### Program of Day 2 – Dec. 19th, 2018 Under invitation only

<b>9h00</b> - Reception of participants	
<b>9h30</b> - Round-Table Discussions	
What would be needed to implement biomonitoring 2.0 in Portugal?	Room 1 – Policy and regulatory challenges Room 2 – Overcoming technical challenges Room 3 – Designing pilot studies
<b>11h00</b> - Coffee break	
<b>11h30</b> - Round-Table Discussions	
What would be needed to implement biomonitoring 2.0 in Portugal?	Room 1 – Policy and regulatory challenges Room 2 – Overcoming technical challenges Room 3 – Designing pilot studies
<b>13:00</b> - Lunch followed by visit to CIBIO-InBio Labs	
<b>14h30</b> - Final conclusions	
Presentation of conclusions of the 3 working groups. General discussion and the way forward.	
<b>16h00</b> - Closing of Day 2	