

# Biomarkers - an user friendly approach

## Advanced course on biomarkers



**4 – 8 June 2018**

### **Aims**

This one-week course held at DBio & CESAM (University of Aveiro, Aveiro, Portugal) aims to provide knowledge about using biomarkers and their advantages (and disadvantages) to assess the ecologically relevant impact of stressors in the environment. Moreover, the ecological relevance and ranges of applicability of biochemical tools will be shown for particular classes of pollutants by linking their biochemical effects with alterations at higher levels of biological organization. Furthermore, the practical use of a biomarker approach in distinct taxa will be demonstrated, showing the usefulness of this set of tools independently from the analyzed ecosystem. This new approach has been successfully used by staff members of this course in soil ecotoxicology, freshwater ecotoxicology, marine ecotoxicology, wildlife ecotoxicology, biomonitoring, characterization of drug toxicity and nanotoxicology. The course is composed by theoretical lectures, by the presentation and discussion of several of our own case studies, and by a strong complimentary practical component, during which test procedures will be demonstrated and students will have the opportunity to handle real techniques and procedures. The course is targeted to scientists, PhD and MSc students (with a background in Biology, Environmental Sciences and Engineering, Chemistry, or related fields) and other professionals involved in decision-making and environmental management. All lectures and training sessions will be held in English.

This course was recently enlisted as one of the available options to obtain the Certification of Environmental Risk Assessors (CRA) issued by the Society of Environmental Toxicology and Chemistry (SETAC), Europe (more details available at <https://certification.setac.org/>).

### **Coordinators**

Dr. Bruno Nunes, DBio & CESAM, University of Aveiro, Portugal  
Dr. Miguel Oliveira, DBio & CESAM, University of Aveiro, Portugal

### **Teaching staff**

Dr. Bruno Nunes, DBio & CESAM, University of Aveiro  
Dr. Miguel Oliveira, DBio & CESAM, University of Aveiro  
Dr. Carla Quintaneiro, DBio & CESAM, University of Aveiro

Dr. Inês Domingues, DBio & CESAM, University of Aveiro  
Prof. Dr. Alberto Teodorico Correia, CIIMAR, University Fernando Pessoa  
Dr. Miguel Santos, CIIMAR & Faculty of Sciences, University of Porto  
Dr. Carlos Barata, IDAEA, CSIC, Department of Environmental Chemistry, Barcelona

### **Program**

This intensive course will consist of a combination of lectures, case-studies and practical sessions with the determination of four biomarkers and data analysis, and discussion of case-studies. All lectures and sessions will be held in English.

### *Main topics*

1. Biotransformation: oxidation and conjugation
2. Antioxidants and oxidative stress and damage
3. Cellular energy production and allocation
4. Neurotoxicity and consequences
5. Genotoxicity and DNA damage
6. Linking different levels of biological organization
7. Use of Biomarkers in Risk Assessment: case studies
8. Chronobiology and Ecotoxicology
9. Endocrine disruption
10. Alternative tests in Environmental Toxicology

### *Day by day*

#### **Monday, June 4th**

9h00 – 10h00 – Welcome to participants  
10h00 – 11h00 – Lecture: Introduction to Biomarkers – advantages and handicaps/criticisms  
11h00 – 11h30 – Coffee Break  
11h30 – 13h00 – Lecture: Traditional biochemical biomarkers  
13h00 – 14h00 – Lunch  
14h00 – 18h00 – Training session: tissues sampling and isolation of cell fractions

#### **Tuesday, June 5th**

9h30 – 11h00 – Lecture: alternative methods in Ecotoxicology: ZebraBox and behavior  
11h00 – 11h30 – Coffee Break  
11h30 – 13h00 – Cell lines and primary cultures in Ecotoxicology  
13h00 – 14h00 – Lunch  
14h00 – 18h00 – Training session: Cholinesterases and Glutathione S-transferases activities

#### **Wednesday, June 6th**

9h30 – 11h00 – Risk Assessment and Biomarkers  
11h00 – 11h30 – Coffee Break  
11h30 – 13h00 – Case-study: The use of biomarkers in mechanistic ecotoxicology and monitoring: case studies  
13h00 – 14h00 – Lunch  
14h00 – 18h00 – Training session: Protein quantification and Catalase activity

#### **Thursday, June 7th**

9h30 – 11h00 – Lecture: Endocrine disruption  
11h00 – 11h30 – Coffee Break  
11h30 – 13h00 – Case-study  
13h00 – 14h00 – Lunch  
14h00 – 18h00 – Training session: Lipids and sugars

**Friday, June 8th**

9h00 – 11h00 – Lecture: Chronobiology and Ecotoxicology

11h00 – 11h30 – Coffee Break

11h30 – 13h00 – Case-study: Fish otoliths in Ecotoxicology

13h00 – 14h00 – Lunch

14h00 – 16h00 – Evaluation period for attendees pursuing diploma

**Registration, fees and other information**

Registration fee: € 500 (includes attendance to all lectures and training sessions, and course documentation)

Reduced fee: € 400 (reduced fee for members of the Society of Environmental Contamination and Toxicology - SETAC)

Student fee: € 300 (reduced fee for students from other universities)

Number of external participants: **16 maximum**

Certificates: Certificate of attendance for all the participants; certificate of approval, including the final classification obtained in a written exam at the end of the course, **only** for participants requesting it in the registration form.

**Application**: Candidates should fill in the *registration form* and send it to Bruno Nunes and Marcelino Miguel Oliveira by email ([nunes.b@ua.pt](mailto:nunes.b@ua.pt) or [migueloliveira@ua.pt](mailto:migueloliveira@ua.pt)) before 31 May 2016.

**Registration**: After notification of by e-mail of acceptance in the course, candidates will have 5 days to process fee payment by Bank Transfer (details of Bank Account will be provided in the acceptance e-mail); if the transfer is not processed during this period the acceptance will be cancelled.

**Additional information**

Bruno Nunes and Miguel Oliveira

Department of Biology & CESAM

Campus de Santiago

3810-193 Aveiro

Portugal

Email: [nunes.b@ua.pt](mailto:nunes.b@ua.pt) or [migueloliveira@ua.pt](mailto:migueloliveira@ua.pt)

**Biomarkers in Ecotoxicology 2018 – Join us!**

# Biomarkers - an user friendly approach

## Advanced Course on Biomarkers 2018

Department of Biology & CESAM, University of Aveiro, 3810-193 Aveiro, Portugal

### REGISTRATION FORM

Name \_\_\_\_\_

Title \_\_\_\_\_

Institution / Company \_\_\_\_\_

Postal address \_\_\_\_\_

Postal code \_\_\_\_\_ Town \_\_\_\_\_ Country \_\_\_\_\_

Telephone \_\_\_\_\_ Fax \_\_\_\_\_ Email \_\_\_\_\_

Normal fee (500 €) \_\_\_\_\_ Reduced fee (400 €) \_\_\_\_\_

Student fee (300 €) \_\_\_\_\_

#### Invoice to

Name \_\_\_\_\_

Postal address \_\_\_\_\_

Postal code \_\_\_\_\_ Town \_\_\_\_\_ Country \_\_\_\_\_

NIF / VAT number \_\_\_\_\_

To be sent to B. Nunes ([nunes.b@ua.pt](mailto:nunes.b@ua.pt)) or M. Oliveira ([migueloliveira@ua.pt](mailto:migueloliveira@ua.pt)) no later than **31 May 2017**.

