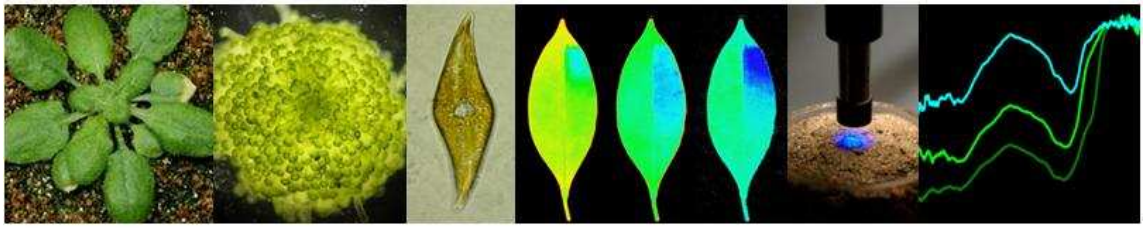
universidade de aveiro departamento de biologia

Universidade do Minho
Escola de Ciências

Bioplant
MAP JOINT DOCTORAL PROGRAMMES

FIRST ANNOUNCEMENT

Optical techniques for the *in vivo* study of photosynthesis



Advanced Workshop Studies in Biology and Applied Sciences
&
Workshop in Advanced Techniques of the BioPlant Doctoral Programme

Department of Biology, University of Aveiro
Aveiro, Portugal
4-8 July 2011

This post-graduate advanced workshop, organized in the framework of the BioPlant MAP joint doctoral programme, will provide fundamental and practical knowledge on Pulse Amplitude Modulation (PAM) fluorometry and Spectral Reflectance Analysis (SRA), two optical techniques that allow non-destructive and real-time assessment of photosynthetic activity *in vivo*. Originally developed to study land plants, both methodologies have been applied to a wide range of organisms, covering virtually all life forms carrying out photosynthetic activity. Due to their operational advantages, these techniques have been increasingly used in many fundamental and applied fields of plant biology.

The course will combine lectures, hands-on practical laboratorial work, and sessions on data processing and paper discussions. A range of biological models will be used in practical sessions, from higher plants (including *in vitro* cultures and *Arabidopsis* mutants) to macro- and microalgae, including photosynthetic symbioses like lichens and corals. Participants are encouraged to bring their own photosynthetic models.

State-of-the-art instruments will be available for participant use, including special imaging fluorometer models designed to study bidimensional objects (plant leafs, lichen thalli, macroalgae) or suspensions (microalgal, chloroplasts).

Contents

Pulse Amplitude Modulated Fluorometry
The emission of chlorophyll fluorescence *in vivo*. The light phase of photosynthesis. Light absorption, photosynthetic pigments, and pathways of energy dissipation.
Basic principles of the detection and quantification of chlorophyll fluorescence through PAM fluorometry. The saturation pulse technique. Basic fluorescence parameters, commonly-used indices and their physiological meaning.
Applications to the study of photosynthesis *in vivo*. Photoacclimation, photoprotection and photoinhibition. Estimation of photosynthetic rates and primary productivity budgets. Quantification of environmental stress effects. Non-invasive monitoring of the photosynthetic activity both in natural environments (e.g. agricultural plant crops, phytoplankton) and in controlled laboratory conditions (e.g. screening of plant varieties and mutants, growth of microalgae cultures).

Spectral Reflectance Analysis
Basic principles. Photosynthetic pigments and absorption spectra. Effects of sample pigment composition on the reflectance spectrum.
Theoretical and practical aspects of spectral reflectance measurement in the field and in the laboratory. Spectrum processing and calculation of reflectance indices. Main reflectance indices, their uses and limitations.
Applications. Non-destructive quantification of foliar pigment content. Early detection of leaf senescence and fruit maturation. Remote sensing of vegetation cover. Detection of environmental stresses.

Participants

The course is open to participants other than BioPlant students, but limited to a maximum total number of 20 participants. A minimum number of participants may be required.

Course Fee 200 €

Course Coordinators

João Serôdio
Department of Biology & CESAM – Center for Environmental and Marine Studies, University of Aveiro, Portugal

Ana Cunha
Department of Biology & CITAB – Center for Research and Technology of Agro-Environmental and Biological Sciences, University of Minho, Portugal

Travel to Aveiro

For those arriving at Porto Airport: Travel by underground between Porto airport and railway station of Porto-Campanhã takes 40 minutes. Travel between Porto-Campanhã and Aveiro takes 30-50 minutes, departures every 25 minutes, on average.

For those arriving at Lisbon airport: Aveiro can be reached also by train, departing from Gare do Oriente railway station. Connection between the Lisbon airport and the railway station are available by bus or taxi. On average, trains to Aveiro depart every 90 minutes, taking the around 2 hours.
Please visit www.cp.pt for detailed information on train connections.

Accommodation

As soon as we have more information on the prices and availability of rooms we will inform you. We can easily pre-book a number of rooms, in a hotel within walking distance from the University with a convenient price.

More informations

For more informations, please contact: Prof. João Serôdio, +351 234370787 jserodio@ua.pt

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Registration Form

E-mail to jserodio@ua.pt or fax to Prof. **João Serôdio**, +351 234372587 until June 20th.

Name _____

Institution _____

Address _____

Country _____

Accommodation
- ❑ I am interested in the pre-booked rooms
- ❑ I will book my own room