

2010  
Activities  
Report

March, 30th

**CITAB**

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Committee

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- ❖ SAC, Sustainable Agro-food Chains
- ❖ EI, EcoinTEGRITY
- ❖ BE, Biosystems Engineering

## Index

0. – Executive Summary .....	4
1. – Objectives and Achievements.....	5
1.1. – Unit Description .....	5
1.2. – General Objectives.....	6
1.2.1. – Scientific objectives .....	6
1.2.2. – Co-scientific objectives .....	7
1.3. – Main achievements during 2010.....	7
2. – Activities in 2010 .....	9
2.1. – Integrative/multidisciplinary activities.....	9
2.2. – Outreach activities .....	10
3. – Funding.....	12
4. – General indicators .....	12
4.1. – Composition and training.....	12
4.2. – Researchers hired.....	12
4.3. – Technical personnel hired .....	13
4.4. – Additional comments .....	13
4.5. – Summary of budget execution .....	13
5. – Research Groups.....	14
5.1. – Sustainable Agro-food Chains (SAC) .....	14
5.1.1. – Group description.....	14
5.1.2. – Funding .....	14
5.1.3. – Objectives.....	15
5.1.4. – Main achievements .....	16
5.1.5. – Group productivity.....	17
5.1.6. – Future research .....	39
5.2. – EcoinTEGRITY (EI) .....	42
5.2.1. – Group description.....	42
5.2.2. – Funding .....	42
5.2.3. – Objectives.....	42
5.2.4. – Main achievements .....	44
5.2.5. – Group productivity.....	45
5.2.6. – Future research .....	60

5.3. – Biosystems Engineering (BE) .....	67
5.3.1. – Group description.....	67
5.3.2. – Funding.....	67
5.3.3. – Objectives.....	67
5.3.4. – Main achievements .....	68
5.3.5. – Group productivity.....	70
5.3.6. – Future research .....	89
6. – Unit composition.....	91



## 0 – Executive Summary

2010 was a landmark year for CITAB. At the beginning of the year (January), the External Advising Committee (EAC) visited and evaluated CITAB, proffering suggestions and contributions towards the Unit's reorganization. The guidelines and plan drawn up by the EAC were highly welcomed. Realizing the need to move forward; improvement measures were implemented and achieved with the support of the coordinators of each scientific Group. Thus, the greater part of 2010 was dedicated to implementing the suggested plan, resulting in a modernized Centre and a novel scientific approach for each research Group. The Research Groups now focus on multidisciplinary projects with defined tasks developed to give the results that fulfill previously established specific objectives. The Centre's Directorate is very pleased to announce the success of this process and is very grateful to the EAC.

Another innovative step in the life of CITAB was the publication of the first edition of our English language Newsletter, which was distributed to more than 210 scientific organizations around the world. The first edition was well received by many recipients, providing positive feedback for the next issue, pursuing the strategy for internationalization, a clear objective in our Activity Plan (AP) and one of the priorities for 2010.

As clearly stated in the early days of CITAB, we expect members and collaborators to gradually obtain the minimum requirements to become integrated members. The number of integrated members has increased by approximately 10% following an upgrade of several of CITAB's collaborators.

The scientific activities of our members are given in the main scientific achievements section but also in the so called "metric results". They largely meet the numbers that were set in the Activity Plan for 2010.

CITAB made contributions to increase sustainability and provide innovative solutions, outlined in the main achievements section. We continue to face challenges for the future.

# 1 – Objectives and Achievements

## 1.1 – Unit description

Following debate during the visit by the External Advising Committee (EAC), CITAB's Scientific Council decided to reorganize the Unit in 3 interactive working groups (WG) namely, Sustainable Agro-Food Chains, EcoinTEGRITY and Biosystems Engineering. Although core activities focus on agri-food, forestry and the environment, engineering, particularly new technologies, is also integrated into the centre's activities with the aim of developing agri-food and forestry production chains in Portugal.

CITAB's activities rely on the contribution of integrated members and collaborators (with and without PhD), selected according to international benchmarking criteria. Since most of the CITAB members are primarily lecturers the Unit supports post-graduate courses offered by the host institution and others centres of learning.

CITAB is managed using a bottom-up approach. The Directorate (1 Director and 2 Vice-Directors) is supported by an Executive Committee (6 members- 2 from each Research Group) which forms a two way link between CITAB members and the Directorate concerning direction on policy laid down by the Directorate. The ExCo is also responsible for compiling information and collaborating in actions to promote the visibility of the Unit to the exterior. Both the Directorate and the ExCo meet approximately once a month. Research group members also hold regular meetings to evaluate group progress according to Plan of Activities for the current year. The Scientific Council meets a minimum of 4 times a year, according to regulations. Given the considerable size of the Unit, a secretary has been contracted who deals with all of the Centre's administrative activities researchers, UTAD's central services of UTAD and the FCT, providing support to the Directorate and the ExCo in all matters that require the attention of these bodies.

## 1.2 – General objectives

CITAB's general objectives follow those that are laid down at the beginning of the year/end of the previous year. Our aim is to raise the quality of the Unit to achieve classification of "Excellent" by the international evaluation carried out by the FCT. We aim to identify and promote activities that differentiate CITAB from other Units at national level, by applying international benchmarking criteria to all ongoing scientific and co-scientific activities and promoting a clearer, more transparent approach.

Planning of CITAB has centred objectives on improving quality growth by incorporating new members of high scientific quality, promoting internationalization of the Research Groups, developing innovative research, promoting contact with industry and improving the image and visibility of CITAB. These are collective driving objectives to which each of the Research Groups contribute actively to.

### 1.2.1 – Scientific objectives

Research topics concentrate on developing more sustainable production chains of agri-food and forestry systems, aiming to make producers more competitive. As a result, our research objectives concentrate on every step and constraint within the chain, such as improving knowledge, studying plant stress adaptation to climate change- in particular the effect of extreme events and how to overcome them by addressing water shortage, water quality and improving water management strategies (for instance in grape growing in the Port wine region). We also aim to develop studies on biodiversity linked to agro-forest management strategies, on protecting systems against biotic agents, on the control of fires and ecosystems recovery, and identifying and quantifying disturbance in terrestrial and aquatic ecosystems through the development of metrics.

The quality and health benefits of vines and other major crops has been studied within the framework of sustainable production and organic farming. Employing a novel approach, all three research lines benefit somehow from the closely allied contribution of technological engineering to better understand the environmental changes at different scales of the ecosystem and the individual (life organism) using signal and image processing, biosensing and remote sensing. A more specific contribution from the world of engineering has been the study and characterization of forestry resources used both in industry and as biofuel and the exploitation of biomaterials.

Continuing the themes of production chain sustainability and competitiveness we have focused on agri-food and forestry transformation units, envisaging added value of the co-products resulting from these industries.

We take special care to address the whole chain of interactions in agro-forested systems, from prediction techniques, ecological modeling of human impacts and climate change, to the monitoring of effects on biotic assemblages (floristic and faunistics) and abiotic factors and the implantation of effective mitigation measures, providing innovative tools for restoring disturbed ecosystems.

Sustainability and competitiveness of production chains focuses on agri-food and forestry transformation units, envisaging added value of co-products resulting from these industries.

### 1.2.2 – Co-scientific objectives

CITAB's key objectives include increasing the amount of funding and JCR scientific production. We foresee an increase in the number of scholarships and national and particularly international links (increasing the number of anchor institutions), to increase the mobility of researchers and build projects within the Seventh Framework Programme (FP7). We also aim to attract the private sector to our research activities.

## 1.3 – Main achievements during 2010

Main achievements of CITAB's research are pointed out, namely those of Sustainable Agro-food Chains Group:

- Further projections of future climatic conditions and regional, national and European viticultural zoning have been developed using an innovative perspective of the dynamic mechanism that underlies drought occurrence in Portugal;
- Identification of a chestnut clone and 2 hazelnut Portuguese varieties better adapted to climate change;
- Development of a fast and reliable hydrophilic interaction liquid chromatography method for determining of ascorbic and isoascorbic acids in nuts;
- Development of new climate change mitigation measures: a reflective kaolin-based particle film to prevent leaf sunburn damage on grapevines; cover cropping to improve the profitability and the sustainability of rainfed olive orchards; and the use of *Bacillus velezensis* to protect chestnut trees against ink disease.
- We have found that is possible to reduce NO emissions from animal slurries treated with nitrification inhibitors prior to soil application.

- Protective effect of *Sambucus nigra* L. berry extract against induced oxidative stress, in HepG2 cells in culture.
- Development of a new model for biochemical and biotechnological applications (nutrient transport, toxicological assessments, etc) following purification of intact, functional protoplast and vacuole populations from grape cells;
- We have successfully distinguished between diseased, healthy and asymptomatic leaves using NMR and principal component analysis in the study of *V. vinifera* cv. Alvarinho defence mechanisms against drought;
- Biofunctional textiles have been developed using resveratrol and other plant extracts;
- CITAB researchers have found that: Curcumin induced antioxidant defences in human fibroblasts; Ursolic acid and luteolin-7-glucoside improve lipid profiles and induce liver glycogen synthase kinase-3 in rats.

Within the 2 ongoing projects from the EcoinTEGRITY Group we would like to give emphasis to the following:

- The group continues to develop novel regional bioindicators of environmental stress in aquatic ecosystems across Northern Portugal as well as integrated tools for hydromorphological rehabilitation.
- Continued contribution to the development of integrated bioassessment methods by validating biomarkers for contamination assessment in fish species;
- Development of a New Spatially Explicit Stochastic Dynamic model to generate spatially explicit ecological patterns to manage and maintain ecological values.
- New treatment of biodiesel wastes using detoxification by fungal fermentation methods and their use as animal feedstuffs.
- Forest managers can now predict post-fire tree mortality for pine and broadleaved species, and advances in fire ecology offer a quantitative basis to create and maintain forests that are more fire-resistant and more fire-resilient. Temporal clustering structures in fire sequences have been identified and characterized.
- The defoliation effects of insect plagues have been assessed and outbreaks have been modelled under future climate scenarios.



Within the 2 ongoing projects from the Biosystems Engineering Group we would like to outline:

- Development of new data reduction methodologies for identifying wood fracture properties and advanced numerical tools applied to the repair of wood structures using composite materials.
- Estimation of anthocyanin contents in grapes using hyperspectral images, an innovative way of using soft computing techniques.
- Research on the variability, properties and wood quality has highlighted the limitations of the use of forest wastes (shrubs and brushwood) for energy purposes, due to the production of high levels of ash and other toxic chemicals.
- Identification of variation patterns of wood density components in *Quercus faginea*. This allowed inferences to be made regarding quality assessment and the most suitable uses (e.g. structural applications) and unsuitable uses (veneers and laminates). Studies on *Acacia melanoxylon* have revealed considerable potential for high quality furniture and wood turning products.

## 2 – Activities in 2010

This section of the report describes how general activities of the Unit are aimed at integrating research from various groups, thereby promoting multidisciplinary and/or trans-disciplinary activities. The second part describes work carried out by the Unit that divulges our activities and research to the general public, schools or other forms of engaging the public in the Unit's work.

### 2.1 – Integrative/multidisciplinary activities

CITAB's research activities are organized into 6 multidisciplinary projects that optimise the expertise of 3 Research Groups. This allows us develop integrated, multidisciplinary research and maximise participation of integrated members and collaborators, essential criteria for effective scientific development. A set of tasks has been defined for each project that involves several members with different areas of expertise.

Within the *Agronomy, climate change & environmental studies* project there is clear interaction between colleagues working on climate modelling and prediction and ecophysiology, plant stress and mitigation measures in major crops (i.e. vines, olive trees, cherries, chestnuts). This collaboration improves understanding on how climate change affects plant behaviour and final product quality. The BE Research Group's *Image-based systems* project also interacts with these studies, monitoring systems using computer vision, image processing and visual inspection. The *Image-based systems* and the *Wood mechanical and quality*

*evaluation* projects show a steadily growing number of integrative activities through the use of image-based techniques (eg image correlation, image processing and morphology and, more recently, the use of hyperspectral imagery). Both these projects have national and international research partnerships. In the area of biomechanics analysis, the multidisciplinary analysis of itineraries and routes in natural spaces, has been done as a collaboration between the BE and the IE groups.

Biodiversity studies are clearly linked to the previous projects since novel varieties and landraces have been characterized, allowing CITAB to assess potential use as crops, in biological control and in major cropping system sustainability not only for vines and olive groves but also for medicinal and aromatic plants (several wild species have been studied and are maintained in our Botanical Garden). In alignment with this is the *Biodiversity in aquatic ecosystems and biotechnology*, which, apart from giving an added-value to biodiversity studies, also develops research in aquatic systems, a major contemporary topic in Portugal.

The *Added-value plant products & co-products* project interacts with the previous project, with the aim of reducing the environmental impact of cropping systems, studying the potential use of by-products as green-manures and for extraction of compounds for functional foods.

In the *Disturbance of forest and agro-forested ecosystems* project, wildland fire studies focus on the interface between fire science first principles (fire behaviour) and fire ecology. This cause-effect approach enables the development of either empiric or process-based closed predictive models. The ecology of forest disturbances and silviculture interact with atmospheric sciences, allowing a more holistic approach that takes temporal dynamics into account.

## 2.2 – Outreach activities

CITAB is fully aware of the importance of outreach activities and has organized several initiatives, promoting the Centre's research activities at several levels to different organizations:

- a) CITAB has promoted activities within the scientific community to steer research activities and generate new ideas (individual and joint activities with other research Units). Some examples: "Management and Health of Wild Species" in cooperation with CIMO-IPB (Bragança) and the one-day conference "Assessing change in a changing environment", to reflect upon the influence of climate change on aquatic ecosystems and the consequences for monitoring methods, modelling, changes in land use, aquatic biodiversity, river regulation and restoration.
- b) CITAB aims to attract students from high schools to science, via initiatives such as "Hands on Research" and the "The national Programme for Life Science". CITAB opens its Labs to students so that they can follow and

actually carry out practical work. Themes have included: “Uncovering the Secrets of Energy”, “Sun and Solar Winds”, “The magic of the physics of Fluids”, “Radioactivity”, “Computational Replication of Nature”, “Climate Change in the laboratory”, “Regional Climatology: how is it done?”, “The grape: a complex biochemical factory”, “From experiment to simulation”. One of these activities has been broadcast on national television (“Biosphere”- episode nº 279) on “Monitoring and conservation of the Alcon Blue butterfly, *Maculinea alcon*”.

c) Outreach activities for non-scientific organizations

We have also taught courses and promoted activities and courses to disseminate findings and divulge our areas of expertise by providing training to relevant companies in the private sector and interested parties. A Course on Controlled Fire in collaboration with the company GiFF - Integrated Management of Forest Fires SA, Vila Real involved several CITAB researchers, who provided training on the impacts of controlled fire, fire behaviour, planning and decision making in controlled fire plans, the use and techniques of controlled fire and how to carry out controlled fire exercises. Another example is the creation of the RefCast chestnut chain network, comprising 27 partners, aiming to increase chestnut consumption and to improve management practices. CITAB has also reinforced collaboration with ADVID, the Wine Cluster from the Douro Region, regarding planning and implementation of joint scientific projects to address problems identified by wine farmers from the region, such as the impact of climate changes in the wine producing sector.

d) For the society as a whole

Several initiatives have been successfully developed. "The World of Mushrooms and Lichens" part of the Environmental Education project of the DGAC-N and the Alvão Natural Park and an Iberian seminar “Ciência, pedestrianismo e saúde: promoção de recursos naturais do território transfronteiriço”, focused on multidisciplinary analyses of hiking trails in natural spaces, aiming to increase environmental awareness and action of this sporting activity.

### 3 – Funding

	2008	2009	2010	Subtotal
FCT Base	116.100,00 €	200.062,50 €	200.062,50 €	516.225,00 €
FCT Projects	1.629.638,00 €	2.338.892,00 €	1.108.512,37 €	5.077.042,37 €
Other (National)	3.416.743,47 €	2.487.3031,26€	2.152.074,58 €	8.055.849,31 €
Other (International)	1.729.444,69 €	1.797.055,00 €	266.568,50 €	3.912.568,19 €
Industry (National)	310.529,97 €	0,00 €	58.400,00€	368.929,97 €
Industry (International)	0,00 €	0,00 €	0,00 €	0,00 €
<b>Total</b>	<b>7.202.456,13</b>	<b>6.823.040,76 €</b>	<b>3.785.617,95 €</b>	<b>17.930.614,84 €</b>

### 4 – General indicators

#### 4.1 – Composition and training

	2006	2007	2008	2009	2010	Total
Contracted Researchers (Ciência Programme)	0	0	1	4	1	<b>6</b>
Researchers (FTE)	61	41	42	55	66	-
Masters degrees (Master thesis completed)	22	7	26	52	15	<b>122</b>
PhDs (PhD thesis completed)	7	10	4	11	11	<b>43</b>

#### 4.2 – Researchers hired

Name: Richard Neil Bennett (Ciência Programme – FCT)

Start date: 12-03-2010

End date: 12-09-2014

### 4.3 – Technical personnel hired

N/D

### 4.4 – Additional comments

N/D

### 4.5 – Summary of budget execution

	2010	2009	2008
<b>Budget Funds</b> (FCT Funding)	<b>200.062,50 €</b>	<b>200.062,50 €</b>	<b>116.100,00 €</b>
Scientific Productivity	120.037,50 €	110.034,38 €	58.050,00 €
<b>Board (1)</b>	30.009,38 €	50.015,62 €	40.635,00 €
<i>Brought forward (not spented funds) (2)</i>	55.637,55 €	36.301,10 €	--
<i>(1) + (2)</i>	<b>85.646,93 €</b>	<b>86.316,72 €</b>	<b>40.635,00 €</b>
Full members	50.015,62 €	40.012,50 €	17.415,00 €
<b>Board Budget Spending</b>			
Scientific equipment	49.748,21 €	632,00 €	---
Administrative and computer equipment	4.886,07 €	11.150,69 €	---
Dissemination and promotion			
<i>Web site</i>	---	5.520,00 €	---
<i>Newsletter</i>	1.152,34 €	---	---
<i>Participation in Scientific events</i>	694,77 €	---	1.516,40 €
Secretariat	15.584,09 €	9.175,88 €	2.640,00 €
Consultants	1.430,41 €	4.200,60 €	---
Other expenses	165,50 €	---	177,50 €
<b>Total</b>	<b>73.661,39 €</b>	<b>30.679,17 €</b>	<b>4.333,90 €</b>
<b>Board Balance</b>	<b>11.985,54 €</b>	<b>55.637,55 €</b>	<b>36.301,10 €</b>

## 5 – Research Groups

Reference	Group Title
RG-Norte-4033-134	<u>Sustainable Agro-food Chains</u>
RG-Norte-4033-135	<u>Ecointegrity</u>
RG-Norte-4033-136	<u>Biosystems Engineering</u>

### 5.1 – Sustainable Agro-food Chains

#### 5.1.1 – Group description

Principal Researcher	Henrique Trindade
Research area	Agricultural Sciences
Home Institution	Universidade de Trás-os-Montes e Alto Douro

#### 5.1.2 – Funding

	2009	2010
FCT Projects	1.324.517,00 €	327.933,70 €
Other (National)	673.039,00 €	158.946,00 €
Other (International)	824.505,00 €	91.543,90 €
Industry (National)	0,00 €	43.400 €
Industry (International)	0,00 €	0,00 €
<b>Total</b>	<b>2.822.061,00 €</b>	<b>621.823,60 €</b>

### 5.1.3 – Objectives

Objectives have been set for each of the ongoing projects:

#### i) Agronomy, climate change & environmental studies (ACES)

This project will develop suitable adaptation and mitigation measures for environmental and climate change in the agricultural sector, based on plant studies and numerical atmospheric modelling. Work will include studies on environmental impacts on Mediterranean agricultural production chains and the design and improvement of cropping practices. Major scientific activities comprise:

- (task i.1) Studies on climate variability mechanisms;
- (task i.2) Atmospheric modeling and simulation of environmental impacts;
- (task i.3) Recovery and evaluation of local endangered germplasm; selection, characterization and conservation of plant resources to maintain biodiversity as a potential resource for sustainable development;
- (task i.4) Conserve and enhancement of biological control of insect pests in olive groves and vineyards by increasing their functional biodiversity;
- (task i.5) Effects of environmental impacts on plant composition - phytochemicals and other compounds;
- (task i.6) Study of trace gas emissions from agricultural systems under climate change scenarios;
- (task i.7) Design and improvement of cropping practices and mitigation measures;
- (task i.8) Mitigation of animal manure and agro-food wastes impacts - cycles of nutrients; residues processing and reuse.

#### ii) Added-value plant products & co-products (APPC)

This project will provide pragmatic, effective and sustainable solutions for "greening the food chain" and optimizing human and animal health. Emphasis is given to Mediterranean crops, medicinal and aromatic plants (MAP), and other economically-important plants. The APPC project will provide strategies for using agro-food/forestry wastes and applying plant cell cultures to produce added-value products and co-products e.g. biopesticides, functional food ingredients and animal feeds. Major scientific activities include:

- (task ii.1) Studies on composition and health effects of Portuguese and International foods;
- (task ii.2) Development of added value co-products from Portuguese agro-food wastes: Phytochemical biopesticides and "green manures"; Functional

food compounds from agro-food wastes – animal and human foods; Pragmatic and effective processing of agro-food wastes.

- (task ii.3) Bioproducts & Biotechnology: Study of essential oils and phenolic compounds from medicinal and aromatic plants: phytochemistry, bioactivities and biotechnology; Identification and role of bioactive metabolites in plants; study of their biosynthesis and production and how to genetically manipulate plants to produce pharmaceutically useful compounds; Study and characterization of in vitro plant cultures (of economically-important species) at the developmental, physiological and biochemical levels.

### 5.1.4 – Main achievements

Within the “Agronomy, climate change & environmental studies” and “Added-value plant products & co-products” the following main achievements have been:

- Exploration of dynamic mechanisms underlying the occurrence of droughts in Portugal. An innovative perspective of these mechanisms has been developed. Another study has produced regional climate change projections for precipitation in Portugal until the end of this century using a state-of-the-art regional climate model.
- Grapevine yield in Douro Wine Region has been modelled using a set of atmospheric variables. Projections based on future climatic conditions simulated by a regional climate model have been developed; Viticultural zoning is critical for assessing suitability grapevine growing and wine production in a given region. Viticultural zoning has also been carried out for Europe and climate change assessments until 2100 have been made using regional model data.
- Chestnut clonal selection program for cvs. Judia has been established from the best 10 Trás-os-Montes genotypes. Hazelnut germplasm studies have completed the collation of descriptive data of cultivars in collections. All these studies allow better selection of 2 hazelnut Portuguese varieties, potentially important sources of genes tolerant of new environment conditions, pests and diseases resistance and/or nutritional characteristics.
- Pre-selection of native plants to be used in the olive agro-ecosystem in 3 main olive cropping regions of Portugal. Evaluation of potential nectar accessibility for the olive moth and 2 of its main natural enemies, Identification of native flowering plants that occur in Porto Wine Region as well as arthropods prior to assessment and selection of those most suitable for establishing ecological infra-structures.
- Development of a fast and reliable hydrophilic interaction liquid chromatography method for determining ascorbic and isoascorbic acids; conclusion of studies evaluation of the metabolite composition of Portuguese



chestnut cvs, contributing to greater knowledge on chemical composition of differently processed chestnuts from several Portuguese cvs.

- Trace gas studies concluded that: NH<sub>3</sub> emissions from dairy cattle buildings in Portugal were very important and that current Portuguese inventory underestimates emissions from this source; slurry processing by mechanical separation and treatment with nitrification inhibitors affect emissions of NO & N<sub>2</sub>O.
- Assessment of summer stresses mitigation strategies on Mediterranean species; assessment the physiological responses of cherry trees to different canopy light levels; a close relation between <sup>18</sup>O and chestnut quality was found; studies on the action of *Bacillus velezensis* in the protection of chestnut against ink disease.
- Evaluation of the potential effect of intracellular polysaccharides from 3 different fungi on the viability and proliferation rate of HepG2 cells in culture; Evaluation of the *Sambucus nigra* L. berry extract protective effect against induced oxidative stress, in HepG2 cells in culture.
- Extraction of highly pure, intact and functional protoplast and vacuole populations from grape cells. The molecular characterization of some tonoplast Cu<sup>2+</sup> transporters in grapevine was achieved; the study of the defence mechanisms of *V. vinifera* cv. *Alvarinho* against esca proceed: diseased, healthy and asymptomatic leaves were clearly distinguished using multivariate statistical techniques.
- Development of biofunctional textiles using resveratrol and other plant extracts.
- Curcumin was found to induce antioxidant defences in human fibroblasts. Ursolic acid and luteolin-7-glucoside improves lipid profiles and induces liver glycogen synthase kinase-3 in rats.

### 5.1.5 – Group productivity

#### International Projects

A Surveillance system for assessing and monitoring of desertification (DeSurvey) (FP6). REF IP-003950. Project coordinator CITAB: João Alexandre Medina Corte-Real. Total budget CITAB/UTAD: 0 Euro. State: Running. Starting date: 11/3/2005, duration: 5 years.

Meteorological Information to evaluate future agricultural production system uncertainties: application to Iberian Duoro catchment. Junta de Castilla y León, REF: SA135A08. Project coordinator: Fernando de Pablo Davila. Total budget CITAB/UTAD: 0 Euro. State: Concluded. Starting date: 1/1/2008, duration: 36 months.

Pepino Mosaic Virus: epidemiology, economic impact and pest risk analysis (PEPEIRA). EU Project SSPE-CT-2006-044189. Project coordinator CITAB: Ana Maria Nazaré Pereira Total budget CITAB/UTAD: 16.657 Euro. Starting date: 1/2/2007, duration: 36 months.

“REVAL”- Incremento de la competitividad de la industria agroalimentaria de la zona transfronteriza. INTERREG-POCTEP, Cooperación Transfronteriza/Cooperação Transfronteriza: España – Portugal. Project coordinator: Cecilia Sanz Montalvilho (Fundación Cartif, Spain). CITAB coordinator: Richard Bennett. Total budget: 838.350,90 Euros. CITAB/UTAD budget: 149.773,79 Euros. State: In Evaluation. Starting date: 2011, duration: 24 months.

## National Projects

AQUAVITIS - Understanding water transport in *Vitis vinifera*: biochemical characterization of aquaporins upon their heterologous expression in yeast. FCT, PTDC/AGR-AAM/099154/2008. Project coordinator CITAB: Hernâni Varanda Gerós. Total budget CITAB/UM: 14400 Euro. Starting date: 2010, duration: 36 months.

Cilus Plus as a preventive agent of chestnut ink disease. Project coordinator CITAB: José Gomes Laranjo. Total budget CITAB/UTAD: 3900 Euro. Starting date: February 2010, duration: 12 months.

Cover cropping: a decisive strategy for the sustainable management of rainfed olive orchards. FCT, PTDC/AGR-AAM/098326/2008. Project coordinator CITAB: Carlos Manuel Correia. Total budget CITAB/UTAD: 93.897 Euro. Starting date: March 2010, duration: 36 months.

Developing an adaptive management system for predicting and mitigating damage caused the pine wilt nematode *Bursaphelenchus xylophilus* (Nematoda: Aphelenchoididae) in Portugal. FCT: PTDC/AGR-CFL/098869/2008. Project coordinator CITAB: Richard Neil Bennett. Total budget CITAB/UTAD: 18.274 Euro. Starting date: January 2010, duration: 36 months.

Development of practical low-cost methods for processing sub-products of cereals. Vale I&DT No 11730 (Promotor: Moagem Ceres A. de Figueiredo & Irmão S.A.): Project Coordinator: Richard Bennett. CITAB coordinator: Richard Bennett. Total budget 33.400 Euros. UTAD budget: 33.400 Euros. Starting date: April 2010, duration: 12 months.

Direct and indirect impacts of climate change on soil erosion and land degradation in Mediterranean watersheds (ERLAND). FCT, PTDC/AAC-AMB/100520/2008. Project coordinator CITAB: João Carlos Andrade dos Santos. Total budget CITAB/UTAD: 0 Euro. Starting date: 2010, duration: 36 months.

Effect of phytochemicals on organic matter transformation and on key processes of carbon and nitrogen cycles in soil. FCT: PTDC/AGR-AAM/102006/2008. Project

coordinator: Henrique Trindade. Total budget CITAB/UTAD: 125.680 Euros. Starting date: January 2010, duration: 36 months.

Environmental Sciences teaching planning using the virtual campus. Universidad de Salamanca, REF: ID9/153. Project coordinator: Luís Jesus Rivas Soriano. Total budget CITAB/UTAD: 0 Euro. Starting date: 2010, duration: 12 months.

Feasibility study of Fertisol chestnut plantations. Project coordinator CITAB: José Gomes Laranjo. Total budget CITAB/UTAD: 2900 Euro. Starting date: April 2010, duration: 12 months.

Functional foods for neuroprotection: a role for *Hypericum perforatum* (Hyperic-Food) PTDC/Agr-Ali/105169/2008. Project coordinator CITAB: Alberto Carlos Pires Dias. Total budget CITAB/UM: 0 Euro. Starting 2010, duration: 36 months.

GrapeBerryFactory - Sugars, acids, phenolics and water on grape berry development and ripening. PTDC/AGR-ALI/100363/2008. Project coordinator CITAB: Hernâni Varanda Gerós. Total budget CITAB/UM: 155.000 Euro. Starting 2010, duration: 36 months.

Holocene climate record from limestone tuffs and associated lacustrine sediments, HOLOCLIMA. FCT, PTDC/CTE-GEX/71298/2006. Project coordinator CITAB: Maria Solange Mendonça Leite. Total budget CITAB/UTAD: 0 Euro. State: Concluded. Starting date: 2008, duration: 36 months.

Increasing functional biodiversity in olive groves to enhance conservation biological control of insect pests. PTDC/AGR-AAM/100979/2008. Project coordinator: Laura Monteiro Torres. Total budget CITAB/UTAD: 107.800 Euro. Starting date: March 2010, duration: 36 month.

Lightning activity in Portugal: variability patterns and socioeconomic impacts, RAIDEN. FCT, PTDC/CTE-ATM/101931/2008. CITAB Project coordinator: Maria Solange Mendonça Leite. Total budget CITAB/UTAD: 47.532 Euro. Starting date: 2010, duration: 36 months.

NanoSKIN: Chemotherapeutic agent-loaded nanoparticles for innovative therapy of severe skin diseases – muco-/cutaneous Leishmaniasis and squamous cell carcinoma as examples. CITAB project coordinator: Amélia M. L. Dias da Silva. Total budget CITAB/UTAD: 0 Euro. Starting date: July 2010, duration: 24 months.

NaturAge - Anti-aging properties of natural compounds. PTDC/QUI-BIQ/101392/2008. Project coordinator: Cristóvão F. Lima. Total budget CITAB: 145884 Euro. Starting date: May 2010, duration: 36 month.

New bio-products and technologies for valuating *Hypericum* species (HypericumBiotech.) FCT (PTDC/AGR-AAM/70418/2006). Project coordinator: Manuel Fernandes Ferreira. Total Budget: 170.000 Euros. Starting date: May 2008, duration: 36 month.

“NutriDouro” Healthy crystalised fruits and jams with a traditional flavour. QREN-Compromissão: 13111 (Promotor: Douromel-Fábrica de Confeitaria, Lda). Project coordinators: Fernando Nunes (CQ/UTAD) and Richard Bennett. CITAB coordinator: Richard Bennett. Total budget 564.501 Euros. UTAD budget: 476.838 Euros. Starting date: July 2010, duration: 36 months.

PromoAgro - Promotion of Agro-food Competitiveness. PRJ-11-013. Project coordinator: Eduardo Augusto dos Santos Rosa. Total budget CITAB/UTAD: 522.609 Euro. Starting date: October 2010, duration: 36 month.

Reconstruction of the past climate in Portugal from borehole temperatures, BOREHCLIM. FCT, PTDC/CLI/66304/2006. Project coordinator CITAB: Maria Solange Mendonça Leite. Total budget CITAB/UTAD: 0 Euro. Starting date: 2008, duration: 36 months.

Trace gas emissions from Portuguese irrigated rice fields in contrasting soils, by the influence of crop management, climate and increase concentration of CO<sub>2</sub> in the atmosphere. FCT, PTDC/CLI/66304/2006. Project coordinator CITAB: Henrique Trindade. Total budget CITAB/UTAD: 45.360 Euro. Starting date: March 2010, duration: 36 months.

Understanding Resistance to Pathogenic Fungi in *Castanea* sp.. ResCast. Project coordinator CITAB: José Gomes Laranjo. Total budget CITAB/UTAD: 8400 Euro. Starting date: February 2010, duration: 36 months.

Valorização do Arboreto da Escola Secundária de Barcelos (Acrónimo: VA-ESB). Programa Ciência na Hora – Microprojectos Ciência Viva; Agência Nacional para a Cultura Científica e Tecnológica. Pareceria ESB-UM. Coordenadora: Paula Cristina Santos Gomes (Ph.D.). Responsável pela UM: Manuel Fernandes Ferreira (01 Set. 2009 – 30 Julho 2010).

WUSSIAAME - Water use, survival strategies and impact of agrochemicals on water resources in agricultural Mediterranean ecosystems. PTDC/AAC-AMB/100635/2008 Project coordinator CITAB: Aureliano Malheiro. Total budget CITAB/UTAD: 51.574 Euro. Starting date: February 2010, duration: 36 months.

Valuation of agro-industrial residues. Vale I&DT No 71200 (Promotor: LabInvest [Sociedade de Investigação e Desenvolvimento de Biotecnologia, S.A.]/Varandas de Sousa): Project Coordinator: Amin Karmali (ISEL). CITAB coordinator: Richard Bennett. Total budget 33.400,00 Euros. UTAD budget: 10.000 Euros. Starting date: July 2009, duration: 12 months.

## Publications in peer review journals

Amaglo, N., Bennett, R., Lo Curto, R., Rosa, E., Lo Turco, V., Giuffrida, A., Lo Curto, A., Crea, F., Timpo, G., 2010. Profiling selected phytochemicals and nutrients in different tissues of the multipurpose Tree *Moringa oleifera* L., grown in Ghana. *Food Chem*, 1047–1054.

Andrade, J, Santos, J.A., Pinto, Jg, Corte-Real, J., Leite, S., 2010. The empirical forcing function as a tool for the diagnosis of large-scale atmospheric anomalies. *Ann-Geophys*. 28, 75-87.

Azevedo, MF, Camsari, Ç, Sá, CM, Lima, CF, Fernandes-Ferreira, M, Pereira-Wilson, C., 2010. Ursolic Acid and Luteolin-7-Glucoside Improve Lipid Profiles and Increase Liver Glycogen Content through Glycogen Synthase Kinase-3. *Phytother. Res*. 24: S220–S224.

Bennet, R., Shiga, T., Hassimotto, N., Rosa, E., Lajolo, F., Cordenunsi, B., 2010. Phenolics and antioxidant properties of fruit pulp and cell wall fractions of postharvest banana (*Musa acuminata* Juss.) cultivars. *Journal of Agricultural and Food Chemistry* 58, 7991-8003.

Barros, A., Silva A.P., Gonçalves B., Nunes F., 2010. A fast, simple, and reliable hydrophilic interaction liquid chromatography method for the determination of ascorbic and isoascorbic acids. *Anal Bioanal Chem* 396: 1863-1875.

Carneiro J., Cardenas L.M., Hatch D.J., Trindade H., Scholefield D., Clegg C.D., Hobbs P. 2010. Effect of the nitrification inhibitor dicyandiamide on microbial communities and N<sub>2</sub>O from arable soil fertilized with ammonium sulphate. *Environmental Chemistry Letters* 8, 237-246.

Conde, A, Diallinas, G, Chaumont, F, Chaves, M, Gerós, H., 2010. Transporters, channels or simple diffusion? Dogmas, atypical roles and complexity in transport systems. *The International Journal of Biochemistry and Cell Biology* 42: 857-868.

Dias, IR, Viegas, CAA, Silva, AM, Pereira, HF, Sousa, CP, Carvalho, PP., Cabrita, AS, Fontes, PJ, Silva, SR and Azevedo, JT, 2010. Assessment of haematological and biochemical parameters in Portuguese Churra-da-Terra-Quente ewes of the northeast of Portugal. *Arquivo Brasileiro de Medicina Veterinária e Zootecnia*, 62(2): 265-272.

Fangueiro, D, Ribeiro, H, Coutinho, J, Cardenas, L, Trindade, H, Cunha-Queda, C, Vasconcelos, E, Cabral, F, 2010. Nitrogen mineralization and CO<sub>2</sub> and N<sub>2</sub>O emissions in a sandy soil amended with original or acidified pig slurries or with the relative fractions. *Biology Fertil Soils* 46: 383-391.

Fernandes-Silva, A, Ferreira, TC, Correia CM, Malheiro A, Villalobos F., 2010. Influence of different irrigation regimes on crop yield and water use efficiency of olive. *Plant Soil* 333: 35–47.

Galhano, V., Peixoto, F., Gomes-Laranjo J. (2010). Bentazon Triggers the Promotion of Oxidative Damage in the Portuguese Ricefield Cyanobacterium *Anabaena cylindrica*: Response of the Antioxidant System. *Environ Toxicol* 25 (5): 517-526.

Galhano, V., Peixoto, F., Gomes-Laranjo, J., Fernandez-Valiente, C., 2010. Comparative Toxicity of Bentazon and Molinate on Growth, Photosynthetic Pigments, Photosynthesis, and Respiration of the Portuguese Ricefield Cyanobacterium *Nostoc muscorum*. *Environ Toxicol* 25: 147–156.

Loranty, A, Rembalkowska, E, Rosa, E., Bennett, R., 2010. Identification, quantification and availability of carotenoids and chlorophylls in fruit, herb and medicinal teas. *Journal of Food Composition and Analysis* 23, 432-441.

Lou JD, Ma YC, Wang Q, Vatanian N, Zhang C, 2010. Selective Oxidation of Benzoin with Chromic Acid Supported on Aluminum Silicate Under Viscous Conditions. *Synthesis and Reactivity in Inorganic, Metal-Organic, and Nano-Metal Chemistry*, 40:495–498.

Malheiro, A, Santos, JA., Fraga H, Pinto J, 2010. Climate change scenarios applied to viticultural zoning in Europe. *Climate Research* 43: 163–177.

Moutinho-Pereira, J, Bacelar, E, Gonçalves B, Ferreira H, Coutinho J, Correia C, 2010. Effects of Open-Top Chambers on physiological and yield attributes of field grown grapevines. *Acta Physiology Plant* 32: 395-403.

Pereira, J, Figueiro, D, Chadwick, DDR, Misselbrook, TH, Coutinho, J, Trindade, H, 2010. Effect of cattle slurry pre-treatment by separation and addition of nitrification inhibitors on gaseous emissions and N dynamics: A laboratory study. *Chemosphere* 79: 620–627.

Pereira, J, Misselbrook, TH, Chadwick, DR, Coutinho, J, Trindade, H, 2010. Ammonia emissions from naturally ventilated dairy cattle buildings and outdoor concrete yards in Portugal. *Atmospheric Environment* 44: 3413-3421.

Pérez-Gregorio, MR, García-Falcón, MS, Simal-Gándara, J, Rodrigues, AS, Almeida, DPF, 2010. Identification and quantification of flavonoid in traditional cultivars of red and white onions at harvest. *Journal of Food Composition and Analysis* 23: 592-598.

Portela E., Pires C.C., Louzada J. (2010). Magnesium deficiency in chestnut groves: the influence of soil manganese. *Journal of plant Nutrition* 33, 452-460.

Rodrigues, AS, Pérez-Gregorio, MR, García-Falcón, MS, Simal-Gándara, J, Almeida, DPF, 2010. Effect of post-harvest practices on flavonoid content of red and white onions cultivars. *Food Control* 21: 878-884.

Saavedra, MJ, Borges, A, Dias, C, Aires, A, Bennett, RN, Rosa, ES, Simões, M, 2010. Antimicrobial activity of phenolics and glucosinolate hydrolysis products and their

synergy with Streptomycin against pathogenic bacteria. *Medicinal Chemistry* 6: 174-183.

Santos, S, Pereira, J, Raimundo, A, Torres, LM, Pereira, AN, Nogueira, A, 2010. Seasonal synchrony between *Saissetia oleae* and coccinellid species in Portugal olive groves in different management systems. *Bulletin of Insectology* 63 (1): 51-57.

Santos, S, Pereira, J, Raimundo, A, Torres, LM, Pereira, AN, Nogueira, A, 2010. Response of coccinellid community to the dimethoate application in olive groves in northeastern Portugal. *Spanish Journal of Agricultural Research* 8(1), 126-134.

Silva, BA, Oliveira, PJ, Cristóvão, A, Dias, ACP, Malva, J, 2010. Biapigenin Modulates the Activity of the Adenine Nucleotide Translocator in Isolated Rat Brain Mitochondria. *Neurotox Res* 17:75–90 DOI 10.1007/s12640-009-9082-5.

Silva, P, Façanha, AR, Tavares, RM, Gerós, H, 2010. Role of Tonoplast Proton Pumps and Na<sup>+</sup>/H<sup>+</sup> Antiport System in Salt Tolerance of *Populus euphratica* Oliv. *Journal of Plant Growth regulation* 29: 23-24.

Vasconcelos MC, Nunes F, Viguera C, Bennett R, Rosa E, Ferreira-Cardoso J, 2010. Industrial processing effects on chestnut fruits (*Castanea sativa* Mill.) 3. Minerals, free sugars, carotenoids and antioxidant vitamins. *International Journal of Food Science and Technology* 45, 496-505.

Vasconcelos, MC., Bennett, R, Quideau, S, Jacquet, R, Rosa, E, Ferreira\_Cardoso, J, 2010. Evaluating the potential of chestnut (*Castanea sativa* Mill.) fruit pericarp and integument as a source of tocopherols, pigments and polyphenols. *Industrial Crops and Products* 31, 301–311.

Wang XH, Zhang C, Wang Y, Gomes-Laranjo J, 2010. Screen of micro-organisms for inducing the production of dragon's blood by leaf of *Dracaena cochinchinensis*. *Letters in Applied Microbiology* 51(5): 504-510.

### **Other publications international**

Dinis, L.-T., Ramos, S., Gomes-Laranjo, J., Peixoto, F., Vallania, R., Costa, R., Botta, R., 2010. Phenology and reproductive biology in cultivar 'Judia' (*Castanea sativa* Mill.). *Acta Hort.* (ISHS), 169–174.

Gomes-Laranjo, J., Gonçalves, E.J., Peixoto, F., 2010. Study of high temperature effect on chestnut seedlings growth. *Acta Hort.* (ISHS), 267–274.

Aires, A., Dias, C., Bennett, R.N., Rosa, E. and Saavedra, M.J., 2010. Analysis of the 2-Phenylethyl isothiocyanate present in Brassica leaves and their potential application as antimicrobial agent against bacteria strains isolated from Human and Pig gastrointestinal tracts. *International Conference on Antimicrobial Research, ICAR Congress, Valladolid, Spain, 3-5 November [Abstract].*

Aires, A., Rosa Carvalho, R., Fernandes, C.M., Saavedra, M.J.F. and Rosa, E., 2010. Phytochemical Composition and Antioxidant Properties of Portuguese Kale and Portuguese Tronchuda Cabbage Produced in a Sustainable Agriculture Production System are affected by Climate Conditions. 28th International Horticultural Congress, Lisbon, Portugal, 22-27 [Abstract].

Amaral, C., Anjos, M.R., & Pais, C., 2010. Bioremediation of Olive Mill Wastewaters with Fungi. *Terrestrial and Aquatic Environmental Toxicology*, 45–56.

Andrade, C., Santos J.A., Corte-Real, J., 2010. A wavelet analysis perspective of the North Atlantic ridge development. In European Geosciences Union General Assembly, 35, Vienna, Austria. *Geophysical Research Abstracts*, 12, EGU2010-2224..

Azevedo, M.M., Santos, D.J.L., & Silva, A.M., 2010. Fitoquímicos presentes em frutos silvestres: evidência científica para a sua acção biológica. *Revista da Faculdade de Ciências da Saúde*.

Borges, A., Dias, C., Simões, M., Bennett, R.N., Rosa, E.A.S., Saavedra, M.J., 2010. Initial in vitro evaluations of the antibacterial properties of phytochemicals against *Listeria monocytogenes*. “FAV HEALTH” IHC 28th International Horticultural Congress, Lisboa, 22-27 August.

Brito, C., Bacelar, E., Correia, C.M., 2010. Are exotic and alien plants a threat to portuguese native flora? In Proceedings of the IUFRO Conference, ‘2010 Mixed and Pure Forests in a Changing World’. UTAD, p. 121, 6-8 Outubro, Vila Real.

Carlos, C., Alves, F. & Torres, L., 2010. Constraints to the application of mating disruption against *Lobesia botrana* in Douro Wine Region. In CERVIM, Sicília, 11-14 de Maio de 2010 (Cd-Rom).

Cerdeira, A., Santos, A., Bennett, R.N., Louzada, J.L., 2010. Cultivation effects on the polyphenolics and pigments contents of leaves, flowers and fruits of *Sambucus nigra* L. grown in Southern Douro, Portugal. “NON ROSACEOUS TREE, BUSH AND VINE FRUIT SPECIES” IHC 28th International Horticultural Congress, Lisboa, 22-27 August.

Correia, C.M., Bacelar, E.A., Gonçalves, B., Moutinho-Pereira, J.M., Ferreira, T., Rosa, E., Bennett, R., 2010. Variation in the concentrations of phenolic compounds of *Olea europaea* Leaves with different water and nitrogen applications. *Metabolomics 2010*, 27 June-1 July, Amsterdam, The Netherlands, p.130.

Costa, A.C., Santos, J.A., Pinto, J.G., 2010. Future scenarios for precipitation extremes in Portugal based on regional climate model data. In: Lima, J.L.M.P., Krajewski, W., Lima, M. I.P. (Eds.), *Book of Abstracts. IPC-10*, In International Precipitation Conference, 10, Coimbra, Portugal. IPC10-142, 68



De Vasconcelos, M.C., Bennett, R., Rosa, E., Ferreira-Cardoso, J.V. and Nunes, F., 2010. Industrial Processing of Chestnut Fruits (*Castanea sativa* Mill.) - Effects on Nutrients and Phytochemicals. *Acta Hort.*(ISHS) 866:611-617.

Dias, M.C., Pinto, G., Correia, C.M., Moutinho-Pereira, J., Guerra, C., Monteiro, C., Santos, C., 2010. Effects of light intensity on photosynthesis during acclimatization of *U.minor*. In *Proceedings of the XVIII Congress of the Federation of European Societies of Plant Biology*. Valencia, Spain, 4-9 July, pp.128.

Dias, M.C., Pinto, G., Correia, C.M., Moutinho-Pereira, J., Guerra, C.C., Monteiro, C., Santos, C., 2010. Effects of light intensity on photosynthesis during acclimatization of *U.minor*. *Proceedings of the "XVIII Congress of the Federation of European Societies of Plant Biology" (FESBP)*. Valencia, Spain, 4-9 July, pp.128 [Abstract].

Fernandes-Silva, A.A., 2010. Necessidades hídricas e resposta da oliveira (*Olea europaea* L.) ao Deficit hídrico na região da Terra Quente. *Revista APH*, 41-42.

Fontes N,D.S., Gerós H., 2010. A method for the isolation of protoplasts from grape berry mesocarp tissue. *Recent Patents Biotechnol*, 125-129.

Gonçalves, B., Moutinho-Pereira, J., Correia, C.M., Bacelar, E., Ferreira, H., Santos, A., 2010. Photosynthetic capacity, chlorophyll fluorescence and leaf reflectance responses of *Prunus Avium* L. to different irradiance levels. In *Proceedings of the 28th International Horticultural Congress*, Lisbon, August 22-27, pp.332.

Gonçalves, B., Moutinho-Pereira, J., Correia, C., Bacelar, E., Ferreira, H., Santos, A., 2010. Photosynthetic capacity, chlorophyll fluorescence and leaf reflectance responses of *Prunus Avium* L. to different irradiance levels. *Proceedings of the 28th "International Horticultural Congress"*, Lisbon, August 22-27, pp.332 [Abstract].

Karremann, M.K., Santos, J.A., Malheiro A.C., Fraga H., Pinto, J.G., 2010. Statistische Modellierung der Weinproduktivität in der Portwein Region für gegenwärtige und zukünftige Klimabedingungen. In *Kurzfassungen der Meteorologentagung DACH*, Bonn, Germany. *Geophysical Research Abstracts*, 12, DACH2010-251.

Leite, S.M., Santos, J.A., Correia, A., Safanda, J., Corte-Real, J., 2010. Validation of borehole temperature with meteorological data using spectral analysis. In *European Geosciences Union General Assembly*, 35, Vienna, Austria. *Geophysical Research Abstracts*, 12, EGU2010-2232-1

Lima C.F, Pereira-Wilson C, Rattan S.I., 2010. Hormetic effects of curcumin in normal human skin fibroblasts: implications towards aging intervention. *7th European Congress of Biogerontology - Centenarian lesson: a life beyond time*. Palermo (Italy), October 14-17, 2010.

Lima C.F, Pereira-Wilson C, Rattan S.I., 2010. Curcumin induces antioxidant defenses in normal human skin fibroblasts: implications towards aging intervention. *International Symposium on the Pathophysiology of Reactive Oxygen and Nitrogen Species*, Salamanca (Spain), May 19-21, 2010.

Malheiro, A.C., Santos, J.A., Fraga, H., Pinto, J.G., 2010. Future scenarios for viticultural climatic zoning in Iberia. In International Horticultural Congress, 28, Instituto Superior de Agronomia, Universidade Técnica de Lisboa, Lisboa.

Malheiro, A.C., Santos, J.A., Fraga H., Pinto, J.G., 2010. Future scenarios for viticultural climatic zoning in Europe. In International Terroir Congress, 8, Soave, Italy. Book of Abstracts.

Malheiro, A.C., Gonçalves, I., Conceição N., Fernandes-Silva, A.A., Silvestre, J., Sousa, V., Ferreira, M.I., 2010. Water relations, growth and yield of grapevines in Portugal's Douro Wine Region. In: Proceedings of the VIII International Terroir Congress, 7:134-139. 14-18 June, Soave, Italy.

Malheiro, A.C., Gonçalves, I.N., Conceição, N.S., Fernandes-Silva, A.A., Silvestre, J.C., Paço T.A., Ferreira, M.I., 2010. Transpiration of *Vitis vinifera* (cv. Moscatel Galego-Branco) in Portugal's Douro Wine Region. Abstracts of 28th International Horticultural Congress, Volume II (Symposia): 691-692. August 22-27, Lisbon.

Marques, G., 2010. Biodiversidade do solo: interações benéficas na nutrição e sanidade da vinha. *Enovitis*, 29–31.

Nunes, J.P., Corte-Real, J., Keizer, J.J., Abrantes, N., Lima, J.C., Roebeling, J., Sampaio, E., Santos, J.A., Varela, M.E., 2010. Direct and indirect impacts of climate change on soil erosion and land degradation in Mediterranean watersheds: a presentation of the ERLAND project. In European Geosciences Union General Assembly, 35, Vienna, Austria. *Geophysical Research Abstracts*, 12, EGU2010-14089.

Paço T.A., Malheiro, A.C., Conceição, N.S., Silvestre, J.C., Fernandes-Silva, A.A., Ferreira, M.I., 2010. Vineyard evapotranspiration measurement in non-flat terrain conditions by the eddy covariance technique – Douro Wine Region, Portugal. Abstracts of 28th International Horticultural Congress, Volume II (Symposia): 695. August 22-27, Lisbon.

Pereira J., Coutinho J., Moreira N., Trindade H., 2010. Comparison of field methods to assess net N mineralization in soils under different rates of cattle-slurry application and a maize / annual ryegrass cropping system. In: C.S.C. Marques dos Santos Cordovil, L.Ferreira (Eds). Proceedings of the 14th Ramiran International Conference, of the FAO ESCORENA Network on the Recycling of Agricultural, Municipal and Industrial Residues in Agriculture: Treatment and use of organic residues in agriculture – Challenges and opportunities towards sustainable management. 13th-15th September 2010, Lisbon, Portugal, ISBN 978-972-8669-47-8, pp.617-620.

Pereira J., Marques F., Rodrigues P., Teixeira D., Perdigão A., Pinto A., Trindade H., 2010. A pilot scale study to assess the effect of different rates of tannery effluent applied to constructed wetlands with Phragmites and Typha. In: C.S.C. Marques dos Santos Cordovil, L.Ferreira (Eds). Proceedings of the 14th Ramiran International Conference, of the FAO ESCORENA Network on the Recycling of Agricultural, Municipal and Industrial Residues in Agriculture: Treatment and use of organic

residues in agriculture - Challenges and opportunities towards sustainable management. 13th-15th September 2010, Lisbon, Portugal, ISBN 978-972-8669-47-8, pp.449-451.

Pereira J., Misselbrook T.H., Chadwick D.R., Coutinho J., Trindade H., 2010. Effect of solid and slatted floors and temperature on ammonia and GHG emissions in a scale model of dairy cattle houses. In: C.S.C.Marques dos Santos Cordovil, L.Ferreira (Eds). Proceedings of the 14th Ramiran International Conference, of the FAO ESCORENA Network on the Recycling of Agricultural, Municipal and Industrial Residues in Agriculture: Treatment and use of organic residues in agriculture - Challenges and opportunities towards sustainable management. 13th-15th September 2010, Lisbon, Portugal, ISBN 978-972-8669-47-8, pp.181-184.

Pereira J., Misselbrook T.H., Chadwick D.R., Coutinho J., Trindade H., 2010. Effects of temperature and dairy cattle excreta characteristics on ammonia emissions from a simulated concrete floor. In: C.S.C. Marques dos Santos Cordovil, L.Ferreira (Eds). Proceedings of the 14th Ramiran International Conference, of the FAO ESCORENA Network on the Recycling of Agricultural, Municipal and Industrial Residues in Agriculture: Treatment and use of organic residues in agriculture - Challenges and opportunities towards sustainable management. 13th-15th September 2010, Lisbon, Portugal, ISBN 978-972-8669-47-8, pp.177-180.

Pinto, G., Silva, S., Dias, M.C., Costa, A., Branco, J., Gonçalves, P., Correia, C.M., Moutinho-Pereira, J., Gonçalves, B., Santos, C., 2010. Analysing the impact of high temperature in ecophysiological parameters of two Eucalyptus globulus clones. In Proceedings of the XVIII Congress of the Federation of European Societies of Plant Biology. Valencia, Spain, 4-9 July, pp.178.

Pinto, G., Silva, S., Dias, M.C., Costa, A., Correia, C., Branco, J., Gonçalves, P., Correia, C.M., Moutinho-Pereira, J., Gonçalves, B., Santos, C., 2010. Impact of high temperature on photosynthesis, carbon metabolism and lipid peroxidation of Cork Oak plants. In Proceedings of the "24th IUFRO Conference for Specialists in Air Pollution and Climate Change Effects on Forest Ecosystems". 22th to 26th of March 2010. Antalya, Turkey.

Pinto, G., Silva, S., Dias, M.C., Costa, A., Correia, B., Branco, J., Gonçalves, P., Correia, C.M., Moutinho-Pereira, J., Gonçalves, B., Santos, C., 2010. Analysing the impact of high temperature in ecophysiological parameters of two Eucalyptus globulus clones. Proceedings of the "XVIII Congress of the Federation of European Societies of Plant Biology" (FESBP). Valencia, Spain, 4-9 July, pp.178 [Abstract].

Pinto, G., Silva, S., Dias, M.C., Costa, A., Correia, C., Branco, J., Gonçalves, P., Correia, C., Moutinho-Pereira, J., Macedo, B., Santos, C., 2010. Impact of high temperature on photosynthesis, carbon metabolism and lipid peroxidation of Cork Oak plants. Proceedings of the "24th IUFRO Conference for Specialists in Air Pollution and Climate Change Effects on Forest Ecosystems". 22th to 26th of March. Antalya, Turkey.

Portela, E., Ferreira-Cardoso, J., Louzada, J., 2010. Assessment of boron application in a chestnut orchard over three years. In 28th International Horticultural Congress, Lisboa, Portugal, 22-27 August 2010. Abstract Book Vol.II (Symposia), pp.313.[Poster S06.243]

Portela, E., Ferreira-Cardoso, J., Louzada, J., 2010. Diagnosis of boron deficiency at an early stage in chestnut. In 28th International Horticultural Congress, Lisboa, Portugal, 22-27 August 2010. Abstract Book Vol.II (Symposia), pp.312.[Poster S06.242]

Raziei, T., Bordi, I., Santos, J.A., 2010. Relationship between daily atmospheric circulation patterns and daily precipitation over Iran. In European Geosciences Union General Assembly, 35, Vienna, Austria. Geophysical Research Abstracts, 12, EGU2010-8009.

Rei, F.T.& Torres L.M., 2010. Formicídeos em *Olea europaea* L. In XIV Congreso Iberico de Entomologia “Año Internacional de la Biodiversidad Biológica”. Lugo, 1-4 de Setembro de 2010, p.39.[Abstract]

Rei, F.T., Campos, M.& Torres L.M., 2010. Beneficial arthropods associated with the olive tree canopy in Alentejo (South region of Portugal). In Kalaitzaki, Argyro. Integrated Protection of Olive Crops IOBC/wprs Bull. Bragança. ISBN 978-92-9067-227-2.53, pp.117-127.

Rei, F.T., Mateus, C.& Torres, L., 2010. Thrips in *Oleae europaea* L: organic versus conventional production. In Proceedings of the 28th International Horticultural Congress, Centro de Congressos de Lisboa, 22-27 Agosto de 2010, vol. II, p.381.[Abstract]

Saavedra, M.J., Borges, A., Dias, C., Aires, A., Bennett, R.N., Rosa, E.S.and Simões, M., 2010. Antimicrobial Activity of Phenolics and Glucosinolate Hydrolysis Products and their Synergy with Streptomycin Against Pathogenic Bacteria. International Conference on Antimicrobial Research, ICAR Congress, Valladolid, Espanha, 3-5 November [Abstract].

Santos, J.A., Leite, M.S., Bennett, R.N., Rosa, E.A.S., 2010. The Changing Climate: Using Modeling to Predict Potential Effects on Horticultural Crops. In Acta Horticulturae, 28, In press.

Santos, J.A., Malheiro A.C., Fraga H., Pinto, J.G., 2010. Future scenarios for viticultural bioclimatic indices in Europe. In European Geosciences Union General Assembly, 35, Vienna, Austria. Geophysical Research Abstracts, 12, EGU2010-2403.

Santos, J.A., Malheiro, A.C., Karremann, M.K., Pinto, J.G., 2010. Grapevine productivity modelling in the Portuguese Douro Region. In International Terroir Congress, 8, Soave, Italy. Book of Abstracts.

Santos, J.A., Pinto, J.G., Ulbrich, U., Woollings, T., 2010. On the development and persistence of strong ridge episodes over the eastern North Atlantic. In European

Geosciences Union General Assembly, 35, Vienna, Austria. Geophysical Research Abstracts, 12, EGU2010-2198.

Santos, J.A., Leite, M.S., Bennett, R.N., Rosa, E.A.S., 2010. The changing climate: using modelling to predict potential effects on horticultural crops “CLIMATE CHANGES AND IMPACTS ON VEGETABLE CHAINS I” IHC 28th International Horticultural Congress, Lisboa, 22-27 August.

Xavier C.P., Lima C., Rohde M., Pereira-Wilson C., 2010. Autophagy triggered by ursolic acid synergistically enhances 5-fluorouracil induced cell death in HCT15 (MSI p53 mutant) colorectal cancer cells. European Journal of Cancer Supplements, 8 (5): 66-67.

Xavier C.P., Lima C.F., Rohde M., Pereira-Wilson C., 2010. Autophagy triggered by ursolic acid synergistically enhances 5-fluorouracil induced cell death in HCT15 (MSI p53 mutant) colorectal cancer cells. 21st Meeting of the European Association for Cancer Research, Oslo (Norway), June 26-29, 2010.

### **Other National publications**

Alencão, A., Serôdio, A., Faria, A., Gomes, E., Moreira, H., Santos, J.A., Mendes, L., Quaresma, L., Sousa, L., Marques, M., Gabriel, R., Leite, S., 2010. Apresentação do livro “Pedestrianismo, uma abordagem multidisciplinar: ambiente, aptidão física e saúde”. In Ciência, Pedestrianismo e Saúde: Promoção de Recursos Naturais do Território Transfronteiriço, Seminário Ibérico, 1, Miranda do Douro.

Silva, A.S., Oliveira, A.A., Oliveira P.C., Moura, J.P., Falco, V., 2010. “CD interactivo - Apoio ao Viticultor”. ISBN: 978-972-669-941.

Brito, C., Lourenço, S., Bacelar, E., Moutinho-Pereira, J., Ferreira, H., Correia, C.M., 2010. A aplicação de ácido salicílico aumenta a resistência ao stresse hídrico na oliveira (*Olea europaea* L.)? In livro de resumos das “4as Jornadas de Biologia na UTAD”, p 42, 20-21 Outubro, Vila Real.

Carlos, C., Val, M.C., Crespi, A. & Torres, L., 2010. Biodiversidade e protecção biológica de conservação contra pragas da vinha na Região Demarcada do Douro. In 12º Encontro Nacional de Ecologia, Porto, 18-20 Outubro de 2010, p.8 [Abstract]

Castro PM, Lima CF, Neves-Silva JP, Carvalho AC, Gomes AC., 2010. Dynamic role of reactive oxygen species and antioxidant cell response during myogenic differentiation. XXXV Jornadas de Portuguesas de Genética, Braga (Portugal), May 31-June 2, 2010.

Dias, L., Franco, E., Colaço, B., Pinto, A., Ventura, J., Pires, M.J., 2010. Contribuição para o estudo das alterações hepáticas induzidas pela ligadura do conducto biliar comum em ratos Wistar. In 4as Jornadas de Biologia, UTAD, Vila Real, 20-22 Outubro 2010. Livro de Resumos, pp.43.

Gomes, M., Alencão, A., Sousa, L., Gabriel, R., Moreira, H., Fernandes, A., Quaresma, L., Santos, J.A., 2010. A geodiversidade e os percursos pedestres na promoção da saúde: o exemplo das Arribas do Douro Internacional. In Congresso Nacional de Geologia, 8, Braga, Portugal.

Gonçalves, F., Rodrigues, C., Torres L.M.& Pereira, J.A., 2010. Survey of entomopathogenic fungi associated with the olive fruit fly, *Bactrocera oleae* (Gmelin) in the northeast of Portugal. In Kalaitzaki, Argyro. Integrated Protection of Olive Crops IOBC/wprs, Bull.Bragança. ISBN 978-92-9067-227-2.53, p.67 [Abstract]

Gonçalves, F., Torres L.M., 2010. Pupation depth of the olive fruit fly, *Bactrocera oleae* (Gmelin) and behaviour of the larvae in search of a place to pupate. In Kalaitzaki, Argyro. Integrated Protection of Olive Crops IOBC/wprs Bull.Bragança. ISBN 978-92-9067-227- 2.53, p.81 [Abstract]

Gonçalves, F., Torres L.M., 2010. Relationship between captures of adults of *Bactrocera oleae* (Gmelin) in McPhail and sex-pheromone chromotropic traps and infestation. In Kalaitzaki, Argyro. Integrated Protection of Olive Crops IOBC/wprs Bull. Bragança. ISBN 978-92-9067-227-2.53, p.80 [Abstract]

Gonçalves, I., Moutinho-Pereira, J., Correia, C.M., Malheiro, A., 2010. Respostas fisiológicas e bioquímicas da videira num contexto de variável disponibilidade hídrica. In WSCRA2010 - II workshop internacional sobre clima e recursos naturais nos países de língua portuguesa. Bragança, Portugal, 15 - 19 Novembro, pp.147-152.

Herz, A.& Torres L.M., 2010. Is the indigenous *Trichogramma nerudai* (Hymenoptera, Trichogrammatidae) a promising biological control agent to control the olive moth, *Prays oleae*, in Portugal?. In Kalaitzaki, Argyro. Integrated Protection of Olive Crops IOBC/wprs Bull.Bragança. ISBN 978-92-9067-227-2.53, p.106 [Abstract]

Leite, S., Santos, J.A., Marques, M., Gabriel, R., Moreira, H., Quaresma, L., Seródio, A., Gomes, E., Sousa, L., Alencão, A., Rosa, E., 2010. Clima, saúde humana e equilíbrio físico: uma perspectiva actual. In Clima e Recursos Naturais em Países de Língua Portuguesa, 2, Bragança Portugal. Livro de Resumos, 141.

Leite, S., Santos, J.A., Pablo, F., Rivas, L., Tomás, C., Garcia, E., Fragoso, M., 2010. Contribuição para a análise da distribuição das descargas eléctricas nuvem-solo na Península Ibérica. In Clima e Recursos Naturais em Países de Língua Portuguesa, 2, Bragança, Portugal. Livro de Resumos, 127-128.

Lima CF, Azevedo MF, Sá CM, Silva D, Fernandes-Ferreira M, Pereira-Wilson C., 2010. Biological assays for the investigation of antidiabetic properties of plant extracts. Plantas Aromáticas e Medicinais: aplicações, bioprodutos, bioactividades e biotecnologia, Advanced Workshops BioPlant 2010, Braga (Portugal), July 19-23, 2010.

Lima CF., 2010. Health improving effects of plant metabolites through induction of stress responses. 1<sup>o</sup> Workshop Anual BioPlant, Porto (Portugal), March 29-30, 2010.

Lima CF., 2010. Induction of cellular stress responses and antioxidant defences as a mechanism of health promotion of plant metabolites. Oxidative Stress and Antioxidants, Advanced Workshops BioPlant 2010, Braga (Portugal), July 5-16, 2010.

Lima CF., 2010. NaturAge: investigando as bases bioquímicas e moleculares das propriedades anti-envelhecimento de compostos naturais. I Jornadas de Bioquímica: as faces da bioquímica na Universidade do Minho, Braga (Portugal), May 24-25, 2010.

Malheiro, A.C., Santos, J.A., 2010. A videira e as condições meteorológicas do clima: variabilidade da precipitação e desenvolvimento da vinha. *Enovotis: Revista Técnica de Viticultura e Enologia* 21, 26-28.

Malheiro, A.C., Santos, J.A., 2010. Macrozonagem vitivinícola da Península Ibérica face a cenário de alteração climática. *Enovotis: Revista Técnica de Viticultura e Enologia* 22, 26-28.

Malheiro, A., Santos, J.A., 2010. Clima e Viticultura. In 4<sup>o</sup> Encontro Anual Meteolberia “Impactes Regionais do Clima e das Alterações Climáticas”, Universidade de Trás-os-Montes e Alto Douro, Vila Real.

Malheiro, A.C., Santos, J.A., Fraga, H., Pinto, J.G., 2010. Future scenarios for viticultural climatic zoning in Europe. In: *Proceedings of the VIII International Terroir Congress*, 3:90-95. 14-18 June, Soave, Italy.

Malheiro, A.C., Santos, J.A., Fraga, H., Pinto, J.G., 2010. Future scenarios for viticultural climatic zoning in Iberia. In: *Abstracts of 28th International Horticultural Congress, Volume II (Symposia)*: 704. August 22-27, Lisboa, Portugal.

Moreira, H., Ronaldo, G., Quaresma, L., Serôdio, A., Gomes, E., Alencão, A., Sousa, L., Santos, J.A., Mendonça, S., Rosa, E., 2010. Projecto FLUVIAL: uma intervenção multidisciplinar vocacionada para a promoção da saúde. In *Simpósio Internacional “Promoção da Saúde e Actividade Física: Contributos para o Desenvolvimento Humano”*, 1, Vila Real, Portugal.

Nave, A., Gonçalves, F., Campos, M. & Torres, L., 2010. O fomento da biodiversidade do olival no incremento da protecção biológica contra a traça-da-oliveira, *Prays oleae* (Bernard). In 12<sup>o</sup> Encontro Nacional de Ecologia, Porto, 18-20 Outubro de 2010 [Abstract]

Nave, A., Gonçalves, F., Rodrigues, M.C., Campos, M. & Torres, L., 2010. Incremento da actuação da crisopa-comum, *Chrysoperla carnea* (Stephens) no olival em agricultura biológica. In 3<sup>o</sup> Congresso Nacional de Agricultura Biológica biodiversidade e futuro. Braga, 18-19 de Novembro de 2010, p.38-39 [Abstract]

Pinto, T., 2010. Aplicação de uma Película Antitranspirante Após Descortiçamento em *Quercus suber* L.Seminário da Ordem dos Engenheiros "Novas Tecnologias na Floresta", Exponor, Porto, 21 de Outubro.

Rodrigues, R.& Torres L., 2010. Avaliação da selectividade de campo de *Bacillus thuringiensis* var.kurstaki sobre *Typhlodromus pyri* Scheuten (Acari: Phytoseiidae) em vinha. In 3º Congresso Nacional de Agricultura Biológica biodiversidade e futuro.Braga, 18-19 de Novembro de 2010, p.42. [Abstract]

Sá CM, Ramos AA, Lima CF, Pereira-Wilson C., 2010. Sage drinking improves plasma lipid profile, erythrocyte antioxidant defences and increases lymphocyte Hsp70.1º Workshop Anual BioPlant, Porto (Portugal), March 29-30, 2010.

Santos, J.A., 2010. A relevância na Análise Estatística em Climatologia, Seminários do Centro de Matemática, UTAD, Vila Real.

Santos, J.A., 2010. A viticultura na Europa e no Douro num contexto de alterações climáticas, Seminário no âmbito do Colóquio: "Alterações Climáticas - Oportunidades e Desafios para a Vitivinicultura do Douro", Liga dos Amigos do Douro Património Mundial, Vila Real.

Santos, J.A., 2010. Alterações Climáticas, Saúde e Percursos Pedestres, Workshop "Ciência, Percursos Pedestres, Recursos Naturais e Promoção da Saúde", UTAD, Vila Real.

Santos, J.A., 2010. Climate Change in Portugal: fundamentals and scenarios.Assessing change in a changing environment.Seminar of the Forestry Department, UTAD, Vila Real.

Santos, J.A., 2010. Modelação Atmosférica. I Semana do Ambiente, Universidade Fernando Pessoa, Porto, Portugal.

Santos, J.A., Malheiro, A.C., Karremann, M.K., Pinto J.G. (2010) Modelação estatística da produtividade da videira na Região do Douro. In InfoWine Forum - Congresso Técnico e Científico, Vila Real.

Santos, S.A.P., Pereira, J.A.Torres L.M. & Nogueira J.A., 2010. Coccinellids as potential predators of *Saissetia oleae* (Olivier). In Kalaitzaki, Argyro. Integrated Protection of Olive Crops IOBC/wprs Bull.Bragança. ISBN 978-92-9067-227-2.53, p.94 [Abstract]

Silva D., Lima C.F., Pereira D.M., Valentão P., Andrade P.B., Sottomayor M., Pereira-Wilson C., 2010. Induction of insulin secretion and antioxidant protection in S-cells: effects of *Catharanthus roseus* and compounds alone.1º Workshop Anual BioPlant, Porto (Portugal), March 29-30, 2010.

Silva, A.P., Gonçalves, B., Santos, J.A., Moutinho-Pereira, J., Trindade, H., Torres, L., Rosa, E., 2010. Mitigation of Climate Change Effects on Mediterranean Crops. In



Encontro Nacional de Ciência, Ciência 2010, 4, Fundação para a Ciência e Tecnologia, MCTES, Lisboa.

Silva, E., Correia, C.M., Moutinho-Pereira, J., Ferreira, H., Sampaio, A., Bacelar, E., 2010. Estudo de características fisiológicas de dois arbustos Mediterrânicos, *Arbutus unedo* L.e *Rhus coriaria* L. In livro de resumos das “4as Jornadas de Biologia na UTAD”, p 55, 20-21 Outubro, Vila Real.

Sousa, J., Santos, J.A., Leite, S., 2010. Análise de excedências e modelação do ozono troposférico em Portugal. In Clima e Recursos Naturais em Países de Língua Portuguesa, 2, Bragança, Portugal. Livro de Resumos, 97-98.

Torres, L., 2010. Biodiversidade funcional na vinha da R.D.D.: desafios e oportunidades. In Biodiversidade em viticultura: criação de valor entre ecologia e economia, Pinhão, 8 de Julho de 2010 [Abstract]

Torres, L.M., 2010. Arthropod pest management in olive groves in Portugal: present status and prospects. In Kalaitzaki, Argyro. Integrated Protection of Olive Crops IOBC/wprs Bull. Bragança. ISBN 978-92-9067-227-2.53, pp.3-4.

Xavier C.P.R., Lima C.F., Fernandes-Ferreira M., Pereira-Wilson C., 2010. Natural products as source of potential chemotherapeutic agents for the control of colon cancer progression - the case of *Salvia* extracts and some isolated compounds. Plantas Aromáticas e Medicinais: aplicações, bioprodutos, bioactividades e biotecnologia, Advanced Workshops BioPlant 2010, Braga (Portugal), July 19-23, 2010.

Xavier C.P.R., Ramos A.A., Pedro D., Lima C.F., Fernandes-Ferreira M., Pereira-Wilson C., 2010. Chemoprevention and antitumor effects of *Salvia officinalis* extract on colon cancer: involvement of the MAPK/ERK pathway.1<sup>o</sup> Workshop Anual BioPlant, Porto (Portugal), March 29-30, 2010.

### **Masters and Ph.D.theses completed**

MSc: Freitas, M.C.C. Efeito do stresse hídrico na fisiologia e composição bioquímica de *Mentha rotundifolia* L. 2<sup>o</sup> Ciclo em Biologia e Geologia para o ensino, UTAD; Supervisors: Teresa Pinto, Berta Gonçalves.

MSc: Martins, M.C.B. Estudo Morfo-Anatómico de Três Espécies Produtoras de Corantes Naturais. 2<sup>o</sup> Ciclo em Biologia e Geologia para o ensino, UTAD; Supervisors: Teresa Pinto, Eunice Bacelar.

MSc: Noronha, H.L. The effect of high-temperature on sugar transport in grape cells”. Mestrado em Fisiologia Molecular de Plantas, UM; Supervisors: Hernâni Gerós, Sandra Paiva.

MSc: Bulha, L. Caracterização do vento de Levante da costa sul do Algarve. Mestrado em Clima e Alterações Climáticas, UTAD; Supervisors: Eurico Vasco Ferreira Amorim and J.A. Santos.

MSc: Guerreiro, M. Análise sinóptica das condições de Levante. Mestrado em Clima e Alterações Climáticas, UTAD; Supervisors: J.A. Santos, Eurico Vasco Ferreira.

MSc: Simões, M.C. Aplicação multimédia para identificação de castas da Região Demarcada do Douro. Mestrado em Comunicação e Multimédia, UTAD; Supervisors: João Paulo Moura, Ana Alexandra Oliveira.

MSc: Silva, A.S. Aplicação multimédia de apoio ao Viticultor. Mestrado em Comunicação e Multimédia, UTAD; Supervisors: Paula Cristina Oliveira, Ana Alexandra Oliveira.

MSc: Morgadinho, M.C.O. Dinâmica de água no solo e consumo hídrico em Agricultura: Um caso de estudo em vinha na Região Demarcada do Douro. Mestrado em Clima e Alterações Climáticas, UTAD; Supervisors: Aureliano Malheiro, Anabela Silva.

MSc: Cardoso, V.F.M. Functional consequences of chemokine receptor heterodimerization. Mestrado em Biotecnologia para as Ciências da Saúde, UTAD; Supervisors: Amélia Silva, Marc Parmentier (Université Libre de Brussels, Belgique).

MSc: Pinto, F.M.T. Role of metastasis suppressor Raf Kinase Inhibitory Protein (RKIP) in Cervical Cancer. Mestrado em Biotecnologia para as Ciências da Saúde, UTAD; Supervisors: Amélia Silva, Rui Reis (UM).

PhD: Natacha Fontes. Tonoplast transporters mediating sugar accumulation in the vacuole of grape berry cells" (Financiamento FCT - SFRH/BD/23169/2005). PhD em Ciências. Supervisors: Hernâni Gerós, Serge Delrot (Universidade de Poitiers).

PhD: Andrade, C.M.M. Large-scale forcing functions. Thesis in Environmental Sciences, University of Évora. Supervisors: J.Corte-Real and J.A.Santos.

PhD: De Vasconcelos, M.C.B.M. Chestnut (*Castanea sativa* Mill.) fruit composition and quality - Effects of industrial processing on nutrients and secondary metabolites. Doutoramento em Ciências Agronómicas e Florestais, UTAD. Supervisors: Eduardo Rosa, Jorge Ferreira Cardoso.

PhD: Pereira, J.L.S. Emissões de amoníaco e de gases com efeito de estufa em instalações e gestão de efluentes de bovinicultura no NW de Portugal (in Portuguese). Doutoramento em Engenharia Rural, UTAD. Supervisors: Henrique Trindade, David R.Chadwick (Rothamsted Research, UK).

## Patents/prototypes

Paula Cristina Oliveira; João Paulo Moura; Ana Alexandra Oliveira "Metodologia não destrutiva e dispositivo para calcular o vigor e a expressão vegetativa das arbóreo-arbustivas e suas aplicações": PT 105163, 2010.

## Organization of conferences

28th International Horticultural Congress: Lisbon, 22-27 August 2010. Ana Paula Silva as member of Local Organising Committee and Eduardo Augusto dos Santos Rosa as member of Scientific and Programme Committee.

2nd Annual meeting of SAFENUT Project: Vila Real, UTAD, 16-18 March 2009, Ana Paula Silva as member of Organising Committee.

Oxidative Stress and Antioxidants, Advanced Workshops BioPlant 2010, Braga (Portugal), July 5-16, 2010. Lecturers: Alberto Dias, Cristóvão Lima, Franklin Gregory (CITAB-UM, UMinho, Braga, Portugal); Rui Oliveira (CBMA, UMinho, Braga, Portugal); Fernanda Fidalgo, Jorge Teixeira (BIOFIG, FCUP, Porto, Portugal). Organization: Alberto Dias WP1 & WP2 meeting (GP-TCM Project), "Best practice methods used for information analysis in Traditional Chinese Medicine", 2-4 December 2010. Organization: Alberto Dias

IV Reunião Ibérica de Pastagens e Forragens, Pastagens - Fonte Natural de Energia, Zamora – Miranda do Douro, 3 - 6 Maio, Henrique Trindade as member of Organising and Scientific Committee.

I Jornadas de Bioquímica "As faces da Bioquímica na Universidade do Minho". No evento participaram oradores da Escola de Ciências, da Escola de Engenharia e da Escola de Ciências da Saúde da Universidade do Minho, 24 e 25 de Maio de 2010. <http://jornadasbq.ecum.uminho.pt>. Organization: Hernâni Gerôs.

Workshop "Ciência, Percursos Pedestres, Recursos Naturais e Promoção da Saúde", UTAD, Vila Real. Organization and member of the Scientific Committee: João Carlos Andrade dos Santos.

"II Workshop Internacional sobre Clima e Recursos Naturais nos países de língua portuguesa: Estratégias para o estabelecimento de Serviços de informação climática na CPLP (WSCRA10)", Instituto Politécnico de Bragança, Bragança. Member of the Scientific Committee: João Carlos Andrade dos Santos.

Workshop: "Seminário Ibérico - Ciência, Pedestrianismo e Saúde: Promoção de Recursos Naturais do Território Transfronteiriço". Miranda do Douro. Organization and member of the Scientific Committee: João Carlos Andrade dos Santos.

Workshop: "4º Encontro Anual MeteoIberia: Impactes Regionais do Clima e das Alterações Climáticas", Universidade de Trás-os-Montes e Alto Douro, Vila Real.

Organization and member of the Scientific Committee: João Carlos Andrade dos Santos.

3º Congresso Nacional de Agricultura Biológica: biodiversidade e futuro. Braga, 18 e 19 de Novembro de 2010. Member organization: Laura Torres.

"II Encontro de Viticultura e Enologia". UTAD, Vila Real, 14-15 de Maio de 2010. Organization and member of the Scientific Committee: Ana Alexandra Oliveira.

Advanced course "Optical techniques for the in vivo study of photosynthesis". Programa Doutoral MAP BioPlant, UA, Aveiro, 7 a 9 de Julho de 2010. Organization: Ana Cunha (UM) e João Serôdio (UA).

4ªs Biojornadas – Biodiversidade. Universidade de Trás-os-Montes e Alto Douro, Vila Real, 20-22 de Outubro de 2010. Organization: Amélia M.Lopes Dias da Silva and other CITAB members.

Curso de Ilustração Científica (Acção de formação no âmbito de desenho biológico) a preto e branco. Universidade de Trás-os-Montes e Alto Douro, Outubro e Novembro de 2010 (40 horas de formação). Com 13 participantes. Ilustrador: Mestre Fernando Correia (Gradientes e Texturas & UA). Organization: Amélia Dias da Silva.

## Industry contract research

N/A

## Internationalization

Among others, SAC researchers have active and effective collaborations in several activities:

### i) Agronomy, climate change & environmental studies

Aristotle Univ. of Thessaloniki (Greece) (Prof. Filippos Aravanopoulos); FP7 consortium.

Biocentrum - Technical University of Denmark: join research (consultant) and publications; Active FCT Project (2010-2012).

Consejo Superior de Investigaciones Científicas (CSIC) Estación Experimental del Zaidín (Spain); Dr<sup>a</sup> Mercedes Campos Aranda is co-adviser of a FCT funded PhD thesis.

CRA, Consiglio per la Ricerca e la Sperimentazione in Agricoltura, Italy, (Dr. Damiano Avanzato): Join social ecological actions, divulgation book.

CRAB, Consorzio di Ricerche Applicate alla Biotecnologia, Italy, (Dr. Daniela Spera): Samples Analyses, and join EC project.

ENEA, Ente per le Nuove Tecnologie, l'Energia e l'Ambiente, Italy, (Dr. L. Bacchetta): Active AGRI GEN RES (EC) project (2007-2010), join research and communications in International Congress.

Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (Spain) Subdirección General de Investigación y Tecnología; "Red ibérica de evaluación de eficacia y efectos secundarios de tratamientos para el control de plagas en el olivar (Proyecto/Acción nº AC2009-00045-00-00).

IRTA, Institut de Recerca i Tecnologia Agroalimentàries (IRTA), Spain (Dr. Mercè Rovira): Join research and communications in International Congress, join EC project.

Lundbeck Pharmaceuticals: join research (consultant) and publications; Active FCT Project (2010-2012).

NAGREF - National Agricultural Research Foundation (Greece): (Prof Setefanos Diamandis), submitted FCT Project (2009); ( Dr Pavolina Drogoudi and Dr. Metzidakis, Institute of Olive Trees and Subtropical Plants), Samples Analyses.

Plant Research International B.V. Wageningen, NL (Doctor Rene van der Vlugt): Join research and join publications.

Univ. Santiago Compostela: (Prof Santiago Pereira Lorenzo), FP7 consortium, book chapter and collaborations in INTERREG projects; (Prof. Cristina Cabaleiro), Join supervision of PhD student and join publications.

Univ. Torino (Italy); Prof Roberto Botta; FP7 consortium.

Univ. Zagreb (Prof. Mirna Curkovic-Perica): FP7 consortium.

## **ii) Added-value plant products & co-products**

GRAB, Agropark (France) (Sophie Joy Ondet) Colaboration in Ph.D work programme, FCT Grant SFRH(BD/63468/2009).

HelmhotzZentrum Munchen – Institute of Stem Cell Research (ISF) (Germany): active FCT project PTDC/AGR-ALI/105169/2008.

King's College, London (UK): active project "Good Practice in Traditional Chinese Medicine Research in the Post-genomic Era (Acronyme: GP-TCM)" European Project (Cooperation).

KNUST, Ghana (Mr. Newton Amaglo): Ghanaian Plant Samples & Joint Papers.

Max Plank Institute (Cologne): Students Exchange (PhDs), Active Projects & Joint Papers.

SGGW, Poland (Prof. Ewa Rembiałkowska): Student Exchange (Erasmus), Active Projects & Joint Papers.

Swiss Federal Institute of Technology in Lausanne (Switzerland) & College of Engineering and Technology, University of Dar es Salaam (Tanzania) (Dr. Markus Schneider-Mmay): Sample Exchanges/Analyses & Joint Papers.

Univ. Bordeaux, France (Prof. Stéphane Quideau): Phytochemical Standards & Joint Papers.

Univ. Messina, Italy (Prof. Bruno Lo Curto): Sample Analyses & Joint Papers.

Univ. Novara, Italy (Prof. Marco Arlorio & Dr. Monica Locatelli): Sample Exchanges/Analyses & Joint Papers.

Univ. São Paulo (Prof. Beatriz Cordenunsi): Sample Analyses & Joint Papers.

Univ. Sri Jayewardenepura, Sri Lanka (Prof. KDDS Ranaweera): Joint Supervision of PhD Students, Provision of Sri Lankan Plant Samples, Joint Review Paper in 2010.

Univ. de Bordeaux – ISVV, France (Serge Delrot): Purification of protoplasts and intact vacuoles from grape berry tissues; transport experiments and molecular studies, proteomic and metabolomic analyses. Co-supervision of a PhD thesis and joint papers.

Univ. de Montpellier, Ecole Polytechnique (France) (Pascale Chalier) Collaboration in Ph.D work programme, FCT Grant SFRH(BD/63468/2009).

Univ. of Aarhus (Denmark) (Prof. Suresh Rattan): Scientific Advisement and Joint Papers.

Univ. of Leiden (Netherlands) (Robert Verpoorte): Metabolomics - Collaboration in the Ph.D work programme FCT Grants SFRH/BD/42513/2007.

### **Government/Organization contract research**

N/A

## 5.1.6 – Future research

### Objectives

We have set out the following specific objectives:

#### **Task #5.01 - Climate variability mechanisms:**

Study of dynamic mechanisms underlying the occurrence of precipitation and temperature extremes in Portugal and in Europe (e.g. identification of dynamical precursors) and their associated hydrological impacts will be the most important goals of this task.

#### **Task #5.02 - Atmospheric modelling and environmental impacts**

More detailed studies on viticultural zoning in Europe will be undertaken using state-of-the-art observational datasets. The inter-annual variability of several bioclimatic indices relevant to viticultural zoning will be assessed in greater detail (by applying multivariate statistical approaches) and related to the atmospheric large-scale circulation;

#### **Task #5.03 – Biodiversity as a potential resource for sustainable development: Selection, characterization and conservation of plant resources**

Chestnut fruit polispermic tendency will be analysed by controlled pollinations using different *C. sativa* pollinators. A germ bank will be prepared to preserve different genotypes from Côta variety; genotypic screening using molecular markers will be carried out. A project is in preparation for submission to the European commission – “Community programme on genetic resources in agriculture”, with partners from 6 countries to continue the studies on the Safenut project. Studies on chestnut metabolite composition will continue. Analyses on fibre, organic acids and phenolics compounds will be carried out on wild blueberries.

#### **Task #5.04 - Increasing functional biodiversity in olive groves and vineyards**

We intend to develop studies to evaluate nectar accessibility for insects and native plants pre-selected during 2010 by assessing other pre-selected species. Phytochemicals and sugars in pollen and nectar as well as in *Sternorrhynchae* honeydews will be extracted and analysed. Volatiles released from different plant species infested by theoretical alternative hosts for the natural enemies will be screened for potential natural enemies' attractant. An ecological infrastructure network will be designed for selected pilot Porto Wine Region farms, using new methods of landscape spatial analysis for pest management, and quantification of biodiversity and ecological services.

**Task #5.05 - Environmental impact effects on plant composition**

Abiotic stresses can increase the biosynthetic secondary metabolites such as phenolics, with beneficial effects in human health. We intend to continue studies in this subject, particularly: to analyse the antioxidant activity of aqueous or methanolic extracts of aromatic and medicinal plants; antioxidant activities of chestnut fruits of *Castanea sativa* from different ecotypes.

**Task #5.06 - Trace gas emissions from agricultural systems under climate change scenarios**

Assessment of ammonia and greenhouse gas emissions from rice paddies in Mediterranean conditions under elevated atmospheric CO<sub>2</sub> and temperature will continue and associations between gas emissions and cropping practices, soil type, climatic parameters, and N cycle key-processes, like nitrification will be studied.

**Task #5.07 - Design and improvement of cropping practices and mitigation measures**

We will focus on the implementation of two FCT projects: “Short-term climate change mitigation strategies for Mediterranean vineyards” and “Cover cropping - the decisive strategy for the sustainable management of the rainfed olive orchards”; other activities will include studies on the chestnut interaction with abiotic and biotic factors to develop greater resistance to ink disease.

**Task #5.08 - Mitigation of animal manure and agro-food wastes impacts- Cycles of nutrients; residues processing and reuse**

Gas emission measurements from stored animal slurries will be made following chemical and biological treatment methods. The kinetics of gas emissions will be assessed under temperature scenarios corresponding to winter and summer conditions. We will investigate the effects of phytochemical compounds on the composting process and degradation pattern of compounds during the composting process.

**Task #6.01 – Composition and Health Effects Studies of Portuguese and International Foods**

Continued analytical support for researchers in SAC/CITAB and other Researchers/Research Centers in UTAD – specifically further development of collaborations with CECAV. We aim to increase critical mass in the cell model area, a key research area for studying the health effects of dietary phytochemicals. This will be partly developed through an FCT funded post-Doctoral scholarship, a new project and scholarships proposals in 2011. In parallel with the co-products area (6.01) we will further development fundamental nutrient and compositional studies via international and national project proposals involving Anchor Institutes, Stakeholders (Ceres) and International Collaborators.



### **Task #6.02 - Added Value Co-Products Derived from Portuguese Agro-Food Wastes**

Phytochemical biopesticides and “green manures”: we aim to identify effective natural products (phytochemicals and secondary metabolites from non-plant organisms) that can be used in the food chain to control economically important pathogens, food pests and also diseases of animals and humans e.g. pesticide resistant bacterial and fungal pathogens of crops and antibiotic resistant bacteria in animals and humans. This research involves researchers from ACES and APPC and also an important collaboration with the Microbiology group of CECAV.

Functional Food Compounds from Agro-Food Wastes: Agro-food wastes have great potential as sources of functional food ingredients including phytochemicals, dietary fibre and important nutrients and minerals. This sub-task involves collaboration between ACES and APPC and also the Animal Nutrition group in CECAV.

Pragmatic and Effective Processing of Agro-food Wastes: An important issue in food production is the generation and subsequent disposal of wastes (solid and liquid). There is great potential to develop low-cost processing and extraction methods for many of these materials, generating added-value co-products and simultaneously reducing/eliminating negative environmental and health impacts (projects within sub-tasks 6.02.1 and 6.02.2). Sub-task 6.02.3 involves various stakeholders e.g. CERES, DOUROMEL, COOPERATIVAS DE AZEITE, SORTEGEL and SOUSACAMP.

### **Task #6.03 Bioproducts & Biotechnology**

For the next year this task will focus on the following axes:

Study of results on solute (sugars/acids/phenolics) transport/metabolism in grapevine, under the effect of heat and drought. Evaluation of the utilization of biological control agents and biopesticides against esca e vineyards is underway and is expected to produce results in 2011. We will study the effect of plant polyphenols on intestinal SGLT1 glucose transporters, insulin secretion from beta-cells, mechanisms of colon anti-cancer effects. We will also study the use of plant extracts for obtaining functional foods with antioxidant and neuroprotective activities. The nanoencapsulation of plant extracts and selected compounds with the aim of brain targeting will be studied.

### **Pending and expected funding**

Not available

## 5.2 – EcoinTEGRITY

### 5.2.1 – Group description

Principal Researcher	Rui Manuel Vitor Cortes
Research area	Environment
Home Institution	Universidade de Trás-os-Montes e Alto Douro

### 5.2.2 – Funding

	2009	2010
FCT Projects	166.288,00 €	638.918,00 €
Other (National)	1.042.492,26 €	1.659.081,45 €
Other (International)	503.550,00 €	80.000,00 €
Industry (National)	0,00 €	15.000,00 €
Industry (International)	0,00 €	0,00 €
<b>Total</b>	<b>1.712.330,26 €</b>	<b>2.392.999,45 €</b>

### 5.2.3 – Objectives

Research in this group focuses on ecosystem characterization (natural or changed by human activities) at different scales of observation. Results are used to select appropriate ecological indicators or ecosystem processes that allow us to model the different component dynamics and to set guidelines for ecosystem management, namely the conservation of natural resources and biodiversity or the restoration of disturbed areas or target species. The EI Group research is grouped into two main projects:

#### i) Biodiversity in aquatic ecosystems and biotechnology

This project develops assessment tools to detect and quantify environmental impacts and their role on the sustainability of natural ecosystems (terrestrial and aquatic) and agro-systems. The project includes practical applications such as the

the development of models to predict the dynamism of populations, communities or key components of ecosystem function and also the rehabilitation of disturbed ecosystems at various levels, from the treatment of toxic wastes to the recreation of habitats and biodiversity. Major scientific activities include:

- Studies of contamination and extreme natural or human events on hydromorphological and biological processes and their dynamics in inland waters (rivers and reservoirs). Selection of appropriate bioindicators. Catchment management and mitigation or rehabilitation of degraded ecosystems in accordance with EU Directives.
- Effects and mechanisms related to water contamination on fish populations based on the most suitable biomarkers (linked to reproduction, histopathological changes, oxidative stress, etc.).
- Dynamic and spatially dynamic predictive modelling of ecological indicators associated with different impacts, functional biodiversity and planning of conservation measures for endangered or high economical value species (from wildlife to hunting species).
- Application of biotechnological processes to improve ecosystems, namely the use of microorganisms in sewage treatment and in nutrient cycling.

#### **ii) Disturbance of forest and agro-forested ecosystems**

This project focuses on the natural or human induced factors of disturbance acting on forests, woodlands and agro-forest systems with particular relevance on abiotic factors, like fire and biotic ones, like disease and plagues. The role of climatic factors on the disturbance magnitude is also included. This project develops models that explain spatial and temporal patterns and regimes of disturbance. The final objective is to develop management-oriented guidelines for mitigation and adaptation to disturbance. Major scientific activities include:

- The study of interactions between the role of vegetation (fuel) and climatic parameters in explaining the fire regime.
- The determination of temporal and spatial trends and spatio-temporal clustering of fires.
- The role of the pathogenic agents on the forest productivity (e.g. pine processionary moth).
- The management of protected areas to promote biodiversity and endemic taxa (e.g. the conservation of the blue alcon butterfly) in the Alvão Natural Park.

### 5.2.4 – Main achievements

The number of researchers working in the '**Biodiversity in aquatic ecosystems and biotechnology**' project was considerably enlarged by contracting new Masters level members to carry out tasks and goals in projects funded by both the private and public sectors. The most relevant achievements were:

1. Integrated assessments of aquatic ecosystems (running waters and reservoirs) covering northern Portugal and different typologies, by integrating data from different aquatic communities, physical features and chemical data. New procedures were established to assess how specific taxa can be associated with the magnitude of different stressors.
2. Definition of integrated tools for hydromorphological rehabilitation of disturbed aquatic ecosystems, using soil conservation techniques to stabilize banks and improve riparian layers to promote biodiversity and reduce fluvial erosion.
3. Improvement of existing monitoring systems to assess the condition of aquatic habitats and river corridors.
4. Analysis of distinct environmental scale effects on the aquatic communities, from soil use at catchment level to habitat level phenomena. These aspects are relevant for catchment management plans and restoration procedures.
5. Collection of information on the ecology of bivalve populations with high conservation value, obtaining distribution patterns and their dependence on specific fish populations or the impact of exotic species.
6. A new Spatially Explicit Stochastic Dynamic Methodology has been developed to produce simulation models that generate spatially ecological patterns to manage and maintain ecological values. This approach provides a useful starting point to develop more global techniques, and create rapid GIS interfaces that produce more instructive, credible and intuitive modelling outputs to decision-makers and environmental managers.
7. Fungal pre-treatment of fibrous residues has been carried out. It has been demonstrated as a viable alternative to non-biological processes. *Jatropha curcas* L. seed cake obtained after oil extraction (for biodiesel) was detoxified by fungal fermentation promoting the added value of this residue as animal food. The distribution of filamentous fungi and yeasts in polluted and unpolluted rivers has been assessed. We collaborated on the development of molecular technology for detection and specific identification of the yeast *Cryptococcus neoformans*.

The '**Disturbance of forest and agro-forested ecosystems**' project has achieved:

1. Greater knowledge on the fire ecology of Portuguese forests. Post-fire tree mortality models for pine and broadleaved species have been developed. Fire severity differences in the transition of maritime pine forest to less flammable forest types have been assessed. The relationships between recurrent fires, fire severity and fuel dynamics have been quantified for maritime pine.

2. Identification and quantification of temporal clustering structures in fire sequences (1980-2005) in Portugal, revealing daily and annual periodicities superimposed to a scaling behaviour. Links between vegetation and the fire regime have been established, namely the effect of weather on the fuel-age dependency of fire frequency.

3. Assessment of defoliation effects of the pine processionary moth (*Thaumetopoea pityocampa*) on pine biomass growth, and modelling of its outbreaks under future climate scenarios.

4. Study of the ecology of the blue alcon butterfly (*Maculinea alcon*) life cycle, which is relevant to the conservation of this threatened species. Flight periods were determined as were oviposition preferences. Host ant species were identified.

## 5.2.5 – Group productivity

### International Projects

Advances in Homogenization Methods of Climate Series: an Integrated Approach (HOME). ESF, COST ACTION 306/06. Project coordinator CITAB: Mário Jorge M. Gonzalez Pereira. Total budget CITAB/UTAD: 0 Euro.

FIRE PARADOX an Innovative Approach of Integrated Wildland Fire Management Regulating the Wildfire Problem by the Wise Use of Fire: Solving the Fire Paradox. FP6, FP6-018505. Project coordinator CITAB: Paulo Alexandre Martins Fernandes. Total budget CITAB/UTAD: 503.550,00 Euro. Starting date: 2006, duration: 48 months.

Forest fires under climate, social and economical changes in Europe, the Mediterranean and other fire-affected areas of the world (FUME). FP7, ENV-243888-2009. Project coordinator CITAB: Mário Jorge M. Gonzalez Pereira. Total budget CITAB/UTAD: 0 Euro. Starting date: 2010, duration: 36 months.

Post-fire Forest Management in Southern Europe. ESF, COST Action FP0701. Project coordinator CITAB: Paulo M. Fernandes. Total budget CITAB/UTAD: 0 Euro. Starting date: 2008, duration: 60 months.

### National Projects

Urban green structure: study of the relation between public space morphology and flora and fauna diversity in the city of Porto. FCT, PTDC/AUR-URB/104044/2008. Project coordinator CITAB: Frederico Meireles.

An Integrative Study on the Toxipathic Lesions in Portuguese Estuarine Fishes – Assessing Injury Impact and Toxicogenomic Implications in Experimental Modes.

FCT, PTDC/MAR/70436/2006. Project coordinator CITAB: António Augusto Fontainhas Fernandes. Total budget CITAB/UTAD: 19.820,00 Euro.

Technical and Scientific support to INAG concerning the complaint lodged in Brussels concerning the “Plano Nacional de Barragens de Elevado Potencial Hidroeléctrico”. Project coordinator CITAB: Rui M. V. Cortes. Starting date: 2010, duration: 18 months.

AQUARIPORT – National monitoring programme of freshwater fish resources and ecological monitoring of river systems. National Forest Authority. Project coordinator CITAB: João M. Oliveira. Total budget CITAB/UTAD: 36.000,00 Euro. Starting date: 2010.

Boticas Park: Nature and Biodiversity. Boticas Municipal Council. Project coordinator CITAB: António Fontainhas-Fernandes. Total budget CITAB/UTAD: 176.280,00 Euro.

“Conhecer é Proteger”. ON.2/QREN. Project coordinator CITAB: António Fontainhas Fernandes. Total budget CITAB/UTAD: 65.383,56 Euro. Starting date: 2010, duration: 24 months.

Cover cropping: the decisive strategy for the sustainable management of the rainfed olive orchards. FCT, PTDC/AGR-AAM/098326/2008. Project coordinator CITAB: José Albino Alves Dias. Total budget CITAB/UTAD: 93.847,00 Euro.

Desenvolvimento de inóculos micorrízicos e aproveitamento micológico em áreas marginais. QREN/Agência de Inovação, microproject 1589. Project coordinator CITAB: Guilhermina Marques. Total budget CITAB/UTAD: 418.764,91 Euro.

Development of a behavioural barrier for fish. PROFICO-Ambiente. Project coordinator CITAB: Rui M. V. Cortes. Total budget CITAB/UTAD: 43.428,26 Euro. Starting date: 2010, duration: 36 months.

Effect of phytochemicals on organic matter transformation and on key processes of carbon and nitrogen cycles in soil. FCT, PTDC/AGR-AAM/102006/2008. Project coordinator CITAB: Guilhermina Marques. Total budget CITAB/UTAD: 125.660,00 Euro. Starting date: 2010, duration: 36 months.

Evolution of North Atlantic Climate; the role of Blocking and Storm-tracks in the Past, Present and Future climate of Southern Europe (ENAC). FCT, PTDC/AAC-CLI/103567/2008. Project coordinator CITAB: Mário Jorge M. Gonzalez Pereira. Total budget CITAB/UTAD: 0 Euro. Starting date: 2010

Factors affecting the post-fire natural regeneration variability in *Pinus pinaster* and *Eucalyptus globulus* in Portugal: implications for biodiversity and post-fire management. FCT, PTDC/AGR-CFL/099420/2008. Project coordinator CITAB: Paulo Alexandre Martins Fernandes. Total budget CITAB/UTAD: 38.338,00 Euro. Starting date: 2010, duration: 36 months.

Fire – Land – Atmosphere Inter-Relationships: understanding the processes to predict wildfire regimes in Portugal (FLAIR). FCT, PDC/AAC-AMB/104702/2008. Project coordinator CITAB: Mário Jorge M. Gonzalez Pereira. Total budget CITAB/UTAD: 21.240,00 Euro. Starting date: 2010, duration: 36 months.

Digital Flora of Portugal. Luso-spanish collaborative actions. Project coordinator CITAB: António Crespí. Total budget CITAB/UTAD: 39.500,00 Euro.

Mixed forests: modelling, dynamics and distribution, geography of productivity and Carbon fixation in Portuguese mixed forests. FCT, PTDC/AGR-CFL/68186/2006. Project coordinator CITAB: Domingos Lopes. Starting date: 2007, duration: 36 months.

ForeStake – the role of local agents in the success of forestry politics in areas affected by fire in Portugal. FCT, PTDC/AGR-CFL/099970/2008. Project coordinator CITAB: Paulo M. Fernandes. Starting date: 2010, duration: 36 months.

Increasing functional biodiversity in olive groves to enhance conservation biological control of insect pests. FCT, PTDC/AGR-AAM/100979/2008. Project coordinator CITAB: Laura M. Torres. Total budget CITAB/UTAD: 107.800,00 Euro. Starting date: 2010, duration: 36 months.

Master-Plan Sta. Cruz do Bispo. Matosinhos Municipal Council. Project coordinator CITAB: António Fontainhas Fernandes. Total budget CITAB/UTAD: 29,340.00.

Compensatory measures MC 10 – Programme for the protection and assessment of reptiles, amphibians and invertebrates in the Sabor valley as part of the Sabor Hydroelectric scheme. PROFICO Ambiente. Project coordinator CITAB: Rui M. V. Cortes. Total budget CITAB/UTAD: 25.000,00 Euro.

Compensatory measures MC 9 – Programme for the protection and assessment of riparian avifauna in theNW Transmontano region; part of the Sabor Hydroelectric scheme PROFICO Ambiente. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 85.257,33 Euro.

Monitoring of avian activity and mortality in the Ribabelide and Lagoa de D. João wind parks. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 15 869,07 Euro.

Monitoring of avifauna in the future area of the electricity lines at PE Alto da Coutada. ECOSFERA. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 7.765,33 Euro.

Monitoring of avifauna in the Montesinho Natural Park. Airtricity. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 12.961,33 Euro.

Monitoring of bird activity and mortality by towers for measuring eolic potential Montesinho Serra. Airtricity. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 11.301,33 Euro.

Monitoring of Avifauna in the Negrelo and Guilhado Wind Parks. ECOSFERA. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 7.386,67 Euro.

Monitoring of Quiroptera and avifauna in the Sobrado Wind Park. EnergieKontor. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 103.480,00 Euro.

Monitoring of Quiroptera in railway tunnels of the Tua line. Profico Ambiente. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 3.896,00 Euro.

Monitoring of Quiroptera in the Alto da Coutada wind park. ECOSFERA. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 17.048,43 Euro.

Monitoring of Quiroptera in the Negrelo e Guilhado wind parks. ECOSFERA. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 4.312,00 Euro.

Monitoring of Quiroptera in the Outeiro wind park. FINERGE. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 34.537,32 Euro.

Monitoring of Quiroptera in the Serra do Alvão wind park. COLMUS. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 6.300,00 Euro.

Monitoring of Quiroptera in the Serra do Ralo e Alto do Monção wind parks. COLMUS. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 15.169,00 Euro.

Monitoring of impacts on avifauna and habitat and vegetation distribution in the Mafômedes wind park, including monitoring of the effect of excluding birds from the associated electricity power cable. EnergieKontor. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 11.494,40 Euro.

Monitoring of ecosystems in the Penedo Ruivo, Seixinhos and Mafômedes wind parks. EnergieKontor. Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 23.040,00 Euro.

Ovary apoptosis in zebrafish (*Danio rerio*): pathways characterization, role in sexual differentiation and as endocrine disruptors. FCT, PTDC/CVT/102453/2008. Project coordinator CITAB: Ana Coimbra. Starting date: 2010, duration: 36 months.

The regulatory role of “azinçais” in the propagation of forest fire: defining planning measures and landscape scale management strategies. FFP/IFAP. Project coordinator CITAB: Paulo M. Fernandes. Starting date: 2008, duration: 48 months.

Integrated Management Plan of site PTCON0025 Montemuro. ON2. Project coordinator CITAB: Aurora Monzón. Total budget CITAB/UTAD: 65.000,00 Euro.



Inventory and monitoring plan for target species in Sernancelhe: Freshwater Pearl Mussel (*Margaritifera margaritifera*), Lusitanian Salamander (*Chioglossa lusitanica*), The Pyrenean Desman (*Galemys pyrenaicus*), the Iberian Wolf (*Canis lupus signatus*). Project coordinator CITAB: João A. Cabral. Total budget CITAB/UTAD: 73.791,90 Euro. Starting date: 2010, duration: 48 months.

Requalification of the banks of the Lima Estuary in the areas of Cardielos and Portuzelo. Viana do Castelo Municipal Council. Project coordinator CITAB: Rui M. V. Cortes. Total budget CITAB/UTAD: 40.000,00 Euro. Starting date: 2010, duration: 18 months.

Collaborative Protocol – part of the Project to valorize riparian galleries of the Odelouca Enterprise. Project coordinator CITAB: Rui M. V. Cortes. Starting date: 2010, duration: 18 months.

SeivaCorgo. ON2/QREN, Vila Real Municipal Council. Project coordinator CITAB: António Augusto Fontainhas Fernandes. Total budget CITAB/UTAD: 184,021.64 Euro.

Study of the effect of basidiomycetic fungi in the detoxification of the *Jatropha curcas* fruit. GALP. Project coordinator CITAB: Jose Albino Alves Dias. Total budget CITAB/UTAD: 15,000.00.

## **Publications in peer review Journals**

Arnaldo, P.S. Moreira, J., Oliveira, I. 2010. Habitat associations of Odonata species in mountainous water sites in the North Portugal. *Odonatologica*, 185-193.

Catry, F.X., Rego, F., Moreira, F., Fernandes, P.M., Pausas, J.G. 2010. Post-fire tree mortality in mixed forests of central Portugal. *Forest Ecology and Management* 260, 1184–1192.

Dias, A.A., Freitas, G.S., Marques, G.S.M., Sampaio, A., Fraga, I.S., Rodrigues, M.A.M., Evtuguin, D.V., Bezerra, R.M.F. 2010. Enzymatic saccharification of biologically pre-treated wheat straw with white-rot fungi. *Bioresource Technology* 101, 6045–6050.

Fernandes, P. M., Luz, A, Loureiro, C. 2010. Changes in wildfire severity from maritime pine woodland to contiguous forest types in the mountains of northwestern Portugal. *Forest Ecology and Management* 260, 883–892.

Hughes, S.J., Santos, J., Ferreira, T.M., Mendes, A. 2010. Evaluating the response of biological assemblages as potential indicators for restoration measures in an intermittent Mediterranean river. *Environmental Management* 46, 285–301.

Martins, M.L., Ferreira, A.S., Sampaio, A., Vieira, R. 2010. Direct and specific identification of *Cryptococcus neoformans* in biological samples using

fluorescently labelled DNA probes. *European Journal of Clinical Microbiology and Infectious Diseases* 29, 571–576.

Monteiro, S.M., Fontainhas-Fernandes, A., Sousa, M. 2010. An immunohistochemical study of gill epithelium cells in the Nile tilapia, *Oreochromis niloticus*. *Folia Histochemica et Cytobiologica* 48, 112-121.

Monteiro, S.M., Oliveira, E., Fontainhas-Fernandes, A., Sousa, M. 2010. Fine structure of the branchial epithelium in the teleost *Oreochromis niloticus*. *Journal of Morphology* 271, 621–633.

Pinto, A.L., Varandas, S.; Coimbra, A.M., Carrola, J., Fontainhas-Fernandes, A. 2010. Mullet and gudgeon liver histopathology and macroinvertebrate indexes and metrics upstream and downstream from a wastewater treatment plant (Febros River—Portugal). *Environmental Monitoring and Assessment* 169, 569–585.

Rebelo R., Amaral, P., Bernardes, M., Oliveira, J., Pinheiro, P., Leitão, D. (2010). *Xenopus laevis* (Daudin, 1802), a new exotic amphibian in Portugal. *Biological Invasions* 12, 3383–3387.

Rodrigues, M.A.M., Bezerra, J R.M.F., Dias, A.G.A., Guedes, C.V.M., Ferreira, L.M.M., Nunes, F. 2010. Could basidiomycetes fungi be an alternative for the treatment of fibrous feedstuffs? Application of enzymatic complexes and future prospects. *Revista Brasileira de Zootecnia* 39, 519–527.

Santos, M., Bastos, R., Travassos, P., Bessa, R., Repas, M., Cabral, J. A. 2010. Predicting the trends of vertebrate species richness as a response to wind farms installation in mountain ecosystems of northwest Portugal. *Ecological Indicators* 10, 192–205.

Silva-Santos, P., Valentim, H., Luís, A., Queirós, L., Travassos, P., Cabral, J.A. 2010. A Stochastic Dynamic Methodology (StDM) to simulate the effects of fire on vegetation and bird communities in *Pinus pinaster* stands. *Ecological Indicators* 10, 206–211.

Silva, J.P., Santos, M., Queirós, L., Leitão, D., Moreira, F., Pinto, M., Leqoc, M., Cabral, J. 2010. Estimating the influence of overhead transmission power lines and landscape context on the density of little bustard *Tetrax tetrax* breeding populations. *Ecological Modelling* 16, 1954–1963.

Soares, A.A, Ferreira, J.M., Caramelo, L., Anacleto, J., Chhabra, R.P. 2010. Effect of temperature-dependent viscosity on forced convection heat transfer from a cylinder in crossflow of power-law fluids. *International Journal of Heat and Mass Transfer* 53, 4728–4740.

Telesca, L., Pereira, M.G. 2010. Time-clustering investigation of fire temporal fluctuations in Portugal. *Natural Hazards and Earth System Sciences* 10, 661–666.

Varandas, S., Cortes, R. 2010. Evaluating macroinvertebrate biological metrics for ecological assessment of streams in northern Portugal. *Environmental Monitoring and Assessment* 166, 201–221.

### Other publications International

Amraoui, M., Calado, T., Pereira, M.G., Camara, C.C. 2010. High fire activity and associated atmospheric circulation patterns over the Mediterranean basin. In: *Geophysical Research Abstracts*, Vol. 12.

Arnaldo P.S., Chacim, S., Lopes, D. 2010. Effects of defoliation by the pine processionary moth, *Thaumetopoea pityocampa* on biomass growth of young stands of *Pinus pinaster* in Northern Portugal. *iForest - Biogeosciences and Forestry* 3, 159-162.

Arnaldo, P.S., Leite, S., Santos, J., Pinto, J. 2010. Climate Change and Forest Plagues: the Case of the Pine Processionary in Northeastern Portugal. In: *Mixed and Pure Forests in a Changing World*.

Ascoli, D., Esposito, A., Seneca, U., Strumia, S., Rutigliano, F.A., Catalanotti, A.E., Salgueiro, A., Palheiro, P., Rebelo, A., Mazzoleni, S., Bovio, G., Fernandes, P. 2010. Using *Piropinus* to assess fuel reduction effectiveness of prescribed burning in a *Pinus halepensis* plantation in southern Italy. In: Viegas, D.X. (Ed.), *Proceedings of the 6<sup>th</sup> International Conference on Forest Fire Research, ADAI*.

Barbati, A., Arianoutsou, M., Corona, P., de Las Heras, J., Fernandes, P., Moreira, F., Papageorgiou, K., Vallejo, R., Xanthopoulos, G. 2010. Post-fire forest management in southern Europe: a COST action for gathering and disseminating scientific knowledge. *iForest - Biogeosciences and Forestry* 3, 5–7.

Calheiros, T., Pereira, M.G., Da Camara, C.C. 2010. Assessment of the potential effects of regional climate change on wildfires. In: *Geophysical Research Abstracts*, Vol. 12.

Caramelo, L., Gonçalves, N., Pereira, M.G., Soares, A., Naia, M. 2010) Graphic representations: keys to disclose the codex of nature. In: *Geophysical Research Abstracts*, Vol. 12.

Caramelo, L., Manso, M.D., Soares, A.A. 2010. Spatio-temporal variability of Iberian Peninsula water budget. In: *Geophysical Research Abstracts*, Vol. 12.

Carvalho, J. 2010. Performance of mechanical forest vegetation clearing technique and litter decomposition. *Spanish Journal of Rural Development* 1, 89–98.

Carvalho, J., Loureiro, A., Bariteau, M. 2010. Provenances trial of *Cedrus atlantica* Manetti in North-eastern Portugal. In: Souvannavong, O.M., Malagnoux F.D., Besacier, C. (Eds.), *Resources in the Mediterranean Region. IUFRO 20213 – Breeding and Genetic Resources of Mediterranean Conifers. FAO & IUFRO*.

Cortes, R.M.V., Varandas, S.G., Hughes, S.J., Jesus, J.J.B., Pinto, A.L.P., Martins, J.M.S. 2010. Elaboração de um plano estratégico de monitorização das massas de água do Norte de Portugal. In: Livro de Resumos XV Conference of the Iberian Limnological Association (AEL). p.161.

Dias, A.A., Lucas, M.S., Sampaio, A., Peres, J.A., Bezerra, R.M.F. 2010. Decolorization of azo dyes by yeasts. In: Atacag Erkurt, H. (Ed.), Biodegradation of Azo Dyes , The Handbook of Environmental Chemistry Vol. 9. Springer. p. 183–193.

Diogo, P., A.,E., Aranha, J.T.M. 2010. GIS Analysis of the antidote programme in Portugal. In: Azevedo, J.C., Feliciano, M., Pinto, M.A., Castro, J.P. (Eds.), Forest Landscapes and Global Change - New Frontiers in Management, Conservation and Restoration, Abstracts of the IUFRO Landscape Ecology Working Group International Conference. IPB: Bragança.

Fernandes, P., Loureiro, C., Ascoli, D., Cabré, M., Castellnou, M., Jimenez, E., Kraus, D., Lambert, B., Molina, D., Palheiro, P., Rigolot, E., Rydqvist, T., Vega, J.A. 2010. European burn prescriptions. In: Viegas, D.X. (Ed.), Proceedings of the 6<sup>th</sup> International Conference on Forest Fire Research, ADAI.

Fernandes, P.M. 2010. Creating fire smart forests and landscapes. *Forêt Méditerranéenne* 31(4): 411-417.

Fernandes, P.M. 2010. Scientific knowledge and operational tools to support prescribed burning: recent developments. In: Silva, J.S., Rego, F., Fernandes, P., Rigolot, E. (Eds.), Towards Integrated Fire Management – Outcomes of the European Project Fire Paradox. EFI Research Report 23. Joensuu: EFI. 151–159.

Fernandes, P.M., Fernandes, M., Loureiro, C. 2010. Remnants of *Pinus pinaster* forest left by wildfire in northern Portugal: patch structure, fire severity and the fire regime. In: Viegas, D.X. (Ed.), Proceedings of the 6<sup>th</sup> International Conference on Forest Fire Research, ADAI.

Fernandes, P.M., Loureiro, C., Magalhães, M., Ferreira, P. 2010. Testing the fire paradox: is fire incidence in Portugal affected by fuel age? In: Azevedo, J.C., Feliciano, M., Castro, J., Pinto, M.A. (Eds.), Forest Landscapes and Global Change - New Frontiers in Management, Conservation and Restoration, Proceedings of the IUFRO Landscape Ecology Working Group International Conference, IPB, Bragança. p. 705-710.

Ferreira, J., Pádua, J., Hughes, S.J., Varandas, S.G., Valentim, H., Furtado, A., Romão, F., Cortes, R. 2010. Avaliação da qualidade hidromorfológica no âmbito da aplicação da Directiva Quadro Da água: implementação da metodologia River Habitat Survey em Portugal continental. In: XV Conference of the Iberian Limnological Association (AEL).

Ferreira, M., Aranha, J. 2010. Mapping forest types, land cover and land cover changes of East Timor using multi-temporal Landsat. In: IUFRO Conference, Lugo (Galicia, Spain).

Malik, A., Calado, T., Pereira, M.G., Da Camara, C.C. 2010. High fire activity and associated atmospheric circulation patterns over the Mediterranean basin. In: Geophysical Research Abstracts, Vol. 12.

Martinho, H., Fonseca, T., Aranha, J., Martins, L. 2010. Climatic hazard assessment mapping for *Pinus pinaster* stands. In: Mixed And Pure Forests in a Changing World. IUFRO Conference.

Martins, M.G.C., Aranha, J. 2010. Electrical network hazard assessment for the avifauna in Portugal. In: Azevedo, J.C., Feliciano, M., Pinto, M.A., Castro, J.P. (Eds.), Forest Landscapes and Global Change - New Frontiers in Management, Conservation and Restoration, Abstracts of the IUFRO Landscape Ecology Working Group International Conference. IPB: Bragança..

Monzón, A., Crespi, A.L., Fernandes, P., Barros, P. 2010. Which arrangement of landscape for wild rabbit? In: Azevedo, J.C., Feliciano, M., Pinto, M.A., Castro, J.P. (Eds.), Forest Landscapes and Global Change - New Frontiers in Management, Conservation and Restoration, Abstracts of the IUFRO Landscape Ecology Working Group International Conference. IPB: Bragança.

Nogueira, M., Teixeira, A.T., Varandas, S., Lopes-Lima, M., Hinzmann, M., Machado, J., Cortes, R.M. 2010. Caracterização ecológica das populações de mexilhão-de-rio (*Margaritifera margaritifera* L.) e de truta (*Salmo trutta* L.) na bacia hidrográfica do rio Tua (NE Portugal). In: XV Congresso da Associação Ibérica de Limnologia. p. 36.

Pereira, M.G., Calado, T., Da Camara, C.C., Trigo, R.M. 2010. Analysis of fire size distribution in Portugal. In: Geophysical Research Abstracts, Vol. 12.

Pereira, M.G., Caramelo, L. 2010. Teaching climatology and climate change with low cost lab equipment. In: Geophysical Research Abstracts, Vol. 12.

Pereira, M.G., Caramelo, L., Anacleto, J. 2010. Do the students understand the thermodynamics concepts? In: Geophysical Research Abstracts, Vol. 12.

Pereira, M.G., Caramelo, L., Gouveia, C., Gomes-Laranjo, J. 2010. Assessment of the chestnut production weather dependence. In: Geophysical Research Abstracts, Vol. 12.

Pereira, M.G., Malamud, B., Trigo, R.M. 2010. Continental Portuguese Rural Fire Database: completeness and round effects. In: Geophysical Research Abstracts, Vol. 12.

Pereira, M.G., Trigo, R.M., Caramelo, L., Rasilla, D. 2010. Wildfire activity in the Iberian Peninsula. In: Geophysical Research Abstracts, Vol. 12.

Rego, F., Rigolot, E., Fernandes, P., Montiel, C., Silva, J.S. 2010. Towards Integrated Fire Management. Policy Brief 4. EFI: Joensuu.

Rego, F., Silva, J.S., Fernandes, P., Rigolot, E. 2010. Solving the Fire Paradox – regulating the wildfire problem by the wise use of fire. In: Silva, J.S., Rego, F.,

Fernandes, P., Rigolot, E. (Eds.), Towards Integrated Fire Management – Outcomes of the European Project Fire Paradox. EFI Research Report 23. Joensuu: EFI. pp. 219–228).

Ribeiro, S., Luzio, A., Monteiro, S.M., Fontainhas-Fernandes, A., Coimbra, A.M. 2010. Effects of copper and cadmium on zebrafish (*Danio rerio*) embryo survival, heart beat rate and hatching success. In: Proceedings of the VIII Congresso Ibérico, V Iberoamericano de Contaminacion y Toxicología Ambiental, Heredia, Costa Rica.

Rodrigues, M.C., Arnaldo, P.S., Aranha, J. 2010. Contribution to the characterization of *Gentiana pneumonanthe* L. and *Maculinea alcon* L. distribution in the Alvão Natural Park. In: Azevedo, J.C., Feliciano, M., Pinto, M.A., Castro, J.P. (Eds.), Forest Landscapes and Global Change - New Frontiers in Management, Conservation and Restoration, Abstracts of the IUFRO Landscape Ecology Working Group International Conference. IPB: Bragança.

Rodrigues, M.C., Soares, P.S., Aranha, J., Arnaldo, P.S. 2010. Characterization of a *Maculinea alcon* population in the Alvão Natural Park (Portugal) by a mark-recapture method. In: Azevedo, J.C., Feliciano, M., Castro, J., Pinto, M.A. (Eds.), Forest Landscapes and Global Change - New Frontiers in Management, Conservation and Restoration, Proceedings of the IUFRO Landscape Ecology Working Group International Conference, IPB, Bragança. p. 404-408.

Ryan, K., Rigolot, E., Rego, F., Botelho, H., Vega, J., Fernandes, P., Sofronova, T. 2010. Use of prescribed burning for restoration and maintenance of ecological conditions: predicting and managing fire injury and tree mortality. In:

Ryan, K., Vega, J.A., Sofronova, T., Rigolot, E., Botelho, H., Fernandes, P., Rego, F. 2010. Prescribed fire applications in forest and woodlands: integration of models and field studies to guide fire use. In: Robinson, M., Bushey, C.L., Alexander, M.E., Trott, A., Ekstrom, M. (Compilers), Program and Abstracts of 3rd Fire Behavior and Fuels Conference, Spokane, Washington. International Association of Wildland Fire, Birmingham, Alabama. p. 131.

Ryan, K., Rigolot, E., Rego, F., Botelho, H., Vega, J., Fernandes, P., Sofronova, T. 2010. Use of prescribed burning for restoration and maintenance of ecological conditions: predicting and managing fire injury and tree mortality. In: Extended abstracts 7th European Conference on Ecological Restoration, Avignon, Provence, France.

Silva, J. S., Rego, F., Fernandes, P., Rigolot, E. 2010. Introducing the Fire Paradox. In: Silva, J.S., Rego, F., Fernandes, P., Rigolot, E. (Eds.), Towards Integrated Fire Management – Outcomes of the European Project Fire Paradox. EFI Research Report 23. Joensuu: EFI. p. 3–6).

Tibério, L., Manso, F.T., Marta-Costa, A., Fonseca, C., Monzon, A. 2010. Protected areas, subsistence farming systems and nature conservation. In: Darnhofer, M. (Ed.), 9<sup>th</sup> European IFSA Symposium. Vienna: University of Natural Resources and Applied Life Sciences. p. 1289-1299.

Torres-Manso, F., Tibério, M., Roxo, L., Monzón, A., Marta-Costa, A. 2010. A landscape management plan for Natura 2000 Montemuro Site. In: Azevedo, J.C., Feliciano, M., Pinto, M.A., Castro, J.P. (Eds.), Forest Landscapes and Global Change - New Frontiers in Management, Conservation and Restoration, Abstracts of the IUFRO Landscape Ecology Working Group International Conference. IPB: Bragança.

Varandas, S., Teixeira, A., Lopes-Lima, M., Hinzmann, M., Cortes, R.M.V., Machado, J. 2010. Estudos preliminares de populações de náíades nos sectores terminais dos rios Tua e Sabor (Bacia do Douro): análise do habitat e da qualidade da água e sedimentos. In: XV Congresso da Associação Ibérica de Limnologia. p. 36.

Viana H., Aranha, J. 2010. Mapping invasive species (*Acacia delabata* Link) using ASTER/Terra and Landsat 7 ETM+ Imagery. In: Azevedo, J.C., Feliciano, M., Pinto, M.A., Castro, J.P. (Eds.), Forest Landscapes and Global Change - New Frontiers in Management, Conservation and Restoration, Abstracts of the IUFRO Landscape Ecology Working Group International Conference. IPB: Bragança.

Viana, H., Mesquita, J., Aranha, J. 2010. Assessing multi-temporal land cover changes in the Mata Nacional da Peneda Geres National Parque (1995 and 2009), Portugal – A land model approach for landscape spatial patterns modelling and structural evaluation. In: Azevedo, J.C., Feliciano, M., Pinto, M.A., Castro, J.P. (Eds.), Forest Landscapes and Global Change - New Frontiers in Management, Conservation and Restoration, Abstracts of the IUFRO Landscape Ecology Working Group International Conference. IPB: Bragança.

Viana, H., Lopes, D., Aranha, J. 2010. Modelling aboveground NPP of Portuguese forest, at regional scale, using field inventory data and NDVI from Landsat 5 TM, Modis and Spot vegetation imagery. In: IUFRO Conference, Lugo (Galicia, Spain).

### **Completed Masters and Ph.D. theses**

PhD: AMARAL, C.M.A.Q., 2010. Caracterização físico-química e microbiológica de águas residuais de lagares de azeite - selecção de leveduras para aplicação ao tratamento de águas ruças. Doutoramento em Ciências do Ambiente, Universidade de Trás-os-Montes e Alto Douro. Supervisor: Maria dos Anjos.

MSc: BASTOS, R.C., 2010. A spatially dynamic simulation of the Azores bullfinch occurrence in the scope of the Laurisilva forest conservation. Mestrado em Ecologia, Faculdade de Ciências e Tecnologia da Universidade de Coimbra. Supervisor: Jaime Ramos (Univ. Coimbra) and João Cabral.

MSc: CALHEIROS, T.L.T.M., 2010. Impacto de cenários de alterações climáticas no regime de incêndios em Portugal. Departamento Engenharia Geográfica, Geofísica e Energia da Faculdade de Ciências da Universidade de Lisboa. Supervisors: Mário Pereira and Carlos da Camara (DEGGE).

MSc: CLARO, A.M.B., 2010. Estudo de populações de Mexilhão-de-rio (*Margaritifera margaritifera* L.): Análise da qualidade ecológica de ecossistemas lóticos da Bacia

Hidrográfica do Rio Tua (NE Portugal). Mestrado em Gestão de Recursos Florestais, IPB, Escola Superior Agrária, Bragança, 79 pp. Supervisors: Amilcar Teixeira (IPB) and Simone Varandas.

MSc: GOMES, S., 2010. Avaliação da qualidade ecológica do espaço público urbano via monitorização de indicadores dos espaços verdes. Mestrado em Engenharia e Planeamento Municipal, Universidade de Trás-os-Montes e Alto Douro. Supervisor: João Cabral.

MSc: LARANJEIRA, P., 2010. Sistema de Informação Geográfica para Timor-Leste. Caso de estudo nos distritos de Bobonaro e de Covalima. Universidade de Trás-os-Montes e Alto Douro. Supervisor: José Aranha.

MSc: MENDES, M.R., 2010. Localização e caracterização de locais com potencial para produção de energia solar. Universidade de Trás-os-Montes e Alto Douro, Vila Real. Supervisor: José Aranha.

MSc: PEREIRA, C.F.S., 2010. Avaliação multifactorial das condicionantes ambientais da biologia da reprodução, comportamento e disponibilidade de habitat de uma população residual da gralha-de-bico-vermelho (*Pyrrhocorax pyrrhocorax*) no Noroeste de Portugal. Mestrado em Gestão de Ecossistemas, Universidade de Trás-os-Montes e Alto Douro. Supervisor: João Cabral and Salviano Soares.

MSc: PINTO, P.B., 2010. Deslenhificação de palha de trigo por fungos da podridão branca. Inibição da lacase de *Fomes fomentarius* pelo ião Cl<sup>-</sup>. Mestrado em Ciências Agrárias: Produção Animal, Universidade de Trás-os-Montes e Alto Douro. Supervisors: Rui Bezerra and Jorge Colaço.

MSc: ROCHA, R., 2010. Aplicação dos Sistemas de Informação Geográfica em Estudos de Caracterização Biofísica da Ilha de Santo Antão em Cabo Verde.. Universidade de Trás-os-Montes e Alto Douro, Vila Real. Supervisor: José Aranha.

MSc: SANTOS, H.M.P., 2010. Simulação de cenários de alteração das características dos povoamentos florestais com influência na distribuição da biodiversidade na serra do Marão. Mestrado em Engenharia Florestal, Universidade de Trás-os-Montes e Alto Douro. Supervisor: João Cabral.

MSc: SILVA, S.M., 2010. Avaliação de prejuízos na floresta causados pelos ungulados. Os veados (*Cervus elaphus*) na Serra da Lousã. Mestrado em Engenharia Florestal, Universidade de Trás-os-Montes e Alto Douro. Supervisor: Aurora Monzón.

## Patents/propotypes

N/A



## Organization of conferences

Workshop Promoção e Marketing da Caça. UTAD, Vila Real, 25 June 2010. Co-organized by Aurora Monzón.

Workshop Myrmecophily of Maculinea butterflies (Lepidoptera: Licaenidae), especially in the Carpathian Basin. UTAD, Vila Real, 6 July 2010. Organized by Paula Arnaldo.

Restauração e Reabilitação de Sistemas Aquáticos, Semana de Engenharia Florestal e Arquitectura Paisagista “Abril, Águas Mil”. UTAD, Vila Real, 15 April 2010. Organized by Simone Varandas, Samantha Hughes and Rui Cortes.

Wildfires, Weather and Climate session (NH7.1/AS4.2/CL2.10) of the European Geosciences Union General Assembly 2010, Vienna, Austria, 2-7 May. Mário Gonzalez Pereira co-organized one thematic session.

CESAM Workshop Forest Fires Research – Beyond Burnt Area Statistics. CESAM Universidade de Aveiro, 26 May 2010. Paulo Fernandes, as member of the Scientific Committee.

Mini-conference “Assessing change in a changing environment”. CITAB, UTAD, Vila Real, 1-2 July. Organized by Samantha Jane Hughes.

R summer School (COST ACTION ES0601). UTAD, Vila Real, 19-23 July 2010. Organized by Mário Gonzalez Pereira and Marco Duarte Naia.

17<sup>a</sup> Conferência Nacional de Física e 20<sup>o</sup> Encontro Ibérico para o Ensino da Física (FÍSICA2010). UTAD, Vila Real, 1-3 September 2010. Organized by Mário Gonzalez Pereira.

Riscos Naturais e Planos Municipais de Emergência, UTAD, Vila Real, 29 September, 2010. Organized by José Aranha.

4<sup>as</sup> Jornadas de Biologia. UTAD, Vila Real, 20-22 October 2010. Organized by Ana Coimbra.

Novas Tecnologias no Sector Florestal. Joint action with Ordem dos Engenheiros, Feralia-Fimap, Exponor, 21 October. Organized by José Aranha.

## Industry contract research

N/A.

## Internationalization

Fire-related short-term scientific exchanges and international training activities have been carried out in the frame of COST Actions FP071 and ES0601, and have

contributed to the research network 'European Forest Institute Project Center on Fire Ecology and Post-Fire Management'.

Active cooperation in the form of collaborative publication and preparation of funding proposals has involved researchers from: CEAM, Universitat Autònoma de Barcelona, Universidad de Cádiz, Universidad de Castilla-La Mancha, CTFC, Universitat Autònoma de Barcelona and Universidad de Salamanca (Spain); Istituto di Metodologie per l'Analisi Ambientale CNR (Italy); CNRS, INRA and CEMAGREF (France); University of Athens (Greece); University of Kastamonu and Hacettepe University (Turkey); University of Trier and Potsdam Institute for Climate Impact Research (Germany); Kings College, Macaulay Institute and University of Edinburgh (UK); Swiss Federal Research Institute and Swiss Federal Institute of Technology (Switzerland); BOKU (Austria); Lund University (Sweden); Czech University of Life Sciences (Czech Republic); FORIM (Slovakia); Wageningen University (Netherlands); Oregon State University (US); CSIRO Sustainable Ecosystems and University of New South Wales (Australia).

EFIMED Progress Meeting and Scientific Seminar on Knowledge-based Management of Mediterranean Forests Under Climate Driven Risks: the Ways Ahead, Antalya, Turkey, 14-15 April 2010. Paulo Fernandes (keynote lecture).

11th Annual Network Conference - River Restoration: From Policy to Practice. The River Restoration centre (RRC), University of York, England, 14-16 April 2010. Samantha Jane Hughes.

CESAM Workshop Forest Fires Research – Beyond Burnt Area Statistics. Universidade de Aveiro, 26 May 2010. Paulo Fernandes.

Unidad de Gestión Forestal Sostenible, Universidade de Santiago de Compostela. Lugo, Spain, 7-11 June 2010. Paulo Fernandes, as an invited visiting researcher.

Forest Ecology and Management Highly Cited Author 2007–2010. Awarded to Paulo Fernandes.

International Multidisciplinary Scientific GeoConference, SGEM. Albena, Bulgaria, 14-20 June 2010. Ana Cristina Ramos Sampaio.

XV Congresso da Associação Ibérica de Limnologia (AEL). Ponta Delgada, Açores, 5-9 July 2001. Samantha Jane Hughes.

IUFRO Landscape Ecology Working Group International Conference. IPB, Bragança, 21-27 September 2010. Paulo Fernandes, José Aranha, Aurora Monzón.

VI International Conference on Forest Fire Research. Coimbra, 15-18 November 2010. Paulo Fernandes.

## Other publications National

Caldeira, L., Varela, J., Gonçalves, N. J., Pavão, J., Pereira, M.G. 2010. Modelação de um ambiente gráfico. In: Livro de Resumos Física 2010, 17<sup>a</sup> Conferência Nacional de Física, 2<sup>o</sup> Encontro Ibérico para o Ensino da Física. Vila Real: Sociedade Portuguesa de Física. p. 181-182.

Freitas, L., Pereira, M.G., Caramelo, L. 2010. Variabilidade de baixa frequência e homogeneidade de series temporais. In: Livro de Resumos Física 2010, 17<sup>a</sup> Conferência Nacional de Física, 2<sup>o</sup> Encontro Ibérico para o Ensino da Física. Vila Real: Sociedade Portuguesa de Física. p. 177-178.

Freitas, L., Pereira, M.G., Caramelo, L., Anacleto, J. 2010. Métodos de homogeneização de series temporais. In: Livro de Resumos Física 2010, 17<sup>a</sup> Conferência Nacional de Física, 2<sup>o</sup> Encontro Ibérico para o Ensino da Física. Vila Real: Sociedade Portuguesa de Física. p. 179-180.

Freitas, L., Stepanek, P., Pereira, M.G., Caramelo, L. 2010. Time series correction methods. In: Livro de Resumos Física 2010, 17<sup>a</sup> Conferência Nacional de Física, 2<sup>o</sup> Encontro Ibérico para o Ensino da Física. Vila Real: Sociedade Portuguesa de Física. p. 185-186.

Gonçalves, N.J., Naia, M.D., Caramelo, L., Pereira, M.G., Soares, A.A. 2010. Exploração de aplicações open source de apoio ao ensino: representação gráfica de informação científica. In: Livro de Resumos Física 2010, 17<sup>a</sup> Conferência Nacional de Física, 2<sup>o</sup> Encontro Ibérico para o Ensino da Física. Vila Real: Sociedade Portuguesa de Física. p. 373-374.

Marques, G.M., Pinto, C.C., Muñoz, J. 2010. DNA barcoding Mediterranean Boletales. In: 2nd Conference of the European Consortium for the Barcode of Life (ECBOL2) - 2010 International Year of Biodiversity. p. 73.

Miranda, A., Fernandes, E., Santos, S., Dias, A.A., Silva, A., Santos, D.L., Fraga, I., Bezerra, R.M. 2010. Produção e quantificação de polissacáridos intracelulares de *Ganoderma resinaceum*, *Phlebia rufa* e *Trametes versicolor* e avaliação da sua acção na viabilidade e crescimento de células HepG2. In: 4<sup>as</sup> Jornadas de Biologia na UTAD, Vila Real. p. 45.

Pinto, C.C., Marques, G.M. 2010. Molecular characterization and genetic variability among species of the genus *Suillus* (Suillaceae, Basidiomycota). In: XXXV Jornadas Portuguesas de Genética. p. 74.

Rodrigues, M.C., Soares, P., Arnaldo, P.S. 2010. Análise da distribuição de ovos de *Maculinea alcon* (Den. & Schiff.) em relação às características da planta hospedeira, *Gentiana pneumonanthe* L. In: 12<sup>o</sup> Encontro Nacional de Ecologia, Porto.

Teixeira, A., Lopes-Lima, M., Machado, J., Hinzmann, M., Cortes, R.M.V., Varandas, S., Antunes, F. 2010. Estudos preliminares de populações de mexilhão-de-rio (*Margaritifera margaritifera* L.) nos rios Rabaçal e Tuela (Nordeste de Portugal): análise do habitat e da qualidade da água e sedimentos. In: 10<sup>o</sup> Congresso da Água "Marcas d'Água". p. 204

## **Government/Organization contract research**

Definition of Reference Terms for the “Evaluation of Ecological Sustainability of Fluvial Habitats in Protected and Classified Areas of the Minho and Lima Hydrographic Regions (RH1)”- V01/2010. Collaborative Protocol between the Fundação Rei D. Dinis and ARH-Norte. Coordinated by Rui Cortes. Budget: 80.965,94 Euro

Hydromorphological Characterization of Lotic Water Bodies “Evaluation of Ecological Sustainability of Fluvial Habitats in Protected and Classified Areas of the Minho and Lima Hydrographic Regions (RH1)”- V01/2010. Collaborative Protocol between the Original-Consulting and ARH-Norte. Coordinated by Joaquim Barreira. Budget: 17.651,75 Euro.

Studies on the Fish and Invertebrate Fauna of the Minho and Lima Hydrographic Regions Evaluation of Ecological Sustainability of Fluvial Habitats in Protected and Classified Areas of the Minho and Lima Hydrographic Regions (RH1)”- V01/2010. Collaborative Protocol between Instituto Politécnico de Bragança, UTAD and ARH-Norte. Coordinated at UTAD by Rui Cortes. CITAB budget: 80.999,82 Euro

Implementation of a Monitoring Programme for determining the Ecological Potential of Reservoirs in Northern Portugal. Collaborative protocol between UTAD e a ARH-Norte. Coordinated by Rui Cortes. Budget: 88.500,00 Euro.

## **5.2.6 – Future research**

### **Objectives**

#### **Biodiversity in aquatic ecosystems and biotechnology**

This group studies the effects of large scale environmental change on the sustainability, resilience and diversity of disturbed natural ecosystems and agro-systems. The aim is: (i) to create appropriate tools for capturing and predicting the dynamics, structure and function of terrestrial and aquatic ecosystems affected by human disturbance over different spatial and temporal scales. (ii) To develop and promote appropriate management plans, based on the ecological assessment of different components of the natural community, in order to rehabilitate or restore degraded systems.

#### **Studies on climate variability and extreme events on the dynamics of running waters and regulated rivers, including the interaction with human impacts**

This task will study the effect of climate change on aquatic systems. We aim to

- (i) Continue to add to large scale spatiotemporal data sets

- (ii) Assess combinations of biological indicators of catchment condition, landscape change and climate change on freshwater systems (natural and artificial).

### **Effect of water contamination in fish populations (reproduction, histopathological changes, oxidative stress, detoxification mechanisms)**

The overall aim of this task is the use of biomarkers as an “early warning system” linked to sub-organism level processes, allowing quick and predictable associations to be established between obtained results and particular stressor agents. This will provide valuable information on the effect of different sources of water contamination.

- (i) Evaluate and validate multiple biochemical markers of exposure in lotic and estuarine fish populations.
- (ii) Initiate field studies (biomarkers) contributing to the development of integrated bioassessment methods in heavily polluted streams and rivers.

### **EU directive compliant River rehabilitation**

This task is multidisciplinary, taking into account broad temporal and spatial dimensions and the use of bioindicators, physicochemical and hydromorphological elements to characterise and restore aquatic habitats and riparian ecotones.

- (i) Research and development: sampling programmes for assessing the use of bioindicators in the integrated bioassessment of environmentally degraded streams and rivers in Northern Portugal.
- (ii) Research and development: monitoring and compensatory/restoration/requalification measures for aquatic ecosystems and organisms affected by the construction of large dams.
- (iii) Contribute to Water Framework Directive (WFD) oriented planning, development and execution of regional freshwater monitoring and management and planning of aquatic resources.
- (iv) Assess the use land-use and pressure parameters as predictors of ecological quality across different river typologies.
- (v) Development and implementation of river restoration and requalification programmes.

### **Dynamic and spatially dynamic modelling to predict ecological indicators associated with different impacts, functional biodiversity and the planning of endangered species conservation**

Stochastic Dynamic Methodology (StDM) is a sequential modelling process that predicts the ecological status of altered ecosystems. StDM can be complemented by

agent-based modelling approaches (ABM), for predicting the response of ecological indicators to anthropogenically induced change.

- (i) Initiate studies on the use of long term monitoring data and dynamic modelling for predicting regional ecological diversity.
- (ii) Initiate studies on the effect of climate change and anthropogenic factors on ecological processes in reservoirs.

### **Application of microorganisms in biotechnology and in nutrient cycling**

This task studies autochthonous bacteria, yeasts and fungi in bioremediation, agro-food and forestry by product processes and as functional indicators of ecological quality. Agro-industry generates several sub-products, such as residual waters with high polluting potential from olive oil processing industries and wine production.

- (i) Contribute to the sustainable management of olive orchards
- (ii) Study of the integrated use of industrial by-products of agro-food and forestry companies in the production of biodiesel and animal feed
- (iii) Assess the role of ecological function (fungal decomposition) in river bioassessment methods.
- (iv) Contribute to studies in the optimization of ecosystem services in the demarcated Douro region.

### **Disturbance of forest and agro-forested ecosystems**

This project focuses on ecological abiotic (mainly fire) and biotic disturbance that act on forests, woodlands and agro-forestry systems. The aim is to characterize spatial and temporal patterns, regimes of disturbance and develop management-oriented guidelines towards mitigation and adaptation to disturbance.

The tasks within this project will be revised very soon to better accommodate regional, national and international studies in ecological monitoring, environmental impacts and biodiversity preservation in terrestrial forest and agro-forested ecosystems that will take place over 2011.

### **The role of vegetation (fuel) in the Portuguese fire regime**

This task is dedicated to the analysis of the Portuguese fire regime, using the Forest Service atlas of fire perimeters and GIS tools to describe and quantify how fuel age controls the fire regime. Analyses will focus on fire frequency, burn probability, burnt surface and integrate the influence of weather conditions and human pressure..

- (v) Study of the application of fire – land – atmosphere Interrelationships: to predict wildfire regimes

- (vi) Assessment of forest fires under climate, social and economical changes
- (vii) Study of factors affecting post-fire regeneration variability in *Pinus pinaster* and *Eucalyptus globulus*: implications for biodiversity and post-fire management.

### **Trends, temporal, spatial and spatiotemporal clustering of fires in Portugal**

This task analyzes temporal (trends and spatial correlation of variables relating forest fire events in the Portuguese Forest Service fire database using geostatistical methods to detect spatiotemporal clustering of point-database for past fire events and to foresee the continuity of current and the development of new clusters in the future.

- (i) Collaboration in development and implementation of forest fire management systems and the role of local agents in forestry politics in areas affected by fire.
- (ii) Collaboration in post-fire forest management systems in Southern Europe.

### **The role of the pine processionary moth (*Thaumetopoea pityocampa* Den & Schiff) on the biomass increment of pine trees**

Two articles on the results of this task were published in 2010. This task will no longer continue in 2011.

### **Conservation of the blue alcon butterfly (*Maculinea alcon*) in the Alvão Natural Park**

This very specific task is on the ecology of the blue alcon butterfly *Maculinea alcon*, the only representative of its genus and a rare resident butterfly in Portugal. Studies have carried out on the availability of host plant and host-ant species and the quality of potential habitats. These studies will continue under newly delineated tasks on terrestrial biodiversity for 2011.

### **Pending and expected funding**

Funding can be divided into 3 sources: a) international research projects; b) national research projects, and c) contributions from stakeholders.

Several research projects will be funded from 2011 onwards, while others will be resubmitted as calls for funding open or other sources of funding become available over the coming year. Within both EI projects there is a large number of “ongoing” projects that will go into 2011 or beyond.

Within the “*Biodiversity in aquatic ecosystems and Biotechnology*” project, 3 research projects in 3 different subthemes have been approved for a total funding of 509,797.00€ from 2011 onwards by the Fundação de Ciência e Tecnologia (FCT, Table 1). Two of these projects include a considerable number of EI members, in particular the interdisciplinary project “*Combination of biomarkers, bioindicators*”

and functions to assess environmental changes in river systems” (189,521.00€), thereby addressing the first of the main objectives for 2011 objectives, namely the promotion of greater interaction between CITAB members.

Applications in preparation for submission for FCT funding in 2011 include “Predicting Regional Ecological Diversity and Integrity for Inland Contexts based on Long Term Monitoring Data” (190,000.00€) and “Predicting ecological conditions in large reservoirs from climate and landscape changes” (188,000.00€). There is a single Seventh Framework Programme (FP7) project “Creation of Research Capacities to Increase the Competitiveness of Northern Portugal Agro-Food and Forestry Companies: Added-Value Co-Products”. The project’s global budget, if approved, will be 3,867,094.00€ (subtheme *Application of microorganisms in biotechnology and in nutrient cycling*).

Other sources of funding in 2011 for projects within “Biodiversity in aquatic ecosystems and Biotechnology” subthemes include CITAB’s pluriannual funding (FCT), ON.2, PRODER (Rural Development Programme), QREN (part of the National Strategic Reference Framework or NSRF) and the private sector. The ON.2 funded project “PROMOAGRO – Promotion of Agro-food competitiveness” has funding for 522,608.66€

We mention following the projects financed by FCT (or recommended for funding):

- PTDC/AGR-CFL/099420/2008 - FIREREG: Factors affecting the post-fire natural regeneration variability in *Pinus pinaster* and *Eucalyptus globulus* in Portugal: implications for biodiversity and post-fire management. Recommended for funding.
- PTDC/AAC-CLI/103567/2008 - Evolution of North Atlantic Climate; the role of Blocking and Storm-tracks in the Past, Present and Future climate of Southern Europe (ENAC). Duration: 36 months (2010-2012).
- FCT project PTDC/ECM/73069/2006 “Avaliação multi-cenário de sistemas urbanos e de infraestruturas para um desenvolvimento territorial integrado
- FCT project PTDC/AGR-AAM/098326/2008 “Cover cropping: the decisive strategy for the sustainable management of the rainfed olive orchards”
- PTDC/ECM/73069/2006 “Avaliação multi-cenário de sistemas urbanos e de infraestruturas FCT
- PTDC/AGR-AAM/098326/2008 “Cover cropping: the decisive strategy for the sustainable management of the rainfed olive orchards”
- Ecological and population studies on the freshwater bivalve *Anodonta cygnea* for the establishment of conservation measures



- An Integrative Study on the Toxipathic Lesions in Portuguese Estuarine Fishes – Assessing Injury Impact and Toxicogenomic Implications in Experimental Modes FCT (PTDC/MAR/70436/2006)
- Ovary apoptosis in zebrafish (*Danio rerio*): pathways characterization, role in sexual differentiation and as endocrine disruptors (PTDC/CVT/102453/2008)
- Modelação das vias de sinalização do ácido retinóico por contaminantes ambientais em teleósteos. (Com CIIMAR). (PTDC/MAR/68106/2006).
- Combination of biomarkers, bioindicators and functions to assess environmental changes in river systems (PTDC/ BIA-ECS/114859/2010) FCT 189,521€ (UTAD, Resp. Prof Rui Cortes).

Interreg IV: Título: AGROSISTEM N2000 - Gestão e valorização de agroecossistemas sustentáveis com charnecas secas europeias e carvalhais. Proponente: Espanha (Junta de Galiza); Participante: Portugal (UTAD, Resp. Prof. João P.F. Carvalho).

FP7 – Env - 2011: Título: Quercus Gn. and the restoration. Proponente: Univ. Santiago Compostela (USC); Participante: Portugal (UTAD, Resp. Prof. João P.F. Carvalho).

Several research projects within “*Biodiversity in aquatic ecosystems and Biotechnology*” are already underway and will continue into at least 2011 (Table 2). The total funding of these projects is 793,115.70€.

A smaller number of funded research projects starting in 2011 are outlined for “*Disturbance of forest and agroforested ecosystems*” EI project. One of them is an FP7 bid “*Quercus Gn. and regeneration*” that will certainly contribute to internationalization (funding for CITAB will be 38,526.00€ from a total budget of 251,853.00€). The FP7 project proponent is the University of Santiago Compostela (Galicia, Spain); CITAB will be a project participant. A smaller, second project “*Improvement of decision-support to fire management in eucalypt plantations (Fire behavior, ecology and management)*” will be funded by the private sector (6.500.00€)

A large number of ongoing research projects with varying degrees of interaction between EI members will continue into 2011 within the “*Disturbance of forest and agroforested ecosystems*” project (Table 3). The estimated total funding is 863,430.53 €. To better accommodate the large number of projects underway, the EI Executive Committee will be liaising with members and the EI coordinator to redefine subthemes in early 2011.

At least ongoing 8 projects are funded by the FCT (total funding of 295,430.00 €), but the vast majority of funding for 2011 ingoing projects will derive from regional entities. There is also participation of a single CITAB member in a FP7 funded project “*Fire – Land – Atmosphere Inter-Relationships: understanding the processes*”

*to predict wildfire regimes in Portugal (FLAIR)”, again increasing the potential for internationalization.*



## 5.3 – Biosystems Engineering

### 5.3.1 – Group description

Principal Investigator	Pedro José de Melo Teixeira Pinto
Research area	Engineering
Home Institution	Universidade de Trás-os-Montes e Alto Douro

### 5.3.2 – Funding

	2009	2010
FCT Projects	166.288,00 €	140.660,67 €
Other (National)	1.042.492,26 €	334.047,13 €
Other (International)	503.550,00 €	95.024,60 €
Industry (National)	0,00 €	0,00 €
Industry (International)	0,00 €	0,00 €
<b>Total</b>	<b>1.712.330,26 €</b>	<b>569.732,40 €</b>

### 5.3.3 – Objectives

Research activities focus on the development of engineering technologies applied to agri-forestry systems, the environment and life towards providing sustainable development and better quality of life.

During 2010, the Biosystems Engineering group started to focus research efforts into two projects more directly linked to group member's expertise, while maintaining (and steadily developing) its involvement on the other four CITAB projects.

A special attention has also been paid to strengthening and expanding connections with other national and international R&D units and groups through joint scientific work and post-graduate students supervision.

We have identified two main shortcomings that we need to overcome. Although we continuously strive identifying partners from the industry, we need to increase these links; we also need to increase human resources, namely students & researchers.

We aim to maintain an active and focused research agenda, balanced between fundamental and applied research. We have completely accomplished scientific targets namely papers in indexed journals with over 2.5 papers per integrated member; we expect to maintain a ratio of 2 papers per integrated member.

Following CITAB's internal re-organization, six projects were created, each one with specific objectives. The scientific activities of the Biosystems Engineering group are more directly linked to two of these projects:

#### Project #1 – Wood mechanical and quality evaluation

This project aims to develop a materials science approach to wood mechanics, from the micro to macro levels. This is fundamental for promoting wood as a thoroughly characterized engineering material. The project also aims to improve bioenergetic conversion technology of agricultural and forest materials and wastes.

#### Project #2 – Image-based systems

This project aims to design and develop computer vision and image based systems and solutions in the areas of agri-forestry, environment and biology, using both traditional imagery combined with hyperspectral systems (which have been used by us for inspection and quality assessment in fruits and wood so far).

### 5.3.4 – Main achievements

#### Project #1 – **Wood mechanical and quality evaluation**

1. Development of digital image correlation technique with sub-pixel accuracy by combining cross-correlation and optical flow: application to rigid-body movements and homogeneous mechanical test methods.
2. The conventional k-means clustering method has been applied to segmentation in early and late wood in digital images.
3. Extension of compliance based beam method to the Single Edge Notched – Three Point Bending test, to measure the mode I fracture properties of wood.
4. Characterization of mixed-mode I/II fracture properties of wood using the mixed mode bending tests and the compliance based beam method.
5. Development of identification methods of mode I and mode II fracture properties of bonded wood/CFRF joints.

6. Development of finite element models, based on cohesive laws and interface finite elements, to determine the strength of CFRP repairs of wooden structural elements
7. Identification of molecular mechanisms of water interaction with an industrial epoxy.
8. Development of strengthening techniques of dowel type wood connections, based on metallic inserts and CFRP laminates.
9. Identification of the gas resulting composition, digested from organic residues, in order to be injected in Natural Gas grid.

#### Project #2 – **Image-based systems**

1. Development of threshold and multi-threshold techniques using FSs, IVFSs and A-IFSs.
2. Application of the classification methodologies developed in 1. for body composition estimation and meat quality assessment.
3. Application of classification methodologies developed in 1. for pre-processing in image-based wood micro-structure characterization.
4. Application of classification methodologies developed in 1. in the development of a dynamic tracking based movement analysis methodology.
5. Creation of neural network based models for measuring anthocyanin concentration in grapes using hyperspectral imaging.
6. In 2010 experiments were carried out which showed that it is possible to combine hyperspectral imaging and artificial intelligence methods to measure wood density. These results are still preliminary since they were obtained for only one sample. Nevertheless, we are now in possession of a fully developed experimental procedure.
7. Studies were continued on the evaluation of functional recovery in animal model using a new treatment protocol where the analysis model of the animal movement includes now a 3D bi-lateral analysis.

Researchers from the Biosystems Engineering group were also involved in some of the other four CITAB projects.

Monitoring was developed, as well as an intelligent gateway infrastructure for in-field data integration and aggregation in signal and data processing in agricultural and ecological contexts, wireless and self-powered data acquisition systems for environmental and physiological parameters.

In the area of biomechanics analysis we are collaborating in the multidisciplinary analysis of itineraries and routes in natural spaces such as hiking trails, is an area of growing interest for promoting wealth, well-being and greater social conscience of these concepts.

### 5.3.5 – Group productivity

#### International Projects

Growth, biomass, carbon sequestration and wood properties of *Eucalyptus grandis* with mineral and organic fertilizers (sewage sludge). CAPES/GRICES 206/08 (UTAD/USP). Project coordinator: José Luís Penetra Cerveira Louzada. Total budget CITAB/UTAD: 9,000 Euro. State: In progress

Production of MDF panels of mixed fibre SP Saccharum (sugar cane) associated with fibres of *Eucalyptus grandis*: anatomical characterization and physical-mechanical properties. CAPES/GRICES 206/08 (UTAD/USP). Project coordinator: José Luís Penetra Cerveira Louzada. Total budget CITAB/UTAD: 9,000 Euro. State: In progress

Nuevas Ciudades Fluviales del Siglo XXI (FLUVIAL). Programa de Cooperação Transfronteiriça Espanha/Portugal (POCTEP). Project coordinator: Ronaldo Eugenio Calçada Dias Gabriel. Total budget CITAB/UTAD: 400,000 Euro. State: In progress.

Nuevo Modelo de Representación y Agregación de la Información Utilizando las Extensiones de los Conjuntos Difusos: Aplicaciones. Plan Nacional de I+D+i, Ministerio de Educación y Ciencia. Spain. Project coordinator: Pedro José de Melo Teixeira Pinto. Total budget CITAB/UTAD: variable. State: In progress.

Vision para Vehículos Aéreos No-tripulados. Plan Nacional de I+D+i, Ministerio de Educación y Ciencia. Spain. Project coordinator: Pedro José de Melo Teixeira Pinto. Total budget CITAB/UTAD: variable. State: In progress.

#### National Projects

ADAPT – Adaptive Learning Management System. FCT, PTDC/CPE-CED/115175/2009. CITAB project coordinator: Eduardo José Solteiro Pires. Total budget CITAB/UTAD: 2,100 Euro. State: In progress.

Applying Computational Fluid Dynamics to sports (aquatic environment) research. FCT, PTDC/DES/098532/2008. Project coordinator: Abel Ilah Rouboa. Total budget CITAB/UTAD: 99,940 Euro. State: In progress.

BioGN. AICEP, QREN SI Inovação. Project coordinator: Nuno Paulo Correia e Afonso Moreira. Total budget CITAB/UTAD: 160,000 Euro. State: In progress.

DouroBiogas. IAPMEI, QREN QREN, SI I&DT. Project coordinator: Nuno Paulo Correia e Afonso Moreira. Total budget CITAB/UTAD: 360,000 Euro. State: In progress.

Experimental assessment of moisture effects on aging and durability of thermosetting polymers. FCT, PTDC/EME-PME/67791/2006. Project coordinator: José Joaquim Lopes Morais. Total budget CITAB/UTAD: 9,300 Euro. State: Terminated in 2010.

Fracture behaviour of cortical bone tissue. FCT, PTDC/EME-PME/71273/2006. Project coordinator: José Joaquim Lopes Morais. Total budget CITAB/UTAD: 70,680 Euro. State: Terminated in 2010.

Fundamental and simulation study of SYNGAS Combustion on Static Chamber. FCT, PTDC/AAC-AMB/103119/2008. Project coordinator: Abel Ilah Rouboa. Total budget CITAB/UTAD: 134,000 Euro. State: In progress.

Hip femoral prosthesis for *in vivo* loosening data acquisition. Project coordinator: Raul Manuel Pereira Morais dos Santos. Total budget CITAB/UTAD: 20,928 Euro. State: In progress.

Informação Estratégica para a Fileira do Pinho. Project coordinator: Maria Emilia Calvão Moreira da Silva. Total budget CITAB/UTAD: 117,223 Euro. State: In progress.

Numerical and experimental study of cohesive laws in bonded wood joints. FCT, PTDC/EME-PME/114443/2009. Project coordinator: José Joaquim Lopes Morais. Total budget CITAB/UTAD: 38,761 Euro. State: In progress.

Oakwoods: Properties of wood from Portuguese oaks for high value solid and assembled wood products. POCI/AGR-AMM/69077. Project coordinator: José Luís Penetra Cerveira Louzada. Total budget CITAB/UTAD: 134,892 Euro. State: In progress.

Optimização dos perfis das embarcações desportivas (NELO-Kayaks). 4608/QREN/2008. Project coordinator: Abel Ilah Rouboa. Total budget CITAB/UTAD: 25,500 Euro. State: In progress.

Plano de Gestão Integrada do Sítio PTCO0025 Montemuro. Project coordinator: Jorge Azevedo (UTAD). Total budget CITAB/UTAD: 65,000 Euro. State: In progress.

Phenotypic plasticity of maritime pine to climate change. FCT, PTDC/AGR-CFL/099614/2008. Project coordinator: José Luís Penetra Cerveira Louzada. Total budget CITAB/UTAD: 14,400 Euro. State: In progress.

Physiologic supply system for *in vivo* evaluation of bone implants behavior. Project coordinator: Raul Manuel Pereira Morais dos Santos. Total budget CITAB/UTAD: 48,734 Euro. State: In progress.

PortalDouro. QREN/ON.2. Project coordinator: Raul Manuel Pereira Morais dos Santos. Total budget CITAB/UTAD: 124,534 Euro. State: In progress.

Repair of wood structures using artificial composites. FCT, PTDC/EME-PME/64839/2006. Project coordinator at CITAB/UTAD: José Joaquim Lopes Morais. Total budget CITAB/UTAD: 24,000 Euro. State: Terminated in 2010.

Scots pine in Portugal: the “Southwest end” or just “the end”? FCT, PTDC/AGR-CFL/110988/2009. Project coordinator: José Luís Penetra Cerveira Louzada. Total budget CITAB/UTAD: 181,781 Euro. State: In progress.

SmartVision: active vision for the blind. FCT, PTDC/EIA/73633/2006. Project coordinator: J. M. Hans du Buf (U. Algarve). State: Terminated, 2010.

### **Publications in peer review Journals**

Barreto AMJP, Campilho RDSG, Moura MFSF, Morais JLL, Santos CL, 2010. Repair of wood trusses loaded in tension with adhesively bonded carbon-epoxy patches. *The Journal of Adhesion*, 86 (5): 630 - 648.

Bustince H, Molina CL, Fernando J, Couto P, Baets B, 2010. A gravitational approach to edge detection based on triangular norms. *Pattern Recognition*, 43 (11): 3730-3741.

Bustince H, Pagola M, Barranechea E, Fernandez J, Pinto PM, Couto P, Tizhoosh H, Montero J, 2010. Ignorance Functions. An Application to the Calculation of the Threshold in Prostate Ultrasound Images. *Fuzzy Sets and Systems*, 161 (1): 20-36.

Campilho RDSG, Moura MFSF, Barreto AMJP, Morais JLL, Domingues JJMS, 2010. Experimental and numerical evaluation of composite repairs on wood beams. *Construction and Building Materials*, 24: 531–537.

Campilho RDSG, Moura MFSF, Ramantani DA, Morais JLL, Barreto AMJP, 2010. Adhesively bonded repair proposal for wood members damaged by horizontal shear using carbon-epoxy patches. *The Journal of Adhesion*, 86 (5): 649 - 670.

Campilho RDSG, Moura MFSF, Ramantani DA, Morais JLL, Domingues JJMS, 2010. Buckling strength of adhesively-bonded single and double-strap repairs on carbon-epoxy structures. *Composites Science and Technology*, 70 (2): 371–379.

Catalanoti G, Camanho PP, Xavier J, Dávila CG, Marques AT, 2010. Measurement of resistance curves in the longitudinal failure of composites using digital image correlation. *Composites Science and Technology*, 70 (13): 1986-1993.

Correia A A, Matias J, Mestre P, Serôdio C, 2010. Derivative-free nonlinear optimization filter simplex, 20 (4): 679–688.

Costa L., Pereira J., Filipe V., Couto P., Magalhães L., Bulas-Cruz J., Maurício A., Geuna S., Varejão A. (2010). The Effect of Gait Speed on Three-Dimensional



Analysis of Hindlimb Kinematics during Treadmill Locomotion in Rats. *Reviews in the Neurosciences* 21, 487-497.

Cunha CR, Peres E, Morais R, Oliveira AA, Matos SG, Fernandes MA, Ferreira PJSG, Reis MJCS, 2010. The use of mobile devices with multi-tag technologies for an overall contextualized vineyard management. *Computers and Electronics in Agriculture*, 73 (2): 154-164.

Dourado NMM, De Moura MFSF, Morais JLL, Silva MAL, 2010. Estimate of resistance-curve in wood through the double cantilever beam test. *Holzforschung*, 64: 119-126.

Faria A., Gabriel R., Abrantes J., Brás R., Sousa M., Moreira H. (2010). Ankle stiffness in postmenopausal women: influence of hormone therapy and menopause nature. *Climacteric* 13: 265–270.

Faria A, Gabriel R, Abrantes J, Brás R, Moreira H, 2010. The relationship of body mass index, age and triceps-surae musculotendinous stiffness with the foot arch structure of postmenopausal women. *Clinical Biomechanics*, 25 (6): 588-593.

Fernandes A. (2010). Discussion on paper “A Robust Real-Time Ellipse Detector” by Zhang and Liu. *Pattern Recognition* 44, 488-489.

Ginja MM, Silvestre AM, Gonzalo-Orden JM, Ferreira AJ, 2010. Diagnosis, genetic control and preventive management of canine hip dysplasia: a review. *Veterinary Journal*, 184 (3): 269-76.

Koerber H, Xavier J, Camanho PP, 2010. High strain rate characterisation of unidirectional carbon-epoxy IM7-8552 in transverse compression and in-plane shear using digital image correlation. *Mechanics of Materials*, 42 (11): 1004-1019.

Lopes N, Couto P, Bustince H, Pinto PM, 2010. Fuzziness Measure Approach to Automatic Histogram Threshold. *IEEE Transactions on Image Processing*, 19 (1): 199-204.

Mendes L, Pires EJS, Vaz JC, Rosário MJ, Oliveira PBM, Machado JAM, 2010. Automated design of microwave discrete tuning differential capacitance circuits in SI-integrated technologies. *Microwave and Optical Technology Letters*, 52 (3): 629-634.

Marinho D, Reis V, Barbosa A, Rouboa A, Silva A, 2010. Design of a Three-Dimensional Hand/Forearm Model to Apply Computational Fluid Dynamics. *Brazilian Archives of Biology and Technology*. 53(2):437-442.

Monteiro M, Gabriel R, Aranha J, Castro MN, 2010. Influence of obesity and sarcopenic obesity on plantar pressure of postmenopausal women. *Clinical Biomechanics*, 25 (5): 461-467.

Monteiro M, Gabriel R, Castro MN, Sousa M, Abrantes J, Moreira M, 2010. Exercise effects in plantar pressure of postmenopausal women. *Menopause*, 17 (5): 1017-1025.

Monteiro M, Gabriel R, Sousa M, Castro MN, Moreira H, 2010. Temporal parameters of the foot roll-over during walking. influence of obesity and sarcopenic obesity on postmenopausal women. *Maturitas*, 67 (2): 178-185.

Morais JLL, Moura MFSF, Pereira FAM, Xavier J, Dourado N, Dias MIR, Azevedo JMT, 2010. The double cantilever beam test applied to mode I fracture characterization of cortical bone tissue. *Journal of the Mechanical Behavior of Biomedical Materials*, 3 (6): 446 - 453.

Morel S, Lespine C, Coureau JL, Planas J, Dourado NMM, 2010. Bilinear softening parameters and equivalent LEM R-curve in quasibrittle failure. *International Journal of Solids and Structures*, 47 (6): 837-850.

Moura MFSF, Dourado NMM, Morais JLL, 2010. Crack equivalent based method applied to wood fracture characterization using the single edge notched-three point bending test. *Engineering Fracture Mechanics*, 77 (3): 510-520.

Moura MFSF, Oliveira JMQ, Morais JLL, Xavier J, 2010. Mixed-mode I/II wood fracture characterization using the mixed-mode bending test. *Engineering Fracture Mechanics*, 77 (1): 144-152.

Pires EJS, Machado JAT, Oliveira PBM, Cunha JB, Mendes L, 2010. Particle swarm optimization with fractional-order velocity. *Nonlinear Dynamics*, 61 (1-2): 295-301.

Rodríguez JJ, Oliveira PA, Fidalgo LE, Ginja MM, Silvestre AM, Ordoñez C, Serantes AE, Gonzalo-Orden JM, Orden MA, 2010. Lead toxicity in captive and wild Mallards (*Anas platyrhynchos*) in Spain. *Journal of Wildlife Diseases*, 46 (3) 854-863.

Santos CL, Jesus AMP, Morais JLL, Lousada JLPC, 2010. A comparison between the EN 383 and ASTM D5764 test methods for dowel-bearing strength assessment of wood: experimental and numerical investigations. *Strain*, 46 (2): 159-174.

Telmo C, Lousada J, Moreira N, 2010. Proximate analysis, backwards stepwise regression between gross calorific value, ultimate and chemical analysis of wood. *Bioresource Technology*, 101: 3808-3815.

### **Other publications International**

ALMEIDA L, BENTO J, CARVALHO A, FERNANDES M, FERNANDES P, GASPAR MJ, FERNANDES C, LIBERAL M, LIMA-BRITO J, LOUZADA J, SILVA M, 2010, Native Scots pine in Portugal: the 'west end' or just 'the end'?. IUFRO Joint International Meeting: Global Change and Mediterranean Pines: Alternatives for Management; University of Valladolid at Palencia, Spain. p. 79.

ARAGÃO F, ABRANTES C, GABRIEL R, MOTA P, MOREIRA H, 2010. Cardiorespiratory fitness and sarcopenic obesity in postmenopausal women. *Obesity Reviews*. 11 (Suppl 1). p. S350.

ARAGÃO F, ABRANTES C, GABRIEL R, MOTA P, MOREIRA H, 2010. Combined effects of body mass index and waist circumference values on postmenopausal women cardiorespiratory fitness. In *Obesity Reviews*. 11 (Suppl 1). p. S350.

ARAÚJO J, CUNHA JB, OLIVEIRA PM, PIRES ES, COELHO JP, 2010. Automation and Control of the Sortegel Wastewater Treatment Plant. In *Controlo 2010, 9th Portuguese Conference on Automatic Control*; Coimbra, Portugal. 6 pages.

ARMANDO AS, TEIXEIRA JJ, CAMELO L, 2010. Aplicabilidade da Equação de Bernoulli. In *Resumos do 20º encontro Ibérico para o ensino da Física*; Vila Real Portugal. p. 259-260.

BARBOSA M, PIRES, EJS, LOPES A, 2010. Optimization of Parallel Manipulators Using Evolutionary Algorithms. In *Soft Computing Models in Industrial and Environmental Applications, 5th International Workshop (SOCO 2010)*; Guimarães, Portugal. p. 79-86.

BELINI UL, TOMAZELLO FILHO M, LOUZADA JLPC, RODRIGUES JC, 2010, Aspectos anatômicos e tecnológicos de painéis confeccionados com fibras de eucalipto e cana-de-açúcar. *Cadernos de Resumos do XII EBRAMEM, Lavras*. p. 304

CAMANHO PP, DÁVILA CG, LOPES CS, CATALANOTT G, BESSA MA, XAVIER J, 2010. On the relation between cohesive laws and resistance curves in the tensile and compressive longitudinal failure of composites. In *Conferência Ibérica de Fractura e Integridade Estrutural, FEUP*; Porto, Portugal.

CAMPILHO RDSG, MOURA MFSF, PINTO AMG, RAMANTANI DA, MORAIS JLL, DOMINGUES JJMS, 2010. Strength prediction of adhesively-bonded scarf repairs in composite structures under bending. In *Materials Science Forum*; Switzerland. 636-637. p. 233-238.

CARVALHO A, GASPAS MJ, FERNANDES C, ALMEIDA L, LOUZADA J, MORAIS F, PINTO, HG, BRITO JL, 2010, Assessment of genetic variability in Portuguese mature stands of *Pinus sylvestris* L. using molecular markers. *IUFRO Joint International Meeting: Global Change and Mediterranean Pines: Alternatives for Management, University of Valladolid*; Palencia, Spain. p. 37

CARVALHO F, PIMENTA A, COUTO P, FERNANDES A, PINTO PM, 2010. Hyperspectral Image Analysis in Wine Context. In *RECPAD 2010 – The 16th Portuguese Conference on Pattern Recognition*; Portugal. p. 18.

CEPEDA A, LOUZADA J, VIEIRA J, VARUM H, TAVARES P, FERNANDES L, PINTO J, 2010, Estudo do material terra aplicado na construção de tabique existente no Alto Tâmega -*Proceedings do 6º Seminário Arquitectura de Terra em Portugal (6º ATP) e 9º Seminário Ibero-Americano de Arquitectura e Construção com Terra (9º SIACOT)*. Editado em CD UNIVERSIDADE de Coimbra; Coimbra. Portugal. p. 160-162

CEPEDA A, LOUZADA J, VIEIRA J, VARUM H, TAVARES P, FERNANDES L, PINTO J, 2010. *Proceedings do 6º Seminário Arquitectura de Terra em Portugal (6º ATP) e 9º Seminário Ibero-Americano de Arquitectura e Construção com Terra*

ARGUMENTUM. CITAB (Centro de Investigação e de Tecnologias Agro-Ambientais e Biológicas), Dpto Florestal, Universidade Trás-os-Montes e Alto Douro (UTAD), Vila Real, Portugal: ARGUMENTUM - Edições, Estudos e Realizações. Estudo do material terra aplicado na construção de tabique existente no Alto Tâmega; 160-165.

COELHO J, CUNHA J, OLIVEIRA PM, PIRES ES, 2010. Greenhouse Heat Load Prediction Using a Support Vector Regression Model. In Soft Computing Models in Industrial and Environmental Applications, 5th International Workshop (SOCO 2010); Guimarães, Portugal. p. 111-117.

CORREIA A, MATIAS J, MESTRE P, SERÔDIO C, 2010. Direct Search Filter Methods, In The 24th European Conference on Operational Research, EURO XXIV, Lisbon, Portugal. p. 295.

CORREIA A, MATIAS J, MESTRE P, SERÔDIO C, 2010. Direct Search Methods for Nonlinear Optimization. In Proceedings of MME10 International Conference on Mathematical Methods in Engineering; Coimbra, Portugal. p. 1-10

CORREIA A, MATIAS J, MESTRE P, SERÔDIO C, 2010. Direct-Search Penalty/Barrier Methods. In , Proceedings of the World Congress on Engineering; San Francisco, USA. 3. p. 1729-1734.

COUTO P, BUSTINCE H, JURIO A, GLUHCEV G, VAREJAO A, PINTO PM, 2010. A-IFSs based Iterative Thresholding in Gait Analysis. In IEEE IS 2010 – IEEE International Conference on Intelligent Systems; Cordoba, Spain. p. 270-275.

COUTO P, BUSTINCE H, PAGOLA M, JURIO A, PINTO PM, 2010. A-IFSs Entropy Based Image Multi-thresholding. In Trends in Applied Intelligent systems, 23rd International Conference on Industrial Engineering and Other Applications of Applied Intelligent Systems; Cordoba, Spain. p. 341-349.

COUTO P, LOPES, N, BUSTINCE H, MELO PM, 2010. Fuzzy Dynamic Model for Feature Tracking. In WCCI 2010 – 2010 IEEE World Congress on Computational Intelligence; Barcelona, Spain. p. 1600-1607.

CUNHA CR, PERES E, MORAIS R, BESSA M, REIS MC, 2010. Contextualized Ubiquity: A new opportunity for rendering business information and services (extended version). Journal of Theoretical and Applied Electronic Commerce Research, 5 (3): 55-64.

CUNHA CR, PERES E, MORAIS R, BESSA M, REIS MC, 2010. Enhancing Tourism through Viticulture Enterprises in Douro Region: The Inov@Douro Model. Communications of IBIMA, (2010): 14 pages.

DINIS FMM, SOARES AA, 2010. Levitação de uma bola num fluxo de ar. Resumos do 20º encontro Ibérico para o ensino da Física, Vila Real, Portugal. p. 277-278.

FARIA, A., GABRIEL, R., ABRANTES, J., BRÁS, R. & MOREIRA, H., 2010. The effect of obesity on triceps-surae musculotendinous stiffness and damping coefficient of

postmenopausal women. In *Medicine & Science in Sports & Exercise*. 42 (5). p. S403-S404.

GABRIEL R, MONTEIRO M, MOREIRA H, FARIA A, ABRANTES J, 2010. BOOKTITLE. ADDRESS: Nova Science Publishers. Assessment based on plantar pressure: emphasis on its use in symptom-free postmenopausal women; 59-73.

GASPAR MJ, LOUZADA JL, MORAIS J, FERNANDES C, RODRIGUES JC, ALMEIDA MH, 2010. Index selection for growth and wood quality traits for parental selection in *Pinus pinaster*. IUFRO Joint International Meeting: Global Change and Mediterranean Pines: Alternatives for Management, University of Valladolid; Palencia, Spain p. 29.

GONÇALVES C, MARTINHO J, PINTO J, VIEIRA J, SILVA P, TAVARES P, FERNANDES L, LOUSADA J, VARUM H, 2010. Construção de tabique nas Associações de Municípios da Terra Fria do Nordeste Transmontano e da Terra Quente Transmontana. Actas do 1º Congresso Internacional de Habitação no Espaço Lusófono, 1º CIHEL, Desenho e Realização de Bairros para Populações com Baixo Rendimentos. Editado em CD. Tema D: Materiais e Tecnologias - considerando aspectos de escassez de recursos e ligados às diversas facetas da sustentabilidade. Instituto Universitário de Lisboa (ISCTE). Departamento de Arquitectura e Urbanismo; Lisbon. Portugal. p. 1.

GONÇALVES JP, VIEIRA J, SILVA P, PAIVA A, RAMOS L, TAVARES P, FERNANDES L, LOUSADA J, VARUM H, 2010. Tabique construction in the Municipalities Association of the Terra Quente Transmontana. Latest Trends on Cultural Heritage and Tourism. 3rd WSEAS International Conference on Cultural Heritage and Tourism (CUHT '10). Published by WSEAS Press. pp. 235-240.

GONÇALVES NJ, NAIA MD, CAMELO L, PEREIRA MG, SOARES AA, 2010. Exploração de aplicações open source de apoio ao ensino: representação gráfica de informação científica Resumos do 20º encontro Ibérico para o ensino da Física, Vila Real, Portugal. p. 373-374.

KÖRBER H, XAVIER J, CAMANHO PP, 2010. High strain rate characterisation of unidirectional carbon-epoxy IM7-8552 in compression and in-plane shear via digital image correlation. In 14th European Conference on Composite Materials; Budapest, Hungary. p. 13.

KÖRBER H, XAVIER J, CAMANHO PP, 2010. High strain rate characterisation of unidirectional carbon-epoxy IM7-8552 in transverse compression and in-plane shear via digital image correlation. In 19th DYMAT Technical Meeting; Strasbourg, France.

LOPES A, FREIRE H, OLIVEIRA PBM, PIRES EJS, REIS C, 2010. Multi-objective Optimization of Parallel Manipulators Using a Particle Swarm Algorithm. In The 10th WSEAS International Conference on Applied Informatics and Communications (AIC '10); Taipei, Taiwan. 6 pages.

LOUZADA J, 2010. Avaliação das propriedades termoquímicas de várias madeiras nacionais, exóticas e de matos. In 1º Congresso Ibérico de Biocombustíveis Sólidos – Universidad de Vigo; Pontevedra, Espanha.

LOUZADA J, 2010. Rootstock and Plant Spacing Influence Sweet Cherry Growth and Yield, Under Different Soil and Water Conditions. In VI International Cherry Symposium; Reñaca, Viña del Mar, Chile.

MATIAS ER, OLIVEIRA PBM, CUNHA, JB, PIRES, EJS, SOARES F, 2010. E-Grafcet: a Multimedia Educational Teaching Tool. In Control 2010, 9th Portuguese Conference on Automatic Control; Coimbra, Portugal. 6 pages

MATIAS J, CORREIA A, MESTRE P, FRAGA C, SERÔDIO C, 2010. Web-based Application Programming Interface to Solve Nonlinear Optimization Problems. In Proceedings of the World Congress on Engineering; London, UK, 3. p. 1961-1966.

MEIRELES R, COUTO P, SILVA S, PINTO PM, 2010. Digital Image Processing in Ultrasound Images of Live Animals. In RECPAD 2010 – The 16th Portuguese Conference on Pattern Recognition; Portugal. p. 18.

MESTRE P, CORREIA A, MATIAS J, SERÔDIO C, 2010. Direct Search Optimization Application Programming Interface with Remote Access. , 40 (4): 251-261.

MESTRE P, PINTO H, Matias J, MOURA JP, OLIVEIRA P, SERÔDIO C, 2010. Multiple Wireless Technologies Fusion for Indoor Location Estimation, International Conference on Indoor Positioning and Indoor Navigation (IPIN); Zurich.

MESTRE P, SERÔDIO C, MATIAS J, MONTEIRO J, COUTO, 2010. Data Acquisition. Sciyo. Java in the Loop of Data Acquisition Systems; 147-168.

MESTRE P, SERÔDIO C, MORAIS R, AZEVEDO J, PINTO PM, 2010. Vegetation Growth Detection Using Wireless Sensor Networks. In WCE 2010 – World Congress on Engineering; London, UK. p. 802-807.

MIRANDA N, MORAIS R, 2010. A 1.2V 900nW conductance converter. In 17th International Conference of Mixed Design of Integrated Circuits and Systems (MIXDES); Gliwice, Poland. p. 172-175.

MONTEIRO M, GABRIEL R, MOREIRA, M., 2010. Obesity and sarcopenic obesity affects the temporal characteristics of foot roll-over on postmenopausal women during walking. In Obesity Reviews. 11 (Suppl 1). p. S351.

MONTEIRO M, GABRIEL R, MOREIRA, M., 2010. Sarcopenic obesity influence in the foot loading on postmenopausal women during walking. In Obesity Reviews. 11 (Suppl 1). p. S351.

MORAIS JLL, XAVIER J, DOURADO NMM, MOURA MFSF, 2010. Mode I and Mode II fracture characterization of wood bonded joints. In 4th International Conference on Advanced Computational Engineering and Experimenting; Paris, France. p. 194.

MORAIS R, SILVA N, SANTOS P, FRIAS C, FERREIRA J, RAMOS A, SIMOES J, BAPTISTA J, REIS M, 2010. Permanent magnet vibration power generator as an embedded mechanism for smart hip prosthesis. In *Procedia Engineering, Eurosensors XXIV Conference*; Linz, Austria. 5. p. 766-769.

MOREIRA H, OGANDO B, ARAGÃO F, ROCHA J, MOTA P, MONTEIRO M, GABRIEL R, 2010. Influence of cardiorespiratory fitness on the body composition of postmenopausal women. In *Obesity Reviews*. 11 (Suppl 1). p. S166.

MOREIRA H, ROCHA J, MONTEIRO M, OGANDO B, GABRIEL R, 2010. Impact of a 12-month exercise program on the body composition of postmenopausal women. In *Obesity Reviews*. 11 (Suppl 1). p. S162.

MORGADO L, RIBEIRO T, MESTRE P, SERÔDIO C, REIS P, CARVALHO F, 2010. Architecture for transparent helpdesk system with multimodal presence. In *Proceedings of SOCA 2010 – IEEE International Conference on Service-Oriented Computing and Applications*; Perth, Australia. 4 pages.

MURTA A, PINTO J, VARUM H, GUEDES J, LOUSADA J, TAVARES P, 2010. Survey on the main defects in ancient buildings constructed mainly with natural raw materials. In *International Conference Portugal SB10 - Sustainable Building Affordable to All*; Vilamoura, Portugal.

OGANDO B, MONTEIRO M, ROCHA J, ARAGÃO F, MOTA P, GABRIEL R, MOREIRA H, 2010. Levels of cardiorespiratory fitness on postmenopausal women and its relationship with body composition and characteristics of menopause. In *Menopause*. 17 (6). p. 1236.

OGANDO B, ROCHA J, MONTEIRO M, MOTA P, GABRIEL R, MOREIRA, H, 2010. The influence of body composition on the maximum oxygen intake of postmenopausal women. In *Menopause*. 17 (6). p. 1235.

PARALTA M, MESTRE P, CALDEIRINHA R, RODRIGUES J, SERÔDIO C, 2010. TraceMe - A Tool for Safety and Security in Clinical Governance using RFID and Integration of Location Services in a HOSPITAL Environment, *International Conference on Indoor Positioning and Indoor Navigation (IPIN)*, In Abstract Volume of the 2010 International Conference on Indoor Positioning and Indoor Navigation (IPIN); Zurich. p. 333-334

PEREIRA FAM, DOURADO N, MORAIS J, MOURA MFSE, XAVIER J, DIAS, 2010. Mode I fracture of cortical bone tissue. In *Conferência Ibérica de Fractura e Integridade Estrutural, FEUP*; Porto, Portugal.

PEREIRA J, XAVIER J, MORAIS J, LOUSADA J, 2010. On the characterisation of wood at the growth ring scale. *International Workshop on Modeling mechanical behavior of wooden cultural objects (joint focussed meeting of COST Actions IE0601 and FP0802)*, Krakow, Poland.

PINTO J, VARUM H, CEPEDA A, TAVARES P, LOUSADA J, SILVA P, VIEIRA J, 2010. The Sustainable World. CITAB (Centro de Investigação e de Tecnologias Agro-Ambientais e Biológicas), Dpto Florestal, Universidade Trás-os-Montes e Alto

Douro (UTAD), Vila Real, Portugal: WIT Press. Study of the traditional tabique constructions in the Alto Tâmega region; 299-307.

PIRES EJS, MACHADO JAT, OLIVEIRA PBM, 2010. Fractional particle swarm optimization. In *Mathematical Methods in Engineering International Symposium*; Coimbra, Portugal. 9 pages.

PIRES EJS, MENDES L, LOPES A, OLIVEIRA PBM, MACHADO JTM, VAZ JC, ROSÁRIO MJ, 2010. Maximin Spreading Algorithm. In *2010 World Congress on Computational Intelligence, Congress on Evolutionary Computation*; Barcelona, Spain. 8 pages.

PIRES EJS, OLIVEIRA PBM, MACHADO JAT, 2010. Multi-criteria Manipulator Trajectory Optimization Based on Evolutionary Algorithms. In *Soft Computing Models in Industrial and Environmental Applications, 5th International Workshop (SOCO 2010)*; Guimarães, Portugal. p. 87-94.

PIRES EJS, OLIVEIRA PBM, MACHADO JAT, 2010. Robot Manipulators New Achievements. *Sciyo. Multi-Criteria Optimization Manipulator Trajectory Planning*; 503-522.

RAMOS S, MARTINS ES, SOARES AA, NAIA MD. Da experimentação à simulação. In *Resumos do 20º encontro Ibérico para o ensino da Física 2010*, p. 375-376.

ROCHA J, OGANDO B, MONTEIRO M, GABRIEL R, MOREIRA H, 2010. Body composition in postmenopausal women: influence of exercise and nature of menopause. In *Menopause*. 17 (6). p. 1236.

ROCHA J, OGANDO B, MONTEIRO M, GABRIEL R, MOREIRA H, 2010. The influence of exercise programa and hormone therapy on body composition of postmenopausal women. In *Menopause*. 17 (6). p. 1236.

ROSA AA, SOARES AA. Efeito da resistência do ar na queda de uma esfera: análise com o modellus. *Resumos do 20º encontro Ibérico para o ensino da Física 2010*; Vila Real, Portugal. p. 301-302.

SANTOS CL, JESUS AMP, MORAIS JLL, QUEIRÓS ERMA, LIMA AMV, 2010. Development of Strengthening Solutions for Dowel-Type Wood Connections. In *Anales de Mecánica de la Fractura, Conferência Ibérica de Fractura e Integridade Estrutural*; Porto, Portugal. I. p. 57-62.

SARABANDO C, CRAVINO JP, SOARES AA, 2010. Simulações computacionais na aprendizagem dos conceitos de peso e de massa no ensino básico: um estudo quasi-experimental. *Resumos do 20º encontro Ibérico para o ensino da física*, Vila Real, Portugal. p. 307-308.

SERÔDIO C, NOVAIS M, PINTO J, GONÇALVES N, MESTRE P, 2010. Content Server for use in Power Electronics Courses. In *Proceedings of the 4th IEEE International Conference on E-Learning in Industrial Electronics*; Arizona, USA. p. 13-18.



SHANNON A, OROZOVA D, SOTIROVA E, HRISTOVA M, ATANASSOV K, KRAWCZAK M, PINTO PM, NIKOLOV R, SOTIROV S, KIM T, 2010. Studies in Computational Intelligence. Springer. Towards a Model of the Digital University: A Generalized Net Model for Producing Course Timetables and for Evaluating the Quality of Subjects; 373-381.

SILVA AB, LOPES JB, SOARES AA, 2010. Água, energia, sustentabilidade e educação sustentada. Resumos do 20º encontro Ibérico para o ensino da Física 2010; Vila Real, Portugal. p. 311-312.

SILVA JA, SOARES AA, 2010. A contribution to understand wing lift. In GIREP-ICPE-MPTL International Conference 2010: Teaching and Learning Physics today: Challenges? Benefits?, posters 61, Reims, France.

SILVA J, SOARES AA, 2010. Understanding wing lift. Physics Education, 45 (3): 249-252.

SOARES AA, NAIA MD, GONÇALVES NJ, ROUBOA A, 2010. Buoyancy effects on forced convection from a horizontal cylinder in parallel and contra flow regimes. In V European Conference on Computational Fluid Dynamics ECCOMAS CFD, V European Conference on Computational Fluid Dynamics ECCOMAS CFD; Lisbon, Portugal. p. 290.

SOARES AA, SARABANDO C, CRAVINO JP, 2010. Retrospectiva histórica sobre a equação de Bernoulli. In Resumos do 20º encontro Ibérico para o ensino da Física 2010, Vila Real, Portugal, p. 303-304.

SOARES AA, TEIXEIRA JT, CAMELO L, 2010. Equação de Bernoulli, um exemplo de má divulgação da ciência. In Livro de resumos AFI – aprendizagem em ambiente formal e informal 2010, p. 71-75.

SOARES AA, TEIXEIRA JT, CAMELO L, 2010. Sustentabilidade da asa dos aviões – abordagem em manuais escolares e auxiliares de ensino de Física do 12º ano. In Resumos do 20º encontro Ibérico para o ensino da física 2010; Vila Real, Portugal. p. 257-258.

VALENTE A, SOARES S, MORAIS R, BAPTISTA JM, REIS MC, 2010. Button Heat-pulse Sensor for Soil Water Content Measurements. In The First International Conference on Sensor Device Technologies and Applications (SENSORDEVICES 2010); Venice/Mestre, Italy . p. 180-182.

### **Completed Masters and Ph.D. theses**

MSc: AZEVEDO JADP (2010) Interface Multitouch para Aplicações Multimédia. Mestrado em Comunicação e Multimédia, Universidade de Trás-os-Montes e Alto Douro. Supervisors: Mestre P, Serôdio C

MSc: BROCHADO MFF (2010) Identificação das Propriedades de Transporte de Água na Castanha. Mestrado em Engenharia Mecânica, Universidade de Trás-os-Montes e Alto Douro. Supervisors: BORGES A, MORAIS J

MSc: CARVALHO AMS (2010) Integração de redes de telemetria em ambientes industriais. Mestrado em Engenharia Electrotécnica e de Computadores. Supervisors: Mestre P, Seródio C

MSc: GUEDES JFM (2010) Ubiquidade e contextualização na gestão vitícola com recurso a tecnologia NFC. Mestrado em Engenharia Electrotécnica e de Computadores da UTAD. Supervisors: Santos RM, Seródio C

MSc: HENRIQUES, RDT (2010) Software para Planeamento de Transportes Escolares. Universidade de Trás-os-Montes e Alto Douro. Supervisors: CUNHA A, SALGADO P

MSc: JOIA HACS (2010) Avaliação por microdensitometria da qualidade da madeira de Pinus sylvestris. Mestrado em Engenharia Florestal, Universidade de Trás-os-Montes e Alto Douro. Supervisors: Lousada JLPC

MSc: MARTINS JPN (2010) Bases para o projecto de conservação, restauro e reabilitação de edifícios antigos: estudos sobre Quinta do Concelho de Guimarães. Universidade de Trás-os-Montes e Alto Douro, Vila Real. Supervisors: Salavessa M, Xavier J

MSc: MEIRELES, Ricardo (2010) – Processamento digital de imagens de ultrassonografia em animais vivos. Universidade de Trás-os-Montes e Alto Douro. COUTO P

MSc: PEIXOTO AC (2010) Desenvolvimento de software para uma sonda multifuncional de medição simultânea do conteúdo de água no solo, propriedades térmicas e condutividade eléctrica. Mestrado em Engenharia Electrotécnica e de Computadores da UTAD. Supervisors: Valente ALG, Santos RM

MSc: PEREIRA CMG (2010) Inspeção visual em aplicações de viticultura de precisão. Mestrado em Engenharia Electrotécnica e de Computadores da UTAD. Supervisors: Reis MC, Santos RM

MSc: PEREIRA JLC (2010) Implementação de OpenSimulator com Funcionalidade de Voz em Ambiente Empresarial, Mestrado em Engenharia Electrotécnica e de Computadores, Universidade de Trás-os-Montes e Alto Douro. Supervisors: Morgado L, Mestre P

MSc: PIMENTA A (2010) Visão hiperespectral em contexto vitivinícola. Universidade de Trás-os-Montes e Alto Douro. Supervisor: COUTO P

MSc: PINTO, AFM (2010) Sistema de Análise de Forças de Contacto. Mestrado em Engenharia Electrotécnica e de Computadores da UTAD. Supervisors: Santos RM, Varejão A

MSc: RIBEIRO FMS (2010) Gestão e Controlo de Terminais Móveis. Mestrado em Engenharia Electrotécnica e de Computadores. Supervisors: Mestre P, Seródio C

MSc:SANTOS AS (2010) Estudo Numérico do Processo de Digestão Anaeróbia. Mestrado em Engenharia Mecânica, Universidade de Trás-os-Montes e Alto Douro . Supervisors: BORGES A, MOREIRA N

MSc: SANTOS N (2010) Identificação dos parâmetros da lei de Petersson. Universidade de Trás-os-Montes e Alto Douro. Supervisor: DOURADO N

MSc: SETTE CR (2010) Crescimento, biomassa, seqüestro de carbono e propriedades da madeira de *Eucalyptus grandis* com fertilização mineral e orgânica. Doutoramento em Ciências Florestais, Universidade de São Paulo, Escola Superior de Agricultura Luiz de Queros - Brazil. Supervisors: Tomazello M (USP), Lousada JL

MSc: SILVA DN (2010) Biomecânica do Caminhar: Perfil das Forças Reactivas do Apoio a Diferentes Velocidades, Diferentes Cargas Acrescidas em Mulheres Pós-Menopáusicas Obesas e não Obesas. Mestrado em Educação Física e Desporto – Observação e Análise do Movimento, Universidade de Trás-os-Montes e Alto Douro. Supervisors: Gabriel RECD, Moreira MHR

MSc: SILVA, NMSP (2010) Sistema de activação sem fios para dispositivos biomédicos implantáveis. Mestrado em Engenharia Electrotécnica e de Computadores da UTAD. Supervisors: Morais RS, Reis MC

MSc: TELMO C (2010) Wood for pellets industry. Thermochemical properties. Mestrado em Engenharia Florestal, Universidade de Trás-os-Montes e Alto Douro. Supervisor: Lousada JLPC

MSc: VALÉRIO SRS (2010) Sistema de informação no Second Life® Interligando Serviços Instant Messaging e SMS”. Mestrado em Engenharia Electrotécnica e de Computadores, Universidade de Trás-os-Montes e Alto Douro. Supervisor: Seródio C Morgado L

MSc : VARANDAS EAP (2010) Rede Digital Triple Play via FWA. Mestrado em Engenharia Electrotécnica e de Computadores. Universidade de Trás-os-Montes e Alto Douro. Supervisors: Pavão J, Seródio C

MSc: VIEIRA, Nuno Manuel Vaz (2010) Utilização da Internet nas Escolas do 1º Ciclo do Ensino Básico do Distrito de Vila Real: Análise de alguns factores. Mestrado em Tecnologias das Engenharias da UTAD. Supervisors: Reis MC, Santos RM

MSc: WILSON S (2010) Gestão de Home Networks, Mestrado em Engenharia Electrotécnica e de Computadores, Universidade de Trás-os-Montes e Alto Douro. Supervisors: Pinto S, Mestre P

PhD: FARIA JAM (2010) Biomechanics of the musculoskeletal system: biomechanical properties of triceps surae muscle-tendon unit in postmenopausal

women. Doutoramento em Ciências do Desporto. Universidade da Beira Interior. Supervisors: Gabriel RECD, Moreira MHR, Brás RMMB (UBI).

PhD: CORREIA A (2010) Métodos de Pesquisa Directa: Optimização Não Linear. Doutoramento em Ciências Matemáticas, Universidade de Trás-os-Montes e Alto Douro. Supervisors: Matias J, Mestre P

PhD: COSTA NA (2010) Pervasive Wireless Sensor Networks Beyond Dumb Sensor Nodes. Doutoramento em Informática, Universidade de Trás-os-Montes e Alto Douro. Supervisors: Serôdio C, Pereira A (I.P. Leiria)

PhD: PAIXÃO JA (2010) O instrutor de esporte de aventura no Brasil e os saberes necessários a sua atuação profissional. Doutoramento em Ciências do Desporto, Universidade de Trás-os-Montes e Alto Douro UTAD. Supervisors: Costa VLM (UFRJ), Gabriel RECD

PhD: SANTOS F (2010) Sistema de controlo de versões em mundos virtuais para negociação de configurações espaciais. Universidade de Trás-os-Montes e Alto Douro. Supervisors: MORGADO L, FONSECA B

PhD: SOUSA J (2010) Uma arquitectura para a composição dinâmica de serviços dependentes do contexto. Vila Real. Doutoramento em Informática, Universidade de Trás-os-Montes e Alto Douro. Supervisors: CARRAPATOSO E, FONSECA B

### **Patents/propotypes**

Morgado L, Carvalho F, Mestre P, Serôdio C, Ribeiro T, Sistema de informação para atendimento ao público. PPP Process 105392.

### **Organization of conferences**

Workshop “Wood Plasticity and SPIR”, Vila Real, 28 September 2010. Organizer: José Luís Penetra Cerveira Louzada.

1º Congreso Ibérico de Biocombustibles Sólidos – Universidad de Vigo, Pontevedra, Spain, 21-23 July 2010. Organizer: José Luís Penetra Cerveira Louzada.

Cours about coxo-femoral dysplasia in dogs. University of León, Spain. León 7 May 2010. investigator: Mário Manuel Dinis Ginja.

XIV Jornadas Internacionais Medicina Veterinária - patologia e cirurgia articular. UTAD, Vila Real, 24-25 October 2010. Organizer: Mário Manuel Dinis Ginja.

Conference “RECPAD 2010 – 16th Portuguese Conference on Pattern Recognition”. 29 Oct 2010. Vila Real. Portugal. Organizer: Pedro Alexandre Mogadouro do Couto.

Workshop “CICV 2010 – IEEE WCCI Workshop on Computational Intelligence in Computer Vision”. 18-23 Jul 2010. Barcelona. Spain. Organizers: Pedro Alexandre Mogadouro do Couto, Pedro José de Melo Teixeira Pinto.

Special session Motion Analysis, “IEEE WCCI 2010 - 2010 IEEE World Congress on Computational Intelligence”, 18-23 Jul 2010. Barcelona, Spain. Organizers: Pedro José de Melo Teixeira Pinto , Pedro Alexandre Mogadouro do Couto.

Special session Soft Computing in Computer Vision/Image Processing, "IEA/AIE - 2010 The Twenty Third International Conference on Industrial, Engineering & Other Applications of Applied Intelligent System", 1-4 Jun 2010. Córdoba, Spain. Organizers: Pedro José de Melo Teixeira Pinto , Pedro Alexandre Mogadouro do Couto.

Workshop Computational Intelligence in Computer Vision, “IEEE WCCI 2010 - 2010 IEEE World Congress on Computational Intelligence”, 18-23 Jul 2010. Barcelona, Spain. Organizer: Pedro José de Melo Teixeira Pinto.

Organizer of the special session Digital Image Processing, “IPMU 2010 - 13th International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems”, 28 Jun - 2 Jul 2010. Dortmund, Germany. Organizer: Pedro José de Melo Teixeira Pinto.

Seminário Ibérico “Ciência, Pedestrianismo e Saúde: Promoção de Recursos Naturais do território Transfronteiriço”, 21-22 October 2010, Miranda do Douro, Portugal. Organizer: Ronaldo Eugenio Calcada Dias Gabriel.

Jornadas Técnico-Científicas de Desporto Aventura em Meio Aquático, 21-22 May 2010, Vila Real, Portugal. Organizer: Ronaldo Eugenio Calcada Dias Gabriel.

“Meeting Plasticity and SPIR”, UTAD, Vila Real, 28 September 2010. Organizer: Ronaldo Eugenio Calcada Dias Gabriel.

Workshop “Ciência, Percursos Pedestres, Recursos Naturais e Promoção da Saúde”, 25 February 2010, Vila Real, Portugal. Organizer: Ronaldo Eugenio Calcada Dias Gabriel.

Seminário “Associativismo: Uma Estratégia Sustentável para a Gestão dos Espaços Florestais”, UTAD, Vila Real, 13 April 2010. Integrated in the “Abril Águas Mil” event sponsored by CIFAP. Organizer: Maria Emilia Calvão Moreira da Silva.

“Restauração e Reabilitação de Sistemas Aquáticos”, UTAD, Vila Real, 15 April 2010. Integrated in the “Abril Águas Mil” event sponsored by CIFAP. Organizer: Maria Emilia Calvão Moreira da Silva.

## Industry contract research

N/A.

## Internationalization

Eramus – Teaching at post-graduate level at Universidad Publica de Navarra. Pinto, PM

A ciência florestal na Europa, VI Simpósio de Pós-Graduação em Ciências Florestais, II Simpósio de Ciência e Tecnologia da Madeira do Rio de Janeiro – UFRRJ, Rio de Janeiro, Brasil, 20-24 Set, 2010. LOUZADA J as Invited Speaker.

Novas tecnologias de apoio a percursos pedestres, Seminário Ibérico “Ciência, Pedestrianismo e Saúde: Promoção de Recursos Naturais do Território Transfronteiriço”, Miranda do Douro, 21 e 22 de Outubro de 2010. MORAIS R. As inveted speaker

Pedestrianismo uma abordagem multidisciplinar: ambiente, aptidão física e saúde, Seminário Ibérico “Ciência, Pedestrianismo e Saúde: Promoção de Recursos Naturais do território Transfronteiriço”, Miranda do Douro, Portugal. Ad hoc Reviewer, BMC Musculoskeletal Disorders. GABRIEL RECD as Invited speaker -

Theory and applications of ankle stability. Mov Lab Spring school 2010 – Biomechanics of Lower Limb. University Lusófona. Lisboa. Portugal. GABRIEL RECD as Invited speaker -

## Other publications National

ARAGÃO F, ABRANTES C, MOTA P, GABRIEL R, MOREIRA H, 2010. BOOKTITLE. Vila Real, Portugal: Edições da UTAD. Influência da massa gorda e do índice de massa muscular esquelética no consumo máximo de oxigénio de mulheres pós-menopáusicas; 135-143.

CEPEDA A, MURTA A, LOUSADA J, VIEIRA J, PINTO J, FERNANDES L, TAVARES P, SILVA P, VARUM H, 2010. Structures and Architecture. CITAB (Centro de Investigação e de Tecnologias Agro-Ambientais e Biológicas), Dpto Florestal, Universidade Trás-os-Montes e Alto Douro (UTAD), Vila Real, Portugal: CRC Press, Taylor & Francis Group. Tabique construction in Alto Tâmega; 397-398.

CHAVES R, GABRIEL R, MONTEIRO M, MOREIRA, H, 2010. BOOKTITLE. Vila Real, Portugal: Edições da UTAD. Influência da actividade física, da idade e das características da menopausa na composição corporal e na taxa metabólica basal de mulheres pós-menopáusicas; 112-123.

CHAVES R, GABRIEL R, MONTEIRO M, MOREIRA, H, 2010. BOOKTITLE. Vila Real, Portugal: Edições da UTAD. Comparação das variáveis da composição corporal em

mulheres pós-menopáusicas, em função dos níveis de actividade física moderada e elevada; 81-91.

FREIRE H, LOPES AM, OLIVEIRA PBM, PIRES EJS, 2010. Optimal design of parallel manipulators using a particle swarm optimization. In 5th WACI – Workshop on Applications of computational Intelligence; Coimbra, Portugal. p. 6 pages.

GABRIEL R, MOREIRA H, 2010. BOOKTITLE. Vila Real, Portugal: Edições da UTAD. Pedestrianismo, biomecânica e prevenção de lesões; 64 – 81.

GOMES M, ALENCOÃO A, SOUSA S, GABRIEL R, MOREIRA H, FERNANDES A, QUARESMA L, SANTOS J, 2010. A geodiversidade e os percursos pedestres na promoção da saúde: o exemplo das Arribas do Douro Internacional. e Terra, 18 (25): 01/04/11.

MARTINHO J, PINTO J, VIEIRA J, SILVA P, TAVARES P, FERNANDES L, LOUSADA J, VARUM H, 2010. Tabique constructions in the Municipalities Association of Terra Fria do Nordeste Transmontano. VII Congresso Internacional de Arquitectura de Tierra Tradición e Innovación. Grupo Tierra de la Universidad de Valladolid; Valladolid. España. p. 1.

MENDES L, GABRIEL R, MOREIRA H, 2010. BOOKTITLE. Vila Real, Portugal: Edições da UTAD. Classificação dos percursos pedestres; 82 – 109.

MOREIRA H, GABRIEL R, 2010. BOOKTITLE. ADDRESS : Editora Abril. Condição muscular e óssea em mulheres pós-menopáusicas: importância da prática de exercício físico;Paginação.

MOREIRA H, GABRIEL R, 2010. BOOKTITLE. Vila Real, Portugal: Edições da UTAD. Pedestrianismo, aptidão física e saúde; 40-63.

MOREIRA H, GABRIEL R, QUARESMA L, SERÓDIO A, GOMES E, ALENCOÃO A, SOUSA L, SANTOS J, MENDONÇA S, ROSA E, 2010. BOOKTITLE. Vila Real, Portugal: Edições da UTAD. Projecto Fluvial: uma intervenção multidisciplinar vocacionada para a promoção da saúde.; 588-594.

MURTA A, PINTO J, VARUM H, GUEDES J, LOUSADA J, TAVARES P, 2010. Sustainable Building, Affordable to All, Low Cost Sustainable Solutions. CITAB (Centro de Investigação e de Tecnologias Agro-Ambientais e Biológicas), Dpto Florestal, Universidade Trás-os-Montes e Alto Douro (UTAD),Vila Real, Portugal: ICONDA@CIBlibrary. Survey on the main defects in ancient buildings constructed mainly with natural raw materials; 589-596.

OGANDO B, ROCHA J, MONTEIRO M, MOTA P, GABRIEL R, MOREIRA H, 2010. BOOKTITLE. Vila Real, Portugal: Edições da UTAD. Efeito da composição corporal e da taxa metabólica basal na variação do consumo máximo de oxigénio de mulheres pós-menopáusicas; 364-373.

PEREIRA J, XAVIER J, MORAIS J, LOUSADA J, PIERRON F, 2010. On the evaluation of elastic properties of P. pinaster at the growth ring scale. In 8º Congresso Nacional de Mecânica Experimental, APAET, Universidade do Minho; Portugal. p. 105-106.

PINTO J, NOVAIS M, GONÇALVES N, MESTRE P, SERÔDIO C, 2010. Servidor de conteúdos para módulos disciplinares, FÍSICA 2010, 17ª Conferência Nacional de Física, 20º Encontro Ibérico para o Ensino da Física, In Livro de Resumos do Física 2010; Vila Real, Portugal. p. 269-370.

ROCHA J, OGANDO B, MONTEIRO M, GABRIEL R, MOREIRA H, 2010. BOOKTITLE. Vila Real, Portugal: Edições da UTAD. Influência do exercício físico e da natureza da menopausa na adiposidade e na condição muscular de mulheres pós-menopáusicas; 102-111.

SANTOS CL, JESUS AMP, MORAIS JLL, QUEIRÓS ERMA, LIMA AMV, 2010. Desenvolvimento de soluções de reforço em ligações de madeira do tipo cavilha. In 8º Congresso Nacional de Mecânica Experimental – APAET 2010; Portugal. p. 101-102.

SILVA D, GABRIEL R, MOREIRA H, 2010. BOOKTITLE. Vila Real, Portugal: Edições da UTAD. Influência do transporte de cargas na biomecânica do apoio plantar durante o caminhar de mulheres pós-menopáusicas; 69-80.

SOARES AA, GONÇALVES NJ, NAIA MD, ROUBOA A, 2010. Mixed convection from an array of cylinders: effect of aiding buoyancy. In Resumos da 17ª conferência Nacional de Física 2010; Vila Real, Portugal. p. 153-154.

SOARES AA, NAIA MD, GONÇALVES NJ, ROUBOA A, 2010. Effects of aiding buoyancy with viscous dissipation on the heat transfer and fluid flow across a cylinder. In Resumos da 17ª conferência Nacional de Física 2010, Vila Real, Portugal. p. 199-200.

SOUSA AMR, XAVIER J, VAZ M, MORAIS JLL, FILIPE VMJ, 2010. Measurement of displacement fields with sub-pixel accuracy by combining cross-correlation and optical flow. In 8º Congresso Nacional de Mecânica Experimental, APAET, Universidade do Minho; Portugal. p. 253-254. CA20

TEIXEIRA JJ, SOARES AA, CAMELO L, 2010. Clube de ensino experimental de ciências: um espaço de educação não formal e de exploração de actividades ilustrativas. Livro de resumos AFI – aprendizagem em ambiente formal e informal; Vila Real. p.27-31. WEB24

XAVIER J, 2010. Full-field measurements on the mechanical characterisation of biological materials. In Workshop de mecânica da madeira, UTAD, Vila Real, Portugal.

XAVIER J, JESUS A, MORAIS J, PINTO J, 2010. On the determination of the modulus of elasticity of wood by compression tests parallel to the grain. In 8º Congresso Nacional de Mecânica Experimental, APAET, Universidade do Minho; Guimarães, Portugal.

XAVIER, J, JESUS A, MORAIS J, PINTO P, 2010. Characterisation of the modulus of elasticity of wood by compression tests parallel to the grain. In 8º Congresso Nacional de Mecânica Experimental, APAET, Universidade do Minho; Guimarães, Portugal. p. 107-108.



## Government/Organization contract

N/A.

## Awards

Best paper award: A-IFSs Entropy Based Image Multi-thresholding. In Trends in Applied Intelligent systems. 23rd International Conference on Industrial, Engineering & Other Applications of Applied Intelligent Systems (IEA-AIE 2010). COUTO P, BUSTINCE H, PAGOLA M, JURIO A, PINTO PM.

Certificate of Merit: The 2010 International Conference of Applied and Engineering Mathematics: Web-based Application Programming Interface to Solve Nonlinear Optimization Problem. Matias J, Correia A, Mestre P, Fraga C, Serôdio C.

Idea Contest “Inov@UTAD”, UTAD, 3rd place: Smart Shock Absorber. Morais R, Valente A, Ferreira C, Ventura P, Cabral M.

## 5.3.6 – Future research

### Objectives

The Biosystems Engineering research unit consists of three research groups and is focused on the effective and pragmatic applications of engineering for Biomaterials, Digital Image Processing and Signal Processing and Biotelemetry.

Within the Biomaterials group research focuses on the characterization and exploitation of different biomaterials in the following major activities:

- Development of identification methods of mechanical and fracture properties of wood, cortical bone and structural polymers and composites, based on full-field optical methods. A particular attention will be given to identification methods based on the Virtual Fields Method. This will lead to the development of a direct method to determine the cohesive law parameters controlling the fracture behavior of wood and an inverse method to evaluate elastic properties fields of wood at the growth ring scale.
- Characterization of mechanical behaviour of wood dowel joints and wood bonded joints, using advanced experimental (digital image correlation technique) and numerical (finite element method and cohesive models) methods. This will lead to the development of advanced numerical tools to simulate the fracture behavior wood dowel and bonded joints.
- Development of identification methods of thermodynamic properties of lignocellulosic biomass as primary energy source. From this research a model

of structure-properties relationship will be produced concerning the moisture diffusion thermodynamic properties at the scale of the growth rings.

- Improvement of energy efficiency of energy conversion processes employing lignocellulosic biomass from agro-forestry resources and wastes. Experimental and numerical modeling of anaerobic digestion process of biomass will be generated to optimize biogas production.

Within the Digital Image Processing group research is focused on engineering applications in relation to Agro-Forestry, Environmental and Biological contexts:

- Development of a dynamic tracking based movement analysis methodology.
- Development of image based methods applied to bio-materials micro-structure characterization. A shape descriptor (through image based parameterization) of wood micro-structure will be generated.
- Application of local hyperspectral imaging techniques for grape analyses in order to assess the grape maturity by measuring pH, sugar content and anthocyanin content. From these studies a non-destructive grape evaluation method will be developed.

Within the Signal Processing and Biotelemetry group there are two major applied research activities:

- Development of new methods for energy harvesting in agricultural environments.
- Development of smart data acquisition devices.

### **Pending and expected funding**

N/A.

## 6 – Unit composition

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