

XIII CONGRESS

# SOCIEDADE PORTUGUESA DE ETOLOGIA

**13<sup>TH</sup> E 14<sup>TH</sup> OCTOBER**

FACULTY OF SCIENCES UNIVERSITY OF LISBON



## BOOK OF ABSTRACTS

LIVRO DE RESUMOS

# | WELCOME

BEM VINDOS |

Welcome to SPE 2015, the XII congress of the Portuguese Ethological Society that will take place at ISPA (Auditorium Armando de Castro).

The Portuguese Ethological Society (SPE) was established in 1987 to promote the biological study of behaviour in Portugal. The society's activities include the publication of *acta ethologica* by Springer, the organization of scientific meetings, international relations with homologous societies and engaging in outreach ethology-teaching activities at secondary schools.

SPE wants to encourage young researchers to present their work, and in each congress, will offer an award to the best student poster and oral presentations. The Vítor Almada award, created in honour of the great scientist and Professor Vítor Almada, will be presented to the best talk by a student and consists in a financial contribution for the student to participate in an international congress in ethology.

We wish everyone a great conference!

*Bem vindos à SPE 2015, XII congresso da Sociedade Portuguesa de Etologia, que irá decorrer no ISPA - Instituto Universitário (Auditório Armando de Castro).*

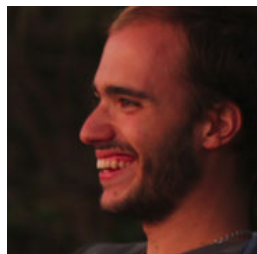
*A Sociedade Portuguesa de Etologia (SPE) foi fundada em 1987 e visa promover o estudo biológico do comportamento em Portugal. As atividades da sociedade incluem a publicação da revista científica *acta ethologica* pela Springer, a organização de reuniões científicas, a promoção de relações internacionais com sociedades congêneres e a divulgação da Etologia a nível do ensino secundário.*

*A SPE entende ser importante incentivar a apresentação de trabalhos por estudantes, pelo que atribui, em cada congresso, prémios para a melhor comunicação oral e melhor poster de estudantes. O Prémio Vítor Almada, criado em homenagem ao grande cientista e Professor Vítor Almada, irá ser atribuído à melhor comunicação oral e consiste no apoio financeiro à participação num congresso internacional de etologia.*

*Votos de um excelente congresso para todos!*

## | ORGANIZING COMMITTEE

## COMISSÃO ORGANIZADORA |



**José Ricardo Paula,**  
MARE

*jrpaula@fc.ul.pt*



**Susana Varela,**  
cE3c

*savarela@fc.ul.pt*



**Rui Rosa,**  
MARE

*rrosa@fc.ul.pt*

## | SCIENTIFIC COMMITTEE

## COMISSÃO CIENTÍFICA |

**Emanuel Gonçalves** | ISPA

**Paulo Gama Mota** | CIBIO

**Gonçalo Cardoso** | CIBIO

**Rui Oliveira** | ISPA

**José Ricardo Paula** | MARE

**Rui Rosa** | MARE

**Manuel Eduardo dos Santos** | ISPA

**Paulo Fonseca** | cE3c

**Susana Varela** | cE3c



## Alexandra GRUTTER

The University of Queensland, Australia

### **Effect of fish cleaning behaviour on the coral reef community**

On the Great Barrier Reef, most fishes engage the cleaning services of the cleaner wrasse *Labroides dimidiatus*, which removes huge numbers of ectoparasites, mostly blood-sucking gnathiids isopods, from clients. Over 25 years, we tested the consequences of these complex behaviours to participants and the wider community. The removal of cleaners from reefs caused a 4-fold increase in gnathiid loads on caged fish within 12 h, but no effect after 6 months on all fish and ectoparasite abundance. An ongoing long-term (16 years) cleaner removal caused a reduction in abundance and/or species diversity visitin, resident, juvenile, recruit and conspecific fish, and client size and growth. Gnathiid traps revealed a potential mechanism for long-term benefits is lower gnathiid infestation rates. Since many clients are grazers, we examined potential flow-on affects to the natural benthos; and on fouling material and sediment load dynamics using settlement tiles (3, 11, or 24 months). We also tested the survival and growth of recruits, predator effects on prey, and fish physiological parameters on the experimental reefs. Analyses of these are underway. Our research reveals extensive cascading effects of cleaners on fish and parasite communities; a rather extraordinary feat for such a small and relatively uncommon fish.



## Andy GARDNER

The University of St. Andrews, UK

### **Adaptation of genes, individuals and groups**

Natural selection explains the appearance of design in the living world. But who wields this design - the gene, the individual, or the group - and what is its purpose?

I review the foundations of Darwinian adaptation through the action of direct and indirect (kin selected) fitness effects, and how this leads organisms to appear designed as if to maximize their inclusive fitness. I also consider the possibilities for adaptation at the gene and group levels.



## Nuno QUEIROZ

CIBIO- InBIO, U.Porto, Portugal

### **Understanding shark movements and behaviour in relation to environment from satellite telemetry**

Shark tagging with electronic sensors is increasingly being undertaken worldwide to track their movements. Electronic tags such as, pop-up archival and satellite positioning tags are revealing when, where and how sharks travel, and, more importantly, how these movements relate to the ocean environment. Pop-up archival transmitting (PAT) tags are externally placed tags that are pre-set to detach, rise to the surface and transmit data summaries by radio to the Argos satellite network. PAT tags provide a means of collecting fishery-independent data, and have been deployed on animals such as tuna, billfish and sharks. Satellite positioning tags are attached externally on animals and transmit a signal to the Argos satellite system which determines the position of the tag, providing near real-time tracking of the animal's movements. Because the tag antenna must be above the water to transmit a signal, these tags are deployed on animals that spend sufficient time at the ocean surface. They are most commonly used on animals such as, marine mammals, sea turtles and some sharks. I will present data on shark movements, activity and habitat selection in relation to variations in the physical environment, information that plays a key role in conservation and fisheries management.



## Clara AMORIM

MARE-ISPA, Portugal

### **Biotic sources of marine soundscapes: how relevant is fish talk?**

Sound is transmitted faster and at greater distances in water than in air, carrying information on the presence of different organisms, landscape features, environmental conditions and human activity. The combination of these natural (biotic and abiotic) and anthropogenic sounds form the acoustic environment or soundscape. Teleost fish are likely the largest vocal vertebrate group and vocalize during distress and social interactions as observed in insects and other vertebrates. These signals are important for reproduction or to gain access over limited resources. Not surprisingly, sounds made by fish are a significant part of marine soundscapes and can be used to assess biodiversity through acoustic passive monitoring. In this talk I will give an overview of the role of acoustic signalling in the outcome of social interactions in fish providing examples of research carried out with vocal fish from Portuguese coastal waters. I will review recent advances in marine soundscape ecology, an emergent field that studies the acoustic seascape resulting from natural and human originated sounds. Finally, I will explain how acoustic monitoring of aquatic environments can allow studying habitat health including biodiversity.

**| TALKS**

**APRESENTAÇÕES ORAIS |**

## From ecosystems to neurons: how ocean warming and acidification affect cooperative interactions

JOSÉ R. PAULA, MARE - Marine Environmental Science Centre, Cascais; ALEXANDRA S. GRUTTER, School of Biological Sciences, The University of Queensland, Brisbane, Australia; RUI ROSA, MARE - Marine Environmental Science Centre, Cascais.

**Abstract:** Cleaning mutualisms are key ecological components in coral reef ecosystems and crucial drivers of marine biodiversity and abundance. These mutualisms are one of the most common interspecific interactions worldwide, which involves a cleaner organism that removes and eats ectoparasites from their so-called “clients” (usually larger reef fish) in complex and cognitive demanding cooperative behaviors that can involve tactile stimulation and partner control. Here we present a project where we studied the effects of ocean warming and acidification on cooperative cleaning interactions from biogeography and ecosystems to behavior and neurobiology. We used species distribution modelling to determine future and present biogeography patterns of cooperative life, ecological manipulations to understand the direct effects of cleaning in client fitness and acclimation capacity, and behaviour neuroendocrinology trials to access the effects of acidification and warming in cooperative interactions. This constitutes the first empirical evidence of how cooperative interactions may influence client fish biogeography, fitness, acclimation capacity and neurobiological breakdown of cooperative interactions in future ocean conditions.

## Habitat selection disruption and enhanced boldness of cryptic flatfish in a changing ocean

EDUARDO SAMPAIO, Divisão de Aquacultura e Valorização (DivAV), Instituto Português do Mar e da Atmosfera (IPMA, I.P.), Lisbon, MARE - Marine Environmental Science Centre, Cascais; ANA LUÍSA MAULVAULT, Divisão de Aquacultura e Valorização (DivAV), Instituto Português do Mar e da Atmosfera (IPMA, I.P.), Lisbon, Interdisciplinary Centre of Marine and Environmental Research (CIIMAR), University of Porto, Porto, MARE - Marine Environmental Science Centre, Cascais; VANESSA M. LOPES, JOSÉ R. PAULA, MARE - Marine Environmental Science Centre, Cascais; VERA BARBOSA, RICARDO ALVES, PEDRO POUSÃO-FERREIRA, Divisão de Aquacultura e Valorização (DivAV), Instituto Português do Mar e da Atmosfera (IPMA, I.P.), Lisbon; TIAGO REPOLHO, MARE - Marine Environmental Science Centre, Cascais; ANTÓNIO MARQUES, Divisão de Aquacultura e Valorização (DivAV), Instituto Português do Mar e da Atmosfera (IPMA, I.P.), Lisbon, Interdisciplinary Centre of Marine and Environmental Research (CIIMAR), University of Porto, Porto; RUI ROSA, MARE - Marine Environmental Science Centre, Cascais.

**Abstract:** Marine organisms will cope with future combined effects of ocean warming and acidification. However, little is known about the interaction of these climate change variables with contaminants. Habitat selection is a vital component in flatfish ecology, and impairment in bottom-choosing judgment may prove disastrous. Likewise, disruption of lateralization has been shown to diminish success in a number of cognitive tasks and predator response behaviors. Here, we determined the acclimation potential of a benthic flatfish, *Solea senegalensis*, to future climate change scenarios and methylmercury (MeHg) neurotoxicity. After 28 days of exposure under three-factor crossed treatments of MeHg, high CO<sub>2</sub> and temperature, we investigated brain mercury accumulation, habitat preference, relative/absolute lateralization and

acetylcholinesterase (AChE) activity in five brain areas. Decreased brain mercury accumulation under hypercapnia was registered. MeHg contaminated flatfish displayed decreased AChE activity, impaired lateralization and spent significantly higher amounts of time in the complex habitat, where they could neither bury nor match the background (i.e. increased boldness). This effect was mediated (positively and negatively) by the climatic stressors. We argue that maintaining current MeHg environmental concentrations, combined with ocean warming and acidification, may lead to severe disruption of behavioural and neurological functions, jeopardizing flatfish ecological fitness.

### **Coping with antidepressants in a changing ocean: behavioural implications in juvenile meagre (*Argyrosomus regius*) exposed to venlafaxine**

ANA LUÍSA MAULVAULT, *Division of Aquaculture and Seafood Upgrading, Portuguese Institute for the Sea and Atmosphere, I.P. (IPMA), Lisboa, Interdisciplinary Centre of Marine and Environmental Research (CIIMAR), University of Porto, Porto, MARE – Marine and Environmental Sciences Centre, Cascais*; JOSÉ RICARDO PAULA, *MARE – Marine and Environmental Sciences Centre, Cascais*; CAROLINA CAMACHO, VERA BARBOSA, RICARDO ALVES, *Division of Aquaculture and Seafood Upgrading, Portuguese Institute for the Sea and Atmosphere, I.P. (IPMA)*; FABIOLA FOGAÇA, *Division of Aquaculture and Seafood Upgrading, Portuguese Institute for the Sea and Atmosphere, I.P. (IPMA)*, *4°EMBRAPA - Meio-Norte, Parnaíba, Brasil*; PATRÍCIA ANACLETO, *Division of Aquaculture and Seafood Upgrading, Portuguese Institute for the Sea and Atmosphere, I.P. (IPMA), Lisboa, Interdisciplinary Centre of Marine and Environmental Research (CIIMAR), University of Porto, Porto, MARE – Marine and Environmental Sciences Centre, Cascais*; VASCO PISSARRA, *MARE – Marine and Environmental Sciences Centre, Cascais*; MÁRIO DINIZ, *UCIBIO, REQUIMTE Chemistry Department, Centre of Fine Chemistry and Biotechnology, Faculty of Sciences and Technology, Nova University of Lisbon (CQFB-FCT/UNL), Caparica*; ANTÓNIO MARQUES, *Division of Aquaculture and Seafood Upgrading, Portuguese Institute for the Sea and Atmosphere, I.P. (IPMA), Lisboa, Interdisciplinary Centre of Marine and Environmental Research (CIIMAR), University of Porto, Porto*; RUI ROSA, *MARE – Marine and Environmental Sciences Centre, Cascais*.

**Abstract:** Anthropogenic activities have contributed to great environmental challenges: remarkable chemical contamination and dramatic climate change. Both factors strongly affect marine ecosystems and are expected to worsen in the future, threatening marine species' welfare and survival. Yet, information on how fish will cope with the presence of chemical contaminants in the future is still extremely limited. The presence of pharmaceuticals in the aquatic environment still lacks regulation, though their elimination during conventional wastewater treatment is known to be rather limited. Thus, assessing ecological consequences of these contaminants becomes imperative, especially considering the expected effects of climate change. Hence, the present work aimed to assess the synergistic effects between climate change (i.e. ocean warming and acidification) and the exposure to the widely and massively used antidepressant venlafaxine on different fish behavioural cues, i.e. anxiety, swimming activity, social behaviour and lateralization, using juvenile *Argyrosomus regius* as biological model. Data evidenced that synergistic effects of climate change, particularly of acidification, combined with venlafaxine exposure led to changes in fish behaviour, affecting the time to adapt to a novel environment and to visualize the fish shoal, suggesting great biological challenges to marine vertebrate populations in the NE Atlantic coastal ecosystems in the ocean of tomorrow.



## The other side of the moon: Disrupted diel vertical migrations of blue sharks (*Prionace glauca*) in the Eastern Tropical Atlantic Oxygen Minimum Zone

MARISA VEDOR, *CIBIO-InBIO, Porto, MARE – Marine and Environmental Sciences Centre, Cascais*; IVO COSTA, *CIBIO-InBIO, Porto*; RUI ROSA, *MARE – Marine and Environmental Sciences Centre, Cascais*; NUNO QUEIROZ, *CIBIO-InBIO, Porto*.

**Abstract:** Oxygen Minimum Zones (OMZs) are hypoxic layers delimited vertically by sharp oxyclines present in several regions of the World's oceans. Off Cape Verde, in the eastern tropical Atlantic, a resident OMZ is found between 200 and 700 m depth, where hypoxia compromises many aerobic processes for most marine organisms. Blue sharks are active swimmers with an expected high energetic requirement, and thus have a high oxygen demand. These are normal diel vertical migrators, being deeper at night and shallower during the day. Previous studies on teleosts have shown a disruption of diel vertical migration (DVM) in the OMZ due to the vertical barrier created by low oxygen, constraining diel dives. In the present study, we focus on the vertical movements of blue sharks in the OMZ. Here, the amplitude of average depth use between day and night is reduced ( $p < 0.001$ ), suggesting a disruption of the DVM. Furthermore, vertical daytime movements are significantly faster than night-time ( $p < 0.05$ ), but are considerably slower in the OMZ ( $p < 0.001$ ).

In the future, OMZs expansion may restrict shark habitat to shallower better oxygenated waters, increasing its susceptibility to fisheries and disrupting its natural behaviour.

---

## Whalequakes: Studying fin whales off South of Portugal using seismic data

ANDREIA PEREIRA, *Instituto Dom Luiz, Sciences Faculty, University of Lisbon, Portugal*; DANIELLE HARRIS, LEN THOMAS, *Centre for Research into Ecological and Environmental Modelling, University of St Andrews, St Andrews, Scotland, UK*; PETER TYACK, *Sea Mammal Research Unit, University of St Andrews, St Andrews, Scotland, UK*; LUIS MATIAS, *Instituto Dom Luiz, Sciences Faculty, University of Lisbon, Portugal*.

**Abstract:** Ocean-bottom seismometers (OBS) are used to locate earthquakes and study the Earth's structure. However, they also have been recording baleen whales along with the target data. These datasets provide valuable information for the study of large cetaceans that would otherwise be difficult to obtain due to economic and logistic reasons. Fin whales are classified as 'Endangered' but sightings off Portuguese mainland waters are rare and insufficient to assess any kind of trend. An array of 24 OBS was deployed between August 2007 and July 2008 southwest of Portugal to study potential tsunami sources. The aim of this study was to develop an automatic signal detection routine to: 1) analyse the occurrence of 20 Hz calls; 2) assess the number of vocalizing animals and distance between them and; 3) evaluate movements. The occurrence of the 20 Hz call was seasonal, with a peak in winter. During this time, two animals vocalizing simultaneously were also recorded. Movement patterns were assessed considering the Gorrige Bank, which is part of a marine protected area, and the entrance to the Mediterranean Sea. These results and contribute to our understanding of fin whale occurrence and seasonal movements in relation to areas of conservation interest.

## Cleaning associations between facultive wrasse *Centrolabrus exoletus* and its client fish

NÁDIA MORADO, PAULO GAMA MOTA, *Universidade de Coimbra*; MARTA SOARES, *CIBIO-InBIO, Porto*.

**Abstract:** Cleaning mutualisms in the marine environment have been seen as a classic example of mutualistic cooperation. This phenomenon occurs worldwide. However, studies of cleaning interactions in temperate regions are scarce, compared with the previous studies in the tropics. Little is known about the ecology and ethology of the North-East Atlantic cleaners, especially on the Portuguese coast. The cleaner wrasse *Centrolabrus exoletus* is a facultive cleaner present in these waters. Thus, the main objectives of this study focused on analyzing the behaviour of the species during cleaning interactions and determine the relevance of these interactions in the overall diet of these cleaners, confirming its dependence, or not, in parasitic elements.

The results of this study shows the great importance of the ecological role of this species in the ecosystem, particularly in the Algarve coast, for that was found that the parasitization of the fish community is real and also, unlike most wrasses, this species has a preference for the intake of Gnathiidae parasites, instead of mucus or scales. In the end, it was also possible to contribute with information for the biological control of parasitic infestations in salmon fish farms in northern Europe as an alternative to pesticide use and vaccination.

## The evolution of song, dance and colour in estrildid finches indicates diverse ecological and life-history drivers of multi-modal signalling

ANA CRISTINA R. GOMES, CATERINA FUNGHI, *CIBIO – Centro de Investigação em Biodiversidade e Recursos Genéticos, Universidade do Porto*; MASAYO SOMA, *Department of Biology, Faculty of Science, Hokkaido University*; MICHAEL D. SORENSON, *Department of Biology, Boston University*; GONÇALO C. CARDOSO, *CIBIO – Centro de Investigação em Biodiversidade e Recursos Genéticos, Universidade do Porto*.

**Abstract:** Sexual selection can target different ornaments and courtship behaviours that are often displayed together, forming multi-modal signals. Some hypotheses predict the joint evolution of different signalling modalities (e.g., when they increase the efficiency of sexually selected communication), while others predict that different signal modalities trade-off with each other (e.g., due to limiting resources to allocate to signalling). Additionally, multiple signals may evolve due to communicating different information (multiple message hypothesis) or increasing the communication efficiency for the same information (redundant message hypothesis). We assessed these hypotheses with a comparative study across the family Estrildidae, one of the largest songbird radiations, where males of many species have profuse colour ornamentation, diverse songs and/or dances. We found very few significant evolutionary correlations among song traits, dance repertoires and colour ornamentation traits, indicating that these signal modalities are able to evolve independently. Accordingly, these sexual signals correlated with distinct ecological and life-history traits (song complexity co-evolved with ecological generalism, song performance with investment in reproduction, dance with habitat type and commonness, and colour ornamentation mostly with sociality). We conclude that multi-modal signalling allows independent evolutionary responses to different ecological and

life-history drivers in estrildid finches, and perhaps accumulates distinct signalling functions.

### Intraspecific variation in the acoustic repertoire of bottlenose dolphins

ANA RITA LUÍS, MIGUEL N. COUCHINHO, MANUEL E. DOS SANTOS, MARE – *Marine and Environmental Sciences Centre, ISPA – Instituto Universitário, Portugal, Projecto Delfim – Centro Português de Estudo dos Mamíferos Marinheiros, Lisboa.*

**Abstract:** Bottlenose dolphins (*Tursiops truncatus*) produce a wide variety of acoustic emissions: whistles, echolocation clicks and other pulsed signals. The influence of environmental conditions and social context on acoustic production has been previously documented. However, intraspecific variability in the acoustic repertoires is still poorly understood. To investigate the (dis)similarities in the vocal emissions of bottlenose dolphins' populations, acoustic signals produced by wild and captive groups were compared. Underwater acoustic recordings were made in Sado/Arrábida, Portugal (2014 - 2016). Acoustic emissions were assigned to the resident or transient populations based on groups' composition assessed during data collection. A third group of six dolphins was sampled at Zoomarine Algarve, Portugal (2012). Preliminary results revealed no significant differences in the overall acoustic emission rate. Interestingly, the repertoire's composition differed between populations (e. g.: bangs and gulps were only recorded for the resident group). Within the common themes produced by the three groups, significant differences were found in the emission rates of whistles ( $F(2, 98)=3.493, p=0.034$ ), creaks ( $F(2, 98)=7.461, p=0.001$ ), and buzzes ( $H(2)=64.250, p<0.001$ ). Furthermore, distinctive stereotyped whistles were recorded in each population. The observed intraspecific variation in the acoustic repertoires could be a result of ecological adaptation or cultural differentiation.

### Does aquatic noise impact reproductive behaviour in vocal gobies?

KAREN DE JONG, *Ecological Research Station Grietherbusch, University of Cologne*; MARIA CLARA P. AMORIM, MARE – *Marine and Environmental Sciences Centre, ISPA - Instituto Universitário, Lisbon*; PAULO J. FONSECA, *Departamento de Biologia Animal and cE3c - Centre for Ecology, Evolution and Environmental Changes, Faculdade de Ciências, Universidade de Lisboa, Lisbon*; ADRIAN KLEIN, *University of Bonn*; KATJA U. HEUBEL, *Ecological Research Station Grietherbusch, University of Cologne.*

**Abstract:** Increasing levels of background noise in our oceans are a major cause of concern and are likely to hamper acoustic communication underwater. When reproductive signals are affected this could lead to a decrease in reproductive success, but evidence in fish is still very scarce. We studied two closely related marine species that use two call types during courtship: the two-spotted goby (*Gobiusculus flavescens*) and the painted goby (*Pomatoschistus pictus*). We compared male acoustic courtship behavior and female spawning behavior in a noisy versus a quiet environment. We found that males of both species reacted similarly to increased noise levels. In the noisy treatment, males used less of one of their call types, but not of the other. Our data thus suggest that males may be able to assess the acoustic environment and respond accordingly. We found no significant effect of treatment on the number of clutches or clutch area in the painted goby. However, we found a significant interaction between treat-

ment and male weight on the likelihood of receiving eggs. Thus, noise can affect both male reproductive behaviour and female spawning decisions in these gobies, which may lead to changes in male traits due to sexual selection.

### **Interspecific competition between two species of passerine birds from different families**

PEDRO FILIPE PEREIRA, *CIBIO - Centro de Investigação em Biodiversidade e Recursos Genéticos, Departamento de Ciências da Vida, Universidade de Coimbra, ICAAM - Instituto de Ciências Agrárias e Ambientais Mediterrânicas, LabOr, Laboratório de Ornitologia, Universidade de Évora*; RUI LOURENÇO, *ICAAM - Instituto de Ciências Agrárias e Ambientais Mediterrânicas, LabOr, Laboratório de Ornitologia, Universidade de Évora*; PAULO GAMA MOTA, *CIBIO - Centro de Investigação em Biodiversidade e Recursos Genéticos, Departamento de Ciências da Vida, Universidade de Coimbra*.

**Abstract:** In general, interspecific competition has been studied mainly in between species belonging to the same genus or family, since they tend to have more ecological similarities and thus more overlapping niches than more distant relatives. With this work, we aimed to evaluate the occurrence of interspecific competition between two species of passerine birds with similar body-size although belonging to different families: the Robin *Erithacus rubecula* and Blackcap *Sylvia atricapilla*. We tested the effect of their co-occurrence in their habitat and verified that they use different habitats in places of co-occurrence and identical habitats in places where they their occurred isolated. We also conducted behavioural tests with pairs of conspecifics and heterospecific opponents (two experiment-types for each species) aiming to record and measure the frequency of aggressiveness. For both species, the latency to approach the opponent did not differ between experiments, suggesting heterospecific-rival recognition. Robins displayed and attacked conspecifics more frequently than heterospecifics, while blackcaps presented lower but similar frequencies of agonistic behaviors between experiments, which may be related with variation in costs and benefits resulting from their differences in territorial behavior. We also observed that both species showed similar chances to win heterospecific contests.

### **Territorial and Social Behaviour of the Pyrenean desman (*Galemys pyrenaicus*) assessed from Scat Deposition**

INÉS CARNEIRO, *Department of Life Sciences, University of Coimbra, Coimbra, InBIO/CIBIO, Porto*; LORENZO QUAGLIETTA, *InBIO/CIBIO, Porto, Jardim BotânicoTropical - IICT (Instituto Investigação Científica Tropical), Lisbon*; PAULO GAMA MOTA, *Department of Life Sciences, University of Coimbra, Coimbra, InBIO/CIBIO, Porto*; PEDRO BEJA, *InBIO/CIBIO, Porto*.

**Abstract:** Freshwater environments are amongst the most threatened habitats in the world, where rare and endemic species are of major concern for the risk of extinction. The Pyrenean desman (*Galemys pyrenaicus*) is a rare freshwater European mammal, whose ecology and behaviour is largely unknown. Previous studies investigated the habitat preferences at small spatial scale, with some river characteristics reported as preferred. We used scat deposition of

Desmans, in the Sabor, Tua and Paiva basin to determine its habitat selection behaviour and describe their preferences, by measuring the local physical and natural conditions where they occurred. Scats were genetically tested for species determination.

At a small-site scale, Pyrenean desman preferentially selected non-exposed sites, preferably on riverbanks near high river flow. At a larger scale, the use of local habitat by the Pyrenean desman appears to be driven by higher spraintability with transects presenting greater percentage of substrate heterogeneity being preferably selected. Preferences for higher spraintability and non-exposed sites suggest that resting sites may have a role in communication and social organization of Pyrenean desman.

### **Sexual selection modulates genetic conflicts and patterns of genomic imprinting**

GONÇALO S. FARIA\*, *University of St Andrews, School of Biology*; SUSANA VARELA, *Faculdade de Ciências, Universidade de Lisboa, Centro de Estudos do Ambiente e do Mar/ Departamento de Biologia Animal*; ANDY GARDNER, *University of St Andrews, School of Biology*.

**Abstract:** Recent years have seen an explosion of interest in linking the theories of kin selection and sexual selection. In particular, there is a growing appreciation that kin selection, arising through demographic factors such as sex-biased dispersal, may modulate sexual conflicts, including in the context of male-female arms races characterized by coevolutionary cycles. However, evolutionary conflicts of interest need not only occur between individuals, but may also occur within individuals, and sex-specific demography is known to foment such intragenomic conflict in relation to social behaviour. Whether and how this logic holds in the context of sexual conflict – and, in particular, in relation to coevolutionary cycles – remains obscure. We develop a kin-selection model to investigate the interests of different genes involved in sexual and intragenomic conflict, and we show that consideration of these conflicting interests yields novel predictions concerning parente-of-origin-specific patterns of gene expression and the detrimental effects of different classes of mutation and epimutation at loci underpinning sexually-selected phenotypes, in particular, behavioural phenotypes.

### **Male competitive adjustment in a species with last-male sperm precedence**

INÊS ÓRFÃO, *CFCUL – Centro de Filosofia das Ciências da Universidade de Lisboa, Faculdade de Ciências, Universidade de Lisboa, Lisbon, E3c – Centre for Ecology, Evolution and Environmental Changes (EE), Faculdade de Ciências, Universidade de Lisboa, Lisbon*; A.F. OJANGUREN, *Centre for Biological Diversity, School of Biology, University of St Andrews, UK*; M. BARBOSA, *Centre for Biological Diversity, School of Biology, University of St Andrews, UK*; CESAM, *Departamento de Biologia, Universidade de Aveiro, Aveiro*; L. VICENTE, *CFCUL – Centro de Filosofia das Ciências da Universidade de Lisboa, Faculdade de Ciências, Universidade de Lisboa, Lisbon*; S.A.M. VARELA, *E3c – Centre for Ecology, Evolution and Environmental Changes (EE), Faculdade de Ciências, Universidade de Lisboa, Lisbon*; A.E. MAGURRAN, *Centre for Biological Diversity, School of Biology, University of St Andrews, UK*.

**Abstract:** Males' reproductive success is critically dependent on their mating rate, which can

be jeopardized by competition, namely by sperm precedence. Selection is, therefore, expected to favour males that can either avoid or adjust to competition with other males, depending on their order of arrival to a female. Here we studied sexual behaviour sequences in a species with last-male sperm precedence (guppies *Poecilia reticulata*), in mesocosms with mixed social groups, where focal males could face different scenarios of competition. We predicted that male guppies should prefer non-competitive scenarios, but that when they were the first to approach a female they should spend more time with her and invest more in courtship displays to ensure paternity than when they were the second. Males approached a female and performed courtship regardless of the presence of other males. However, they spent more time following females when they were the first to approach, as expected, but performed more forced mating attempts.

Our findings suggest that in species with multiple matings and sperm competition, males do not avoid encounters with other males, but instead adjust their behaviour to their presence, and to the order of arrival in a sexual interaction, compatible with mechanisms of sperm precedence.

## **How Do Bumblebees And Honeybees Exploit Food Resources In Different Habitat Qualities?**

JOANA PEREIRA, OLA OLSSON. *Lunds Universitet, Lund, Suécia*

**Abstract:** Foragers increase their fitness by choosing the most profitable food source to forage on. Food resource is spatially distributed in a landscape context and, essentially, in a patch scale. There is a lack of descriptive studies on the relationship between foragers behaviour and food resources' distribution at both different habitat scales perceived by the individuals. To understand which factors from the environment affect bumblebees and honeybees foraging behaviour, a study was conducted in Skåne, considering the quality of foraging plants, patches and landscapes. The main measured behaviour was the time spent per plant, but the foraging diversity and frequency of transition between plant species was also addressed. The main findings show that bee species have different plant selections according to their functional characteristics. Individuals adjust their behaviour to the quality of the plant species where they are foraging, spending more time on high-quality plants. Additionally, on a patch scale, the frequency bees switch plant species is influenced by the patch quality. Also, when they forage on a high-quality landscape, the time spent per plant is decreased. Thus, this study reinforces the theory that the scale, where the type and availability of resources change, really influences foraging strategies and foragers decisions.

## **To eat or not to eat: social transmission of food preferences in wild populations of *Mus spretus***

RITA ANDRADE, cE3c – Center for Ecology, Evolution and Environmental Changes, Faculty of Sciences, University of Lisbon, CESAM – Center for Environmental and Marine Studies, Faculty of Sciences, University of Lisbon; A.M. CERVEIRA, M.L. MATHIAS, CESAM – Center for Environmental and Marine Studies, Faculty of Sciences, University of Lisbon; S.A.M. VARELA, cE3c – Center for Ecology,

**Abstract:** Social information plays a major role in many animal decision-making processes. When it comes to food choices, a trial-and-error strategy can end up being a deadly one, making social learning of food preferences an important alternative. Using an experimental paradigm of social transmission of food preferences with an already validated methodology performed in laboratory rats and house mice, we developed an experiment with wild Algerian mice (*Mus spretus*), to understand whether wild animals, that interact with conspecifics less frequently, are similarly influenced by their conspecifics' food preferences. By developing a horizontal transmission test, we were able to demonstrate that preference for a novel food was transmitted to naïve individuals after social interaction with a conspecific that had eaten that food. However, this transmission depended on the time of interaction between them, since only individuals that interacted a minimum total of two minutes acquired a preference afterwards. Also, we were able to understand that those who acquired a preference, maintained it after a 30-day period, showing a long-term persistence. Additionally, we also developed a vertical transmission test, to determine if preference for a novel food is transmitted from mother to offspring, but we did not find significant evidences for that.

### **Maternal Separation on Different Early Periods: Consequences in Maternal Behaviour and Dams Anxiety**

RENATA ALVES, *University of Porto, Institute for Research Innovation in Health (i3S); University of Porto, Institute for Molecular and Cell Biology (IBMC); University of Porto, Faculty of Psychology and Education Sciences (FPCEUP), Lab of Neuropsychophysiology;* C.J. ALVES, *University of Porto, Institute for Research Innovation in Health (i3S); University of Porto, the Institute of Biomedical Engineering (INEB);* T. SUMMAVIELLE, *University of Porto, Institute for Research Innovation in Health (i3S); University of Porto, Institute for Molecular and Cell Biology (IBMC);* L. SOUSA, *University of Porto, Institute for the Biomedical Sciences Abel Salazar (ICBAS)* L. BARBOSA, *University of Porto, Faculty of Psychology and Education Sciences (FPCEUP), Lab of Neuropsychophysiology;* A. MARGALHÃES, *University of Porto, Institute for Research Innovation in Health (i3S); University of Porto, Institute for Molecular and Cell Biology (IBMC).*

Mother-pup relationship is a dynamic and reciprocal interaction and has an important role in modulating behaviour and shaping neuronal networks. Therefore, it is expected that maternal separation (MS) may affect both members of the dyad. Since development is an ongoing process, early adverse life effects are highly dependent on the critical period in which they occur. Hence, this study aims to investigate the impact of MS of different early periods on maternal behaviour and dams anxiety. Female Wistar rats were subjected to 2h/daily mother-litter separation from postnatal day (PND)2-6 or PND10-14 (n=8). Maternal care was evaluated before and after separation on PND2, 4, 6 or 10, 12, 14. After weaning, maternal anxiety was evaluated with elevated plus maze and open field test. mRNA expression of affiliative behaviour and stress markers in limbic areas were also evaluated. Results show MS has higher impact on PND10-14 offspring once mothers show an increase of maternal behavior. This increase seems related to the decrease of anxiety-like behaviors, on MS10-14 dams, later on. Whereas MS(2-6) dams didn't change maternal behavior compared to the control. Thus, seems to be a key period for parental care investment and the lack of this maternal investment may be critical for mother-infant bonding quality.



**| POSTER PRESENTATIONS**  
**APRESENTAÇÕES EM PÓSTER |**



## POSTER 1 | Variation and Stability in Bottlenose Dolphin Whistles: From Isolation to Social Contexts

PATRÍCIA RACHINAS-LOPES, MARE – Marine and Environmental Sciences Centre, ISPA – Instituto Universitário, Lisboa, Champalimaud Neuroscience Programme, Champalimaud Center for the Unknown, Lisboa, Projecto Delfim – Centro Português de Estudo dos Mamíferos Marinhos, Lisboa; ANA RITA LUÍS, MARE – Marine and Environmental Sciences Centre, ISPA – Instituto Universitário, Lisboa, Projecto Delfim – Centro Português de Estudo dos Mamíferos Marinhos, Lisboa; ANA SOFIA BORGES, MARE – Marine and Environmental Sciences Centre, ISPA – Instituto Universitário, Lisboa; MÁRCIA NETO, Zoomarine - Portugal, Guia, Albufeira; MANUEL E. DOS SANTOS, MARE – Marine and Environmental Sciences Centre, ISPA – Instituto Universitário, Lisboa, Projecto Delfim – Centro Português de Estudo dos Mamíferos Marinhos, Lisboa.

**Abstract:** Whistles produced by bottlenose dolphins (*Tursiops truncatus*) may be emitted in stereotyped (signature) or variant patterns, and their production might be affected by environmental contexts. This study examined the whistle emissions of six captive bottlenose dolphins at Zoomarine (Algarve, Portugal) in two separate time sets and three different contexts: two animals in isolation (2008), and all six in 2012, both segregated and in social contexts. A total of 1,249 whistles was analyzed and classified into 12 different contour categories, through visual inspection of spectrograms. The LS category was the only contour validated as a signature by SIGID criteria (Janik et al, 2013): this stereotyped whistle was recorded in both time sets, associated with the same animal. In isolation, whistle emission rates were 7.8 times higher and multiloop contours were more common. Significant differences were also observed in whistle parameters (end and maximum frequencies,  $p < 0.001$  and  $p = 0.001$ , and number of inflections,  $p < 0.001$ ). The variant (non-stereotyped) contours dominated the whistle production in segregated and social contexts. This study highlights the importance of examining the non-stereotyped portion of the bottlenose dolphin whistle repertoire in different contexts, as signature whistle production may not be a constant or universal phenomenon.

## POSTER 2 | Behavioural Responses of Common Dolphin (*Delphinus delphis*) to Tour Vessels off Algarve, Portugal

JOANA CASTRO, AIMM – Associação para a Investigação do Meio Marinho, Lisboa, Portugal, MARE – Marine and Environmental Sciences Centre, Cascais; ANDRÉ CID, AIMM – Associação para a Investigação do Meio Marinho, Lisboa, Portugal; MARINA I. LABORDE, AIMM – Associação para a Investigação do Meio Marinho, Lisboa, Portugal, MARE – Marine and Environmental Sciences Centre, Lisbon.

**Abstract:** The whale watching industry has been tremendously growing in Portugal mainland. Although it has undeniable economic benefits this business may pose some threats to its target species. The South coast is one of the main dolphin watching tourism destinations of the country. Presently, there are 31 licensed companies and 67 vessels allowed to operate in the region. These numbers suffered a more than a twofold increase in the last two years. The immediate response of common dolphins, *Delphinus delphis*, was studied to verify if dolphin watching vessels were generally affecting the animals. In the past three years, surveys were

carried out on board opportunistic platforms and the results have been very relevant. When less than 3 boats were present in the encounter, the animals tended to approach the boats. In the contrary, whenever three or more vessels were around the majority of the dolphins exhibited an evasive response. By the end of the day the frequency of evasive responses was also higher than during morning encounters. These results are highly relevant to show the importance of enforcing the law in the area. Whale watching operators should also be aware of these responses to encourage a shift in their behaviour.

### POSTER 3 | Effect of boat noise on the acoustic active space of the Lusitanian toadfish

DANIEL ALVES, *Departamento de Biologia Animal and cE3c - Centre for Ecology, Evolution and Environmental Changes, Faculdade de Ciências, Universidade de Lisboa, Lisbon*; M. CLARA P. AMORIM, *MARE – Marine and Environmental Sciences Centre, ISPA-Instituto Universitário, Lisbon*; PAULO J. FONSECA, *Departamento de Biologia Animal and cE3c - Centre for Ecology, Evolution and Environmental Changes, Faculdade de Ciências, Universidade de Lisboa, Lisbon*.

**Abstract:** Anthropogenic noise is considered of global concern since increasing ocean background noise due to human activities is impacting aquatic lifeforms. One of the most prevalent anthropogenic noise sources are boat engines. Although motorboat traffic has increased in the last decades, the impact of boat noise on the communication of aquatic animals is still poorly known. We tested the impact of boat noise on the communication active space of a vocal teleost, the Lusitanian toadfish (*Halobatrachus dydactylus*). To achieve this goal we compared, using the AEP technique, the maximum distance a fish can perceive the conspecific advertisement signal – the boatwhistle, before and after embedding the acoustic signal in boat noise. We used noise from two different types of boat, a small motorboat and a ferryboat. We found that at c. 2 m water depth active space ranged between 6 and 13 m, depending on boatwhistle spectral characteristics. Noise from the small motorboat and from the ferry boat reduced the communication range to c. 2.5-4 m and 7-8.5 m, respectively. These results demonstrate that boat noise can severely reduce the acoustic active space of this fish and, with heavy boat traffic, it may influence mate finding, depending on the boat noise characteristics.

### POSTER 4 | Across the ocean: how environment influences shark's behaviour

ANA COUTO, *MARE – Marine and Environmental Sciences Centre, Lisbon, CIBIO-InBIO, Porto*; DAVID SIMS, *CIBIO-InBIO, Porto*; GONZALO MUCIENTES, *MBA - The Marine Biological Association, Plymouth, UK*; NUNO QUEIROZ, *CIBIO-InBIO, Porto*.

**Abstract:** Understanding how marine predators use habitat, both horizontal and vertical, in relation to physical features is important as they highly influence predators' movements and distribution. Therefore, new satellite tags that can provide not only position but also water depth, temperature, and other environmental factors were developed, providing new information about their movements and the oceanographic properties encountered. Predatory pelagic sharks, such as blue and mako sharks, are highly migratory, crossing long distances over relatively short time, and thus, traversing different habitat types. A previous study by us showed that blue sharks performed different dive patterns when moving between less pro-

ductive (sparser prey) and more productive areas (abundant prey).

Using data collected from our previous tagging studies and environmental data from models, we characterized the habitat of blue and mako sharks (vertical and horizontally) in detail to understand the reasons behind their movement. While most satellite tagging studies have only described the “what” instead of the “why” aspects of shark behaviour, we aimed to understand not only how their behaviour changes during their course but also to answer the main question “why”.

## **POSTER 5 | Indirect Genetic Effects of Oxytocin-like peptides in the Development of Behaviour in Zebrafish**

*DIOGO RIBEIRO, Instituto Gulbenkian de Ciência, Oeiras, Faculdade de Ciências da Universidade de Lisboa, Lisbon; ANA RITA NUNES, Instituto Gulbenkian de Ciência, Oeiras, ISPA-Instituto Universitário, Unidade de Investigação em Eco-Etologia, Lisbon; MAGDA C. TELES, RUI F. OLIVEIRA, Instituto Gulbenkian de Ciência, Oeiras, Faculdade de Ciências da Universidade de Lisboa, Lisbon; Instituto Gulbenkian de Ciência, Oeiras, ISPA-Instituto Universitário, Unidade de Investigação em Eco-Etologia, Lisbon, Champalimaud Neuroscience Programme, Champalimaud Center for the Unknown, Lisbon.*

**Abstract:** Understanding how conspecifics influence a single individual and how these interactions occur in response to changes in the social environment is a major challenge in behavioural and neuroscience fields. These interactions are explained by the Indirect Genetic Effects (IGE) that describe the influence of the social partners’ genes on the phenotype of a focal individual, providing a tool to describe the interactions in the social environment. Oxytocin-like peptides have been involved in the regulation of social behavior across taxa. Using the Zebrafish as an animal model, we are studying the indirect genetic effects induced by oxytocin-like peptides, mainly by assessing zebrafish performance in different social behaviour paradigms, such as shoal preference, shoal recognition and social learning, and also the impact of social interactions in the Darwinian fitness. Our results suggest an effect of social environment in the focal individual’s behaviour. Therefore, we suggest that the social environment is a major factor in the development of behaviour that can revert or recover the phenotype of the individuals.

## **POSTER 6 | Neural Mechanisms of Social Cognition in Zebrafish: the role of oxytocin-like peptides in biological motion perception**

*LEONOR CARREIRA, Instituto Gulbenkian de Ciência, Oeiras, Portugal; ANA RITA NUNES, Instituto Gulbenkian de Ciência, Oeiras, Champalimaud Center for the Unknown, Lisbon; RUI F. OLIVEIRA, Instituto Gulbenkian de Ciência, Oeiras, Portugal; ANA RITA NUNES, Instituto Gulbenkian de Ciência, Oeiras, Champalimaud Center for the Unknown, Lisbon, ISPA- Instituto Universitário, Lisbon.*

**Abstract:** Biological motion perception is one of the fundamental aspects of social-cognitive processes that can help differentiate living organisms from other objects in the environment. This competence is conserved across species and is critical for filial attachment, detection of

predators and perception of social dominance. Moreover, an evolutionary conserved mechanism for animacy detection seems to be present across different species (chimpanzees, chicken, medaka fish) and is probably innate. Therefore, we aim to characterize the underlying neural mechanisms for this cognitive ability and to test if it is regulated by oxytocin-like peptides (isotocin in fish) - a family of neuromodulators implicated in the regulation of sociality. We are using zebrafish as a vertebrate model organism since it exhibits robust social behaviour, relatively simple neuroanatomy and an available genetic toolbox that can allow a better understanding of the gain/loss of oxytocin-like neuronal function. Using a two-choice test we have been able to show that adult zebrafish can detect animacy based on acceleration cues and that isotocin seems to modulate biological motion perception.

In future experiments we plan to explore more complex motion stimuli using direction and agency cues and to disentangle the neural circuitry underlying this vision-based social cognition ability.

## **POSTER 7 | Transcriptomic insights on the courtship behaviour plasticity in the peacock blenny *Salaria pavo***

SARA D. CARDOSO, Instituto Gulbenkian de Ciência, Oeiras, ISPA - Instituto Universitário, Lisbon, Champalimaud Neuroscience Programme, Champalimaud Centre for the Unknown, Lisbon; JOÃO L. SARAIVA, CCMAR – Centro de Ciências do Mar, Universidade do Algarve, Faro; DAVID GONÇALVES, Institute of Science and Environment, University of Saint Joseph, Macau SAR; RUI F. OLIVEIRA, Instituto Gulbenkian de Ciência, Oeiras, ISPA - Instituto Universitário, Lisbon, Champalimaud Neuroscience Programme, Champalimaud Centre for the Unknown, Lisbon.

**Abstract:** Courtship behaviour is an important component of animal reproduction, and different ecological factors can change sexual selection pressures by facilitating or constraining the expression of this behaviour in both females and males. In the peacock blenny *Salaria pavo* the role of courtship behaviour differs among populations. In rocky shore populations, males nest in holes in the rock and defend a courting territory around the entrance of the nest where they perform elaborate courtship displays, while females usually have a passive role in courtship, responding with few displays before they enter the nest to spawn (*i.e.* traditional sex-roles). However, in coastal lagoon populations, nesting substrates are scarce and highly aggregated constraining male territories to the nest itself, leaving males with an almost passive role in courtship, while females display intensely with elaborate changes in body colouration (nuptial colouration) to gain access to these nests (*i.e.* sex-role reversal). Ongoing work focuses on the comparison of females and males from each selective regime from a genomic perspective using two different target tissues, gonads and forebrain. Preliminary results of which changes in gene expression underlie this plasticity in courtship behaviour will be presented.

## **POSTER 8 | Zebrafish (*Danio rerio*) aversion to MS222 and propofol/lidocaine anaesthesia**

JORGE M. FERREIRA, Departamento de Biologia, Faculdade de Ciências, Universidade do Porto, Porto, Portugal; Laboratory Animal Science group, Instituto de Biologia Molecular e Celular, Uni-

versidade do Porto, Porto, Portugal; Instituto de Investigação e Inovação em Saúde, Universidade do Porto, Porto, Portugal; A. M. VALENTIM, Laboratory Animal Science group, Instituto de Biologia Molecular e Celular, Universidade do Porto, Porto, Portugal; Instituto de Investigação e Inovação em Saúde, Universidade do Porto, Porto, Portugal.

Although the interest in zebrafish has been rising in research, there are still refinements required to some procedures. Anaesthesia aim tends to be reduced to clinical efficacy, and animals' welfare can be disregarded. Thus, we aim to study an efficient, and no or less aversive anaesthetic protocol in adult zebrafish, using a combination of propofol/ lidocaine and the most used anaesthetic in fish, MS222. Thirtysix mixedsex AB zebrafish were randomly assigned to MS222 (150mg.L<sup>-1</sup>) and propofol/lidocaine (5/150mg.L<sup>-1</sup>) group. Aversion was tested in a conditioned place aversion task where each protocol was paired with a previously preferred environment, and, afterwards, animals were tested again without the anaesthetic. The aversion degree was measured by the animals' preference for the conditioned place. Experiments are still ongoing but we expect that the zebrafish subjected to the most aversive anaesthetic protocol would have fewer attempts to enter and lower time spent in the place where the anaesthetic was. MS222 has been described to be aversive to this species 1, thus we expect that propofol/lidocaine would be better, and it has already shown promising results for complete anaesthesia 2. | 1) Wong et al. (2015) *PLoS one* 9.2: e88030. 2) Valentim et al. (2016) *PLoS one* 11(1): e0147747.

## POSTER 9 | Comparison of two short periods of maternal separation on adolescent rat social behavior and drug reward

M. NOGUEIRA, *Centro de investigação em Psicologia, Universidade do Minho*; J. BRAVO, *CJ ALVES*; T. SUMMAVIELLE, *Instituto de Investigação e Inovação em Saúde, Universidade do Porto*; A. MESQUITA, *Centro de investigação em Psicologia, Universidade do Minho*; L. DE SOUSA, *A. MAGALHÃES*, *Instituto de Investigação e Inovação em Saúde, Universidade do Porto, Instituto de Ciências Biomédicas Abel Salazar, Universidade do Porto*.

**Abstract:** Social features play an important role in the initial use, maintenance and recovery from addictions. Maternal separation (MS) paradigm was used not as a child negligent model but as a model of physical mother absence, a relevant issue in modern societies. This study investigated if short periods of early MS disrupt adolescent rats social interactions and their susceptibility to drug abuse. We also explored the effect of environmental enrichment (EE), during the period of MS, as a possible tool to protect adolescent rats of these early life events. Two periods of MS, postnatal day (PND)2-6 and PND10-14, for 2 hours/daily under EE or standard environment (SE) were investigated, on different social behavior paradigms, on adolescent *Wistar* rats, and correlate with the expression profile of oxytocin receptor (OXTR) gene. Sensitivity to the conditioned reward of cocaine was also evaluated. Results showed that MS during PND2-6 highly reduced social affiliation/motivation and social novelty preference indicating an inability to establish strong bonds. A lower rewarding cocaine effect in the conditioning place preference test was also observed in these rats. After MS10-14 OXTR expression was increased in prefrontal cortex and rats were more affiliative. This study reveals that early short periods of MS are able to shape adolescent rat social behavior and MS2-6 blunted behavioral responses to both social and drug reward suggesting that this period may be critical for development of the reward circuitry.

## POSTER 10 | Modeling mate-choice copying generalization with genotype-by-environment interactions

MANUEL SAPAGE, *cE3c – Centre for Ecology, Evolution and Environmental Changes, Faculdade de Ciências, Universidade de Lisboa, Lisbon, CFCUL – Center for Philosophy of Sciences of the University of Lisbon, Faculdade de Ciências, Universidade de Lisboa, Lisbon*; HANNA KOKKO, *Department of Evolutionary Biology and Environmental Studies, University of Zurich*; SUSANA A. M. VARELA, *cE3c – Centre for Ecology, Evolution and Environmental Changes, Faculdade de Ciências, Universidade de Lisboa, Lisbon*.

**Abstract:** Mate-choice copying generalization (MCCG) happens when a certain female copies the mate-choice of other females after watching their mating decisions. Unlike mate-choice copying (MCC), where a female changes her preference towards a specific male, a female that performs MCCG will change her preference towards any male similar to the one she saw. MCC and MCCG seem beneficial for females that are not able to assess male quality but are surrounded by females that can. There are still no studies on MCCG with an explicit spatial component, although differences in the spatial environment could play an important role in nonindependent mate-choice, especially when genotype-by-environment interactions (GELs) are present. We suggest that MCC(G) could appear as an adaptive strategy in a population with a decent amount of dispersal, especially for females that tend to disperse more, because they will need the social information of the local females to help them choose the most adapted male phenotype. We suggest a mathematical model to understand the role of MCCG in a world with an explicit spatial component and with GELs, where the population have a certain tendency to copy and each individual has a certain tendency to disperse and to prospect before mating.

## POSTER 11 | How frequent is teaching in Hamadrias Baboons' population at the Lisbon's Zoo?

MARÍLIA SARGENTO, SUSANA A. M. VARELA, *cE3c – Centre for Ecology, Evolution and Environmental Changes, Faculdade de Ciências, Universidade de Lisboa, Lisbon*.

**Abstract:** Acquiring social information to learn new skills is important, but it may not be easy, unless animals facilitate its transmission via teaching. Teaching is a cooperative behaviour that facilitates learning in others, involving the coordinated interaction of a sender and a receiver of information. There has been accumulating evidence that the behaviour of teaching is present in many species of different taxonomic groups. For example, meerkats use teaching to help pups learn to handle difficult prey. This is considered intentional teaching because the sender actively teaches the receiver by modifying the way he/she usually performs a particular behaviour (handling prey) due to the receiver's presence (the naive pups). But there is also inadvertent teaching, which occurs when the receiver learns from the sender natural activities. Here, the sender has no intention of teaching and often does not know that is being observed. Inadvertent teaching is thought to evolve into intentional teaching when learning facilitation becomes adaptive. By studying Hamadrias Baboons' population at the Lisbon's Zoo, we aim to identify in what contexts intentional and inadvertent teaching are relatively more frequent, in order to understand the general circumstances under which intentional teaching became relevant and evolved to facilitate learning.

## POSTER 12 | Gestural communication of a chimpanzee (*Pan troglodytes*) sample from Lisbon Zoo: differences between sexes and age groups

MIGUEL OLIVEIRA, *Departamento de Ciências da Vida, Universidade de Coimbra, Coimbra*; SOFIA N. WASTERLAIN, *Centro de Investigação em Antropologia e Saúde (CIAS), Departamento de Ciências da Vida, Universidade de Coimbra, Coimbra*.

**Abstract:** This study analysed the differences in gestural communication between age groups and sexes of a sample of 16 chimpanzees (*Pan troglodytes*) from Lisbon Zoo, in five parameters: communication frequency, functional context, gestural repertoire size, behavioural response obtainment, and communication success. Data were collected through an *ad libitum* sampling and a focal sampling. Overall, 326 interactions were recorded which produced 27 different gestures. While no differences were found between sexes in any of the analysed parameters ( $p > 0.05$ ), communication frequencies, the functional context, and the communication success differed between the age groups ( $p < 0.05$ ). Differences between age groups probably reflect different social pressures affecting young and adults, and suggest flexibility in how they use the gestures, since they communicate with the most appropriate partners according to the functional context. Although adults are the most successful chimpanzees, the obtained results did not support some of the evidences predicted by the tuning repertoire hypothesis, because no differences were found in the gestural repertoire's size or the use of the most effective gestures between non-adult and adults. It is proposed that methodological mismatches and the influence of the captivity's environment may be responsible for the differences highlighted.

## POSTER 13 | Effect of ocean warming and acidification on fish brain development

FRANCISCO CARVALHO, JOSÉ RICARDO PAULA, ANA RITA LOPES, CATARINA SANTOS, RUI ROSA, *MARE – Marine and Environmental Sciences Centre, Cascais*.

**Abstract:** Brain development is a determinant factor in the animal ontogenesis and a central hub for any specific behavior. The intricate social interactions, the habitat complexity and the environmental factors are determinant for the individuals' brain complexity, size and weight. Here we exposed temperate (*Diplodus sargus*, *Argyrosomus regius*, *Solea solea*) and tropical (*Elacatinus oceanops*, *Pseudochromis fridmanii*, *Amphiprion ocellaris*) fish species to future conditions of ocean warming (+4°C above ambient temperature, 30°C and 22°C for the tropical and temperate species respectively) and ocean acidification (960 ppm pCO<sub>2</sub>) predicted to the end of the century. We compared the growth of total brain related to the body weight and the relative growth of the different brain macro-regions (telencephalon, cerebellum, diencephalon, optic tectum and brainstem). Besides showing how brain development is affected by the conditions of the ocean of tomorrow, we discuss the related jeopardies for fish behavior, ecosystem's health and functioning.

## POSTER 14 | Intraspecific Interactions in a Future Hot and Acidified Ocean

CATARINA SANTOS, JOSÉ R. PAULA, MIGUEL BAPTISTA, MARIA AURÉLIO, FRANCISCO CARVALHO, RUI ROSA, *MARE – Marine and Environmental Sciences Centre, Cascais*.

**Abstract:** Ocean warming and acidification represent serious threats to marine ecosystems.

Previous research has focused on predator-prey interactions or interspecific competition but the combined effects of both stressors on ecological interactions are poorly understood and changes in the dynamic of intraspecific interactions are yet to be addressed. Here we present, for the first time, the potential synergistic effects of ocean warming ( $\Delta 3^{\circ}\text{C}$ ) and acidification ( $\Delta\text{pH}=0.4$ ) on the intraspecific interactions using a highly aggressive temperate shrimp, *Palaeomon elegans*, as a model. After 60 days of acclimation in separated tanks we looked into the (i) feed intake and (ii) food location time. Moreover we observed their (iii) fright response, (iii) shoaling tendency and the (iv) outcome of staged combats. Although there were no signs of impairment in their ability to follow cues and acquire resources, their shoaling tendency decreased with both ocean warming and acidification. Moreover, there were interesting tendencies regarding the escalation of the staged combats, with a reduction of the level of aggression under warming. This is the first study to document both synergistic and isolated effects of warming and acidification on a crucial ecological process like intraspecific interactions, with potential impacts on population dynamics and structure.



## | LIST OF PARTICIPANTS

## LISTA DE PARTICIPANTES |

**Alexandra S. Grutter** | The University of Queensland | Brisbane, Australia

**Andy Gardner** | University of St. Andrews | St. Andrews, Escócia

**Nuno Queiroz** | CIBIO - Universidade do Porto | Vairão

**Clara Amorim** | MARE – ISPA | Lisboa

**Mariana Martins Vieira Palmeiro Nunes** | FCUL | Lisboa

**Rodrigo Aguilar Ramos Vieira** | FCUL | Lisboa

**Sofia Lopes Mendes** | FCUL | Lisboa

**Guilherme Palma** | FCUL | Lisboa

**Gonçalo Faria** | University of St. Andrews | St. Andrews, Escócia

**Inês Dias** | FCUL | Lisboa

**Renata Alves** | i3S - Universidade do Porto | Porto

**Gonçalo Cardoso** | CIBIO - Universidade do Porto | Porto

**Eduardo Sampaio** | MARE - Lab. Marítimo da Guia | Cascais

**Alcina Sousa** | ESTM – IPLeiria | Peniche

**Joana Rosa** | FCT - Universidade de Coimbra | Coimbra

**Ana Cristina Gomes** | CIBIO - Universidade do Porto | Porto

**Sara Cardoso** | Instituto Gulbenkian de Ciência | Oeiras

**Inês Carneiro** | FCT - Universidade de Coimbra | Coimbra

**Jorge Miguel Ferreira** | i3S - Universidade do Porto | Porto

**Daniela Torres** | ICBAS - Universidade do Porto | Porto

**Diogo Ribeiro** | Instituto Gulbenkian de Ciência | Oeiras

**Marisa Vedor** | CIBIO - Universidade do Porto & MARE – LMG | Porto

**Pedro Pereira** | CIBIO - Universidade de Coimbra & ICCAM - Universidade de Évora | Évora

**Leonor Carreira** | Instituto Gulbenkian de Ciência | Oeiras

**Joana Araújo** | FCUL | Lisboa

**Inês Órfão** | CFCUL & cE3c | Lisboa

**Ana Isabel Magalhães** | i3S - Universidade do Porto | Porto

**Manuel Sapage** | FCUL & cE3c | Lisboa

**Karen de Jong** | Univeristy of Cologne | Cologne

**Susana Varela** | cE3c - Universidade de Lisboa | Lisboa

**Paulo Fonseca** | cE3c - Universidade de Lisboa | Lisboa

**Daniel Alves** | cE3c - Universidade de Lisboa | Lisboa

**José Ricardo Paula** | MARE - Lab. Marítimo da Guia | Cascais

**Rui Rosa** | MARE - Lab. Marítimo da Guia | Cascais

**Vasco Pissarra** | MARE - Lab. Marítimo da Guia | Cascais

**Miguel Baptista** | MARE - Lab. Marítimo da Guia | Cascais

**Cátia Figueiredo** | MARE - Lab. Marítimo da Guia | Cascais

**Sara Vieira** | MARE - Lab. Marítimo da Guia | Cascais

**Francisco Borges** | MARE - Lab. Marítimo da Guia | Cascais

**Andreia Pereira** | Instituto Dom Luiz, FCUL | Lisboa

**Nádia Morado** | CIBIO - Universidade de Coimbra | Coimbra

**Marília Sargento** | cE3c - Universidade de Lisboa | Lisboa

**Rita Andrade** | cE3c - Universidade de Lisboa | Lisboa

**Ana Mafalda Marques** | Universidade de Coimbra | Coimbra

**Liliana Almeida** | Universidade de Coimbra | Coimbra

**Francisco Carvalho** | MARE - Lab. Marítimo da Guia | Cascais

**Ana Sofia Ribeiro de Oliveira** | Universidade de Coimbra | Coimbra

**Cristiana Cunha** | FCUL | Lisboa

## | SPONSORS

APOIOS |





# SOCIEDADE PORTUGUESA DE ETOLOGIA | PROGRAMME

## I 13th October, THURSDAY

- 09:00 REGISTRATION
- 09:30 Opening Remarks
- 09:50 **ALEXANDRA GRUTTER | INVITED TALK | Effect of fish cleaning behaviour on the coral reef community**
- 10:40 José Paula | From ecosystems to neurons: how ocean warming and acidification affect cooperative interactions
- 11:00 COFFEE BREAK
- 11:20 Eduardo Sampaio | Habitat selection disruption and enhanced boldness of cryptic flatfish in a changing ocean
- 11:40 Ana Maulvaut | Coping with antidepressants in a changing ocean: behavioural implications in juvenile meagre exposed to venlafaxine
- 12:00 LUNCH
- 14:00 **NUNO QUEIROZ | INVITED TALK | Understanding shark movements and behaviour in relation to environment from satellite telemetry**
- 14:50 Marisa Vedor | The other side of the moon: disrupted diel vertical migrations of blue sharks in the Eastern Tropical Atlantic Oxygen Minimum Zone
- 15:10 Andreia Pereira | Whalequakes: Studying fin whales off South of Portugal using seismic data
- 15:30 COFFEE BREAK
- 15:50 Nádia Morado | Cleaning associations between facultive wrasse *Centrolabrus exoletus* and its client fish
- 16:10 Ana Gomes | The evolution of song, dance and colour in estrildid finches indicates diverse ecological and life-history drivers of multi-modal signalling
- 16:30 Manuel Eduardo Dos Santos | Intraspecific variation in the acoustic repertoire of bottlenose dolphins
- 16:50 POSTER SESSION
- 18:00 SPE PLENEARY MEETING
- 20:00 SOCIAL DINER

## I 14th October, FRIDAY

- 09:30 Opening Remarks
- 09:50 **CLARA AMORIM | INVITED TALK | Biotic sources of marine soundscapes: how relevant is fish talk?**
- 10:40 Karen de Jong | Does aquatic noise impact reproductive behaviour in vocal gobies?
- 11:00 COFFEE BREAK
- 11:20 Pedro Pereira | Interspecific competition between two species of passerine birds from different families
- 11:40 Inês Carneiro | Territorial and social behaviour of the pyrenean desman assessed from scat deposition
- 12:00 LUNCH
- 14:00 **ANDY GARDNER | INVITED TALK | Adaptation of genes, individuals and groups**
- 14:50 Gonçalo Faria | Sexual selection modulates genetic conflicts and patterns of genomic imprinting
- 15:10 Inês Órfão | Male competitive adjustment in a species with last-male sperm precedence
- 15:30 COFFEE BREAK
- 15:50 Joana Pereira | How do Bumblebees and Honeybees exploit food resources in different habitat qualities?
- 16:10 Rita Andrade | To eat or not to eat: social transmission of food preferences in wild populations of *Mus spretus*
- 16:30 Renata Alves | Maternal separation on different early periods: consequences in maternal behaviour and dams anxiety
- 16:50 POSTER SESSION
- 18:00 **FCUL's STUDENTS AWARD:** Sofia Mendes, Mariana Nunes, Rodrigo Vieira | Quantitative discrimination in *Gambusia affinis*
- 18:15 **STUDENTS' AWARDS:** Best oral (Vítor Almada Award) and poster presentations
- 18:30 Presentation of the Behaviour 2017 Conference | Rui Oliveira
- 18:45 **CLOSING REMARKS** | Paulo Gama Mota

More information: [spe2016.campus.ciencias.ulisboa.pt](http://spe2016.campus.ciencias.ulisboa.pt)



# POSTER PRESENTATIONS

## APRESENTAÇÕES EM POSTER



**POSTER 1** | PATRÍCIA RACHINAS-LOPES | Variation and Stability in Bottlenose Dolphin Whistles: From Isolation to Social Contexts

**POSTER 2** | JOANA CASTRO | Behavioural Responses of Common Dolphin (*Delphinus delphis*) to Tour Vessels off Algarve, Portugal

**POSTER 3** | DANIEL ALVES | Effect of boat noise on the acoustic active space of the Lusitanian toadfish

**POSTER 4** | ANA COUTO | Across the ocean: how environment influences shark's behaviour

**POSTER 5** | DIOGO RIBEIRO | Indirect Genetic Effects of Oxytocin-like peptides in the Development of Behaviour in Zebrafish

**POSTER 6** | LEONOR CARREIRA | Neural Mechanisms of Social Cognition in Zebrafish: the role of oxytocin-like peptides in biological motion perception

**POSTER 7** | SARA D. CARDOSO | Transcriptomic insights on the courtship behaviour plasticity in the peacock blenny *Salaria pavo*

**POSTER 8** | JORGE FERREIRA | Zebrafish (*Danio rerio*) aversion to MS222 and propofol/lidocaine anaesthesia

**POSTER 9** | ANA MAGALHÃES | Comparison of two short periods of maternal separation on adolescent rat social behaviour and drug reward

**POSTER 10** | MANUEL SAPAGE | Modelling mate-choice copying generalization with genotype-by-environment interactions

**POSTER 11** | MARÍLIA SARGENTO | How frequent is teaching in Hamadrias Baboons' population at the Lisbon's Zoo?

**POSTER 12** | MIGUEL OLIVEIRA | Gestural communication of a chimpanzee (*Pan troglodytes*) sample from Lisbon Zoo: differences between sexes and age groups

**POSTER 13** | FRANCISCO CARVALHO | Effect of ocean warming and acidification on fish brain development

**POSTER 14** | CATARINA SANTOS | Intraspecific Interactions in a Future Hot and Acidified Ocean