

# XVII

# CONGRESSO DA SOCIEDADE PORTUGUESA DE ETOLOGIA

edição online

6 NOVEMBRO 2020

informações, submissões e registo: [www.ccmар.ualg.pt/spe2020](http://www.ccmар.ualg.pt/spe2020)

## LIVRO DE RESUMOS - ABSTRACT BOOK

ORADORES  
CONVIDADOS:

**Felicity Huntingford** (Univ. Glasgow)

**Rita Covas** (CIBIO-InBio, Univ. Porto)

SUBMISSÃO DE RESUMOS ATÉ 25 SETEMBRO

INSCRIÇÃO  
PARA COMUNICAÇÕES:

Sócios SPE com as quotas em dia: gratuito

Não sócios - estudantes: 10€

Não sócios - profissionais: 30€

Inscrições para assistir: gratuito até 23 Outubro / 5€ após 23 Outubro (requer sempre registo prévio)

ORGANIZAÇÃO:



PARCEIROS:



Ilustração: Jorge Palma

## **NOTA DE BOAS VINDAS**

Caros etólogos,

É com grande prazer que vos damos as boas-vindas ao SPE2020 - XVII Congresso da Sociedade Portuguesa de Etologia. A decisão de avançar com a SPE2020 foi tomada no início do ano, numa altura de grande incerteza: será possível ter um congresso 'normal'? Se não, será possível realizar um congresso online? Como irá a comunidade reagir? E estará a organização à altura da tarefa? Bem, a resposta é clara para as 3 primeiras perguntas. O desenrolar da situação da COVID-19 confirmou infelizmente a nossa cautela ao decidirmos um congresso online, e ao fazê-lo apercebemo-nos das possibilidades de um tal encontro virtual de etólogos. Quanto à resposta da comunidade, ela é clara nas páginas seguintes: um programa extremamente interessante com cientistas e estudantes de 5 nacionalidades apresentando estudos que cobrem todas as 4 perguntas de Tinbergen e focando-se uma vasta gama de modelos. Temos perto de 150 inscrições na conferência, o que demonstra que a etologia em Portugal está viva e de boa saúde. E por último, temos o privilégio de ter não só a investigadora Rita Covas como oradora convidada como também a Prof. Felicity Huntingford como oradora plenária!

Com o peso desta responsabilidade sobre os nossos ombros, esperamos cumprir os elevados padrões que todos merecem, e podemos assegurar-vos que fomos o mais longe possível para fazer desta conferência uma conferência para recordar. Bem-vindos ao SPE2020.

## **WELCOME NOTE**

Dear ethologists,

It is our great pleasure to welcome you to the SPE2020 - XVII Congress of the Portuguese Ethological Society. The decision to run the SPE2020 was taken early in the year, at a time of great uncertainty: will it be possible to have a regular congress? If not, can we run an online meeting? How will the community respond? And can the organisation rise up to the task? Well the answer is clear for the first 3 questions. The unfolding of the COVID-19 situation unfortunately confirmed our precautionary approach to go for an online congress, and as it did, we realised the possibilities of such a virtual gathering of ethologists. As to the response of the community, it is clear in the following pages: a very exciting program with scientists and students from 5 nationalities presenting studies that cover all of Tinbergen's 4 questions and focusing on a wide array of models. We have nearly 150 registrations to attend the conference, which demonstrate that ethology in Portugal is alive and well. And last but not the least we have the privilege to have not only Rita Covas as a keynote speaker but also Prof. Felicity Huntingford as a plenary speaker!

With the weight of this responsibility on our shoulders we hope to meet the high standards that such an audience deserves, and we can assure you that we went as far as possible to make this a conference to remember. Welcome to the SPE2020.

**On behalf of the Organising Committee**

**Joao L. Saraiva**

## **ORGANIZING COMMITTEE (CCMAR)**

João Saraiva

Pedro M Guerreiro

Maria Cabrera

Andreia Pinto

## **SCIENTIFIC COMMITTEE**

Paulo Jorge Gama Mota (Faculdade de Ciências e Tecnologia, Universidade de Coimbra)

Clara Amorim (Faculdade de Ciências, Universidade de Lisboa)

Sandra Trigo (CIBIO-InBIO, Universidade do Porto)

Gonçalo Cardoso (CIBIO-InBIO, Universidade do Porto)

Sónia Cardoso (CIBIO-InBIO, Universidade do Porto; Museu da Biodiversidade, Univ. de Évora)

Rita Covas (CIBIO-InBIO, Universidade do Porto)

Marta Soares (CIBIO-InBIO, Universidade do Porto)

Peter Hubbard (Comparative Endocrinology and Integrative Biology Group, CCMAR)

Adelino Canário (Comparative Endocrinology and Integrative Biology Group, CCMAR)

João Saraiva (Fish Ethology and Welfare Group, CCMAR)

Pedro M Guerreiro (Comparative Endocrinology and Integrative Biology Group, CCMAR)

## PLENARY SPEAKER



**Prof. Felicity Huntingford**

*University of Glasgow*

*Felicity.Huntingford@glasgow.ac.uk*

Felicity completed her degree in General Zoology in 1970 and her PhD in Animal Behavior in 1973, both at Oxford University. In 1974 she started teaching at the Department of Zoology at the University of Glasgow, where she remained until she retired in 2011. She currently holds an honorary position at the Institute of Biodiversity, Animal Health and Comparative Medicine. She received several honors, including grants from the Royal Society of Edinburgh and the Academia Europaea, Niko Tinbergen Lecturer of the Association for the Study of Behavior (2002) and ASAB Medal (2006), PhD Honoris Causa at the Swedish University of Agricultural Sciences (2008), Jack Jones Lecture of the Fisheries Society of the British Isles (2012) and FSBI Beverton Medal (2013), 2016 Buckland Professor of Fisheries and Wood-Gush Memorial lecturer for the Society for Applied Ethology in 2019. She has extraordinary knowledge and expertise in the natural sciences, having carried out teaching, training and research on a number of topics, including: behavior; endocrinology; respiratory physiology; life history biology; ecology; evolution; fish biology and animal welfare. This broad interest is reflected in the textbooks she wrote: *Animal Behavior* (1984), *Animal Conflict* (1987) and *Aquaculture & Behavior* (2012). She has over 45 years of research experience on fish behavior, in the laboratory, in the field, and in aquaculture systems. Her research has been supported by numerous funding agencies, including BBSRC, EC, and NERC, and has resulted in more than 225 scientific articles, 2 complete monographs, and 3 edited books.

## KEYNOTE SPEAKER



### **Rita Covas**

*CIBIO-InBIO, Universidade do Porto*

*rita.covas@cibio.up.pt*

Rita is a behavioural ecologist and evolutionary biologist with a strong interest in the evolution and consequences of sociality and a passion for fieldwork. She uses birds as study models and strongly believes in the importance of long-term data to address questions about evolution in the wild. Rita has been working on cooperation using the sociable weaver as a study model since her PhD (2002). After some years studying patterns of adaptation in island birds, Rita returned to South Africa in 2008 to relaunch the Sociable Weaver project, together with long-term collaborator Claire Doutrelant. The project uses these weavers to study the evolution and consequences of sociality and cooperation and the factors that influence the balance between cooperation and conflict. In 2016, Rita became also the coordinator of another study on a cooperative bird, the large and exceptionally long-lived Southern-Ground Hornbill (at the APNR, Hoedspruit, South Africa). The long-term data sets provided by both projects are also used to study how long-term population dynamics is influenced by environmental variation and how this interacts with social behaviour. In addition, Rita has maintained a keen interest in insularity and how species adapt to the island environment, especially on what concerns behavioural adaptations, and this research is currently pursued through comparative studies. Rita is a Principal Researcher at CIBIO, University of Porto (Portugal) and Honorary Research Associate at the FitzPatrick Institute, University of Cape Town (South Africa).

## PROGRAMME

### Morning Sessions

9.00-9.20	<b>OPENING REMARKS</b>
9.20-10.20	<a href="#"><i>An ethologist's take on sentience in fishes</i></a> <b>Felicity Huntingford</b>
10.20-10.40	<a href="#"><i>Influence of captive environments on fish ethology and welfare</i></a> <b>Pablo Arechavala-Lopez</b>
10.40-11.00	<a href="#"><i>The use of an environmental enrichment modulates dominance response in senegalese sole (<i>Solea senegalensis</i>)</i></a> <b>Elvira Fatsini</b>
11.00-11.20	<a href="#"><i>Effects of tank cover on the welfare of the cichlid <i>Oreochromis niloticus</i> (Nile Tilapia) in a cultivated environment</i></a> <b>Margarida Nogueirinha</b>
11.20-11.30	<b>BREAK</b>
11.30-11.50	<a href="#"><i>The marine soundscape of the Azores – overlap between natural and anthropogenic sounds</i></a> <b>Andreia Pereira</b>
11.50-12.10	<a href="#"><i>Effects of boat noise on vocal behaviour, stress response and reproductive success in the Lusitanian toadfish</i></a> <b>Manuel Vieira</b>
12.10-12.30	<a href="#"><i>Allometry and sexual selection shape the evolution of acoustic signals in parrots</i></a> <b>Fabio Marcolin</b>
12.30-12.50	<a href="#"><i>Is lipsmacking in capuchin monkeys triggered by the sight of an infant's face?</i></a> <b>Natalia Albuquerque</b>
12.50-13.10	<a href="#"><i>How to conduct observational research during the pandemic? Moving lab to online research.</i></a> <b>Renata P. Defelipe</b>
13.10-14.00	<b>LUNCH</b>

## PROGRAMME

### Afternoon Sessions

14.00-14.40	<a href="#"><i>Living together: Cooperation and conflict in the sociable weaver <i>Philetairus socius</i></i></a> <b>Rita Covas</b>
14.40-15.00	<a href="#"><i>Access to cleaning services influence fish physiology under parasite infection and ocean acidification</i></a> <b>José Ricardo Paula</b>
15.00-15.20	<a href="#"><i>Maternal allocation in relation to weather, predation, and social factors in a colonial cooperative bird</i></a> <b>Rita Fortuna</b>
15.20-15.40	<a href="#"><i>Parental stress on rat mothers with vulnerability to depression: The consequences of environmental perception on behaviour</i></a> <b>Renata L. Alves</b>
15.40-16.40	<b>POSTER SESSION</b>
16.40-17.00	<b>BREAK</b>
17.00-17.20	<a href="#"><i>The impact of temporal variation in noise exposure on anxiety-related behaviour and hearing in the adult zebrafish</i></a> <b>Man Ieng Wong</b>
17.20-17.40	<a href="#"><i>Serotonin modulation of waxbills' (<i>Estrilda astrild</i>) behaviour: An experimental approach</i></a> <b>Beatriz Saldanha</b>
17.40-18.00	<a href="#"><i>Testosterone treatment to male and female common waxbills differentially affects sex differences in social hierarchy</i></a> <b>Patrícia Beltrão</b>
18.00-18.20	<a href="#"><i>Comparable behavioural and endocrine responses to mirror images and interacting conspecifics in the Siamese fighting fish</i></a> <b>Andreia Ramos</b>
18.20-18.40	<a href="#"><i>Divergent neurogenomic response to aggression in male <i>Betta splendens</i> selected for fighting</i></a> <b>Sara D. Cardoso</b>
18.40-19.00	<b>CLOSING AND AWARDS</b>

## POSTER LIST

1	<a href="#"><u>Early social development of wild infant capuchin monkeys</u></a> <b>Nayara Teles</b>
2	<a href="#"><u>Social Interaction of bottlenose dolphins of the Sado Estuary and Arrábida coast</u></a> <b>Francisco Martinho</b>
3	<a href="#"><u>Early development of sociability in infants of wild bearded capuchin monkeys (<i>Sapajus libidinosus</i>)</u></a> <b>Pilar Roncero</b>
4	<a href="#"><u>Patriarchal hegemony from an ethological perspective and other social systems</u></a> <b>Ana Clara Vidal</b>
5	<a href="#"><u>Fêmeas e machos de <i>Aulonocara nyassae</i> blue orchid (Regan, 1922) preferem se abrigar ou se alimentar?</u></a> <b>Caroline Teixeira Bonifácio</b>
6	<a href="#"><u>The Relationship between Morphology and Temperament in Domestic Dogs (<i>Canis familiaris</i>)</u></a> <b>Flavio Ayrosa</b>
7	<a href="#"><u>Behavioural modulation in the Siamese fighting fish (<i>Beta splendens</i>) caused by holding water of dominant males</u></a> <b>Melina da Silva</b>
8	<a href="#"><u>Noise-induced behavioral and physiological effects in larval zebrafish</u></a> <b>Lau Ieng Hou</b>
9	<a href="#"><u>Functional specialization of social learning in <i>Drosophila melanogaster</i></u></a> <b>Carla Simões-Henriques</b>
10	<a href="#"><u>Development of trill usage in wild capuchin monkeys (<i>Sapajus libidinosus</i>)</u></a> <b>Júlia Folchito Lacerda</b>
11	<a href="#"><u>Development of diet choices in capuchin monkey infants (<i>Sapajus libidinosus</i>)</u></a> <b>Guilbert Rodrigues de Araujo</b>
12	<a href="#"><u>Behaviour of common octopus individuals facing a baited trap</u></a> <b>Marta Dominguez-Lopez</b>



**ABSTRACTS**  
**ORAL PRESENTATIONS**

## KEYNOTE LECTURE I

# An ethologist's take on sentience in fishes

Huntingford, Felicity

*Institute of Biodiversity, Animal Health and Comparative Medicine, University of Glasgow,  
Glasgow, United Kingdom*

[Felicity.Huntingford@glasgow.ac.uk](mailto:Felicity.Huntingford@glasgow.ac.uk)

The question of whether fish are sentient animals is topical, being central to current debates about fish welfare. It is also challenging, because it is very difficult to study the subjective experiences of any non-human animal. Many disciplines have contributed to our understanding of animal sentience and in this presentation to the Portuguese Ethological Society I thought it would be interesting to explore what ethology has to offer in this context. To this end, my talk will address the following questions: What are the special features of an ethological approach to the study of behaviour? What does it mean to say that an animal is sentient? How have the special features of an ethological approach contributed to our understanding of sentience in fishes? Here I will use a number of important case studies by way of example. Finally, I will pull together insights from these examples to consider the extent to which fish are sentient and the contribution of the ethological approach to our current understanding. I very much hope that this will be done in discussion with the audience, ZOOM permitting.

[Back to Programme](#)

## SESSION I

# Influence of captive environments on fish ethology and welfare

Arechavala-Lopez, Pablo

*Fish Ethology and Welfare Group - Centro de Ciencias do Mar (CCMAR), Faro, Portugal*

[pablo@fishethogroup.net](mailto:pablo@fishethogroup.net)

The environments where the fish are kept for experimentation or aquaculture production generally lack structures, mainly for practical reasons. In addition, during a cycle of aquaculture production there are several situations that can be very stressful for fish. The rearing environment influences several aspects of the biology and behaviour of fish in captivity, and these effects often vary in direction and magnitude, and each species and stage of life needs special consideration with respect to its natural history and preferences. Environmental enrichment (EE) can be used to guarantee or improve the welfare of captive fish, which might help captive individuals to better cope with rearing conditions and stressful events. However, it is of special concern for experimentation and production that the characteristics of the rearing environment or the application of EE can be also associated with some welfare problems, compromising the expected or desired results. Therefore, it is necessary to consider the influence of environmental stimuli or stressors before designing any behavioural experiment or using any EE at farms.

[Back to Programme](#)

## SESSION I

# The use of an environmental enrichment modulates dominance response in Senegalese sole (*Solea senegalensis*)

Fatsini, E.; Almeida, M.; Oliveira, C.; Cabrita, E.

*Centre of Marine Sciences (CCMAR). University of Algarve, Faro, Portugal*

[effernandez@ualg.pt](mailto:effernandez@ualg.pt)

Environmental enrichment is used to promote fish welfare and, in some cases, to reduce detrimental characteristics that fish develop in captive conditions. Senegalese sole is a promising species for European aquaculture, above all in the South of Europe, for its good growth rate and high market price. Behavioural studies have been reported in the last decade in this species, where dominance behaviour has been observed to be caused by the clear hierarchical distribution in captivity related to reproduction. The present study aimed to assess the effect of using a substrate (sand) as an environmental enrichment in the dominance behaviour of Senegalese Sole (*Solea senegalensis*) juveniles by identifying dominance categories and associated behaviours in group-test. For this purpose, 4 groups of sole juveniles (n = 46, groups of 11 and 12 fish) were established in 2 different set of environments, with and without sand. These sole juvenile groups were subjected to behavioural tests related to feeding motivation and territoriality. The three sole feeding first were categorized as dominant, the three sole feeding last or not feeding as subordinate and the other sole feeding in the middle ranking were categorized as intermediate. Two social parameters per condition ("Rest the Head" on another fish and "Position" before and after food delivery associated with the feeding point) were related to dominance of feeding and territory. In both sets of environments, with and without sand, dominant sole were the first to feed, displayed significantly higher number of "Rest the Head" behaviour, lower "Position" indexes and dominated the area close to the feeding point. Applying an enriched environment may enhance dominance and improve welfare in sole. This study will help to observe the linkage between dominance in feeding and territory in the early hood with the dominance in reproduction at breeder stage in captivity.

This work was financed by ReproF1 Project (Mar2020, MAR-16-02-01-FMP-0059), CONDISOLE (CeIMar funds, CEIJ-005) and FCT-UIDB/04326/2020.

[Back to Programme](#)

## SESSION I

# Effects of tank cover on the welfare of the cichlid *Oreochromis niloticus* (Nile Tilapia) in a cultivated environment

Nogueirinha, Margarida <sup>1</sup>; Teodósio, Rita <sup>2</sup>; Engrola, Sofia <sup>2</sup>; Aragão, Cláudia <sup>2</sup>; Saraiva, João <sup>2</sup>

*1 University of Algarve, Faro, Portugal;*

*2 CCMAR, Faro, Portugal*

[margaridanogueirinha@gmail.com](mailto:margaridanogueirinha@gmail.com)

Aquaculture is a booming industry, surpassing fishing in the amount of fish placed on the market. This expansion must be followed by greater awareness and concern for the welfare of farmed fish. Nile tilapia, *Oreochromis niloticus*, is one of the most cultivated species worldwide. In this experiment, the effect of three types of environmental enrichment in tilapia cultivation tanks (total, partial and zero covers) on the well-being of juveniles of this species was tested, using physiological (plasma cortisol) and behavioural indicators. The video recordings were analysed using the Noldus-The Observer XT software. Cortisol levels and the percentage of time spent at the bottom of the tank showed that the treatment with the highest stress index was the tanks with partial coverage. Partial coverage of the tanks may create different areas of light in the tanks, thus increasing the possibility of resource monopolization and consequently creating social instability. The complexity and aggressiveness of *Oreochromis niloticus* resulted in different reactions than the ones expected in the face of environmental enrichment. These results highlight the need for species-specific validation of environmental enrichment measures, especially in animals with complex social behaviours such as the Nile tilapia.

[Back to Programme](#)

## SESSION II

# The marine soundscape of the Azores – overlap between natural and anthropogenic sounds

Pereira, Andreia<sup>1</sup>, Romagosa, Miriam<sup>2</sup>, Corela, Carlos<sup>1</sup>, Oliveira, Cláudia<sup>2</sup>, Cascão, Irma<sup>2</sup>, Silva, Mónica<sup>2</sup>, Matias, Luis<sup>1</sup>

*1 Instituto Dom Luiz, University of Lisbon, Lisbon, Portugal;*

*2 Institute of Marine Research and Okeanos R & D Centre, University of the Azores, Azores, Portugal*

[afpereira@fc.ul.pt](mailto:afpereira@fc.ul.pt)

Evaluating the ocean acoustic environment, i.e. the marine soundscape, is an important task to identify habitat's biological, geological and anthropogenic composition, track ecosystem changes over time and assess potential effects of anthropogenic noise on marine fauna. This study aimed at identifying major contributors to the soundscape to establish an acoustic baseline, assess levels of natural and anthropogenic-related noise and evaluate potential impacts on marine mammals. Two types of acoustic instruments (4 Ocean-Bottom Seismometers - OBSs and 3 Ecological Acoustical Recorders - EARs) were deployed between March and August 2019 off the Azores. Recordings were analysed for differences in occurrence and sound levels between the two types of acoustic recorders, as OBSs and EARs were deployed at different depths. Biological sounds included calls from four species of baleen whales - fin, blue, sei and humpback whales - and potential sounds produced by fish. The latter signals were the most common and the most intense in the soundscape and masked other important biological sounds, such as the ones produced by baleen whales. Anthropogenic noise included mainly vessels and possible airgun noise overlapping in time with baleen whale detections. OBSs recordings at the sea-bottom indicated the regular presence of sounds potentially produced by fish. The shape and the periods between these signals provided indications of biological origin but it is still uncertain because the sampling rate of the OBSs could have clipped the signals and descriptions of potential fish sounds below 1000 m are scarce. These results highlight the importance of long-term soundscape monitoring at different deployment depths and the use of passive acoustic instruments to monitor the marine environment.

[Back to Programme](#)

## SESSION II

# Effects of boat noise on vocal behaviour, stress response and reproductive success in the Lusitanian toadfish

Vieira, M. <sup>1,2,3\*</sup>; Fonseca, P.J. <sup>1,2</sup>; Novais, S.C. <sup>4</sup>; Lemos, M. <sup>4</sup>; Meireles, G. <sup>4</sup>; Matos, A.B. <sup>1,2,3\*</sup>; & Amorim, M. Clara P. <sup>1,3</sup>

*1 FCUL, Lisboa, Portugal;*

*2 cE3c, Lisboa, Portugal;*

*3 Mare-ISPA, Lisboa, Portugal;*

*4 Mare-ESTM, Polytechnic of Leiria, Peniche, Portugal*

[manuel\\_1990\\_v@hotmail.com](mailto:manuel_1990_v@hotmail.com)

Boating and shipping are the most prevalent sources of anthropogenic noise in marine and estuarine waters. However, we know little about how noise affects fish reproductive behaviour and reproductive success. In this study, we compared the effects of boat noise and ambient noise playbacks on breeding Lusitanian toadfish males (*Halobatrachus didactylus*), a species that relies on advertisement calls for mate attraction. Four sets of 12 concrete nests were deployed in Tagus estuary and exposed for a fortnight to either control or playback of boat noise on two mating seasons (2016 and 2017). Noise treatment mimicked the passage of 10 ferries and of 4 small boats per hour during 18 hours, similar to what fish experience in situ. Sounds from each nesting male were continuously recorded on a datalogger. At the end of each experiment, nests were inspected, parental males were sampled for oxidative stress and energy metabolism related biomarkers and the number of eggs in their nest was tallied. Males exposed to boat noise started the vocalise later and called for fewer hours than control fish. A higher number of males abandoned the nest in the noise treatment. Also, parental boat noise males presented an elevated stress response, a higher number of unviable eggs and a lower number of viable eggs. These results suggest that exposure to anthropogenic noise impacts vocal behaviour and reproduction outcome in vocal fish.

This work was funded by PTDC/BIA-BMA/29662/2017.

[Back to Programme](#)

## SESSION II

# Allometry and sexual selection shape the evolution of acoustic signals in parrots

Marcolin, Fabio <sup>1</sup>; Cardoso, Gonçalo <sup>2</sup>; Bento, Daniel <sup>1</sup>; Reino, Luis <sup>2</sup>; Santana, Joana <sup>2</sup>

*1 Instituto Superior de Agronomia, Lisboa, Portugal;*

*2 CIBIO/InBIO, Universidade do Porto, Vairão, Portugal*

[fabio.marcolin89@gmail.com](mailto:fabio.marcolin89@gmail.com)

Acoustic signals evolve influenced by different constraints (e.g., morphology, habitat) and selective pressures (e.g., social and sexual selection), whose relative importance is not well understood. Most evolutionary comparative studies of avian vocalizations focused on the Passerine songs, while other taxa and types of vocalizations remain understudied. For example, the Psittaciformes (parrots, *lato sensu*) are a large clade exhibiting vocal learning, and often living gregariously, for which large-scale comparative studies of vocalizations are lacking. We measured acoustic properties (duration, sound frequency, frequency bandwidth and entropy) of the main call type in 230 species of Psittaciformes, and Phylogenetic Generalized Least Squares (PGLS) models to test hypotheses for the evolution of acoustic differences: (1) morphological constraint (predicting associations with body size); (2) acoustic adaptation hypothesis (predicting differences between forested and open habitats); (3) social complexity hypothesis (predicting associations with gregariousness); and (4) sexual selection hypotheses (predicting correlated evolution with sexual ornamentation). We found robust effects of (1) morphological constraint, since PGLS models showed theoretically-predicted allometries, whereby larger body size was associated with longer calls, lower sound frequency and wider frequency bandwidth. Contrary to the (2) acoustic adaptation and (3) social complexity hypotheses, we found no associations of acoustic traits with habitat type (forested or open) or with gregariousness. Social complexity could, however, be related to vocal traits not studied here, such as call repertoire size. Finally, we found an influence of (4) sexual selection on call evolution, since species with higher sexual dichromatism had simpler calls (shorter duration, lower sound entropy, narrower frequency bandwidth), in accordance with Darwin's "transfer hypothesis" that predicts an evolutionary trade-off between alternative sexual signals. Our results are the first large-scale attempt at understanding acoustic diversity across the Psittaciformes, and indicate that allometry and sexual selection shaped the evolution of their vocal signals.

[Back to Programme](#)



## SESSION II

# Is lipsmacking in capuchin monkeys triggered by the sight of an infant's face?

Albuquerque, Natalia; França, Juliana; Varella, Ana Clara; Belli, Marina; Izar, Patrícia

*Departament of Experimental Psychology, Institute of Psychology, University of São Paulo, São Paulo, Brazil*

[nsalbuquerque@usp.br](mailto:nsalbuquerque@usp.br)

Capuchin monkeys are social primates that use a variety of behaviours for social regulation. A well-known display is the lipsmacking (LS), which is considered to be triggered by the close presence of an infant. Yet, the function of this behaviour is not fully understood. Therefore, our goal was to investigate whether this display is linked to the overall chances individuals have for visual access to a face. We used 1285 videos of naturalistic focal observations of the second and the ninth month of eight capuchin monkeys (*Sapajus libidinosus*), with a total duration of 2398 minutes (second: 1446; ninth: 952). The individuals belong to a wild group from Brazil (Fazenda Boa Vista, Piauí). Divided into two teams, we conducted a screening of LS and the opportunities of visual access to a face, which we called VAF, for all videos. The utilised video clips were the same for both screenings, and an agreement of over 80% was reached by each team. Relative frequency was used due to differences in duration of the recordings. We compared (Friedman test) the second and ninth month for VAF (2nd=0.934±0.509; 9th=1.218±1.272; non significant) and for LS (2nd=0.302±0.074; 9th=0.014±0.023; p=0.005). Moreover, we compared VAF and LS using Wilcoxon tests within the second month, within the ninth and using their summed data (VAF=0.959±0.554; LS=0.181±0.086) and found significant differences for all (p=0.01). Our findings show there is no difference in VAF between the studied months, however there is a clear decrease in LS, as supported by literature. Interestingly, VAF is still frequent in the ninth month whilst LS is not. In fact, for many infants, there was no occurrence of LS at this later stage. Our results suggest that the mere sight of an infant's face is not enough to elicit lipsmacking and paves the way to more in-depth investigations.

Acknowledgements: We thank Fazenda Boa Vista and the field assistants for making this research possible

[Back to Programme](#)

## SESSION II

# How to conduct observational research during the pandemic? Moving lab to online research

Defelipe, R. P.; Resende, B.

*Department of Experimental Psychology, University of São Paulo, São Paulo, Brazil*

[redfelipe@gmail.com](mailto:redfelipe@gmail.com)

The physical distance is the most important precaution to reduce the spread of coronavirus. Changing presential data assessment to an online one is a challenge. In this paper, we described how we adapted the methodology and the data collection of our initial project. We first aimed: to study the effect of adults' demonstration on four objects, varying their sensorial features, on infants' exploration; to implement a cross-sectional design; to use the experimenter as a demonstrator; to set up the setting at kindergartens; to use two professional cameras, and to recruit a sample of 160 mothers and their 10-18 month-old infants. We predicted younger infants would rely on the affordances of the objects to act, and older would follow more the demonstrator's actions. Due to the confinement, we kept the core question but decided: to conduct a longitudinal design; to use the caregiver (usually the mother) as demonstrator; to set up the setting at the families' homes; to use one mobile camera, and to recruit a sample of 20 mothers and their 6-18 month-old infants. Detailed instructions about the setting, the construction of objects, and their demonstrations were sent to the families through text and video messages. Because it takes longer to instruct caregivers, we broadened the age range, reduced sample size, and focused on a molecular observational assessment. These changes bring challenges: we must be sure we give instructions clear enough to get uniform demonstrations, we must deal with the variation from a naturalistic setting (objects' shapes, and individual maternal styles), and a smaller sample. However, at the same time, the more naturalistic approach gives us advantages as the undesired bias caused by an artificial laboratory setting. Rethinking infant observational research and sharing our experience with colleagues is mandatory for keep on doing quality research.

Acknowledgements: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior [Higher Education Improvement Coordination].

[Back to Programme](#)

## Living together: Cooperation and conflict in the sociable weaver *Philetairus socius*

Covas, Rita

*CIBIO/InBIO, Universidade do Porto, Porto, Portugal*

[rita.covas@gmail.com](mailto:rita.covas@gmail.com)

Cooperative behaviour represents an evolutionary puzzle because natural selection is thought to favour selfish individuals over co-operators, which should lead to the collapse of cooperation. Yet, cooperative behaviour is widespread in nature, from unicellular organisms to humans. For cooperation to evolve and persist, its benefits must outweigh the costs, and we have been investigating the benefits and costs of cooperation through a long-term study of a small bird the Sociable Weaver *Philetairus socius* at Benfontein Nature Reserve in South Africa. These birds are highly social and cooperate to achieve various tasks, providing an excellent model to study cooperation. Our work has shown that these birds live in societies that are to some extent based on family interactions, and that kin-selection could play a role in explaining cooperative interactions in this species. However, social links and cooperative interactions also take place among non-kin. Theory and studies in humans show us that co-operators are preferred as social and sexual partners, suggesting that partner choice may therefore provide a powerful explanation for the evolution and stability of cooperation, alongside kin selection, and we are currently assessing the importance of these mechanisms. However, life in animal societies can also be rife with conflict, with consequences varying from social exclusion to extreme behaviours such as infanticide. Ultimately our study aims to understand the factors that influence the balance between cooperation and conflict, allowing cooperation to be maintained and animal societies to persist. Here I will provide an overview of over 10 years of work and the main results obtained.

[Back to Programme](#)

## SESSION III

# Access to cleaning services influence fish physiology under parasite infection and ocean acidification

Paula, José Ricardo <sup>1</sup>, Repolho, Tiago <sup>1</sup>, Grutter, Alexandra <sup>2</sup>, Rosa, Rui <sup>1</sup>

*1 MARE - Marine and Environmental Sciences Centre, Cascais, Portugal;*

*2 University of Queensland, QLD, Australia*

[jrpaula@fc.ul.pt](mailto:jrpaula@fc.ul.pt)

Cleaning symbioses are key mutualistic interactions where cleaners remove ectoparasites from client fishes. Such interactions elicit beneficial effects on clients' ecophysiology, with cascading effects on fish diversity and abundance. As ocean acidification, can disturb cleaner fish motivation to interact with clients, one can conceive a future scenario where client fishes struggle to access cleaning services and thus have to deal with the combined stress of parasite infection and ocean acidification. Here we investigated how the physiological response to parasite infection and ocean acidification of a client fish (*Pomacentrus amboinensis*) is modulated by access to cleaning services, performed by the cleaner wrasse *Labroides dimidiatus*. Access to cleaning services was modulated using a long-term removal experiment where cleaners were consistently removed from patch reefs around Lizard Island (Australia) for 17 years or left undisturbed. Since this long-term experiment has been running longer than the lifespan of the client fish (approx. 6.5 years) individuals from removal reefs had no access to cleaners, and thus a higher parasite pressure, their whole life. Only fish from cleaner-present reefs had a negative metabolic response to parasite infection, and after an acclimation period of 23 days to high CO<sub>2</sub> (~1000 µatm CO<sub>2</sub>, pH 7.66), only damselfish from cleaner-absent reefs a negative metabolic response to ocean acidification. We propose that stronger selection for parasite tolerance might be present in reef fishes without access to cleaners, but this might come at a cost when dealing with more stressors, such as ocean acidification.

[Back to Programme](#)

## SESSION III

# Maternal allocation in relation to weather, predation and social factors in a colonial cooperative bird

Fortuna, Rita <sup>1</sup>; Paquet, Matthieu <sup>2</sup>; Ferreira, André C. <sup>1,3</sup>; Silva, Liliana R. <sup>1</sup>; Theron, Franck <sup>3</sup>, Doutrelant, Claire <sup>3</sup>; Covas, Rita <sup>1,4</sup>

*1 CIBIO-InBIO, Vairão, Portugal;*

*2 Swedish University of Agricultural Sciences, Upsala, Sweden;*

*3 CEFÉ-UMR5175 CNRS, Montpellier, France;*

*4 Percy FitzPatrick Institute, Cape Town, South Africa*

[ritafortuna@hotmail.com](mailto:ritafortuna@hotmail.com)

Females may adjust prenatal allocation in relation to ecological conditions that affect reproductive success, such as weather conditions or predation risk. In cooperative breeders, helpers might also influence reproductive success and previous studies suggest that females can lay smaller eggs or bigger clutches when breeding with more helpers. Although recent work suggests that helper effects can vary according to climatic variables, how social and ecological factors interact to shape prenatal allocation is poorly understood. Here, we examine how ecological and social components of the maternal breeding environment interactively co-vary with egg mass and clutch size, using as a model the sociable weaver (*Philetairus socius*), a colonial, cooperatively breeding passerine. The study spanned 9 years and combined natural variation in weather conditions with a nest predator-exclusion experiment and continuous monitoring of the mother's social environment. We found that egg mass was consistent within-females and did not clearly vary in relation to rainfall or predation risk. There was no evidence for plastic adjustments as the same mother gained and lost helpers and egg mass was instead better predicted by mother size and identity. Females produced more eggs when breeding in environments where predation risk was experimentally reduced and after higher rainfall. Yet, there was no evidence for increasing clutch size as the number of helpers increased, nor for an interaction between helper effects and ecological factors. We conclude that while sociable weaver females can vary their clutch size, they show high individual consistency in egg mass. In addition, we found no evidence that females may maximise fitness through plastic prenatal allocation in relation to the number of helpers. These results challenge our current knowledge of the possible benefits of breeding with helpers and call for more long-term analyses on reproductive allocation adjustments within-females in other cooperative systems.

[Back to Programme](#)

## SESSION III

# Parental stress on rat mothers with vulnerability to depression: The consequences of environmental perception on behaviour

Alves, Renata <sup>1,2</sup>; Portugal, Camila <sup>1</sup>; Lopes, Igor <sup>1</sup>; Oliveira, Pedro <sup>3</sup>; Alves, Cecilia <sup>1</sup>; Barbosa, Fernando <sup>2</sup>; Summavielle, Teresa <sup>1</sup>; Magalhães, A. <sup>1</sup>

*1 i3S, Porto, Portugal;*

*2 FPCEUP, Porto, Portugal;*

*3 ICBAS, Porto, Portugal*

[renatadlalves28@gmail.com](mailto:renatadlalves28@gmail.com)

Depressive mothers often have difficulties to interact with their child. Parental adverse events may further complicate mother-child attachment, which could increase the risk of negative consequences from inadequate child development. We used rats with different vulnerability to depression (Wistar and Kyoto) to investigate the impact of parental stress (maternal separation-MS) on maternal behaviour and adolescent offspring cognition. For this, mother-litter Wistar and Kyoto rats were subjected to 180 min/day of MS from postnatal day 2 to 14. Our results showed that MS led Kyoto mothers to increase pup-contact behaviour, resulting in higher oxytocin levels in mothers, which seems to support the lower anxiety exhibited by these mothers after weaning. Their offspring in the adolescent period showed impairment in their cognitive behaviour. In contrast, MS Wistar dams showed higher quality of pup-directed behaviour with their offspring increasing Brain-Derived Neurotrophic Factor which seems to have protected the negative impact of MS on cognitive performance. Taken together, these results suggest that high hypothalamic oxytocin increases the sensitivity to perceived negative cues from the MS environment, leading to a defensive strategy (more contact). On the contrary, non-depressive mothers increased pup licking/grooming, which suggests an adaptive stress response. Our findings highlight the importance of contextual and individual factors (such as depression and parenting stress) in the understanding of the oxytocin role as a biological substrate underlying maternal behaviour and stress regulatory processes.

This work was financed by FEDER - Fundo Europeu de Desenvolvimento Regional funds through the COMPETE 2020 - Operational Programme for Competitiveness and Internationalisation (POCI), Portugal 2020, and by Portuguese funds through FCT – Fundação para a Ciência e a Tecnologia/Ministério da Ciência, Tecnologia e Ensino Superior in the framework of the Project POCI-01-0145-FEDER-032231 (PTDC/SAU-TOX/32231/2017). AM was supported by FCT and Orçamento do Estado in the framework of the Project EXPL-AMAGALHÃES - IF/00753/2014/CP1241/CT0005. RLA was supported by an FCT Grant (PD/BD/114266/2016).

[Back to Programme](#)

## SESSION IV

# Comparable behavioural and endocrine responses to mirror images and interacting conspecifics in the Siamese fighting fish

Ramos, Andreia; Gonçalves, David

*University of Saint Joseph, Macao, China*

[andreiamcramos@gmail.com](mailto:andreiamcramos@gmail.com)

The Siamese fighting fish *Betta splendens* is becoming a relevant model species for the study of aggression. For this, it is important to validate and standardize behavioural assays that allow quantifying aggressive behaviour in this species. Live fights are not adequate as the high levels of aggression usually result in injuries or even death of the opponent. Alternative methods to quantify motivation for aggression have included the presentation of a live interacting opponent behind a transparent partition, the use of models, video playbacks or mirror images. However, it is not always clear if the use of different stimuli will elicit a comparable behavioural and physiological response. The mirror test, in particular, has been criticized by several authors for not providing comparable results to real fights. Here, we compared the behavioural and endocrine response of male *B. splendens* to a matched for size live interacting conspecific behind a transparent partition with its mirror image. We show that the aggressive response is overall similar to both stimulus types. Likewise, the androgen (11-ketotestosterone and testosterone) and corticosteroids (cortisol) response to the two stimulus types was comparable. We discuss the advantages and disadvantages of using both types of stimuli for the study of aggression and the possible role of androgens and corticosteroids for the modulation of aggressive behaviour in *B. splendens*.

[Back to Programme](#)

## SESSION IV

# Divergent neurogenomic response to aggression in male *Betta splendens* selected for fighting

Cardoso, Sara D. <sup>1</sup>; Ramos, Andreia <sup>1</sup>; Louro, Bruno <sup>2</sup>; Canário, Adelino V.M. <sup>2</sup>; Gonçalves, David <sup>1</sup>

*1 Institute of Science and Environment, University of Saint Joseph, Macao, China;*

*2 Centro de Ciências do Mar, Faro, Portugal*

[sara.cardoso@usj.edu.mo](mailto:sara.cardoso@usj.edu.mo)

Aggression is a pervasive, complex social behaviour influenced by different factors such as genetic, hormonal, neuronal, and social status and context. However, the mechanisms that underlie variation in this behaviour, within and between species, are still poorly understood with contrasting results in the literature. To address this problem, we took advantage of a long-term natural experiment of artificial selection for aggression undergoing in southeast Asia with the Siamese fighting fish *Betta splendens*. In this species, males were selected for winning paired-staged fights for more than six centuries, originating short-fin varieties known as “*Plakat Morh*” (fighter strain). This artificial selection has presumably favoured genetic variations that promote the phenotypic expression of traits that increase the probability of winning fights and likely aggression. Here, we compare the behavioural and neurogenomic response to an aggressive challenge of wild-types with fighters, maintained in lab conditions for several generations. As expected, when presented to an aggressive challenge, either a mirror image or an interacting conspecific, fighter males were more aggressive than wild-type males. These differences were paralleled by markedly different neurogenomic baseline states and response to the challenge in fighters, as compared with wild-types. Interestingly, fighter males presented a preferential up-regulation of genes when compared with the respective control group, whereas wild-types presented the inverse pattern. Additionally, the sequenced genomes for both strains provide insight into differences in genetic variability, that could be linked to genes that were found differentially expressed. This work provides evidence on a differential brain gene regulation associated with the expression of aggression between *B. splendens* strains, a promising species for the investigation of the proximate and ultimate mechanisms of aggression in vertebrates.

This work was supported by the Macao Science and Technology Development Fund, projects 093/2017/A2 and 011/2014/A1.

[Back to Programme](#)



## SESSION IV

# The impact of temporal variation in noise exposure on anxiety-related behavior and hearing in the adult zebrafish

Wong, Man Ieng <sup>1\*</sup>, Lau, Ieng Hou<sup>1</sup>, Gordillo-Martínez, Flora<sup>1</sup>, Fonseca, Paulo J.<sup>2</sup>, Vasconcelos, Raquel O.<sup>1</sup>

*1 Institute of Science and Environment, University of Saint Joseph, Macao;*

*2 cE3c, Universidade de Lisboa, Portugal*

[201900464@usj.edu.mo](mailto:201900464@usj.edu.mo)

Anthropogenic noise is increasing in aquatic ecosystems and may cause adverse effects on organisms including impaired development, heightened physiological stress, hearing loss and behavioural disturbance, thus posing unprecedented risks on animal species and biodiversity. When exposure to an environmental stressor is repeated, animals could either habituate or sensitize due to either augmented or decreased tolerance, respectively. Shifts in tolerance may be dependent on exposure time; hence identifying regimes with less impact is paramount for defining noise sustainable management strategies. However, a lack of knowledge exists on how aquatic organisms species cope with repeated exposure to regular and random noise disturbances. In the present study, we relied on a reference model system in ecotoxicology, zebrafish *Danio rerio*, to evaluate the impact of noise exposure of varying temporal patterns on key endpoints: 1) stress and anxiety-related behaviour, and 2) hearing sensitivity. After whitenoise playback treatment for 24h (continuous, intermittent regular, intermittent random), adult zebrafish were tested using a standardized assay for anxiety assessment, the novel tank diving (NTD) test. Behavioural testing was followed by auditory evoked potential recordings. Results revealed that zebrafish exposed to intermittent regular treatments were significantly closer to the tank bottom and spent less time in the top zone, which are indicators of stress and anxiety. Contrastingly, specimens treated with either continuous or random playbacks showed similar behaviour to control. Auditory measurements revealed that both continuous and intermittent regular treatments induced hearing loss of up to 17 dB and significant delay in response latency, contrary to random noise. Current work focuses on cortisol quantification using ELISA assay to assess physiological stress levels. We demonstrate that the timing of acoustic disturbance is important and that intermittent random regime may down-regulate the impact of noise exposure in the zebrafish model.

This study was supported by the Science and Technology Development Fund (FDCT), Macao (ref. 046/2018/A2).

[Back to Programme](#)

## SESSION IV

# Serotonin modulation of waxbills' (*Estrilda astrild*) behaviour: an experimental approach

Saldanha, Beatriz <sup>1</sup>; Silva, Paulo <sup>1</sup>; Trigo, Sandra <sup>1</sup>; Cardoso, Gonçalo C. <sup>1,2</sup>; Soares, Marta C. <sup>1</sup>

*1 CIBIO-InBIO, Universidade do Porto, Vairão, Vila do Conde, Portugal;*

*2 University of Copenhagen, Copenhagen, Denmark*

[beatrizsaldanha5@gmail.com](mailto:beatrizsaldanha5@gmail.com)

Serotonin (5-HT), a monoaminergic neurotransmitter, is one of the most important and conserved neurotransmitter among vertebrates, and it has been shown to influence aggression and other social behaviours. However, its action is not simple nor well understood, particularly in avian models, for which information is yet sparse. Here, we tested the influence of serotonin on activity and aggression, using short-term manipulations resorting to injections of 8-OH-DPAT (a 5-HT<sub>1A</sub> receptor agonist), of Fluoxetine (a selective serotonin reuptake inhibitor, SSRI) and of WAY 100.635 (a 5-HT<sub>1A</sub> receptor antagonist), in common waxbills (*Estrilda astrild*). Using behavioural observations in a test of competition for food, we found that treatment with the SSRI Fluoxetine caused an overall decrease in activity, feeding and aggressive behaviour, which is likely an anxiogenic-like effect explained by increasing anxiety/fear mechanisms that could be brought about via the 5-HT<sub>2</sub> receptors. This is because treatment with the agonist 8-OH-DPAT, which acts exclusively on the 5-HT<sub>1A</sub> receptor group, had the opposite effect of increasing activity. We found no detectable behavioural effects for treatment with the antagonist WAY 100.635. We discuss how the serotonergic effects observed here may act as adaptive modulators of behaviour in waxbills, in the context of their highly gregarious social organization.

[Back to Programme](#)

## SESSION IV

# Testosterone treatment to male and female common waxbills differentially affects sex differences in social hierarchy

Beltrão, P. <sup>1</sup>; Silva, P.A. <sup>1</sup>; Soares, M.C. <sup>1</sup>; Cardoso, G.C. <sup>1,2</sup>; Trigo, S. <sup>1</sup>

*1 Universidade do Porto, Porto, Portugal;*

*2 University of Copenhagen, Copenhagen, Denmark*

[pbsantospt@cibio.up.pt](mailto:pbsantospt@cibio.up.pt)

Dominance hierarchies reduce the costs of competitive aggression in social animals, and testosterone is a major modulator of aggressive behaviour and social dominance. While the effects of testosterone on male behaviour are well studied, effects on female aggression and dominance within mixed-sex groups are less clear. We tested how short-term testosterone treatment influences aggressive behaviour and dominance hierarchies in the common waxbill (*Estrilda astrild*), a bird with mild social hierarchies. In mixed-sex groups, we administered intramuscular testosterone either to males or to females and, using a test of competition for food, compared aggressive behaviour and social dominance to those of a control treatment (saline) with no testosterone administered. Testosterone treatment to males increased their social dominance, without increasing aggression. We observed a decrease in female aggression towards treated males, suggesting that females were reacting to subtle cues of male dominance (e.g., vocal cues). In contrast, female treatment with testosterone did not increase their dominance. In one of the experimental groups, female treatment with testosterone was associated with a large increase in overall group aggressiveness, suggesting that males might react to, and oppose, cues of female dominance. Together, our results indicate a sex-dependent role of testosterone on social hierarchies.

[Back to Programme](#)

**ABSTRACTS**

**POSTERS**

## POSTER SESSION

Poster 1

### Early social development of wild infant capuchin monkeys

Teles, Nayara; Delval, I.; Faverin, E.; Izar, P.

*Universidade de Mogi das Cruzes, São Paulo, Brazil*

[nayaratelesoliveira@gmail.com](mailto:nayaratelesoliveira@gmail.com)

The study of the development of social relations between mother and infant, requires analysing frequent behaviours present at the infant's early stages of life. That indicate affiliative interactions and their prevalence over time. In this research, we studied the development of social relationships between free-living mothers and four infants of yellow-breasted capuchin monkeys (*Sapajus xanthosternos*) in Una Biological Reserve (Bahia, Brazil) to characterize the pattern of affiliative relations (i.e. sociability) between mother and infant. We analysed the frequency of proximity (co-presence in 1m radius), grooming, carrying, and nursing across the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 9<sup>th</sup>, 15<sup>th</sup>, 21<sup>st</sup>, 27<sup>th</sup>, and 33<sup>rd</sup> months of infants life. Mother and infant were much closer during the initial months of the infant life. The frequency of proximity, nursing, and transporting the infant declined with age, which can be explained by the infants' competences to eat and move on their own. The frequency of proximity and grooming with the mother probably decreased due to the presence of other individuals interacting with the infant. Our results suggest that the initial development of social relations follows the development of other competences such as foraging and motor skills.

[Back to Programme](#)

## POSTER SESSION

Poster 2

# Social Interaction of bottlenose dolphins of the Sado Estuary and Arrábida coast

Martinho, Francisco <sup>1</sup>; Pereira, Andreia <sup>2</sup>

*1 ECCO Ocean, Lisbon, Portugal;*

*2 Instituto Dom Luiz, Universidade de Lisboa, Lisbon, Portugal*

[francisco@lisbondolphins.com](mailto:francisco@lisbondolphins.com)

Bottlenose dolphins (*Tursiops truncatus*) are known to settle close to coastal features such as estuaries, fjords or bays, eventually forming resident populations. In Portugal, previous studies indicate that bottlenose dolphins that occur off the coast of Arrábida and Tróia do not belong to the resident population of the Sado Estuary. Most of the individuals that occur off these coasts are visitors but they are not considered resident since they are only re-sighted punctually over the years. Considering this fact, the present study aims to characterize the coastal bottlenose dolphins off Arrábida and Tróia and assessing the interaction level between the two populations. For this study we collected photographic data from 2018 to 2020. Photo-ID analysis found that all interactions of coastal individuals with the residents in Sado Estuary were made by a small group of 10 individuals that showed high levels of site fidelity in Arrábida coast, since they comprise 80% of all sightings of the area over the 3-year period. Social analysis using SOCPROG revealed that these 10 individuals also form a very cohesive group (constant companions), since they are sighted always together. The other 20% of the individuals showed the expected fusion-fission social structure (casual acquaintances). A year-round sampling effort is needed to determine if the 10 individuals are resident throughout the year or if they settle just for a certain period. A resident coastal group of bottlenose dolphins could play an important role to the threatened Sado's resident population. The assessment of the nature of the interactions between the dolphins of the Sado Estuary and the coastal population in Arrábida is a priority task for the conservation of the small population of the Estuary.

[Back to Programme](#)

## POSTER SESSION

Poster 3

# Early development of sociability in infants of wild bearded capuchin monkeys (*Sapajus libidinosus*)

Roncero, Pilar; Nogueira, Viviane; Izar, Patrícia

*University of São Paulo, São Paulo, Brazil*

[pilar\\_roncero@usp.br](mailto:pilar_roncero@usp.br)

Studies on interindividual behavioural differences in nonhuman animals, as well as research on intraindividual variation and phenotypic plasticity have increased in the last years. However, research on personality development in animals is scarce, and has been mainly based on a paradigm of repeatability in the experimental context. Little attention has been given to within-population variation in personality attributes that may be related to the formation of social bonds, particularly in platyrrhine primates. For young individuals, the formation of relationships between equals reflects a transition from primary affiliation with the mother to becoming a fully integrated member of the group, which shows the importance of personality development in the early stages of life. In this research we investigate the development of the sociability axis of personality in 8 wild bearded capuchin monkeys (*Sapajus libidinosus*). Using the Noldus Observer XT13 software, we analysed videos recorded during the first three months of life of each infant: 3 males and 5 females. We focussed on the rate of emission and reception of social behaviours during the first 12 weeks of life. Using GLMM we tested the effect of sex and rate of reception on rate of emission, controlling for individual and age as random effects. Rate of emission of social behaviours was negatively correlated to rate of reception and females initiated more social behaviours (all of them affiliative) than males. We consider that sex differences explain the significant intraindividual consistency in rates of emission we found employing an ICC test. We suggest that these sex differences may be related to the fact that in *Sapajus* females are philopatric and males emigrate in late juvenility, so females create stronger social bonds with other group members.

[Back to Programme](#)

## POSTER SESSION

Poster 4

# **Patriarchal hegemony from an ethological perspective and other social systems**

Vidal, Ana Clara; Borba, Fernando; Lima, Francisco Matheus; Marcomini, Isabela; Sobreira, Luíza; Corrêa, Rafael; Carozza, Renata

*Universidade de São Paulo, São Paulo, Brazil*

[anaclaraumbelino@usp.br](mailto:anaclaraumbelino@usp.br)

The patriarchal system is hegemonic in the contemporary world. In this study we aimed at understanding the causes of this prevalence, investigating the evolutionary origins of patriarchy. Our question was whether the masculine philopatry is related to the maintenance of the patriarchal structure. We conducted an integrative bibliographic review of the ethological literature, emphasizing the development of feminist concepts about patriarchy and the parental preferences on species evolutionarily close to humans. In addition, we analysed matrilineal communities such as Minangkabau, located at Indonesia, Asia; Mosuo, at China, Asia; and Umoja, at Quenia, Africa; and also two Brazilian social groups with traces of matriarchy, denominated Noiva do Cordeiro and Quebradeiras de Coco, for current alternatives that have dissociated from the prevailing patriarchy. In particular, Umoja and Noiva do Cordeiro were created in response to the preponderant sexism and violence suffered by its founders and other women, who came together to remodel their future actively. The ethological analysis allowed understanding the emergence of patriarchy, showing some socio-cultural contexts, such as sedentarism, language and parental preference, in certain cultures, as promoting its formation. Throughout this research, it was also noticeable that the number of scientific and academic studies on non-patriarchal societies, mainly in the scope of ethology, is quite little. Overall, the present study reveals a contrast between the patriarchy and distinct contemporary social configurations which have detached from feminine subordination, evincing that it is possible for our social systems to change and that we can carry out such transformation, as we understand and reflect about these processes.

[Back to Programme](#)



## POSTER SESSION

Poster 5

### **Fêmeas e machos de *Aulonocara nyssae* blue orchid (Regan, 1922) preferem se abrigar ou se alimentar?**

Bonifacio, Caroline Teixeira; Paranhos, Camila Oliveira; Torres, Isabela Fernanda Araújo; Luz, Ronald Kennedy

*Universidade Federal de Minas Gerais, Minas Gerais, Brasil*

[carolteixeira.bonifacio@hotmail.com](mailto:carolteixeira.bonifacio@hotmail.com)

O presente estudo teve como objetivo analisar a preferência entre abrigo e alimento por machos e fêmeas de *Aulonocara nyssae* blue orchid em labirinto T. Foram utilizados 12 fêmeas e 12 machos que alojados em grupos de 6 indivíduos do mesmo sexo em cada tanque de 28 L mantido em sistema de recirculação de água. Foi utilizado um labirinto em T com as paredes revestidas por plástico opaco branco com corredor principal de 49 cm e braços laterais com 29 cm de comprimento, altura de 14 cm e largura de 17 cm. Todos os animais passaram por sessão de reconhecimento do labirinto por dois dias, antes do início do experimento. Durante 20 dias consecutivos, os peixes em jejum de 12 horas, foram colocados no labirinto individualmente. Em um dos braços do labirinto, por sorteio diário, foi colocado uma peça de LEGO® (marcador visual) e ao final do braço pellets de ração. No braço oposto foi colocado um cano de PVC branco com intuito de fornecer abrigo. Durante os 15 min de permanência no labirinto, os animais foram observados em relação a: comportamento de latência, primeiro braço visitado, duração da visitação, tempo para a primeira escolha e se capturou o alimento ou abrigou como primeira escolha. Não houve diferença significativa entre machos e fêmeas no tempo de latência ( $p=0,0805$ ), tempo para realizar a primeira escolha ( $p=0,8622$ ), tempo de permanência no braço da primeira escolha ( $p=0,7196$ ) e tempo despendido em ócio ( $p=0,9459$ ). Machos e fêmeas de *A. nyssae* blue orchid fizeram escolhas semelhantes ( $p=0,1189$ ), sendo que preferiram se abrigar como primeira opção ( $p<0,001$ ) a se alimentar. Conclui-se que machos e fêmeas de *A. nyssae* blue orchid apresentam mesmo perfil comportamental no labirinto em T e preferem se abrigar a se alimentar, mesmo em jejum.

O presente trabalho foi realizado com apoio da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brasil (CAPES).

[Back to Programme](#)

## POSTER SESSION

Poster 6

# The relationship between morphology and temperament in domestic dogs (*Canis familiaris*)

Ayrosa, Flavio <sup>1</sup>; Albuquerque, Natalia <sup>1</sup>; Savalli, Carine <sup>2</sup>; Resende, Briseida <sup>1</sup>

*1 Institute of Psychology, Univesity of São Paulo, São Paulo, Brasil;*

*2 Baixada Santista Campus, Federal Univeristy of São Paulo, São Paulo, Brasil*

[fmsaf94@gmail.com](mailto:fmsaf94@gmail.com)

Current dog behaviour studies have been investigating how morphological and physiological characteristics can influence the development of behaviour and behavioural patterns. Considering that intrinsic body characteristics (e.g. height, age, metabolism) define how animals perceive and relate to their environment, this study aimed to investigate how such characteristics can affect emotional reactiveness and temperament profiles of dogs in several day-to-day contexts, through the use of the PANAS (Positive and Negative Activation Scale) for dogs. We registered age, sex, reproductive status, size, skull morphology and breed of 171 healthy domestic pet dogs, which had the availability to come participate in experiments at the Dog Laboratory of the University of São Paulo, Brazil. Owners were asked to fill the questionnaire as well as disclaim some of their dog's descriptive information. We analysed the influence of these factors in the Positive (POSAT) and Negative Activation (NEGAT) temperament scores, calculated from the PANAS, by using linear mixed models. Our models indicated an effect of age over POSAT, and first-order interactions effects of age with skull morphology, and size group with skull morphology over NEGAT scores. These results show that younger dogs tend to be more active and sensible to positive stimuli (e.g. treat rewards, petting), possibly due to generally higher metabolic rates compared to their older counterparts. Negative scores decrease as age increase only for short snouted dogs, which means that these dogs, particularly, were more fearful and reactive to negative stimuli (e.g. loud sounds, scolding). Additionally, small, and medium-sized long snouted dogs tended to be more fearful than their larger counterparts. These differences in temperament are likely related to intrinsic morphological and metabolic differences linked to size, age, and skull morphology, but also to how these characteristics influence how the owners treat, educate, and relate to their dog.

Acknowledgements: We thank the Institute of Psychology, the Dog Laboratory of USP, and our funding agency.

[Back to Programme](#)

## POSTER SESSION

Poster 7

# Behavioural modulation in the Siamese fighting fish (*Beta splendens*) caused by holding water of dominant males

da Silva, Melina <sup>1,2</sup>; Gonçalves, David <sup>2</sup>; Hubbard, Peter <sup>1</sup>; Canário, Adelino <sup>1</sup>

*1 CCMAR, University of Algarve, Faro, Portugal;*

*2 University of Saint Joseph, Macao, China*

[mcsilva@ualg.pt](mailto:mcsilva@ualg.pt)

The Siamese fighting fish (*Beta splendens*) is known for its high levels of aggressive behaviour and the availability of long-term artificial selection that generated particularly aggressive strains ('fighter' strains) compared to the wild-type (WT). Aggression is modulated by visual appearance of the opponents (e.g. size) but there is evidence for the importance of chemical communication in this behaviour. It is hypothesized that aggressive behaviour of individuals exposed to holding water (HW) of dominant conspecifics is inhibited by putative pheromones. To test this hypothesis, individuals from 'fighter' strains and WT are allowed to fight with their mirror image while receiving either a constant flow of control water or HW from 'fighters'. To obtain the HW, individuals from 'fighter' strains are placed in tanks with partitions that allows only visual contact of smaller WT individuals. The experiment has a repeated measures design, in which the same individual is exposed to both the HW and negative controls. The experiments are recorded on video, and the Observer XT software is used to measure the aggressive displays and to compare statistical differences. Potential dominance pheromones will be identified using liquid chromatography mass spectrometry and nuclear magnetic resonance. If succeeded this will be the first identification of a dominance pheromone in a teleost fish.

This study is supported by the Portuguese Science and Technology Foundation (FCT) through project UIDB/04326/2020 and fellowship SFRH/BD/143872/2019 and the Macao Science and Technology Development Fund (FDCT) through project 093/2017/A2.

[Back to Programme](#)

## POSTER SESSION

Poster 8

# Noise-induced behavioural and physiological effects in larval zebrafish

Lara, Rafael A. <sup>1,2</sup>; Ieng Hou, Lau <sup>1</sup>

*1 University of Saint Joseph, Macao, China;*

*2 University of Sevilla, Sevilla, Spain*

[rafael.ayala.lara@gmail.com](mailto:rafael.ayala.lara@gmail.com)

Noise pollution is now widely present in most aquatic soundscapes; however, very limited information is known on how this important environmental stressor impacts fish populations especially in early ontogeny. Zebrafish (*Danio rerio*) has become an important vertebrate model for high-throughput screening of environmental stressors, ototoxic drugs, and genetic modulators of embryonic development. In this study, we performed a split-brood experiment to assess the effects of increasing ambient noise level (lab quiet conditions versus 150 dB re 1  $\mu$ Pa continuous white noise playback) on behavioural patterns, hearing abilities and cortisol levels in larval zebrafish (5 days post fertilization). Recently laid eggs from multiple zebrafish breeding tanks were randomly chosen and split into custom-made net-boxes that were suspended above underwater speakers placed in the bottom of acoustic treatment tanks. We found that exposure to increased noise level led to heightened dark avoidance (scotophobia) in an anxiety-related dark/light preference test. Noise-exposed animals also displayed impaired spontaneous alternation behaviour (SAB), a mnemonic-related behaviour. Electrophysiological assessment of hearing sensitivity based on field potentials measured from the inner ear saccular hair cells revealed significant increase in auditory thresholds in noise-treated animals. These results were complemented with ELISA whole-body cortisol quantification that showed increased levels in the noise-exposed group. Our work provides first evidence of anxiety-driven and innate exploratory behavioural alterations, as well as higher physiological stress in larval zebrafish due to noise exposure at moderate and ecologically relevant levels.

[Back to Programme](#)

## POSTER SESSION

Poster 9

# Functional specialization of social learning in *Drosophila melanogaster*

Simões-Henriques, Carla <sup>1</sup>; Marcos, Joana <sup>1</sup>; Varela, Susana <sup>1</sup>; Sucena, Élio <sup>1</sup>; Vasconcelos, Maria L. <sup>2</sup>; Oliveira, Rui <sup>1</sup>

*1 Instituto Gulbenkian de Ciência, Oeiras, Portugal;*

*2 Champalimaud Centre for the Unknown, Lisboa, Portugal*

[carlafshenriques@gmail.com](mailto:carlafshenriques@gmail.com)

The adaptation of animals to complex and changing environments is a slow process and has costs. The evolution of learning is frequently more advantageous as it increases behavioural plasticity. Social learning, in particular – the cognitive process by which animals collect and use information about their environment by observing or interacting with other individuals or their products – could be even more advantageous than learning asocially as the time necessary for learning and the risks taken can be reduced. A long lasting question, however, is whether asocial and social learnings are truly distinct, special-purpose cognitive mechanisms, or whether they share, instead, a common (general-purpose) mechanism. To clarify this debate, we performed a behavioural characterization of a subset of the *Drosophila* Genetic Reference Panel (DGRP) for both social and asocial learning, followed by a genome-wide association study (GWAS). This approach allowed us to unveil sets of candidate genes separately associated with asocial and social learning, but not with both. The present work is the first experimental evidence that asocial and social learnings are truly distinct cognitive mechanisms. Although functional validation remains to be tested, this result already suggests that social learning underwent an evolutionary functional specialization, which is fundamental knowledge to our understanding of the evolution of sociality.

This work was funded by FCT Project (PTDC/BIA-COM/31887/2017), Simões-Henriques' PhD scholarship (PD/BD/138178/2018) and Marcos' fellowship (203/BI/19).

[Back to Programme](#)

## POSTER SESSION

Poster 10

# Development of trill usage in wild capuchin monkeys (*Sapajus libidinosus*)

Lacerda, Júlia F.; Ferreira, Luíza G.; Izar, Patrícia

*Instituto de Psicologia, Universidade de São Paulo, São Paulo, Brasil*

[juliaflacerda@usp.br](mailto:juliaflacerda@usp.br)

Vocal production in nonhuman primates can be limited and constrain flexibility in communication. However, the flexibility of usage, through contextual learning, allows for new possibilities to communication. The “trill” is one of the most frequent intragroup vocalizations in capuchin monkeys. In previous studies, we noticed changes in the context of trill usage during early development. Here we investigated the development of trill usage in *Sapajus libidinosus* infants, verifying the relation between types of trill and contexts of emission. We used the focal animal sampling method for 5 infants of a wild group at Fazenda Boa Vista (Gilbués, Piauí, Brazil). The subjects were recorded using a video camera and a unidirectional microphone through their third and sixth months of life. The videos were transcribed using the Observer XT and the vocalizations were visually classified through spectrograms generated by the software Raven. The videos and audio recordings were, then, synchronized so it was possible to correlate the vocalization to its context of usage. Four types of trill (TrillA, TrillR, TrillU and Trill2) were emitted in both months. During the third month, the only relevant association between a vocalization type and a specific context was between TrillA and food context. In contrast, the sixth month showed relevant relations between TrillU and locomotion context and TrillR and contact context. In conclusion, the changes in trill usage between the third and sixth months points to a vocal development in *Sapajus libidinosus* infants. The study focuses only on the initial phase of development, and future studies, exploring a larger time gap are still needed for a better understanding on how infants master the use of trills.

This work was financed by FAPESP and PUB.

[Back to Programme](#)

## POSTER SESSION

Poster 11

### **Development of diet choices in capuchin monkey infants (*Sapajus libidinosus*)**

Araujo, G. R. <sup>1</sup>; Zago, G. <sup>1</sup>; Góes, P. A. A. <sup>2</sup>; Izar, P. <sup>1</sup>

*1 Universidade de São Paulo, São Paulo, Brasil;*

*2 Universidade de Guarulhos, Guarulhos, Brasil.*

[guilbert.araujo@usp.br](mailto:guilbert.araujo@usp.br)

Understanding early development of diet in wild primates can help to elucidate their nutritional requirements and how they adapt to different environmental conditions. In primate groups, social facilitation can influence the acquisition of food during early development. From this perspective, this research aimed to analyse the variation of diet and the social influence on food acquisition during the early development of infants from a wild group of capuchin monkeys (*Sapajus libidinosus*), which inhabits the Cerrado / Brazilian Caatinga. Using video records dated between 2013 and 2017, we recorded the types of food consumed by four infants during the first year of life, totalling 498 episodes of feeding inserted in 23 hours of video. The foods consumed were classified into fruits, coconuts, vertebrates, invertebrates, seeds, flowers, vegetation, and breast milk. The frequency of breastfeeding decreased as the infants developed. With the exception of coconut, the consumption of fruits, vegetation and invertebrates increased and varied significantly with age. Seeds, flowers, and vertebrates were not relevant in the diet. Overall, the social environment was important for obtaining 23% of solid foods. Our results suggest that soft foods, such as pulp of fruits, initially replace breastmilk, but social competition soon leads to increased consumption of foods evenly distributed in the environment.

[Back to Programme](#)

## POSTER SESSION

Poster 12

# Behaviour of common octopus individuals facing a baited trap

Dominguez-Lopez, Marta <sup>1</sup>, Follana-Berná, Guillermo <sup>1</sup>, Arechavala-Lopez, Pablo <sup>1,2</sup>

*1 Mediterranean Institute for Advanced Studies, Esporles, Spain;*

*2 Universidade do Algarve, Faro, Portugal*

[marta.dominguez@imbrsea.eu](mailto:marta.dominguez@imbrsea.eu)

Common octopus (*Octopus vulgaris*) exposed to a baited trap during three consecutive first-capture tests exhibited diverse behavioural and body pattern sequences resembling when the octopus searches for and hunts its wild prey. Overall, they first visually recognized new objects or potential preys and rapidly moved out the den, exploring, grabbing and approaching the trap with the arms (chemotactile exploration), and capturing the bait with the arms and feeding on top over long periods inside the trap. Simultaneously, common octopus displayed diverse skin textural and chromatic signs, being the regular pattern the most frequent and long-lasting, followed by broad mottle, passing cloud and dark patterns. All individuals (n=8) caught the bait at least once, although only five octopus (62.5%) entered the trap in all three tests. In addition, high variability among individuals was also observed regarding behaviour and body patterns during the first-capture tests, which might evidence different individual temperaments or life-history traits. Differences in behavioural responses at individual level might have population consequences due to fisheries-induced selection, although there is a high necessity to assess how behavioural traits might play an important role on life-history trait of this species harvested by small-scale trap fisheries.

Acknowledgments: Thanks to Pablo Arechavala for guiding me in my future research career as a marine biologist.

[Back to Programme](#)



