**SANFEED Application-form 2016/2017**

**1. Personal data**

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| Full Name: |
| Name under which you publish: |
| Fiscal ID number: |
| ID document: |
| Birth date: |
| Nationality: |
| Gender: |
| Father's name |
| Mother's name |
| Work address: |
| Residential Address: |
| Work Phone: |
| Residential Phone: |
| Email: |
| Fax: |
| Cell phone: |

**2. Academic degrees**

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| Year: |
| Degree: |
| Final grade: |
| Degree granting institution: |
| School/College/Campus: |
| Thesis title (if applicable): |
| Supervisor: |
| Co-supervisor: |
| Scientific area: |
| Number of curricular years: |
| Program title: |

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| Year: |
| Degree: |
| Final grade: |
| Degree granting institution: |
| School/College/Campus: |
| Thesis title (if applicable): |
| Supervisor: |
| Co-supervisor: |
| Scientific area: |
| Number of curricular years: |
| Program title: |

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| Year: |
| Degree: |
| Final grade: |
| Degree granting institution: |
| School/College/Campus: |
| Thesis title (if applicable): |
| Supervisor: |
| Co-supervisor: |
| Scientific area: |
| Number of curricular years: |
| Program title: |

**3. Present research interests:**

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| 3. |  |

**4. SANFEED topic(s)**

*Candidates can apply to one or more topics, and the case of multiple choices the topics should be ranked (1 to 5) according to the preference:*

* **Topic I: Microbiome in poultry: influence of nutritional factors (WP3)**

**Supervisory team:** Agostinho Antunes (CIIMAR/FC-UP); José Luís Mourão (UTAD); António Mira da Fonseca (REQUIMTE/ICBAS-UP)

**Industrial Representative**: José Vieira (SORGAL)

*There is growing recognition of the role of diet in modulating the composition and metabolic activity of the gut microbiota, which can have major impact in health and meat quality in birds and cows. Molecular technologies can be used to decipher the complexity and diversity of the gut microbial communities within and between individuals. Diet, particularly macronutrients, has a major role in shaping the composition and activity of these complex populations. The impacts of dietary fats and protein on the gut microbiota are less well defined. Both short- and long-term dietary change can influence the microbial profiles, and infant nutrition may have life-long consequences through microbial modulation of the immune system. Moreover, there is potential benefits of prebiotics and probiotics to modify microbial populations. General objectives: 1) to characterize the microbiome in poultry based on the microbial identification with genomic pyrosequencing of the 16S ribosomal RNA gene; 2) to improve poultry microbiome through nutritional modulation and/or the use of specific supplements; and 3) to develop the genomic tools to allow evaluation of reliable diagnostic approaches for food authenticity and traceability.*

* **Topic II: Improving immune condition and growth performance in marine fish using nutraceuticals and prebiotics (WP3)**

**Supervisory team:** Benjamin Costas (CIIMAR); Irina Amorim (ICBAS-UP); Sofia Costa Lima (REQUIMTE)

**Industrial Representatives**: Elisabete Matos (SORGAL SA); Luís Conceição (SPAROS)

*Under intensive culture conditions, fish are subjected to increased stress owing to environmental (water quality and hypoxia) and health conditions (parasites and infectious diseases). All these factors have negative impacts on fish well-being and overall performance, with consequent economic losses. The objective of this thesis is to explore the potential of new nutritional supplements (e.g. phytogenics, prebiotics and specific nutrients) on improving the nutritional condition, immune mechanisms and disease resistance in marine fish. The project will focus on gilthead seabream or European seabass as target species. Growth trials with an experimental design incorporating a bacterial challenge will be performed. Besides survival and growth performance of fish, transcriptomics and immunohistochemistry approaches will be used to assess the effects. This project should allow the development of fortified commercial diets with specific knowledge-based formulations, hence supporting better farming results in terms of growth and disease susceptibility of fish. Moreover, data generated in the various trials will assist on the identification of biomarkers for immune condition in fish.*

* **Topic III: Improving growth performance of fish larvae through early nutrition (WP1)**

**Supervisory team:** Sofia Engrola (CCMAR); Luís E. C. Conceição (SPAROS); Luísa M. P. Valente (CIIMAR/ICBAS-UP)

**Industrial Representative**: Luís E. C. Conceição (SPAROS)

*The main objective of this proposal is to increase the knowledge regarding the effects of nutritional strategies at very early stage of development in order to improve growth performance in fish larvae. As nutrition is a key regulator of protein accretion, understanding the major regulators of protein homeostasis is paramount for improved protein retention. The rates of protein synthesis and degradation in muscle cells is tightly regulated as even a small increase in synthesis or small reduction in degradation, if sustained, may result in a marked accretion of muscle. This project will integrate the novel concept of metabolic programming with performance, physiological, transcriptomics, and muscle cellularity indicators, in order to verify how larva protein accretion machinery may be enhanced. This project will create the scientific basis for an improved diet formulation for Senegalese sole and other fish larvae.*

* **Topic IV: Dietary seaweed supplementation in *Sparus aurata* and *Dicentrarchus labrax diets*: Effects on feed utilization, aerobic scope and modulatory response against biotic and abiotic stressors in cultured fish (WP1)**

**Supervisory team:** Leonardo Magnoni (CIIMAR); Rui Pereira (ALGAplus); Anake Kijjoa (CIIMAR/ICBAS-UP)

**Industrial Representative**: Helena Abreu (ALGAplus)

*Seaweed (SW) may be a good alternative to traditional protein sources used in fish feed. In addition, SW are a good source of bioactive compounds with anti-oxidant and anti-inflammatory properties. Thus, the use of SW as dietary additive may be an adjuvant therapeutic strategy to sustain fish welfare under sub-optimal aquaculture conditions. However, chemical composition of SW may depend on environmental factors. The effects of culture conditions on nutritional properties of SW, including the presence/quantity of bioactivite compounds remain to be elucidated. Furthermore, the modulation of antioxidant and immune responses in cultured fish, such as sea bream (Sparus aurata) and sea bass (Dicentrarchus labrax) by dietary SW supplementation still requires investigation, particularly during biotic or abiotic challenges. Objectives: 1) determine the effect of different culture conditions of Porphyra dioica and Ulva sp. in the nutritional composition of the SW and its bioactivity capacity; 2) study the potential use of Porphyra dioica and Ulva sp. as a dietary source for protein in Sparus aurata and Dicentrarchus labrax diets, studying changes in growth performance and digestibility; 3) determine possible effects of dietary supplementation of Porphyra dioica and Ulva sp. (raw vs. extracts) on Sparus aurata and Dicentrarchus labrax subjected to an abiotic stress, by analyzing growth performance, DNA’s cellular integrity, aerobic scope and enzymatic activities/ gene expression related with mechanisms of cellular protection; and 4) study the effect of dietary supplementation with Porphyra dioica and Ulva sp. extracts on Sparus aurata and Dicentrarchus labrax when subjected to a bacterial challenge, by analyzing the immune response and enzymatic and non-enzymatic antioxidant activities.*

* **Topic V: Characterization of the sensory profile of sea urchin aiming at the selection of premium gonads) (WP4)**

**Supervisory team:** Luísa M. P. Valente (CIIMAR/ICBAS-UP); Amparo Gonçalves (CIIMAR/IPMA); Luís M. Cunha (GreenUP, CITAB-UP/FC-UP)

**Industrial Representative**: Rui Costa Lima (SENSETEST)

*Sea urchin gonads market price and consumer acceptability depends on size, colour, odour and flavour, which are a reflection of animals’ diet. Descriptive sensory analysis of sea urchin gonads can help select the best harvest period to obtain the desired gonad quality, and evaluate its quality changes over time. Moreover, the dietary modulation can improve sea urchin production in captivity, allowing regular production of high quality gonads both for market consumption and farming purposes. This project will address these topics by focusing on the: 1) selection and training of sensory panel for sea urchin gonads; this will include: panellists recruitment, selection and training for descriptive testing (including testing of sea urchin gonads) and evaluation of panellists performance; 2) quantitative descriptive analysis (QDA) of sea urchin gonads by testing gonads in different conditions for the characterization of the sensory profile of this product aiming the selection of premium gonads; the Quality Index Method (QIM) will be optimized for sea urchin gonads (during chilled and cold storage conditions) to discriminate the quality grade and define its shelf life; and 3) modulation of sea urchin gonad quality by dietary formulation; dedicated classical nutritional trials will be carried out under laboratory conditions to evaluate best protein/energy ratios in diets for juveniles and the dietary inclusion of supplements to improve gonads quality and marketability. Classic analytical tools applied in nutrient requirement studies combined with transcriptomics of sea urchin gonads will allow the proper identification of major genomic components of the sea urchin unique flavour of gonads.*

**5. Research project synopsis** (maximum 5,000 characters including spaces)

*Candidates have to prepare a project synopsis by themselves for evaluation of their* skills, abilities and capabilities, and *that should include:*

1. *Summarized state of the art related to the selected topic (about 1000 characters);*
2. *Proposal of a timely objective for a PhD thesis within the topic mentioned above, or the preferential one, if multiple topics have been chosen (about 300 characters);*
3. *Brief description of tasks to be developed to attain the objectives proposed above (about 3700 characters).*