

## Oferta Tesis Doctoral

Se busca candidato para realizar una Tesis Doctoral en el ámbito de la Biofísica, en el laboratorio del Dr. Manuel Prieto, Universidad de Lisboa, Portugal.

A continuación están los datos de contacto y el proyecto a realizar.

**Candidatura M2B-PhD 2016 (<http://www.m2b-phd.pt/>)**

**Dates: 16-30 November, 2016**

**Contact person:** Manuel Prieto

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**Tentative title:**

Potassium channels: Topology from frontier fluorescence methodologies.

**Institution(s) where the work will be conducted :**

Centro de Química-Física Molecular, Instituto Superior Técnico, Universidade de Lisboa

**Project synopsis:** (maximum 1500 characters, including spaces)

Protein dynamics rules many cellular processes, and there is a demand for novel experimental approaches carried out in close to physiological context. In this project, fluorescence homo-FRET methodologies will be developed and applied to gain powerful insights on the potassium channel KcsA from *Streptomyces lividans*.

Time-resolved fluorescence anisotropy studies will be used as a nanoruler to determine conformational changes in a single-tryptophan mutant of the homotetrameric KcsA channel (KcsA W67), avoiding the restrictions associated to X-Ray diffraction. Specifically, inter-tryptophan distances will be used to characterize the KcsA selectivity filter according to ion occupancy at pH 7 (closed state) and pH 4 (open state). Then, the influence of membrane composition (anionic phospholipid content) on the liposome-reconstituted channel will be evaluated. Finally, C-type inactivation and channel activity modulation will be addressed via studies of additional mutations in residues R64, E71 and R89.

In addition to the models for homo-FRET in protein oligomers, which should find broad application, the expected detailed understanding of the structure and function of potassium channels will be useful in the design of drugs for the treatment of the so-called channelopathies.

Proof-of-principle for this methodology was already obtained, the lab is equipped with state-of-the-art instrumentation for studies using fluorescence and microscopy, and attained international recognition on biophysics.

**Funding available for this project** (please include project(s) name, funding agency, : reference code / acronym, total amounts, starting date and ending date):

“Lipid oxidation in membrane and cell biophysics: From functional nanosensors to impact on amyloid formation. Application of advanced fluorescence, X-Ray scattering and microscopy techniques”; FCT; FAPESP/20107/2014; 200.000,00 euro; ( Out. 2016- Sept. 2019)

**Potential international collaborations for this project** (please include researcher(s) : name and affiliation)

Prof. José M. Gonzalez Ros, Dr. José A. Poveda, Dr. M. Lourdes Renart. Instituto de Biología Molecular y Celular, Universidad Miguel Hernández, Elche, Alicante, Spain (collaboration confirmed)

### **PhD Advisor**

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