

Chemistry Department

BioNanoLab

REQUIMTE/Bionano@REQUIMTE



Ricardo Franco

(Assistant Professor)

PhD in Bioinorganic Chemistry

BioNanoLab group leader (REQUIMTE)

BioRaman Spectroscopy Group Leader (ITQB/UNL); Visiting Professor USF and SNL (USA); AvHumboldt Scholar (Germany)

Objectives

The **BioNanoLab** research is devoted to applications of **Gold Nanoparticles in Biosensing and Diagnostics**.

Several **collaborations** are in place, namely in nanoparticle synthesis (FCUP), malaria diagnostics (IMM), capacitive immunosensors (I3N), and nano-microscopies (IPHT (Germany), FCUP, I3N).

Industrial partnerships include applications in genetic disease detection (STAB), and technological textiles (Devan).

Methodology

Agarose Gel Electrophoresis and Dynamic Light Scattering techniques for gold nanoparticle (AuNP)-enzyme or antibody conjugate characterization. Enzymatic activity determination by UV/visible Spectroscopy

Fluorescence spectroscopy for the detection of malaria antigens on a AuNP-based immunoassay

Capacitive immunosensors for the detection of malaria antigens.

Localized Surface Plasmon Microscopy for the detection of DNA-binding events.

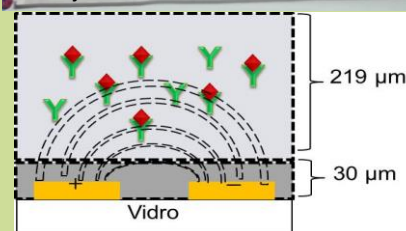
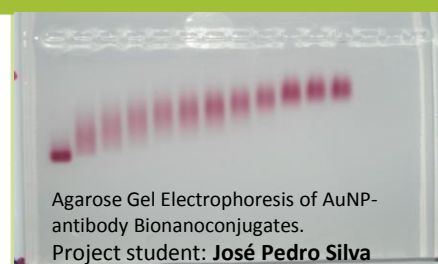
Expected Results

Development of a “sense-and-shoot” AuNP-based platform for phenolic compounds and other pollutants.

Malaria diagnosis in clinical samples by fluorescence spectroscopy or by strip immunochromatography (AuNP-based immunoassays), or using capacitive immunosensors.

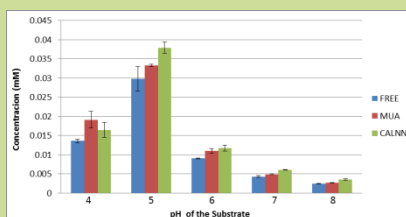
Localized Surface Plasmon Microscopy for the diagnostics of lactose intolerance in clinical samples.

Atomic Force Microscopy for biomolecules and AuNP-conjugates characterization.



Interdigitated Capacitive Biosensor for Malaria immunodetection.

Master student: **Tiago Monteiro**



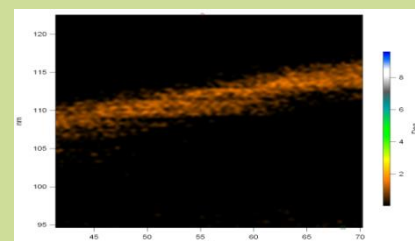
Enzymatic activity of AuNP-Peroxidase Bionanoconjugates.

Project student: **Vanessa Montês**



Nitrocellulose strip AuNP-based Malaria immunodetection.

Master student: **Isabel Silva**



Atomic Force Microscopy image of double-stranded DNA.

Master student: **Tomás Calmeiro**

Funding:

