

IBEC participates in "la Caixa" Fellowship Programme with a set of **stimulating PhD projects** and **excellent research groups** to host the fellows



Biomedical signal processing and interpretation group

Group leader: Raimon Jané

Novel m-Health and multimodal physiological biomarkers for non-invasive monitoring and home healthcare of Obstructive Sleep Apnea and COPD patients with comorbidities

Obstructive Sleep Apnea (OSA) affects at least 4-5% of middle-aged people, but more than 80% of patients remain undiagnosed and untreated. Therefore, it is a very prevalent chronic disease, more common in elderly population, with high impact to the health of individuals. Detection and management of OSA is currently too expensive due to intrinsic limitations of polysomnography (PSG) and the lack of novel strategies that improve classical methods. Consequently, it is necessary to propose and develop novel and cost-effective strategies and tools, for monitoring and management of OSA patients as well as their therapies at home.

Chronic obstructive pulmonary disease (COPD) is currently ranked as the fourth most common cause of death worldwide and is expected to rise to the third in 2030. Despite the health burden of COPD and comorbidities, classical methods to assess its severity have low sensitivity and specificity. In this project, novel m-Health tools and advanced signal interpretation techniques will be proposed for unobtrusive sensing and management improving of OSA and COPD patients at home. These novel tools, developed with hospitals, will also play a key role in healthy ageing of citizens. Novel multimodal physiological biomarkers (MPBs), estimated by biomedical signal interpretation, will be proposed to monitor the clinical status of OSA and COPD patients in a quantifiable, reliable and objective way, and to provide a cost-efficient integrated care for patients. It will be designed novel personalized and adaptive algorithms to obtain MPBs of OSA and COPD severity. The hypothesis is that multimodal information from respiratory muscle activity, respiratory function and breathing sounds can provide significant physiological information for a better and cost-efficient healthcare of OSA and COPD patients.

The group's research addresses the design and development of advanced signal processing techniques and the interpretation of biomedical signals to improve non-invasive monitoring, diagnosis, disease prevention and pathology treatment.

Our main objective is to improve diagnosis capability through the characterization of physiological phenomena and to enhance early detection of major cardiac and respiratory diseases and sleep disorders.

Job position description

Interdisciplinary research on ICT and m-Health tools. Proposal of novel multimodal physiological biomarkers. International collaboration with outstanding research centers and Hospitals