

# PhD scholarship position

## Tissue ultrasound mechanics

### We offer:

- 4-year grant from the prestigious FPI program of the Spanish Ministry of Science. Salary of approximately 1170 €/month after tax. Starting mid-2011 at the Nondestructive Evaluation Laboratory of the University of Granada [[www.ugr.es/~endlab](http://www.ugr.es/~endlab)] and our research projects.
- Possibility of funded research stays at the best research laboratories worldwide, presentations at international conferences and publishing in high impact journals.
- Support in later stabilization as faculty personnel.

### Requisites:

- Degree of physics, engineering, mathematics or physician, with high marks.
- Interest and motivation in experimental and computational research on wave propagation, nonlinear ultrasound, tissue engineering, inverse problems and complex materials.

### Project:

The rational principles of solid mechanics are proposed to understand and diagnose pathologies that manifest by tissue consistency changes, such as tumors. Addressing tissue biomechanics requires a concerted, collaborative effort between engineers, physicists and clinicians. A multidisciplinary effort may allow a better understanding of the questions implied in elastography-based diagnosis.

To quantify variations of mechanical properties of tissue during pathological processes, the model-based inverse problem is proposed to reconstruct linear and nonlinear mechanical properties from the measured distortion of a transmitted ultrasonic wave due to the propagation through the tissue. A detailed understanding of the tissue-ultrasound mechanical interaction is critical and the central objective of this project. The specific objectives are (1) to design and implement a robust algorithm to reconstruct relevant mechanical parameters from the measured signals, (2) to design and test an optimized ultrasound transducer and diagnostic device, (3) to explore the physiological, histological and biochemical variables that provide a rational insight to the clinical process and (4) to evaluate the prototype feasibility, sensitivity and capability of detecting and anticipating tumoral pathologies.

The strength of the strategic scientific position relies on searching expertise and control ranging all the way from the ground research on the challenging physics of ultrasound interaction with tissue to the applied engineering of clinical devices, and understanding in-depth from the micromechanical scale of the tissue to the organ-level physics.

### Contact:

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