

Title:

**Mechanics and cancer**

Organizers:

**José Manuel Garcia Aznar (Universidad de Zaragoza) / Trantafyllos Stylianopoulos (University of Cyprus)**

Mini-symposium description:

**The study of physical and mechanical features of tumor stroma and cancer cells is a new frontier in cancer research. Such studies may enhance our understanding of the disease progression. At tissue level such features include tumor stiffening and elevation of intratumoral mechanical forces that can compress tumor blood vessels resulted in reduced blood flow, limited drug delivery and hypoxia, fueling tumor progression. At cellular level, cancer cell mechanobiological changes are associated with the complex interplay of activation/inactivation of multiple signaling pathways and the interactions with the tumor microenvironment (TME). For example, different studies demonstrated that cell mechanical properties are strongly associated with cancer cell invasive, metastatic potential and drug resistance, and thus may serve as a diagnostic marker of detecting cancer cells in human body fluid samples. Therefore, mechanical characterization of cells and their surrounding matrix is key to uncovering the mechanisms driving tumor progression. At the same time, mechanotherapies that modulate mechanical abnormalities of the TME have already been developed and many of them have reached clinical trials.**

**This emerging field of research has motivated a rapidly growing number of mechanical/biophysical researchers to develop novel experimental and computational methods exploring diverse interests in tumor cell and tissue mechanics. The mini-symposium will cover this interdisciplinary area, including topics related to:**

- **Tumor cell mechanics and its relation to migration, proliferation and force generation**
- **Experimental cell mechanics (loading protocols, tools, data interpretation)**
- **Cell mechanics using microfluidic approaches**
- **Biophysical experiments on cytoskeletal mechanics**
- **Theoretical/numerical modelling of tumor cell mechanics and tumor microenvironment**
- **Cancer cell mechanotransduction**
- **Biomechanical characterization of tumor microenvironment**
- **Tumor organoids and mechanics**
- **Tumor microenvironment**
- **Tumor metabolism and mechanics**
- **Mechanotherapies and mechanotherapeutics**
- **Mechanical Biomarkers of tumors classification and therapy prediction**