



Room 404AB: Monday, February 17

5:30 PM – 7:00 PM
Impetux Optics SL

Force Spectroscopy and Micro-Rheology Assays in Cells, Organisms, and Biomolecular Condensates with SENSOCELL Optical Tweezers: An Applications Review

Discover how the SENSOCELL optical tweezers system, equipped with a calibration-free, direct force sensor, opens new frontiers in Cellular and Molecular Biophysics. In this talk we will demonstrate how SENSOCELL enables precise quantification of mechanical properties in a variety of biological contexts, from biomolecular condensates and isolated cells to more complex systems such as embryos, *Zebrafish* and *C. elegans* organisms.

We will show SENSOCELL's capability to perform detailed mechanical analysis of the intracellular medium using Creep, Stress-Relaxation, and Active Rheology assays across multiple biological systems.

By employing our automated TimSom Micro-Rheology routine, SENSOCELL accurately measures the complex viscoelastic modulus (G^*) across a broad frequency range, spanning five orders of magnitude. This flexibility allows researchers to observe mechanical transitions in real-time, revealing key changes in cells or protein condensates that reflect biological processes like maturation or aging.

The platform also provides unparalleled insights into cell membrane mechanics and molecular interactions through tether pulling, single-molecule stretching, and particle-cell or cell-cell interaction assays. In our presentation, we will showcase applications that measure critical parameters such as membrane tension propagation, and receptor-mediated adhesion forces.

Finally, we will demonstrate how SENSOCELL, designed as a modular add-on for inverted microscopes, seamlessly integrates with fluorescence imaging techniques like Spinning Disk Confocal and epi-fluorescence. This customizable setup allows researchers to capture high-resolution data and conduct complex analyses tailored to specific experimental needs.

Equipped with a cutting-edge optical manipulation module and advanced force spectroscopy capabilities, the SENSOCELL platform is an invaluable asset for advancing research in Cell Mechanobiology, Molecular Biophysics, and Soft Matter Physics, and has already contributed to numerous high-impact scientific publications.

Speaker

Oriol Nos Aguilà, CEO, Impetux Optics SL