International Symposium
BIODYNAMICS - A TRANSDISCIPLINARY APPROACH:
"The tale of cellular dynamics, from observation to application via knowledge"

19-21 May 2022

Venue: Intrarea Portocalelor 1B, Bucharest (physical format)

Organizers: the International Centre of Biodynamics (ICB) and Romanian Academy

Aims: Strengthening an excellence pole on Biodynamics, i.e. in the field of quantitative multivariate tools and advanced concepts to analyze biosystems and cellular dynamics data towards addressing current bioanalytics and biomedical challenges.

This event will mark the (postponed) celebration of 20 years since ICB establishment under UNESCO auspices.

How: An open format, combining lectures with access to laboratory test platforms and round table discussions as an enabling breadboard for future transdisciplinary collaboration avenues, gathering top-level scientists active in biodynamics related fields: from Physics to (micro- & cell-)Biology, Chemistry, Biomedicine, (bio)Engineering, and last but not the least, to AI & Mathematics.

The unique merge between label and label-free formats for multiparametric, high resolution (nanoscale) assessment of live cell dynamics at both single cell and population level is seen as the key enabling paradigm for cell and microbiology studies as well as assessment of drugs induced effects at various levels of cellular organization.

Topics:

I. **Real time, nanoscale microscopy for analyzing the dynamics of living cell structures**

- Super-resolution fluorescence microscopy, **Plenary lecture of Prof. Stefan Hell**, Nobel Laureate

- Quantitative Phase Microscopy approaches for High resolution label-free living cells analysis

- Electrical impedance images at nanoscale based on optical (microscopy) methods

II. **Bringing cells into focus**

-Methods to capture target cells, including pathogens from clinical samples using generic ligands and superparamagnetic iron oxide nanoparticles

-Microfluidics tools for cell assessment

III. **Derive cellular (single cell) dynamics from high content imaging data towards digital twins of biosystems dynamics**

- Multivariate data analysis **and** Artificial Intelligence tools

-The parametric space of biosystem analysis: "How many is enough?" adding the electrical dimension to single cell images, (https://www.nature.com/articles/s41377-020-00461-x)

IV.**(single) Cell physiomics - Biomedical Perspective on rapid detection of pathogenic microorganisms&tumor cells, fast Antimicrobial and Antitumor Drug Sensitivity Testing**

For details on the program, confirmed speakers and registration please regularly check: https://sites.google.com/view/biodynamics2022/home