



ICTP | International Centre for Theoretical Physics
SAIFR | South American Institute for Fundamental Research

Campus of IFT-UNESP – São Paulo, Brazil



BILL BIALEK

Princeton University, USA

Scaling, criticality, and the statistical physics of biological networks



PATRICIA BASSEREAU

Institut Curie, France

Domains and biomembranes



JUAN CARLOS ROCHA

Stockholm Resilience Centre, Sweden

Critical transitions in ecosystems: detection and management challenges



MAURO COPELLI

UFPE, Brazil

Brain criticality



CHRISTOPH WEBER

Institute of Physics, University of Augsburg, Germany

Active droplets in cell biology and their role in the molecular origin of life

January 12 – 23, 2026

SCHOOL ON BIOLOGICAL PHYSICS ACROSS SCALES: PHASE TRANSITIONS

Based on the success of the first school on biological physics across scales organized in 2024, this school will explore the role of phase transitions in living systems, from molecules and organelles to organisms and ecosystems. This classic concept from statistical physics is finding new applications in biology, at all scales, that stimulate the development of new theoretical approaches and tools. At the molecular and cellular levels, phase separation drives the formation of biomolecular condensates and chromatin organization, while membrane phase transitions regulate the physical state and function of cellular interfaces, and cytoskeletal networks and tissue dynamics exhibit transitions reminiscent of active matter and jamming phenomena. At larger scales, phase transitions underpin neural activity, collective animal motion, and ecological resilience, highlighting connections between emergent phenomena in biology and critical transitions in physical systems. The study of these biological phenomena, in turn, stimulates the development of new theoretical frameworks, such as the study of non-equilibrium dynamics, highly multicomponent mixtures, network dynamics, stochastic processes, and criticality in active systems. The goal of this school is to bring together experts on these different systems and approaches to engage in an interdisciplinary dialogue with students from all over South America.

There is no registration fee and limited funds are available for travel and local expenses.

Application deadline:

October 31, 2025

Online application and more information:

ictp-saifr.org/sbpas2026



serrapilheira

ORGANIZERS

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