



November 2 – 6, 2026

**HANDS-ON MINICOURSE ON
 FUNDAMENTALS OF
 BIOLOGICAL PHYSICS**



SILVINA PONCE DAWSON
 UBA, Argentina
Cell signaling



PABLO DE CASTRO
 IF-USP, Brazil
*Statistical Mechanics of
 Self-Propelled Organisms*



RAFAEL MENEZES
 ICTP-SAIFR, Brazil
Individual Based Models in Ecology

Biological systems operate across multiple scales, ranging from molecular signaling inside cells to population-level dynamics in ecosystems. Despite their complexity, many of these processes can be described and understood using concepts and tools from physics. In recent years, the interface between physics and biology has emerged as a vibrant interdisciplinary research frontier, combining ideas from statistical mechanics, soft matter, information theory, and dynamical systems to tackle problems in cell biology, ecology, and collective behavior.

Building on the success of the previous edition, this year's minicourse will first introduce key theoretical and computational approaches that have proven successful in modeling and analyzing biological systems, and then move to specific problems of biological interest. The minicourse will be based on problem-based learning. Students will work in interdisciplinary groups under the guidance of the lecturers to tackle problems carefully prepared to be both challenging and instructive, often representing real, open scientific problems. Topics will include diffusion and stochastic processes, collective behavior between moving entities, cellular signaling, active matter, movement ecology and individual-based models. The hands-on sessions will be complemented by lectures that will give an overview of the area and the theoretical fundamentals of the exercises students will be tackling.

The minicourse is aimed at advanced undergraduate and early graduate students in physics or in biology with a strong quantitative background, but other interested students are also welcome to apply. No prior expertise in biological modeling is required. Participants are welcome to submit an abstract for poster presentation. We also encourage students who participated in last year's program to apply again, as new problems, topics and groups offer new learning opportunities.

This is an initiative promoted by the Physics of Life South American Network, PoLSAN.

**Application deadline:
 September 3, 2026**

**Online application and
 more information:
ictp-saifr.org/mfbp2026**



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