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BAM01: The physics of bacteria and other microorganisms

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Invited speakers: Daria Bonazzi (Institut Jacques Monod, Paris), Florence Elias (Physique et Mécanique des Milieux Hétérogènes, Paris), Ashley Nord (Centre de Biologie Structurale, Montpellier),

Content:

Microorganisms thrive in various environments and play an essential role in ecosystems, health, and industry. Recent advances highlight how their interactions with fluids, surfaces, or with each other pose complex problems in soft matter science, hydrodynamics, and non-equilibrium physics. As active and adaptive micrometric organisms, they have therefore attracted keen interest from the biophysics community.

Some examples of microorganism-driven processes explored by physicists include: the evolution of microbial populations, the emergence of patterns in swimmer suspensions, individual or collective motility mechanisms, the interaction of microbes with surfaces, and the spatial organization of individuals into biofilms. Studies can range from sub-cellular regulation processes (nm scale), to the behavior of individuals in interaction with complex environments (micron scale), all the way to biofilm morphogenesis (micron to mm scale and beyond).

Selected contributions can cover on one hand, the exploration of the role of physical cues in the life of bacteria and other microorganisms, from individuals to communities; and on the other, the development of original physical approaches to push the understanding of microbial behavior, either experimentally or theoretically.

The goal of the mini-colloquium is to bring together researchers interested in understanding how physical interactions shape the life of microorganisms, impacting their behavior, organization and dynamics at the single-cell and collective levels.