Colloquium

MAX PLANCK INSTITUTE
FOR DYNAMICS AND
SELF-ORGANIZATION

What drives biofilm assembly and structuring? A Physics perspective

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Biofilms are aggregates of microorganisms in which cells are embedded in a self-secreted matrix of extracellular polymeric substances, which protects the microbial community from chemical and mechanical insults, thus favoring its survival and evolutionary success. Biofilms are the primary mode of growth of bacteria and have a crucial impact in environmental, industrial, and medical settings. Despite this, there is a severe lack of understanding of how the physical structure and chemical composition of biofilms determine their resistance to harsh environments.

My work investigates the bio-physical drivers of biofilm assembly and the emergence of distinctive morphological and mechanical properties. I will present examples of biofilms grown in different environmental conditions, ranging from the air-solid interface of moist surfaces to surfaces exposed to fluid flow and porous media, and by different bacterial species. In each case, I will show that the interplay between biological functions, i.e., growth, and physics mechanisms, i.e., surface adhesion, osmotic pressure, and flow shear stress, controls biofilm assembly, morphology, rheology, and, ultimately, affects the physiological protective function of biofilms. By shedding light on this interplay, we can control biofilm development, showing the prominent role that soft matter physics can play in developing novel antimicrobial and antifouling strategies.

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MPI-DS, Prandtl Lecture Hall
Am Fassberg 11, Göttingen, and
Zoom Meeting ID: 959 2774 3389
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