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Life on a Surface in a Low-Reynolds-Number Flow

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There are many studies of the dynamics of swimming microorganisms. There are far fewer studies of how bacteria that attach to surfaces respond to motions of the surrounding fluid. Such motions can influence bacterial orientation, which can, in turn, impact bacterial colonization and motility on surfaces. Moreover, as biofilms develop, stresses from the flow on the surface can cause three-dimensional rearrangements of the soft biofilm in the form of "streamers" that can bridge the sides of a porous system; such suspended filaments trigger rapid clogging. Some of the underlying fluid dynamics will be discussed in the spirit of how the flow couples to the spatial and temporal evolution of these bacterial systems. Joint work with N. Autrusson, B. Bassler, K. Drescher, Z. Gitai, L. Guglielmini, F. Ingremeau, M.K. Kim, S. Lecuyer, O. Pak, A. Persat, R. Rusconi, Y. Shen, A. Siryaporn, N. Wingreen