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A framework to understand cell type transitions in bacterial biofilms AGNESE SEMINARA, CNRS - Laboratoire de physique de la matière condensée, Nice, France, NAVEEN SINHA, JAMES WILKING, STEPHANE KOELHER, School of Engineering and Applied Sciences, Harvard University, Cambridge, MA, MATTHEW CABEEN, Department of molecular and cellular biology, Harvard University, Cambridge, MA USA, DAVID WEITZ, MICHAEL BRENNER, School of Engineering and Applied Sciences, Harvard University, Cambridge, MA — Bacterial biofilms are colonies of cells that live associated to surfaces and differentiate into different cell types, in response to unknown environmental cues. Similar to the development of multicellular organisms, differentiation happens in reproducible spatio-temporal patterns of gene expression. Why do we see the patterns that we see? Fluorescence microscopy shows that there is a cell lineage specific to biofilms: cells are first motile, they then become matrix producers, and finally they sporulate. We combine this knowledge to the complete space-time distribution of fluorescence to study when and where the transitions among these three cell types arise. We first isolate the effect of growth and expansion on the evolution of the expression profiles to detect the cell type transitions. Based on these data we then elaborate a consistent scenario to explain cell type transitions.

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