

**Biochemistry-Biophysics Friday Lunchtime Pizza Talks**  
**Oct 7, Fri 11:30 am, Kosow 116.**

**Title: “Collective dynamics of gene activity in cell populations”**

**Speaker:**

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**Abstract:**

Gene activity (expression) determines the response of a living cell to environmental signals and supports the stabilization of a well-determined cell state in the face of intrinsic and environmental perturbations. How the intracellular complex molecular dynamics stabilize a cell state is one of the fascinating open questions in biophysics. After presenting the background for this problem, I'll discuss our experimental approach allowing measurements of the long-term intracellular processes in dynamic cell populations, gaining insight into the genes' collective many-body dynamics. We show that two cell populations derived from a single steady-state mother population, fed by the same medium and exhibiting an invariant growth phenotype in response to an environmental challenge, displayed diverse gene activity patterns, including genes essential for their metabolism. These degenerate gene expression patterns emerged from population-collective dynamics. This surprising result suggests that in a wide range of biological contexts, gene expression reflects a self-organization process coupled to collective population-environment dynamics.