Politecnico di Torino

SmartData@PoliTO

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SmartTalk: Covivio

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Unraveling the Inner Workings of Cells via Statistical Inference

ABSTRACT

Intracellular metabolic activity (e.g. reaction fluxes and metabolite levels) is largely inaccessible to experiments. I will describe recent work aimed at constructing generative models of cellular metabolism through statistical inference from empirical data. After motivating why this problem is worth the effort and clarifying the technical difficulties to be overcome, I will focus on (i) the existence of a testable hard bound relating fitness to (inferred) heterogeneity in all cell types, and (ii) the possibility to identify `objective functions' of metabolic activity. If time permits, I will finally present some results on the reconstruction of inter-cellular interactions in populations of cancer cells from high-resolution pH micronvironment data obtained via ratiometric nanofibers.

SmartTalks Season 2