



Seminar/Talk

Correlational Information and non-local decoding

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ISTA

Host:

In developing tissues or organisms, cells undergo differentiation, a process in which pluripotent stem cells commit to specific cell fates. To ensure proper biological function, differentiation occurs in spatial patterns that are both precise and reproducible, and it does so in an inherently stochastic environment. In the late 1960s Lewis Wolpert first introduced the concept of Positional Information (PI), which traces back this patterning to the ability of cells to infer their position by reading out the information contained in the graded profiles of the so-called morphogen molecules. More recent efforts by Dubuis et al formalised the concept of PI in the language of information theory providing a robust understanding of the constraints imposed by stochasticity on morphogen-based patterning. Despite these successes, several outstanding questions remain, particularly regarding the origin and refinement of PI. We explore the possibility that in situations where the stochastic fluctuations in gene expression are spatially correlated, these correlations can be exploited. In particular we quantify the amount of information that can be extracted from said correlations, and find the optimal way to convert it into useful PI through non-local decoding. With this, we aim to shed light on potential mechanisms by which cells collectively enhance developmental precision.

Friday, January 31, 2025 03:00pm - 04:00pm

Mondi Seminar Room 2, Central Building



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

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