Institute colloquium

Institute Colloquium: Strategy for deconstructing complex systems by phenotypes

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Host:

The announcement of the draft sequence of the human genome revealed the true magnitude of the Grand Challenge involved in relating genotype to phenotype. Although we now have a generic concept of genotype provided by the detailed DNA sequence, there is no corresponding generic concept of phenotype . Without a generic concept of phenotype there can be no rigorous framework for a deep understanding of the complex biochemical systems that link genotype to phenotype. The task of relating the two could be facilitated if these systems could be generically decomposed into a series of tractable subsystems representing the full phenotypic repertoire and if the results of their analysis could be reassembled to provide insight into the original system. I will describe advances in a novel approach that addresses these important challenges. It provides a generic definition of phenotype and automatically identifies the corresponding subsystems. The qualitatively distinct phenotypes of a complex system can then be rigorously defined and counted, their fitness analyzed and compared, their global tolerances measured, and their biological design principles revealed. A few simple applications will be used to illustrate how this approach elucidates the relationship between genotypically determined parameters, environmentally determined variables, and the qualitatively distinct phenotypes of biochemical systems. This approach has provided quantitative understanding for a number of natural systems. The global perspective on the behavioral repertoire also facilitates comparisons of alternative systems and assists in the rational design of synthetic constructs.

Monday, September 29, 2014 04:30pm - 05:30pm
Raiffeisen Lecture Hall, Central Building

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.
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https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.