EPFL PHYSICS COLLOQUIUM

Sloppy models, and why science works

Prof. James Sethna
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APERO after the colloquium

Monday
November 11
16:15
Room CE1 2

Models of systems biology, climate change, ecology, complex instruments, and macroeconomics have parameters that are hard or impossible to measure directly. If we fit these unknown parameters, fiddling with them until they agree with past experiments, how much can we trust their predictions? We have found that predictions can be made despite huge uncertainties in the parameters – many parameter combinations are mostly unimportant to the collective behavior. We show that physics theories are sloppy and describe how to use these notions to systematically coarse-grain complex systems into human-comprehensible form. We will present new methods for visualizing this model manifold for probabilistic systems – such as the space of possible universes as measured by the cosmic microwave background radiation.

Host: Prof. Lenka Zdeborová

School of Basic Sciences

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