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Evolution of codes, crosstalk, and sequence niches in biomolecular signaling CHRISTOPHER MYERS, Cornell University — Signaling and regulation in cellular networks is mediated through biomolecular interactions, which can be somewhat promiscuous, involving the molecular recognition of broad sets of binding targets. This leads to some basic questions concerning crosstalk among similar sets of biomolecules: does it occur, to what extent can it be avoided, how can phenotypic errors due to crosstalk be minimized, and when might crosstalk be advantageous? Beyond biology, questions of this sort have connections to phase transitions in constraint satisfaction problems, and to the theory of message coding in noisy channels. Expanding upon my previous work exploring the nature of the satisfiability (SAT-UNSAT) transition in a simple model of protein-protein interactions, this talk will investigate the role of sequence evolution in shaping high-dimensional sequence niches and biomolecular codes.

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