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Tinkering with Genetic Networks In Vivo

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Synthetic genetic networks have recently emerged as an alternative experimental framework for studying cellular networks. Biological systems have evolved through a process of blind molecular tinkering. I will present an experimental genetic system which mimics this tinkering process. This system is composed of a few well characterized genetic elements: the promoters and genes of lambda cI, LacR and TetR. Using a combinatorial synthesis method we create libraries of simple genetic networks with various connectivities that function as logical gates. We observe how new computational functions arise through one-step changes in network connectivity. The connectivity-function map is found to be many-to-many even for these small networks.