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"Design principles for controlling organization and self-assembly far from equilibrium."

Understanding the microscopic chemical and physical principles that control organization and self-assembly in non- equilibrium conditions remains an important problem in statistical mechanics. In this talk, I will describe recent work from my group that elucidates how non-equilibrium forces can be used to achieve novel self-assembly, functionality and organization in a variety of chemical and biological systems. I will focus in particular on two new non-equilibrium thermodynamic frameworks developed in the group and show how these can be used to achieve control over morphologies, material properties and self-assembly in wide range of microscopic non-equilibrium systems. Together, our results lay the framework for a general set of thermodynamic principles to control transport, assembly and organization in a broad class of non-equilibrium systems.