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Programming Molecules

Programs that execute within cells or that create intricate nanoscale structures are a reality, implemented using DNA molecules. As the scale and variety of DNA programs expand, a rich theory of molecular programming is emerging.

Chemical reactions are a natural programming language, but programming molecules is tricky! For example, reactions execute asynchronously, it's hard to control counts of input molecular species, and challenging to "recycle" species so that the volume (space) of a computation is minimized. In this talk I'll describe results on the power and limitations of programming with chemical reactions, and some open problems in this fascinating field.