



## Mixing it up: Computation in dynamical systems

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### Abstract

To make an understatement, the concept of “computation” is multifaceted. “Computation” in syntax, cognitive science, and computer science often receives drastically different definitions, sometimes at direct odds with each other. Are we defining closed input-output mappings over natural? Are we integrating information from multiple sources interactively? What are the basic ingredients in a definition of “computation” such that we can say that a digital computer and a human are doing it? This talk will examine some aspects of the relation between what “computation” looks like in the theory of syntax and some aspects of neurocognition and computer science and try to establish to what extent these approaches deal with the same process. Asking these questions is important to bridge the gap between syntactic theory (which is concerned with providing empirically adequate structural descriptions for natural language sentences) and cognitive neuroscience (concerned with the neurocognitive underpinnings of what goes on in language production and processing). Building on the distinction between emulation and simulation, of long pedigree in computer science and AI research, we will focus on the basic properties of syntactic computation, analyze what we should require of a descriptively adequate grammar, and whether a correspondence with neurocognitive processes is not only possible but even desirable.

**Keywords:** Syntactic theory, Structural uniformity, Mixed computation, Emulation, Simulation

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