Hierarchical Evolutionary Dynamics for Understanding Self-Assembly in Nano-Mechanical Systems
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Abstract
This poster will deal with two interrelated issues in nanoassembly. One of these issues is a mapping of nanosystem components from the physical world to a virtual world. This involves a consideration of developments in the areas of tangible interfaces and programmable materials. A related topic involves characterizing the physical attributes (forces, movement patterns, and energy utilization) of the physical world as a living system. This is particularly useful when comparing the dynamics of synthetic nanostructures to those of an organic, self-assembled macromolecule. These three issues (tangible interfaces, programmable materials, and living systems) will be brought together using an hierarchical evolutionary dynamics framework (see Figure 1). Specifically, hierarchical evolutionary dynamics can be used to both identify simple machines/mechanisms critical to self-assembly and characterize universal tendencies and properties of these systems. This can be useful to applications in both basic system design and systems at the nano-bio interface.

Figure 1: schematic diagram of key ideas presented in poster. Frame A: relevance to nanoassembly, Frame B: relationship to hierarchical evolutionary dynamics.

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