

The Art of Building Small from Molecular Switches to Motors

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The fascinating molecular motors and machines that sustain life offer a great source of inspiration to the molecular explorer at the nanoscale. Among the major challenges ahead in the design of complex artificial molecular systems and is the control over dynamic properties and responsive far-from-equilibrium behavior. Chemical systems and adaptive materials ultimately require integration of structure, organization and function of multi-component dynamic molecular assemblies at different hierarchical levels. A major goal is to achieve and exploit translational and rotary motion.

In this presentation the focus is on the dynamics of functional molecular systems as well as triggering and assembly processes. We design switches and motors in which molecular motion is coupled to specific functions. For instance, Photopharmacology offers fascinating opportunities to control biological function by light. Responsive behavior will also be illustrated in self-assembly and responsive materials with a focus on cooperative action, amplification along multiple length scales and 2D and 3D organized systems. The design, synthesis and functioning of rotary molecular motors and machines will be presented with a prospect toward future dynamic molecular systems and materials.

Information on <http://www.benferinga.com>

- Molecular Machines: Nature, September 2015
- Molecular Switches: Chemistry World, June 2016
- Vision statement "Materials in Motion": Adv. Mater. 2020