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Janus and Multiblock Colloids[1]

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This talk surveys emerging areas opened up by the directional interactions presented by the specially-designed spheres known as Janus. The "diblock" motif, mutually attractive on one domain and repulsive on another, makes this a prototypical system for elucidating, on a mechanistic level, how concepts of chemical reaction kinetics explain the development of stable and highly ordered nonequilibrium structures. With the "triblock" motif, spheres that attract one another on two polar regions but repel at the middle band, we go beyond this to demonstrate the self-assembly of a useful low-density lattice of spheres, the colloidal Kagome lattice, and visualize its aqueous assembly dynamics on the single-particle level. A newer area of opportunity is "dynamic self-assembly," in which energy fed into the system as a control variable generates big surprises. The generalization of these design rules will be discussed.

[1]Work performed with Erik Luijten, Qian Chen, Jing Yan, Nobuhiro Yanai, Jie Zhang, Jonathan K. Whitmer, and Sung Chul Bae.