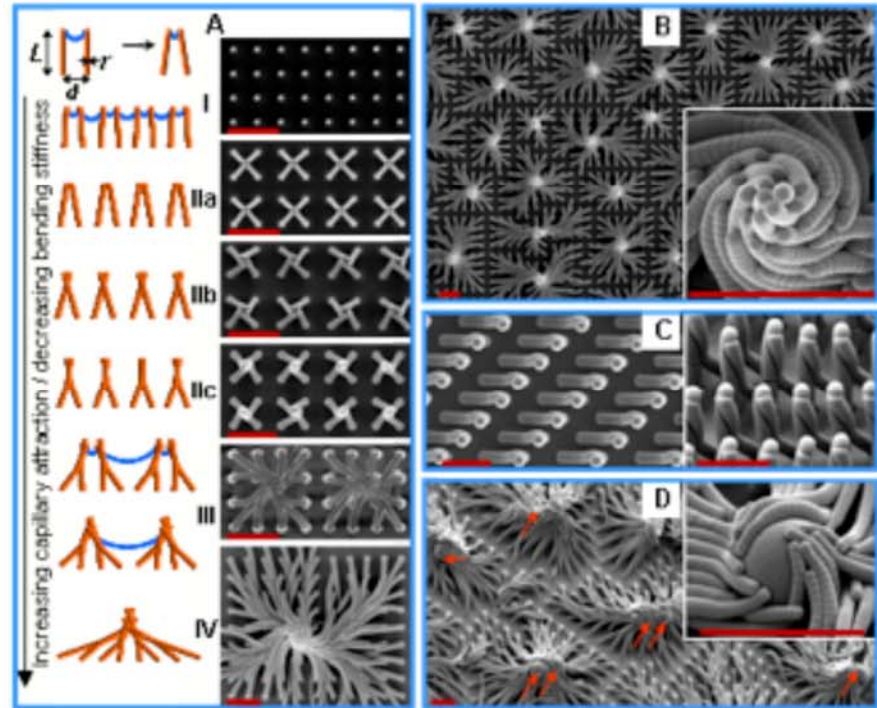
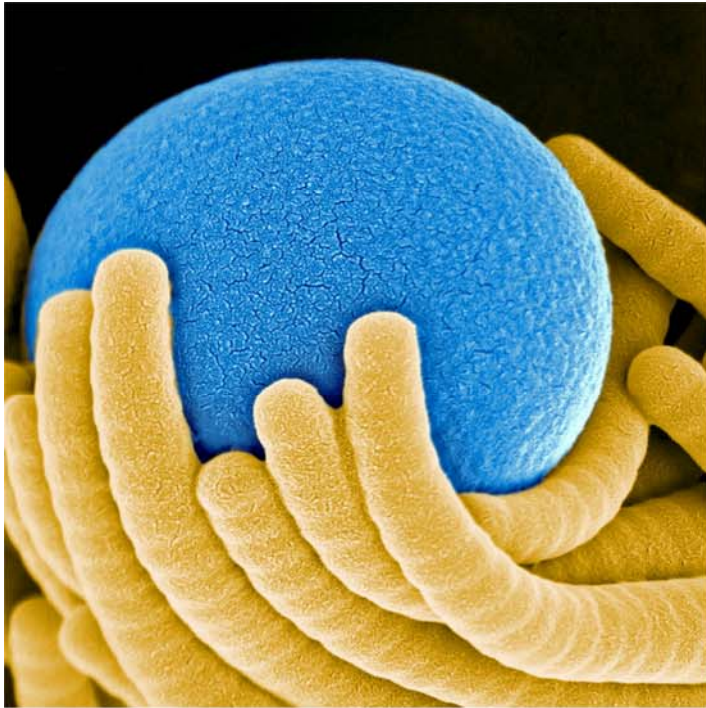


New Ordered Hierarchical Helical Assemblies

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Mesoscale hierarchical helical structures with diverse functions are abundant in nature. Aizenberg, Mahadevan, and their coworkers have shown how spontaneous helicity can be induced in a synthetic polymeric nanobristle assembling in an evaporating liquid, consistent with a theoretical model to characterize the geometry, stiffness, and surface properties of the pillars that favor the adhesive self-organization of bundles with pillars wound around each other. The process can be controlled to yield highly ordered helical clusters with a unique structural hierarchy that arises from the sequential assembly of self-similar coiled building blocks over multiple length scales. The MRSEC team has also demonstrated their function in the context of self-assembly into structures with uniform, periodic patterns and controlled handedness with the potential to create reversible adhesives, mechanical memories and active microscale mixers and stirrers.