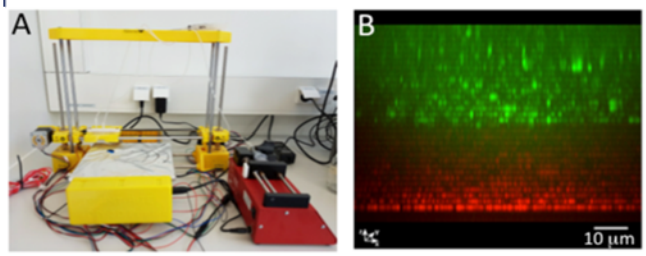
Biological Materials Seminar

Title: "Biological architecture: From protective biocrystals to 3D-printed bacteria."



3D printing of bacteria. A. The Meyer lab's home-built 3D bacterial printer. **B**. The 3D bacterial printer was used to extrude a layer of red fluorescent bacteria, followed by a layer of green fluorescent bacteria overtop, creating structured layers with negligible bacterial mixing.

Monday, February 3
4:00pm
Hutchison Hall 473
University of Rochester
Department of Chemistry

Guest Speaker:
Professor Anne Meyer
University of Rochester
Department of Biology

Abstract:: The Meyer lab performs research targeted at applying and re-engineering bacteria to synthesize bio-inspired materials with improved properties. This approach has the potential to replace traditional chemical approaches that require extreme environmental conditions, expensive equipment, and the generation of hazardous waste. We have targeted bacterial production of patterned artificial nacre, a biomineralized, optically active material lining seashells that combines high mechanical stiffness with high fracture toughness, as well as conductive graphene materials. Combination of our biological materials-producing systems with our newly developed 3D bacterial printers will allow the rapid and straight-forward production of spatially-structured biomaterials. We also study fundamental questions of chromosome organization in bacteria. In starving bacteria cells, Dps (DNA binding protein from starved cells) is the most abundant protein component of the chromosome. Dps compacts DNA into a dense structure that resembles a crystal, both in vivo and in vitro. We applied a combination of high-throughput sequencing, biochemical, and magnetic tweezer techniques to measure the effects on gene expression associated with Dps-induced compaction of DNA, and we found that Dps does not affect gene expression in starved cells either directly or indirectly in the cell. We hypothesize that Dps forms a dynamic liquid crystalline structure that excludes some DNA-binding proteins yet allows RNA polymerase free access to the buried genes, a behavior characteristic of phase-separated organelles.

Host: Kara Bren ● Email: Kara.Bren@Rochester.edu