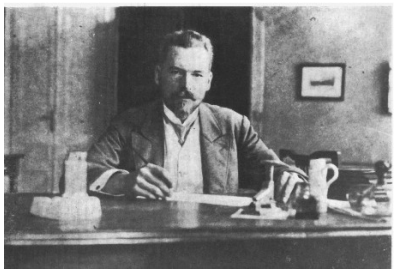

Contribution ID: **4** Type: **talk**

Nurturing Nature for Nanotechnology

Tuesday, September 4, 2018 2:30 PM (45 minutes)

It has long been a dream to design molecular devices and machines. We are not, though, very good at it, but Nature is. From the complex machinery of the ribosome to the integration of information, sensing, and actuation in cells, biological systems conduct the most exquisite nanofabrication and molecular operation that we know of. Our best methods so far for creating nanoscale objects mimic and exploit biological systems – top-down lithographic techniques notwithstanding. DNA nanotechnology, in particular, makes information – the sequence of bases – into structures by taking advantage of the specificity of Watson-Crick pairing. An appropriate chosen sequence of DNA, or sequences of many pieces of DNA, will self-assemble into different shapes and patterns, and can even generate structures that move and respond to different stimuli. This assembly process, though, is not fool proof; it does not always give us what we want. To do as biology does (whether chemical, e.g., ribosomal, or structural), we better develop the tools to measure, model, and understand biomolecular assembly. I will present theoretical principles of biomolecular nanostructure design, as well as experimental results to test these principles in the context of DNA origami. In other words, I will discuss how we can better nurture Nature to give us novel structures and devices, from sensors to machines to drug delivery systems.

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