



Program in Polymers
and Soft Matter

SEMINAR

Prof. Rein V. Ulijn

Director, Nanoscience Initiative

CUNY Advanced Science Research Center

City University of New York (CUNY)



“Guiding principles for peptide-based, life-like nanotechnology”

Summary

Life's diverse molecular functions are largely based on only a small number of highly conserved building blocks- the twenty canonical amino acids. These building blocks are chemically simple, but when they are organized in three-dimensional structures of tremendous complexity, new properties emerge, giving rise to the extraordinary machinery of life. So, if just twenty simple building blocks- when appropriately assembled - give rise to the complexity and functionality that can sustain life- then this is clearly a very versatile construction set.

Our overall goal is conceptually simple: to figure out how to make nanoscale systems and materials from biology's building blocks, and to apply these materials to diverse problems, that require them to be interfaced, ideally seamlessly, with living systems, or the natural environment. Different from other research groups, we have an unbiased approach, that is not guided by copying biological systems, and we keep these systems as simple as possible, which lowers barriers to application.

The talk will focus on our latest results in three areas: (i) directed discovery of peptide nanostructures with new functions, by searching the sequence space; (ii) application of peptide nanostructures as functional materials (including customizable melanin pigments and cell culture matrices). (iii) actively assembling systems, that continuously turn over chemical fuels, enabling dynamic changes in structure and function.



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On the Web at <http://polymerscience.mit.edu>

Information: Greg Sands (gsands@mit.edu/253-0949)