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A Department of the College of Engineering & School of Medicine

BIOEN 509 – DEPARTMENTAL SEMINAR SERIES

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Foege Bioengineering Building N130A

Building Functional Nanostructures with Designer Proteins

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Nature has long used peptide and protein-based manufacturing to create structures whose remarkable mechanical, transport, optical, and magnetic properties are determined by a fine control of composition and architecture extending from the nano- to the macroscale. By putting molecular biology at the service of materials sciences, it is now possible to build chimaeric proteins that combine biological function (e.g., ligand binding, enzymatic activity...) of a “host” scaffold with the adhesive or materializing properties of “guest” peptides selected by combinatorial techniques. Such designer proteins are suitable for controlling the nucleation, growth habit, assembly and geometrical organization of inorganic phases and are emerging as powerful tools for the fabrication of hybrid functional materials. After briefly reviewing the solid binding peptide selection process, I will describe how designer proteins can be used to mineralize and organize solid phases under non-equilibrium conditions, control the size and shape of inorganic materials, and build functional nanostructures useful in biology and medicine.

Dr. François Baneyx is the Charles W.H. Matthaei Professor of Chemical Engineering and Bioengineering at the University of Washington. He directs the University of Washington Center for Nanotechnology, the Pacific Northwest node of the NSF National Nanotechnology Infrastructure Network, and serves as Co-Director of the Genetically Engineered Materials Science and Engineering Center, a NSF Materials Research Science and Engineering Center. Dr Baneyx earned a Ph.D. in Chemical Engineering from the University of Texas at Austin and joined the faculty of the University of Washington in 1992 after postdoctoral work at DuPont. His research interests are in the areas of protein folding, protein expression, protein structure-function relationship and nanobiotechnology.



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