

Department of

Chemical and Environmental Engineering

2014—2015 Seminar Series

Friday, December 5, 2014

10:00—11:00 AM

Watkins 1000



Francois Baneyx

Department Chair and
Charles W.H. Matthaei Professor

Department of Chemical Engineering

University of Washington

Biological Nanomanufacturing

Living systems build complex inorganic materials with exceptional properties. They do so by using proteins to specify the spatial, compositional and temporal organization of biological and inorganic species, thus controlling architecture, crystallography and chemistry from the nano- to the mesoscale. By engineering solid binding peptides selected by combinatorial display within the framework of larger polypeptides that exhibit useful characteristics (e.g., ligand binding, self-assembly or antigenicity), it is possible to produce designer proteins that are suitable for the production of medically useful products such as CD8 T cell vaccines. Designer proteins also hold potential for supporting the fabrication of an entirely new generation of devices based on graphene nanoribbons and on the transport of protons instead of electrons. The adhesive properties of solid binding peptides themselves make them powerful tools for oriented and chemically addressable protein immobilization and for rapid and inexpensive protein purification. This universe of possibilities can be further expanded by harnessing an emerging ability to design entirely new protein frameworks *in silico* and by making use of engineered cells to gain spatio-temporal over biomineralization processes.

Biosketch: François Baneyx is the Charles W.H. Matthaei Professor and Chair of the Department of Chemical Engineering at the University of Washington. He previously served as Director of the University of Washington *Center for Nanotechnology*, Site Director of the Pacific Northwest node of the *National Nanotechnology Infrastructure Network* and Co-Director of the *Genetically Engineered Materials Science and Engineering Center*. Dr. Baneyx earned his Ph.D. in Chemical Engineering from the University of Texas at Austin and joined the University of Washington faculty in 1992 after postdoctoral work in molecular biology at DuPont. His research interests are highly interdisciplinary and lie at the interface of biotechnology, nanotechnology, materials science and molecular engineering. Dr. Baneyx holds 4 patents and has published over 90 papers in the areas of molecular chaperones, protein folding, protein expression, protein engineering, protein-aided fabrication of hybrid nanomaterials and systems and bionanotechnology. He is a Fellow of the American Association for the Advancement of Science.

*Light Refreshments will be served.