Engineering Artificial Proteins: From Biomaterials to Detoxifiers

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ABSTRACT: Through centuries of evolution, nature has developed biomacromolecules capable of folding and assembling into discrete structures with a functional consequence. Inspired by this, our lab focuses on engineering proteins in order to: (1) fabricate entirely new materials properties and function and (2) reprogram enzymes for applications. In the first part of my talk, I will discuss our work towards engineer new structures and supramolecular assemblies by piecing together natural or nature-derived domains that have never been fused to one another. This will be followed by a description of how we can engineer stability into enzymes found in nature to detoxify harmful neurotoxins often found in pesticides and warfare agents via the integration of chemical and genetic diversity. The resulting artificial proteins bear potential as scaffolds for biotechnology, nanoelectronics and medicine as well as directs agents for detoxification.

BIOGRAPHY: Jin Kim Montclare is an Associate Professor in the Department of Chemical and Biomolecular Engineering, who is performing groundbreaking research in engineering proteins to mimic nature and, in some cases, work better than nature. She works to customize artificial proteins with the aim of targeting human disorders, drug delivery and tissue regeneration as well as create nanomaterials for electronics. Using multidisciplinary expertise in chemistry and genetic engineering, these results have already been realized. Prior to joining NYU-Poly, Montclare was a postdoctoral fellow at the California Institute of Technology in the Division of Chemistry and Chemical Engineering. She received a Bachelor of Science in Chemistry from Fordham University in 1997, a Master of Science and a PhD in Bioorganic Chemistry from Yale University in 2001 and 2003, respectively. Among her many honors and awards are the Agnes Faye Morgan Research Award from Iota Sigma Pi, Executive Leadership in Academic Technology and Engineering Fellowship, American Chemical Society PROGRESS /Dreyfus Lectureship, the Dreyfus Special Grants Program Award, the Air Force Office of Scientific Research Young Investigator Award, the Wechsler Award for Excellence, the Othmer Junior Fellow Award, the National Institute’s of Health Postdoctoral Fellowship, and the National Science Foundation Pre-doctoral Fellowship.

EVENT DETAILS
DATE: Wednesday, October 21, 2015
TIME: 11:00 AM
LOCATION: Carnegie 315
Stevens Institute of Technology
ATTENDANCE: This event is open to Stevens’ Faculty, Students, Staff, and Invited Guests

Co-Sponsored by the Mechanical Engineering and the Chemical Engineering and Material Science Departments