Won Min Park

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Won Min Park is an assistant professor in the Tim Taylor Department of Chemical Engineering at the Kansas State University. He received his bachelor's degree from Hanyang University in 2007, and master's degree from KAIST in 2009, and doctorate from Georgia Tech in 2015, all in chemical engineering. He completed his postdoctoral training in biology and biological engineering at MIT, before he joined K-State in August 2018. He was a recipient of the Exemplary Academic Achievement Award and the James T. Porter Fellowship from Georgia Tech. His research focuses on the development of protein nanomaterials that present novel properties for advanced biotechnology.

Modular Self-Assembly to Develop Protein-Engineered Nanomaterials

Abstract

Proteins are biological polymers that fold and assemble into sophisticated nanoscale structures. The three-dimensional folding and specific interactions of proteins enable a "bottom-up" approach to building nanomaterials that present novel physical properties as well as biological functionalities. Thus, protein-engineered nanomaterials offer great benefits and potential for innovative technological advances in biological and biomedical engineering. However, the complexity that arises from understanding and manipulation of protein folding or protein-protein interactions has significantly limited the capability to engineer nanomaterials from proteins. In this talk, I will present a rational approach to supramolecular protein nanomaterials through modular self-assembly of recombinant protein building blocks. The recombinant fusion proteins were designed by modular combination of well-characterized protein motifs and domains. Upon precise controls over the self-assembly processes, the protein building blocks self-assembled into desired nanoscale suprastructures. The interactions between protein modules and their arrangement within the designed fusion proteins dictated morphologies of the resulting suprastructures, which range from nanotriangles to hollow cages. Future work will be focused on development of next-generation protein nanomaterials with controlled nano-topological, biocatalytic, or optical properties for advanced biotechnology applications.

Thursday Oct. 4th, 2018
11:00 – 11:50AM
368 Ritchie Hall