Directed Evolution of Tandem Repeat Fibrous Proteins

ABSTRACT
Many globular and fibrous proteins have repetitions in their sequences or structures. However, a clear relationship between these repeats and their contribution to the physical properties in materials remains elusive. Exquisite knowledge of structure-property relationships in proteins will allow the design of materials with programmable properties that have novel functionalities. The scientific progress in this field is growing rapidly as we understand the effects of long-range order (i.e., the frequency and form of repetition) on macromolecular complexity. Here, we summarize recent studies on a specific class of tandem repeat proteins inspired by squid ring teeth as a model material system by combining expertise in nanoscale materials science, molecular biology, and protein physics.

BIOGRAPHY
Professor Demirel, Lloyd and Dorothy Foehr Huck Endowed Chair in Biomimetic Materials, is a scientist and innovator with expertise in biotechnology, nanotechnology and materials science. His research focuses on recent advances in biotechnology and materials science for biosynthesis of environmentally sustainable materials (biodegradable, self-healing, self-repairing) that are excellent alternative to plastics. He is the director of CRAFT Center (with 23 faculty, http://www.mri.psu.edu/craft/) at Penn State. He frequently publishes articles in high impact publications (Nature Materials, Nature Nanotechnology, PNAS, Nature Biotechnology, Physical Review Letters). He received numerous national and international awards as well as educated over 50+ students as a faculty member at Penn State.