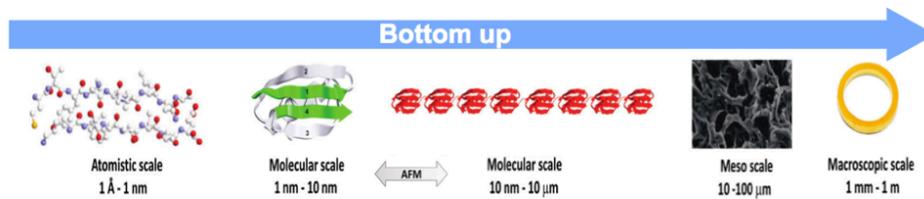


Mechanical Engineering of Protein-based Biomaterials: from single molecule features to macroscopic traits

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Elastomeric proteins function as molecular springs in their biological settings to establish elastic connections, and provide mechanical strength, elasticity and extensibility. To fulfill their biological functions, elastomeric proteins have evolved to assume different structures, from simple random coil-like structure to more sophisticated beads-on-a-string conformation, and exhibit distinct mechanical properties. The development of single molecule force spectroscopy techniques has made it possible to directly probe the mechanical properties of such elastomeric proteins at the single molecule level and allowed to understand molecular design principles of these complex protein polymers. This knowledge has enabled us to engineer novel elastomeric proteins to achieve tailored and well-defined nanomechanical properties. Going a step further, we have started to employ these novel elastomeric proteins as building blocks to construct protein-based biomaterials, which in turn provide an ideal system to understand how single molecule nanomechanical features are translated into biomechanical properties of macroscopic materials. These studies will pave the way to utilizing proteins as building blocks to engineer new generations of protein-based biomaterials for diverse applications in biomedical engineering as well as material sciences.



**Tailoring Biomaterials' Mechanical Properties Via
Programming Single Molecule Building Blocks**

CV

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Research interests:

Single molecule force spectroscopy; protein engineering; protein-based biomaterials; protein folding; polymer physics and chemistry

Biographic description:

Dr. Hongbin Li is currently a Professor at the Department of Chemistry, The University of British Columbia, Canada. He held the position of Canada Research Chair in Molecular Nanoscience and Protein Engineering from 2004-2014. Prior to joining UBC, he worked as an Associate Research Scientist in Columbia (2002-2004) and a postdoctoral research fellow in Department of Biophysics and Physiology, Mayo Medical Center (1999-2002). He obtained his Ph.D. degree in polymer chemistry and physics at the Jilin University in 1998 and B.S. degree at Tianjin University in 1993. His awards include Charles McDowell Award in Research, NSERC Accelerator Award, Career Investigator Award from Michael Smith Foundation, JILA Distinguished Fellowship and Changjiang Scholar.