**Harnessing Surface Force and Surface Plasmon for Nanobioanalytics**

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**Abstract:**  Cell is the basic unit of life. In the case of unicellular bacteria, we are having a difficult time dealing with them because of antibiotic resistance, not to mention the threats from bioterrorism. A deep understanding of bacterial virulence and antimicrobial mechanism is of paramount importance to tackle these problems. In the case of multicellular human, cancer cells can spread throughout the body and threaten the life. One of the challenges in cancer treatment lies in diagnosis of cancer at its early stage. In this seminar, I will introduce two nanobiotechnologies. The first technique, namely “force mapping”, allows to visualize biomolecular distribution on single bacterial surface down to the unprecedented resolution *via* surface force signal, thereby providing nanoscale understandings to bacterial virulence and antimicrobial mechanism. The second technique, plasmonic biosensor based on localized surface plasmon resonance of gold nanoparticles, enables to detect trace amounts of molecular biomarkers secreted from cancer cells for early diagnosis of cancer. I would like to share my story about developing a novel material, metal-organic framework, to stabilize biosensors in harsh environments such as elevated temperatures. Finally, I will discuss about the broad applications of this material for stabilization of biospecimens and protein therapeutics, thus extending the biomedical research beneﬁts to resource-limited settings and under-served populations/regions.

**Biography:**

**Dr. Congzhou** Wang is an assistant professor in Nanoscience and Nanoengineering Program at SDSM&T since 2018.  Before joining SDSM&T, he was a postdoctoral research associate with Dr. Srikanth Singamaneni in the Department of Mechanical Engineering and Materials Science at Washington University in Saint Louis, focusing on plasmonic biosensor for protein sensing and metal-organic framework for protein stabilization (2016-2018). He received his doctoral degree (Chemical and Life Science Engineering) under the guidance of Dr. Vamsi Yadavalli at Virginia Commonwealth University, where he developed atomic force microscopy-based force mapping to spatially recognize biomolecules on single cell surfaces (2012-2015).

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