



### **Topic of the Speech:**

Enhancing CO<sub>2</sub> Capture and Utilization: A Dual-Function Approach Using Silk Fibroin Hydrogels and Carbon Absorbents

### **Professor Xiaoqin Wang**

Soochow University  
China



**Professor Xiaoqin Wang** obtained his Bachelor's degree in the Microbiology Department of Shandong University, China, in 1991. After graduation, he joined Harbin Medical Group as a R&D engineer until 1995 when he continued his education for his Master's degree in Peking Union Medical College, China, on molecular biology and gene engineering. He went to the University of Groningen, the Netherlands, in 1998 joining Prof. George Robillard's group to start his PhD study on biochemistry and protein science. After his graduation in 2004, he worked shortly in a biotech company in the Netherlands, and then went to the United States to join Prof. David Kaplan's group at Tufts University for his postdoc training on biomedical engineering using biodegradable materials, mainly silk fibroin protein purified from silkworm cocoons. During this period, Prof. Wang's primary research mission was to understand how cells, ranging from mammalian cells to prokaryotic cells, interact with biomaterial scaffolds, and how the material processing and functionalization may impact on the structure, mechanical properties, biocompatibility and degradation of the scaffolds. Another research area that Prof. Wang focused on was the controlled release and stabilization of bioactive molecules ranging from small molecules to macromolecules from biomaterial carriers, such as nano- and microparticles, hydrogels, etc. Prof. Wang was appointed as a research assistant professor of Tufts University in 2011. In 2012, Dr. Wang was appointed as a distinguished professor at Soochow University, China and established a Soochow-Tufts joint lab to promote collaborative research between Soochow and Tufts University on silk biomaterials.

So far, Prof. Wang has published over 60 peer-reviewed articles and more than 30 US and Chinese patents, most of which are on silk biomaterials for tissue engineering and drug delivery, and has served as a reviewer for the top scientific journals and the key speakers for several international conferences.

In addition to his academic achievements, Prof. Wang is also actively engaged in the commercialization of research results. In 2009, during his postdoc training at Tufts University, he co-founded a biotech company, Ekteino Laboratory, together with Prof David Kaplan and served as a consultant for the product development. In 2013, he co-founded another Tufts spin-off company, Cocoon Biotech Inc., and served as the vice president of R&D until 2016. Prof. Wang is also the founder and president of Simatech Inc., a startup company located in Suzhou, with a focus on silk-based biomedical applications.

## ABSTRACT SUBMISSION

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### **Enhancing CO<sub>2</sub> Capture and Utilization: A Dual-Function Approach Using Silk Fibroin Hydrogels and Carbon Absorbents**

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#### **ABSTRACT (NO MORE THAN 500 WORDS:)**

Global efforts to mitigate climate change are increasingly focusing on innovative carbon dioxide (CO<sub>2</sub>) capture and utilization strategies. This presentation discusses a novel dual-function approach integrating silk fibroin hydrogels embedded with microalgae and carbon absorbent materials for efficient CO<sub>2</sub> capture and subsequent utilization. The studies highlighted involve the development of silk fibroin-based materials that not only demonstrate enhanced CO<sub>2</sub> adsorption capacity but also support sustained photosynthesis and oxygen generation by embedded microalgae, offering a biologically enhanced solution to air purification. This method capitalizes on the natural properties of microalgae and the engineering of silk fibroin to create a system that can effectively reduce atmospheric CO<sub>2</sub> levels while producing valuable biomass, showcasing a significant advancement in environmental technology.