

The Hong Kong University of Science & Technology  
Division of Life Science  
Department of Chemical & Biomolecular Engineering

PRESENTATION FOR  
DESIGN THINKING AND ENTREPRENEURSHIP

**Dr Sunny Tam**

Research Associate Professor, Clark University and  
Director of Professional Science Master's in Biotechnology, Framingham State University

**The Impact of STEM Education on the U.S. Biotech Entrepreneurship:  
Advancing from STEM to STREAM**

**Abstract**

The successful development of the biotech industry in the USA has largely been driven by many innovative entrepreneur startup companies. The innovation is a reflection of a world class educational system, scientific research and commercial collaborations. As education has been focusing on Science, Technology, Engineering & Mathematics (STEM) to foster biotech innovation and entrepreneurship, additional concepts of Aalytics and Regulatory (thus becoming STREAM) in education have been applied to further accelerate this high growth industry. A comparison and contrast of the STEM driven bio-entrepreneurship economy between Boston and Hong Kong will be presented with some historical, cultural, scientific and commercial perspectives. As “Analytics” are introduced into the STEM focus, thus generating STEAM; many novel biotech startups in the USA have been able to contribute into this biopharmaceutical arena and the health care industry. Examples of research in biomarker discovery, digital pathology and big data analyses will be provided to demonstrate the importance of adding Analytics to STEM education. Furthermore, critical “Regulatory” practices must be introduced into the biotech product development to sustain its credibility and usefulness; thus creating the new field of STREAM. An early regulatory development strategy is particularly important for young entrepreneur companies in medical devices, engineering platforms or sophisticated mass spectrometry clinical assays. A summary through a post-graduate program incorporating the cross disciplinary demands of the STEM, STEAM and STREAM education will be presented to highlight their importance in future biotech product development.

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**Biography**

Sunny Tam, PhD has 25 years of biotechnology and academic experiences in early stage R&D, preclinical testing, assay and technology development following his training from the Boston University School of Medicine and Harvard University School of Public Health. He has held numerous scientific and management positions in small molecule discovery and protein therapeutic companies including Mitotix, Inc., Texas Biotechnology Corporation, Tanox Inc. and Charles River Laboratories. He is a pioneer in protein microarray development and application of proteomic tools in drug discovery, biomarker discovery and assay development. He has helped to establish a number of biotech startup companies in the US and Canada. He is well published and has contributed significantly toward a number of issued patents and federally awarded grants. He has completed a number of projects for major US biopharmaceutical and government sponsors in new protein technology development, further advancing biomarker discovery and product applications in a number of chronic human diseases. During his tenure as the Program Director and Research Associate Professor at the University of Massachusetts Medical School, Dr Tam has successfully established instructional programs in the training of Postdoctoral fellows, PhD/MD & PhD students, and local undergraduate student interns. While serving as the Vice President of R&D at Nuclea Bio and research faculty member at Clark University, he again has created a state of art GLP Proteomics and Metabolomics laboratory in the training of graduate and undergraduate students. More recently, Dr Tam is leading a graduate Biotechnology department at Framingham State University in the recruiting of faculty members and training of students in the technical & managerial roles of the fast expanding biopharmaceutical industry.