CURRICULUM VITAE of Prof. TANG LEIHAN (lhtang@hkbu.edu.hk)

Name: Tang Leihan

Academic qualifications:

1978.3-1981.7	B. Sc.	Univ. of Science and Tech. of China
1981.9-1983.1	M. Sc.	Carnegie Mellon University
1983.2-1987.7	Ph.D.	Carnegie Mellon University

Previous academic positions held:

1996.1-1997.1	Lecture	Imperial College
1997.1-2005.6	Associate Professor	Hong Kong Baptist University

Present academic position:

2007.5-	Professor	Hong Kong Baptist University

Previous relevant research work:

Living systems offer endless examples of spatio-temporal patterns ranging from glycolytic oscillations in starved yeast cells to morphogenesis in animal and plant development. Supporting this diverse spectrum of form and behavior is an intricate web of molecules and molecular reactions driven by energy. Using methods of nonequilibrium statistical physics, we i) construct and analyze minimal but quantitative models to trace key players and their interactions for a given phenomenon; ii) investigate molecular processes in specific organisms to make contact with the underlying physical and biochemical reality; iii) develop methodologies and tools for systematic analysis of feedback and regulation in a network setting to dissect biological complexity in connection with functional optimization. Close integration of the statistical mechanical, biophysical, and systems research will contribute to the revelation of the most-tightly kept secrets behind successful life strategies. Specific on-going projects include,

<u>Metabolic regulation of micro-organisms</u>

The biochemical processes underlying growth of the model bacterium Escherichia coli have been carefully studied experimentally for more than half a century, with vast knowledge collected on the properties of enzymes and pathways that make up its metabolic system. Yet there is limited understanding on how the cell orchestrates this metabolic repertoire to achieve fast growth. Our research aims at developing systematic computational methodologies to i) identify the regulatory interactions at work from genome-scale metabolic profiling data that are becoming routinely available in recent years; ii) examine the performance of regulatory schemes that incorporate the observed interactions through model studies; iii) assist experimental investigations where bacteria growth is an important component in the system dynamics.

<u>Bacteria-based tumor therapy</u>

Can engineered bacteria be equipped with magic tools to kill cancer cells? This question is addressed in the collaborative research project (CRF) by the HKU (PI: Dr. Jian-Dong Huang) and HKBU teams. On the computational side, we have developed continuum models to profile cell

densities and evaluate the effectiveness of individual and combined strategies of the therapy.

Noise propagation in biochemical networks

How can genetically identical cells exhibit a broad range of phenotypes and responses? The search for answers to this question prompted active experimental and theoretical investigation of noise in molecular networks in recent years. We study the auto-correlation of birth events in a biochemical network. The method gives a much more precise notion of noise generation and propagation in molecular conversion pathways as well as regulatory cascades, and can also be used to treat non-Markovian processes with arbitrary waiting-time distributions.

Recent Paper

1. H. Zhi, **L.-H. Tang**, Y. Xia and J. Zhang, "Ssk1p-independent activation of Ssk2p plays an important role in the osmotic stress response in *Saccharomyces cerevisiae*: alternative activation of Ssk2p in osmotic stress", ***PLoS One*** *8,* e54867 (2013).
2. B. Yu, M. Yang, L. Shi, Y. Yao, Q. Jiang, X. Li, **L.-H. Tang**, B. J. Zheng, K. Y. Yuen, D. K. Smith, E. Song, J. D. Huang, "Explicit hypoxia targeting with tumor suppression by creating an "obligate" anaerobic Salmonella Typhimurium strain", ***Scientific Reports*** *2*, 436 (2012).
3. X. Fu, **L.-H. Tang**, C. Liu, J.-D. Huang, T. Hwa, P. Lenz, "Stripe formation in bacterial systems with density-suppressed motility", ***Phys. Rev. Lett.*** 108, 198102 (2012).
4. C. Liu, X. Fu, L. Liu, X. Ren, C.K.L. Chau, S. Li, L. Xiang, H. Zeng, G. Chen, **L.-H. Tang**, P. Lenz, X. Cui, W. Huang, T. Hwa, J.-D. Huang, "Sequential establishment of stripe patterns in an expanding cell population", ***Science*** *334*, 238 (2011).
5. L.-P. Xiong, Y.Q. Ma, and **L.-H. Tang**. "Attenuation of transcriptional bursting in mRNA transport". ***Phys. Biol.*** 7, 016005 (2010).
6. H. Hong, H. Chaté, H. Park, and **L.-H. Tang**, "Entrainment transition in populations of random frequency oscillators," ***Phys. Rev. Lett.*** 99, 184101 (2007).
7. Sheng Hui and **Lei-Han Tang**, "Ground state and the glass transition of the RNA secondary structure," ***Euro. Phys. J. B*** 53, 77 (2006).
8. **L.-H. Tang** and P.-Q. Tong, "Zero-temperature criticality of the two-dimensional gauge-glass model," ***Phys. Rev. Lett.*** 94, 207204 (2005).
9. A. Mishra, M. Ma, F.-C. Zhang, S. Gürtler, **L.-H. Tang**, and S. Wan, "Directional Ordering of Fluctuations in a Two-dimensional Compass Model," ***Phys. Rev. Lett.*** 93, 207201 (2004).
10. T. Hwa, E. Marinari, K. Sneppen, and **L.-H. Tang**, "Localization of denaturation bubbles in random DNA sequences," Proc. National Academy of Sciences, ***USA.*** 100, 4411-4416 (2003).

Awards and Recognitions：

1. Fellow, American Physical Society, 2010
2. Recipient of the NSFC overseas young scientist collaboration award (HK/Macau), 2006
3. HKBU Presidential award for outstanding performance in scholarly work, 2003