



# 华侨大学系统科学研究所

Institute of Systems Science, Huaqiao University

## Seminar

### Recent developments in biological evolution (生物演化的最近發展)

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#### Abstract:

In this talk, I give a brief review about some recent developments in biological evolution [1-3]. We proposed a shock wave model for punctuated equilibrium of biological evolution [1]. We proposed a modification of the Crow-Kimura and Eigen models of biological molecular evolution to include a mutator gene that causes both an increase in the mutation rate and a change in the fitness landscape. This mutator effect relates to a wide range of biomedical problems. There are three possible phases: mutator phase, mixed phase and non-selective phase. We calculate the phase structure, the mean fitness and the fraction of the mutator allele in the population, which can be applied to describe cancer development [2]. We proposed an accurate analytic solution of chemical master equations for gene regulation networks in a single cell, which can show unimodal to bimodal transition, then to unimodal behavior observed in experiments [3].

[1] D. B. Saakian, M. Ghazaryan, and C.-K. Hu, , Phys. Rev. E 90, 022712 (2014).

[2] David B. Saakian , Tatiana Yakushkina and Chin-Kun Hu, Scientific Reports 6, 34840 (2016).

[3] Guan-Rong Huang, David B. Saakian and Chin-Kun Hu, Phys. Rev.E 97, 012412 (2018).

**时间:** 2:30-3:30 pm, Apr. 24, 2018

**地点:** Room B430, Mechatronics Building  
(机电信息实验大楼B430会议室)