

1153-62-526

Xinping Cui* (xinping.cui@ucr.edu), Department of Statistics, University of California, Riverside, Riverside, CA 92521, and **Chenwei Tian, Nicolas Brunel, Jinzhe Guo** and **Zhenbiao Yang**. *Parameter Estimation Procedure of Reaction Diffusion Equation with Application on Cell Polarity Growth*. Preliminary report.

Cell polarity is a fundamental feature of almost all cells. An excellent example for studying cell polarity is pollen tube tip growth, which is a specialized form of cell growth. The key of pollen tube tip growth is polarized distribution on plasma membrane of a particle named ROP1 and Ca²⁺. The oscillated distribution is the result of a feedback loop between ROP1 and Ca²⁺. In this talk, I will present a multidisciplinary approach by combining knowledge of cell biology, mathematics, and statistics in order to quantitatively study the full system for the interaction between ROP1 and Ca²⁺ in pollen tube tip growth. Specifically, we propose a mechanistic reaction-diffusion equation derived model of cell polarity, and analytically study the spatiotemporal dynamic of proposed model. We then introduce parameter estimation procedure of linear reaction-diffusion equation and consistency and asymptotic normality of proposed method will be discussed supported by simulation studies. Application of applying proposed method on the pollen tube tip growth model to predict ROP1 and Ca²⁺ concentration on plasma membrane will be demonstrated. (Received September 04, 2019)