Ying Tang

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Research Interest

I studied statistical physics, stochastic process and machine learning. The recent research focused on the nonequilibrium thermodynamics and quantitative modeling of immune systems at different scales. Combining analytical and machine learning approaches, my ultimate goal is to uncover simple theoretical principles that could help understand complex nonequilibrium dynamical process.

Professional Appointment

Postdoctoral researcher **07/2018–**
Signaling Systems Laboratory in University of California, Los Angeles, USA.
Advisor: Alexander Hoffmann.
Collaboratory fellow 07/2019–

Education

Shanghai Jiao Tong University, Shanghai, China. **09/2013–06/2018**
Ph.D. in Department of Physics and Astronomy.
Advisor: Ping Ao.
Thesis: "Extended free energy equality and potential function in high dimension for nonequilibrium stochastic dynamics"

University of California, San Diego, USA. **07/2016–03/2018**
Exchange graduate student in Department of Physics.
Advisor: Terence Hwa.

Shanghai Jiao Tong University, Shanghai, China. **09/2009–06/2013**
B.S. in Applied Mathematics, Zhiyuan College.
Advisor: Ping Ao.
Thesis: "Path Integral Approach to Stochastic Process: Starting From Ornstein-Uhlenbeck Process"

Publications

Preprint articles

- **Y. Tang**. Amplification of free energy change by magnetic flux for driven quantum systems. *In revision at Commun. Phys.*
- M. O. Metzig, **Y. Tang**, S. Mitchell, B. Taylor, R. Foreman, R. Wollman, A. Hoffmann. An incoherent feedforward loop interprets NFκB/RelA dynamics to determine TNF-induced necroptosis decisions. *In revision at Mol. Sys. Biol.*
- **Y. Tang**, A. Adelaja, X. Ye, E. Deeds, R. Wollman, A. Hoffmann. Quantifying information accumulation encoded in the dynamics of biochemical signaling. *Submitted.*
- Y. Lin, Y. C. Liu, **Y. Tang**, A. Mehta, J. K. King, M. Paing, D. Rao, A. Hoffmann. NFκB/RelA dynamics control developmental pacing in early B lymphopoiesis. *Submitted.*
- P. M. Loriaux*, **Y. Tang***, A. Hoffmann. As potential biomarkers, Kinetic network features may be more predictive than commonly used molecular abundances. *In submission.*
- Y. C. Liu, **Y. Tang**, Y. Lin, K. Roy, D. Rao, S. Sen, A. Hoffmann. NFκB system regulates Flt3-mediated hematopoiesis. *In submission.*

Peer-reviewed journal articles

- J. Cremer*, T. Honda*, **Y. Tang**, J. Wong, M. Vergassola, T. Hwa. Chemotaxis as a navigation strategy to boost range expansion. *Nature* 575 (7784), 658-663 (2019).

- **Y. Tang**, S. Xu, and P. Ao. Escape rate for nonequilibrium processes dominated by strong non-detailed balance forces. *J. Chem. Phys.* 148 (6), 064102 (2018).
- **Y. Tang**, R. Yuan, G. Wang, X. Zhu, and P. Ao. Potential landscape and stochastic transitions of high dimensional nonlinear dynamics under large noise. *Sci. Rep.*, 7 (1), 15762 (2017).
- Y. Yao, **Y. Tang** and P. Ao. Generating transverse responses explicitly from harmonic oscillators. *Phys. Rev. B* 96 (13), 134414 (2017).
- X. Qiu, Q. Mao, **Y. Tang**, L. Wang, R. Chawla, H. Pliner, C. Trapnell. Reversed graph embedding resolves complex single-cell developmental trajectories. *Nat. Methods*, 10.1038 (2017).
- **Y. Tang**, R. Yuan, and P. Ao. Anomalous free energy changes induced by topology. *Phys. Rev. E*, 92, 062129 (2015).
- **Y. Tang**, R. Yuan, and P. Ao. Work relations connecting nonequilibrium steady states without detailed balance. *Phys. Rev. E*, 91, 042108 (2015).
- **Y. Tang**, R. Yuan, J. Chen, and P. Ao. Control symmetry-breaking state by a hidden quantity in multiplicative noise. *Phys. Rev. E*, 90, 052121 (2014).
- **Y. Tang**, R. Yuan, and P. Ao. Summing over trajectories of stochastic dynamics with multiplicative noise. *J. Chem. Phys.* 141, 044125 (2014).
- **Y. Tang**, R. Yuan, and P. Ao. Nonequilibrium work relation beyond the Boltzmann-Gibbs distribution. *Phys. Rev. E*, 89, 062112 (2014).
- **Y. Tang**, R. Yuan, and Y. Ma. Dynamical behaviors determined by the Lyapunov function in competitive Lotka-Volterra systems. *Phys. Rev. E*, 87, 012708 (2013).

Grants and Awards

- Collaboratory fellowship ($25000/yr) at UCLA (07/2019-).
- Tang Lixin scholarship at Shanghai Jiao Tong University (10/2015).
- Outstanding student in Zhiyuan college (06/2013).
- Excellent undergraduate student of Shanghai (06/2013).

Presentations

- Annual Symposium on Mulitscale Cell Fate, Irvine, USA, 10/2018. (Poster)
- Molecular Mechanisms in Evolution, Gordon Research Conference, Easton, USA, 06/2017. (Poster)
- Stochastic Physics in Biology, Gordon Research Conference, Ventura, USA, 01/2017. (Poster)
- The Lindau Nobel Laureate Meetings in Physics, Lindau, Germany, 06-07/2017. (Young Scientist)
- APS March Meeting, Baltimore, USA, 03/2016. (Contributed talk)
- APS March Meeting, San Antonio, USA, 03/2015. (Contributed talk)
- Systems Biology: design principles, dynamic regulation and disease, Beijing, China, 08/2015. (Poster)
- 8th IUPAP International Conference on Biological Physics, Beijing, China, 06/2014. (Poster)

Research Experiences

- Visiting scholar, The University of Tokyo, Tokyo, Japan, 07-09/2013.

Teaching Experiences

- Instructor for Collaboratory Matlab course, The University of California, Los Angeles, USA., 07/2019-.

Professional Services

- Reviewer for *PNAS* (07/2020 with Alexander Hoffmann), *Phys. Rev. Lett.* (02/2020, 04/2019), *Phys. Rev. E* (12/2019, 09/2014), *J Bifurcat. Chaos* (02/2014), and *Physica A* (04/2014, 08/2013).

References

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