Shanshan Qin, Ph.D.

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RESEARCH AND ACADEMIC POSITIONS

Harvard University — Cambridge, MA
Postdoctoral Fellow — starting 08/2019
Research area: Theoretic and computational neuroscience
Advisor: Prof. Cengiz Pehlevan

Peking University Center for Quantitative Biology — Beijing, China
Graduate research assistant, Chao Tang Lab
- Information processing in the olfactory systems — 11/2015 - 07/2019
- Early-warning signals of critical transitions — 12/2013 - 11/2017

UC Berkeley Department of Molecular and Cell Biology — Berkeley, CA
Graduate visiting scholar, Hernan Garcia Lab — 06/2016 - 09/2016
Designed and performed experimental study on the temperature-dependent speed of embryogenesis in *Drosophila Melanogaster.*

Central China Normal University Department of Physics — Wuhan, China
Undergraduate research assistant, Jinping Liu Lab — 10/2009 - 06/2011
Successfully prepared the hematite nanorods array, and studied its electrochemical properties as an anode material and reversible lithium storage.

EDUCATION

Peking University — Beijing, China
Ph.D., Theoretical and Systems Biology — 09/2012 - 07/2019
Dissertation: Theoretic study on odor coding in peripheral olfactory systems
Advisor: Prof. Chao Tang

Central China Normal University — Wuhan, China
B.S., Physics — 09/2008 - 06/2012
Advisor: Prof. Jinping Liu

PREPRINTS

1. **S. Qin**, S. Farashahi, D. Lipshutz, A. M. Sengupta, D. B. Chklovskii, and C. Pehlevan. "Coordinated drift of receptive fields during noisy representation learning". *bioRxiv* (2021). doi: 10.1101/2021.08.30.458264.

PUBLICATIONS

1. Y. Yuan, H. Ren, Y. Li, **S. Qin**, X. Yang, and C. Tang. "Cell-to-cell variability in inducible Caspase9-mediated cell death". *Cell Death & Disease* **13**, 1 (2022)
2. P Masset*, **S. Qin***, J. Zavatone-Veth*. "Drifting Neuronal Representations: Bug or Feature?", *Biological Cybernetics*, 2022, * *Equal contribution*
3. Y. Liu, Q. Li, C. Tang, **S. Qin***, and Y. Tu*. "Short-Term Plasticity Regulates Both Divisive Normalization and Adaptive Responses in Drosophila Olfactory System". *Frontiers in Computational Neuroscience* **15**, 2021. (* Corresponding authors)
4. **S. Qin**, N. Mudur, C. Pehlevan,"Supervised Deep Similarity Matching", *Neural Computation* **33**(5), 1300(2021)
5. K. Vogt, D. Zimmerman, M. Schlichting, L. A. H. Nunez, **S. Qin**, K. Malacon, M. Rosbash, C. Pehlevan, A. Cardona, A. D. T. Samuel, "Internal state configures olfactory behavior and early sensory processing in Drosophila larva", *Science advances* **7**(1), eabd6900.
6. **S. Qin**, Q. Li, C. Tang and Y. Tu, article: "Optimal compressed sensing strategies for an array of nonlinear olfactory receptor neurons with and without spontaneous activity", *Proc. Natl. Acad. Sci. U.S.A.*, **116**, 20286(2019).

7. **S. Qin** and C. Tang, "Early-warning signals of critical transition: Effect of extrinsic noise", *Physical Review E*, **97**, 032406(2018).
8. Z. Gao, H. Sun, **S. Qin**, X. Yang and C. Tang, "A systematic study of the determinants of protein abundance memory in cell lineage", *Science Bulletin*, **63**, 1051(2018).
9. Z. Gao, S. Chen, **S. Qin** and C. Tang, "Network Motifs Capable of Decoding Transcription Factor Dynamics", *Scientific Reports*, **8**, 3594(2018).
10. L. Cao, D. Yang, W. Wu, X. Zeng, B. Jing, M. Li, **S. Qin**, C. Tang, Y. Tu, D. Luo, Odor-evoked inhibition of olfactory sensory neurons drives olfactory perception in Drosophila,*Nature Communications*, **8**, 1357(2017).
11. Y. Song, **S. Qin**, Y. Zhang, W. Gao, and J. Liu, "Large-Scale Porous Hematite Nanorod Arrays: Direct Growth on Titanium Foil and Reversible Lithium Storage", *the Journal of Physical Chemistry C*, **114**, 21158(2010).

TEACHING AND ADVISING EXPERIENCE

- Teaching assistant of "Introduction to applied mathematics" (AM50), Harvard University, spring 2022.
- Teaching assistant of "Neural Computation" (AM226), Harvard University, fall 2020.
- Teaching assistant of "Critical reading of systems biology" , Peking University, spring 2014.
- Honors thesis advisor of an undergraduate student of Tsinghua University, spring 2015.
- Advised six rotational graduates at Peking University, 2013 - 2017.
- Instructor for undergraduate research training program of Peking University, 2013 - 2019.

SELECTED AWARDS AND HONORS

- *Distinguished teaching assistant*, Harvard University, 2020
- *Quantitative Biology Research* scholarship, Peking University, 2019.
- Huirong Li scholarship, Peking University, 2017.
- *Quantitative Biology Research* scholarship, Peking University, 2014.
- Pacemaker to merit student, Central China Normal University, 2012.
- Second-class prize of *Challenge Cup* national undergraduate curricular academic science and technology works by race, 2011.
- National scholarship, Central China Normal University, 2011.
- National Encouragement scholarship, Central China Normal University, 2010.

TALKS AND SEMINARS

2022 Mar, APS March Meeting, *Unveiling the dynamics and structure of drifting neural representationsg.*

2021 Oct, Gordon Research Conference on stochastic physics in biology, *Dynamics of Drifting Receptive Fields During Noisy Representation Learning.*

2021 Oct, Rutgers Center for Quantitative Biology Seminar, Unveiling the dynamics and structure of drifting neural representations.

2020 Oct, The online Neuromatch unconference 2.0, *Dynamics of drifting receptive fields during noisy representation learning*

2020 Mar, The online Neuromatch unconference 1.0, *Biologically plausible supervised learning*

2019 Dec, Sensing Chemical Spaces, Princeton, Princeton University, *Optimal compressed sensing strategies for an array of nonlinear olfactory receptor neurons*

2019 Mar, American Physical Society March Meeting, Boston, *Nonlinear compressed sensing in olfactory systems*

2018 Nov, Postdoctoral fellow interview symposium of the Center for the Physics of Biological Functions, Princeton University,*Statistical properties of the optimal sensitivity matrix for compressed sensing with nonlinear sensors*

2018 July, Quantitative Biology: Neuroscience and Artificial Intelligence – Where Do We Meet, Beijing, *An information-theoretic model for odor coding*

ACADEMIC SERVICE

Co-organizer of "Harvard olfaction journal club", December 2019 to present, Cambridge, MA.

Co-organizer of "Brain Storm" of Center for Quantitative Biology together with professor Ping Wei, January 2018, Beijing, China.

Co-organizer, The first Young Scholars Frontier Symposium on Quantitative Biology Development, May 2015, Beijing, China.

Co-organizer, 2014 Center for Quantitative Biology Annual Symposium, July 2014, Beijing, China.