Fangming Xie

Ph.D. student in Physics
Computational Neural DNA Dynamics Lab (Mukamel Lab)
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Education

2016 - Ph.D. in Physics
University of California, San Diego, CA

2012 - 2016 B.S. in Physics
University of Science and Technology of China, Hefei, China

Research Experience

2017 - **Ph.D. research in neuroscience and epigenetics**
Physics department, University of California, San Diego, CA
Thesis: Integrative analysis of brain cell type transcriptomes and epigenomes.
Advisor: Eran A. Mukamel

2014 - 2016 **Research assistant in condensed matter physics and materials science**
Hefei National Laboratory for Physical Sciences at the Microscale, University of Science and Technology of China, Hefei, China
First principles numerical analysis of two-dimensional van der Waals materials.
Advisors: Wenguang Zhu, Jie Zeng

2015 **Research assistant in biophysics**
Physics department, University of California, Los Angeles, CA
Computational modeling of melting transition in viral capsid assembly.
Advisors: William S. Klug, Robijn F. Bruinsma

2014 **Research assistant in condensed matter physics**
Physics department, University of Michigan, Ann Arbor, MI
Computational modeling of opto-mechanical properties of a photonic crystal membrane.
Advisor: Hui Deng

Teaching Experience

2020 Tutor, “AP Calculus”, San Diego Tutor Tree (remote tutoring during COVID)

2019 Instructor, the Young Scientist Club (preschool outreach)

2016 - 2019 Teaching assistant, “Modeling & Data Analysis”, “Neural Signal Processing”, “General Physics (Mechanics)”, “Physics Lab (Mechanics)” “Physics Lab (Wave, Optical, and Modern Physics)”, University of California, San Diego

Professional Associations

2017 - 2019 Member, *Society for Neuroscience*

2018 - Member, *BRAIN Initiative Cell Census Network*

Publications

(*These authors contributed equally to this work.)

Research papers

Yao*, Z., Liu*, H., **Xie*, F.**, Fischer*, S., Adkins, R. S., Aldridge, A. I., Ament, S. A., Bartlett, A., Behrens, M. M., Van den Berge, K., Bertagnolli, D., de Bézieux, H. R., Biancalani, T., Booeshaghi, A. S., Bravo, H. C., Casper, T., Colantuoni, C., Crabtree, J., Creasy, H., … Mukamel, E. A. (2021). A transcriptomic and epigenomic cell atlas of the mouse primary motor cortex. *Nature*, 598(7879), 103–110.

BRAIN Initiative Cell Census Network (BICCN). (2021). A multimodal cell census and atlas of the mammalian primary motor cortex. *Nature*, 598(7879), 86–102.
(A paper with >300 co-authors. My analysis results go into several main figures.)

Bakken, T. E., Jorstad, N. L., Hu, Q., Lake, B. B., Tian, W., Kalmbach, B. E., Crow, M., Hodge, R. D., Krienen, F. M., Sorensen, S. A., Eggermont, J., Yao, Z., Aevermann, B. D., Aldridge, A. I., Bartlett, A., Bertagnolli, D., Casper, T., Castanon, R. G., Crichton, K., …, **Xie, F.**, …, Lein, E. S. (2021). Comparative cellular analysis of motor cortex in human, marmoset and mouse. *Nature*, 598(7879), 111–119.

Fang, R., Preissl, S., Li, Y., Hou, X., Lucero, J., Wang, X., Motamedi, A., Shiau, A. K., Zhou, X., **Xie, F.**, Mukamel, E. A., Zhang, K., Zhang, Y., Behrens, M. M., Ecker, J. R., & Ren, B. (2021). Comprehensive analysis of single cell ATAC-seq data with SnapATAC. *Nature Communications*, 12(1), 1337.

Dharmavaram, S., **Xie, F.**, Klug, W., Rudnick, J., & Bruinsma, R. (2016). Landau theory and the emergence of chirality in viral capsids. *EPL*, 116(2), 26002.

Dharmavaram, S., **Xie, F.**, Klug, W., Rudnick, J., & Bruinsma, R. (2017). Orientational phase transitions and the assembly of viral capsids. *Physical Review. E*, 95(6-1), 062402.

Nan, F., **Xie, F.-M.**, Liang, S., Ma, L., Yang, D.-J., Liu, X.-L., Wang, J.-H., Cheng, Z.-Q., Yu, X.-F., Zhou, L., Wang, Q.-Q., & Zeng, J. (2016). Growth of metal-semiconductor core-multishell nanorods with optimized field confinement and nonlinear enhancement. *Nanoscale*, 8(23), 11969–11975.

Review papers

Armand*, E. J., Li*, J., **Xie*, F.**, Luo, C., & Mukamel, E. A. (2021). Single-Cell Sequencing of Brain Cell Transcriptomes and Epigenomes. *Neuron*, 109(1), 11–26.

Research preprints

Luo*, C., Liu*, H., **Xie*, F.**, Armand, E. J., Siletti, K., Bakken, T., Fang, R., Doyle, W. I., Hodge, R. D., Hu, L., Wang, B.-A., Zhang, Z., Preissl, S., Lee, D.-S., Zhou, J., Niu, S.-Y., Castanon, R., Bartlett, A., Rivkin, A., … Ecker, J. R. (2019). Single nucleus multi-omics links human cortical cell regulatory genome diversity to disease risk variants. In bioRxiv (p. 2019.12.11.873398). *Under review*

Manuscripts in preparation

Xie*, F., Armand*, E. A., … Mukamel, E. A. (2021). Robust enhancer-gene regulation identified by single-cell transcriptomes and epigenomes. *In preparation*

Software

SingleCellFusion: https://github.com/mukamel-lab/SingleCellFusion
A computational tool that integrates disparate single-cell transcriptome and epigenome datasets.
