

Fangming Xie

Ph.D. student in Physics

Computational Neural DNA Dynamics Lab (Mukamel Lab)

University of California San Diego

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Education

- 2016 - Ph.D. in Physics
 University of California San Diego
- 2012 - 2016 B.S. in Physics
 University of Science and Technology of China

Research Experience

- 2017 - **Ph.D. research in neuroscience and epigenetics**
 University of California San Diego
 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**
 University of Science and Technology of China
 First principles numerical analysis of two-dimensional van der Waals materials.
 Advisors: Wenguang Zhu, Jie Zeng
- 2015 **Research assistant in biophysics**
 University of California Los Angeles
 Computational modeling of melting transition in viral capsid assembly.
 Advisors: Sanjay Dharmavaram, William S. Klug, Robijn F. Bruinsma
- 2014 **Research assistant in condensed matter physics**
 University of Michigan Ann Arbor
 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, University of California San Diego
 "Modeling & Data Analysis", "Neural Signal Processing",
 "General Physics (Mechanics)", "Physics Lab (Mechanics)"
 "Physics Lab (Wave, Optical, and Modern Physics)"

Professional Associations

- 2018 - Member, *BRAIN Initiative Cell Census Network*
- 2017 - Member, *Society for Neuroscience*

Publications

First-author papers (co-first authors)

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., Boeshaghi, 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.

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.

Xie, F., Armand, E. J., Yao, Z., Liu, H., Bartlett, A., Margarita Behrens, M., Li, Y. E., Lucero, J. D., Luo, C., Nery, J. R., Pinto-Duarte, A., Poirion, O., Preissl, S., Rivkin, A. C., Tasic, B., Zeng, H., Ren, B., Ecker, J. R., & Mukamel, E. A. (2021). Robust enhancer-gene regulation identified by single-cell transcriptomes and epigenomes. *bioRxiv* (p. 2021.10.25.465795).

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. *bioRxiv* (p. 2019.12.11.873398).

Other papers

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. (2017). Orientational phase transitions and the assembly of viral capsids. *Physical Review. E*, 95(6-1), 062402.

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.

Nan, F., **Xie, F.**, 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.

Software

SingleCellFusion: <https://github.com/mukamel-lab/SingleCellFusion>

A computational tool that integrates disparate single-cell transcriptome and epigenome datasets.
