

Songpeng Zu, Ph.D.

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| EDUCATION | Department of Automation, Tsinghua University, Beijing, CHINA Ph.D. in bioinformatics School of Life Science, Tsinghua University, Beijing, CHINA B.Sc. in biological sciences | 2017.01 2011.07 |
| RESEARCH SUMMARY | <p>I received graduate and postdoctoral training in the areas of bioinformatics and epigenetics. I also had three-year experience on deep learning in the industry. My researches have contributed to:</p> <ul style="list-style-type: none">• Inference of both biological activities and clinical responses of drugs using statistical models and artificial intelligence (Zu et al., 2015; Ding et al., 2016; Ding et al., 2020) .• Developing statistical models for single-cell sequencing data analysis (Hu and Zu et al., 2020).• Identification of candidate <i>cis</i>-regulatory elements in the adult mouse brain by analyzing large-scale of single-cell epigenomic data(Zu et al., Nature 2023; Liu et al, Nature 2023). <p>My current interest is using artificial intelligence and sequencing technologies to study gene regulatory programs and drug development.</p> <ul style="list-style-type: none">• Constructing gene regulatory programs using multi-omics single-cell sequencing data.• Identifying essential <i>cis</i>-regulatory elements for neurological disorders with statistical tools.• Developing deep learning models on drug discovery. | |
| RESEARCH EXPERIENCES | <ul style="list-style-type: none">• Postdoctoral Fellow at UCSD Mentor: Dr. Bing Ren Large-scale single-cell sequencing data analysis to decipher gene-regulatory programs in the adult mouse brain.• Postdoctoral Fellow at Harvard University Mentor: Dr. Jun Liu Developing statistical models for analyzing single-cell sequencing data.• Graduate at Tsinghua University Mentor: M.D. Shao Li Applications of machine learning on compound-protein interactions• Visiting Scholar at Harvard University Mentor: Dr. Jun Liu Bayesian non-parametric algorithm for detecting <i>cis</i>-eQTLs.• Undergraduate at Tsinghua University Mentors: Dr. Yu Li and M.D. Shao Li Prediction and validation of the induced autophagy effect on HEK293 cells by a compound from traditional Chinese medicine. | 2021.08 - Now 2019.09 - 2021.07 2011.07 - 2017.01 2014.03 - 2014.09 2009.09 - 2011.07 |
| INDUSTRIAL EXPERIENCES | <ul style="list-style-type: none">• Senior research engineer on deep learning, Alibaba DAMO Academy, China• Researcher on recommendation system, HULU Beijing, China | 2018.12 - 2019.08 2017.01 - 2018.11 |
| SCIENTIFIC PUBLICATIONS | https://scholar.google.com/citations?user=_hNPV5IAAAAJ&hl=en . (#, co-first author) | |

1. **Songpeng Zu**#, Yang Eric Li#, Kangli Wang#, Ethan J. Armand, Sainath Mamde, Maria Luisa Amaral, Yuelai Wang, Andre Chu, Yang Xie, Michael Miller, Jie Xu, Zhaoning Wang, Kai Zhang, Bojing Jia, Xiaomeng Hou, Lin Lin, Qian Yang, Seoyeon Lee, Bin Li, Samantha Kuan, Hanqing Liu, Jingtian Zhou, Antonio Pinto-Duarte, Jacinta Lucero, Julia Osteen, Michael Nunn, Kimberly A. Smith, Bosiljka Tasic, Zizhen Yao, Hongkui Zeng, Zihan Wang, Jingbo Shang, M. Margarita Behrens, Joseph R. Ecker, Allen Wang, Sebastian Preissl, Bing Ren. Single-cell analysis of chromatin accessibility in the adult mouse brain. *Nature*, 2023, 624, 378-389.
2. Hanqing Liu, Qiurui Zeng, Jingtian Zhou, Anna Bartlett, Bang-An Wang, Peter Berube, Wei Tian, Mia Kenworthy, Jordan Altshul, Joseph R. Frey, Huaming Chen, Rosa G. Castanon, **Songpeng Zu**, Yang Eric Li, Jacinta Lucero, Julia K. Osteen, Antonio Pinto-Duarte, Jasper Lee, Jon Rink, Silvia Cho, Nora Emerson, Michael Nunn, Carolyn OConnor, Zhanghao Wu, Ion Stoica, Zizhen Yao, Kimberly A. Smith, Bosiljka Tasic, Chongyuan Luo, Jesse R. Dixon, Hongkui Zeng, Bing Ren, M. Margarita Behrens, Joseph R. Ecker. Single-cell DNA methylome and 3D multi-omic atlas of the adult mouse brain. *Nature*, 2023, 624, 366-377.
3. Zhirui Hu#, **Songpeng Zu**#, and Jun S. Liu, SIMPLEs: single-cell RNA sequencing imputation and cell clustering methods by modeling gene module variation. *NAR genomics and bioinformatics*, 2020, 2(4), lqaa077.
4. Qingyang Ding, Siyu Hou, **Songpeng Zu**, Yonghui Zhang, Shao Li, VISA: an interactive tool for dissecting chemical features learned by deep neural network QSAR models, *Bioinformatics*, 2020, 36(11), pp3610-3612.
5. Zijian Ding, **Songpeng Zu**, and Jin Gu, Evaluating the molecule-based prediction of clinical drug response in cancer. *Bioinformatics*, 2016, 32(19), 2891-2895.
6. **Songpeng Zu**, Ting Chen, and Shao Li, Global optimization-based inference of chemogenomic features from drug-target interactions. *Bioinformatics*, 2015, 31(15), 2523-2529.
7. Xiaoran Xu, **Songpeng Zu**, Chengliang Gao, Yuan Zhang, Wei Feng, Modeling attention flow on graphs, *NeurIPS 2018 Relational Representation Learning Workshop*.
8. Xiaoran Xu, **Songpeng Zu**, Yuan Zhang, Hanning Zhou, Wei Feng, Backprop-Q: Generalized back-propagation for stochastic computation graphs, *NeurIPS 2018 Deep Reinforcement Learning Workshop*.
9. Xiaoran Xu, Laming Chen, **Songpeng Zu**, Hanning Zhou, Hulu video recommendation: from relevance to reasoning, *Proceedings of the 12th ACM Conference on Recommender Systems*, 2018, p482-482.

ORAL PRE-
SENTATIONS

- **Cell Symposia**, The Conceptual Power of Single Cell Biology Aug. 29th - 30th, 2023
Comprehensive single-cell analysis of chromatin accessibility in the adult mouse brain
- **Neuroscience 2022** Nanosymposium of Epigenomic and Transcriptomic Cell Type Atlas of the Whole Mouse Brain, Nov. 11th - 16th, 2022
Comprehensive single-cell analysis of chromatin accessibility in the adult mouse brain
- **Harvard University Center of Mathematical Science and Applications Interdisciplinary science seminar** April 4th, 2022
A single-cell RNA sequencing imputation strategy preserving gene modules and cell clusters variation

GRANT
SUBMITTED

Harvard Data Science Initiative Postdoctoral Fellow Research Fund

USD 6,933 (Direct cost)

2020.03.01 - 2021.02.28

Title: Learning Peptide-specific T Cell Receptors in Human Cancers by Deep Neural Network and Structural Modeling.

Role: Principal Investigator

- TEACHING EXPERIENCE
- Guest speaker, Monte Carlo methods for statistical analysis, Harvard University, 2020
 - Teaching assistant, Probabilistic graphical models, Tsinghua University 2014
 - Teaching assistant, Introduction to Systems Biology, Tsinghua University 2013 and 2014
- SCIENTIFIC COMMUNITY SERVICES
- Reviewer for the academic journals:
- Annals of Applied Statistics
 - Briefings in Bioinformatics
 - BMC Bioinformatics
 - IEEE/ACM Transactions on Computational Biology and Bioinformatics
- AWARDS
- National Scholarship for Graduate Students, China, 2015
 - Tsinghua University Scholarship for Overseas Graduate Studies, 2014
 - Tsinghua University Excellent Undergraduate Counselor, 2013
 - Tsinghua University Zhongying Tang Scholarship, 2008-2010