

Hao Tian

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EDUCATION

- Southern Methodist University**, Dallas, TX Aug. 2019 – May 2023
- Ph.D. in Theoretical and Computational Chemistry, GPA: 3.9/4.0
 - Research topic: Understand protein allostery through molecular dynamics and artificial intelligence
- Georgia Institute of Technology**, Atlanta, GA Aug. 2020 – May 2023
- M.S. in Computer Science, GPA: 4.0/4.0
- Beijing University of Chemical Technology**, Beijing, China Aug. 2015 – Jun. 2019
- B.Eng. in Chemical Engineering, GPA: 3.49/4.33

SKILLS

- **Languages:** Python, Java, HTML, CSS, JavaScript, PHP
- **Toolkits & Frameworks:** Linux, Docker, Git, MySQL, Django, Bootstrap
- **Machine Learning:** Scikit-learn, Keras, PyTorch

EXPERIENCE

- Meta (Facebook)**, Menlo Park, CA May 2022 – Aug. 2022
Software Engineer Intern
- Incoming software engineer intern in machine learning at Signals + Identity Prediction team.
- Southern Methodist University**, Dallas, TX Aug. 2019 – May 2023
Research Assistant
- Benchmarked and developed a variational autoencoder model to explore hidden protein conformational spaces.
 - Launched a public website on high computing center for fast and accurate protein allosteric sites prediction.
 - Developed a machine learning based framework to understand and analyze protein allosteric process.
 - Initiated automated and customized development workflow with CI/CD via GitHub Actions.

PROJECTS

- Deep Learning Enabled Conformation Exploration** June 2021
- Developed a **variational autoencoder** model to explore protein conformational spaces.
 - Reduced the differences between training and decoded structures to within **1Å** (the size of one atom).
 - Applied the learned latent space to generate new and unexplored conformations to accelerate conformation sampling.
- PASSer: Protein Allosteric Sites Server** | <http://passer.smu.edu> Jan. 2021
- Advanced the state-of-the-art prediction accuracy of top 3 to **84.9%** through **extreme gradient boosting** (XGBoost) and **graph convolutional neural networks** (GCNNs).
 - Launched a web server with **Django** and **JSmol** (a **JavaScript** framework) for jobs submission and protein visualization with web pages written in **HTML/CSS** and improved UI experience using **Bootstrap**.
 - Improved job execution to less than **1** second and has handled **12000+** visitors and **500+** jobs.
- Machine Learning based Framework for Protein Allostery** May 2020
- Constructed a framework integrating biology simulations and machine learning for protein allostery.
 - Proved the feasibility of ivis dimensionality reduction framework for large-scale protein simulation data set.
 - Trained one-vs-one **random forest** models in classifying protein macrostates with **94.5%** accuracy.

SELECTED PUBLICATIONS

- Tian, H.; Jiang, X.; Trozzi, F.; Xiao, S.; Larson, E.; Tao, P. Explore Protein Conformational Space With Variational Autoencoder. *Frontiers in Molecular Biosciences*, 2021, in press.
- Tian, H.; Jiang, X.; Tao, P. PASSer: Prediction of Allosteric Sites Server. *Machine Learning: Science and Technology*, 2021, 2, 3, 035015.
- Tian, H.; Trozzi, F.; Zoltowski, B. D.; Tao, P. Deciphering the Allosteric Process of Phaeodactylum tricornutum Aureochrome 1a LOV Domain. *The Journal of Physical Chemistry B*, 2020, 124, 41, 8960–8972.

AWARDS

- Graduate Research Assistant Award, Southern Methodist University, May 2021
- Outstanding Teaching Assistant, Southern Methodist University, May 2020