ZIJI ZHANG

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Ph.D. Candidate at Applied Math and Statistics Department, Stony Brook University, SUNY

TECHNICAL STRENGTHS

Research Interests:	Deep Learning, NLP/NLU, HPC/Cloud Computing
DL Models:	CNNs, Transformers, RNNs, GANs, Physics-informed NNs
Programming Languages:	Python, C/C++, R, Matlab, Html, SQL, LaTeX
ML Toolkits:	Tenserflow, Pytorch, Scikit-Learn, Pandas, Fairseq, Scipy
HPC/Cloud Experiences:	AWS, On-premise clusters, IBM Cloud

SELECTED INDUSTRIAL AND ACADEMIC EXPERIENCES

Applied Scientist Intern — **Amazon.com Inc.**
CS-ML Team — *May 2022-Aug.2022*

1. Developed a novel non-autoregressive phoneme-augmented Transformer model to correct language error in ASR transcriptions, which results in more robust inputs for downstream conversational bot models.
2. Accelerated the inferencing time up to 6x times compared to Seq2Seq autoregressive model, improved accuracy compared to SOTA non-autoregressive ASR error correction models.

Research Intern, Research Contractor — **IBM T.J. Watson Research Center**
Hybrid Cloud Infrastructure Software Team — *May 2021-May 2022*

1. Deployed an intelligent simulation workflow on the IBM Cloud HPC Cluster with Docker and Enroot, provided the best practices to optimize the performance for containerized applications. Published blog could be found here.
2. Proposed a general methodology framework for building coarse-grained models to help accelerate the conventional molecular dynamics (MD) simulations, leveraging on HPC and AI (physics-informed NN, conditional/regularized GAN).

Research Assistant — **SUNY, Stony Brook University**
AI Meets HPC: Learning the Cell Motion in Biofluids (Best Poster Finalist in SC20) — *March 2020-Oct. 2020*

1. Generalized the century-old physics theory and developed a biomechanics-informed online learning framework using Keras to extract, learn and predict future cell dynamics, with ground truth from LAMMPS numerical simulations.
2. Built a pipeline to processing spatial-temporal simulation data using moving average and wavelet transformation, designed an online sampling approach for training batches, feedback to MD simulations and propose re-training to avoid over-fitting.

Research Assistant — **SUNY, Stony Brook University**
Rapid Analysis of Streaming Platelet Images by Semi-unsupervised Learning — *Sept. 2018-Nov. 2019*

1. Proposed a semi-supervised learning system, implemented by Keras, which can utilize unlabeled data by active learning algorithm, and generate high quality semantic segmentation predictions with attention to cell boundary details.
2. Designed a meta-model using ensemble learning and augmented dataset, dramatically reduce human intervention to generate reliable pseudo-label with a multi-model fusion CNN-based policy network and an auxiliary reward network.

EDUCATION BACKGROUND

State University of New York at Stony Brook — Stony Brook,New York,U.S.A
Ph.D. candidate in Department of Applied Mathematics and Statistics — *Aug. 2018-Present*
• Two times winner of **Junior Researcher Award** from IACS. — *2021,2022*
• **Expected graduation date**: *May, 2023.* — **Overall GPA: 4.0/4.0**

University of Science and Technology of China (USTC) — Hefei,P.R.China
B.S. in Mathematics and Applied Mathematics — *Sept. 2014-June 2018*
• **Li Liu Leadership Scholarship** of USTC (Comprehensive consideration top 5%). — *2016*

JOURNAL AND CONFERENCE PUBLICATIONS (FULL LIST)

1. **Zhang, Z.**, Zhang, P., Han, C., Cong, G., Yang, C-C., Deng, Y., "Online Machine Learning for Accelerating Molecular Dynamics Modeling of Cells", *Frontiers in Molecular Biosciences*, 2021. DOI: 10.3389/fmolb.2021.812248
2. **Zhang Z.**, Zhang, P., Wang, P., Sheriff, J., Bluestein, D., Deng, Y., "Rapid Analysis of Streaming Platelet Images by Semi-unsupervised Learning", *Computerized Medical Imaging and Graphics*, 2021. DOI: 10.1016/j.compmedimag.2021.101895
3. **Zhang, Z.**, Zhang, P., Han, C., Cong, G., Yang, C-C., Deng, Y., "AI Meets HPC: Learning the Cell Motion in Biofluids", Research Posters Track, *Supercomputing Conference 2020 (SC20)*, November 16-19, 2020, DOI: 10.13140/RG.2.2.18340.40321
4. Niu, Z., Deng, Y., **Zhang, Z.**, Rafailovich, M., Simon, M., Zhang, P., "Modeling of the Thermal Properties of SARS-CoV-2 S-protein", *Frontiers in Molecular Biosciences*, 2022. DOI: 10.3389/fmolb.2022.953064
5. Sheriff, J., Wang, P., Zhang, P., **Zhang, Z.**, *etc.*, "*In Vitro* Measurements of Shear-Mediated Platelet Adhesion Kinematics as Analyzed through Machine Learning", *Annals of Biomedical Engineering*, 2021. DOI: 10.1007/s10439-021-02790-3