Ziming Liu

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EDUCATION

09/2016-06/2020 **PEKING UNIVERSITY** Beijing, China
Bachelor of Science in Physics, School of Physics
Research assistant 02/2018-06/2020
Research about intersections between machine learning and physics

01/2019-02/2019 **STONY BROOK UNIVERSITY** New York, USA
Winter intern at department of chemistry
Research about intersections between machine learning and physics

06/2019-09/2019 **UNIVERSITY OF CALIFORNIA, SANTA BARBARA** California, USA
Summer intern at department of electrical and computer engineering
Research about machine learning methods for uncertainty quantification and tensors

02/2021-06/2025 **MASSACHUSETTS INSTITUTE OF TECHNOLOGY** MA, USA
Doctoral program at department of physics (I will defer enrollment to Spring 2021)
Research about intersection of artificial intelligence and physics

For more detailed timelines, please visit my website: kindxiaoming.github.io

FEATURES

- Strong experiences in machine learning and data mining
- Strong backgrounds in physics
- Sufficient experiences in mathematics and statistics
- Versatile computer skills: Python (packages: sklearn/tensorflow/pytorch/keras for machine learning and deep learning), Mathematica, LaTeX, Matlab, C/C++/C#, Linux

RESEARCH INTERESTS

- Machine learning (in particular deep learning) to boost general science
- Understanding and improving deep learning using physics-inspired and information-theoretic tools
- AI interpretability and AI safety
- Practical aspects of machine learning: optimization, uncertainty quantification, distributed learning etc.

PUBLICATION LIST

(1) Principal Component Analysis of Collective Flow in Relativistic Heavy-Ion Collisions
Authors: **Ziming Liu**, Wenbin Zhao and Huichao Song
Status: Published in European Physical Journal C
Comment: Machine learning for physics

(2) Robustness of Principal Component Analysis on Harmonic Flow in Heavy-Ion Collisions
Authors: **Ziming Liu**, Arabinda Behera, Huichao Song and Jiangyong Jia
Status: Submitted to Physical Journal C
Comment: Machine learning for physics

(3) Influenza Modeling Based on Massive Feature Engineering and International Flow Deconvolution
Authors: **Ziming Liu**, Yixuan Wang, Zizhao Han and Dian Wu
Status: For Citadel Data Science Competition in Beijing. We won the champion.
Comment: Machine learning and data mining for real-life problems

(4) Quantum-Inspired Hamiltonian Monte Carlo for Bayesian Sampling

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Authors: **Ziming Liu**, Zheng Zhang

Status: Submitted to Journal of Machine Learning Research (JMLR)

Comment: Physics for machine learning. A monte carlo sampler inspired from physics can be applied to various cool applications including image denoising and neural network pruning.

(5) Schrodinger PCA: You Only Need Variances for Eigenmodes

Authors: **Ziming Liu**, Sitian Qian, Yixuan Wang, Yuxuan Yan, Tianyi Yang

Status: Submitted to NeurIPS 2020

Comment: Physics for machine learning. A modified quantum solver is proposed to attack computationally expensive PCA problems.

MATHEMATICAL MODELING AND OTHER EXPERIENCES

- Led a group of eight competing for CUPT (China Undergraduate Physics Tournament) which requires us to solve real-life physical problems and won the second place in Peking University
- Used C# to develop an online Electrical Laboratory software with a group of four
- Held a seminar for hydrodynamics, participated in a seminar for numerical analysis, holding a seminar for quantum computation and quantum information.

AWARDS AND HONORS

- Peking University Merit Student Award 2019, 2018, 2017
- Scholarship of Robin Lee (5^{th} place out of 200 students) 09/2019
- Shenzhen Finance Institute scholarship (7^{th} place out of 200 students) 09/2018
- The Championship of ‘Data Open’ competition in Beijing 05/2018
- Scholarship of China National Petroleum Corporation 09/2017
- 2^{nd} Place in Male Rope Skipping Competition in Peking University 03/2018
- 2^{nd} Place in Latin Dance Competition in Peking University 06/2017