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 high energy physics

01/2019-02/2019	**STONY BROOK UNIVERSITY**	New York, USA

Winter intern at department of chemistry
Research about intersections between machine learning and nuclear chemistry

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

09/2020-06/2025	**MASSACHUSETTS INSTITUTE OF TECHNOLOGY**	MA, USA

Doctoral program at department of physics (I will probably defer enrollment)
Research about intersection of intelligence, physics and information

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

- Intersection of intelligence, physics and information: e.g. spin glass and neural networks, information bottleneck.
- Model reduction and mode recognition: e.g. PCA, tensor methods, manifold learning.
- Time-series models and generative models: e.g. RNN, GAN.
- New computational frameworks to boost general science: e.g. physics-inspired neural networks, graph neural networks for spin glass simulation.
- Bayesian inference: e.g. variational inference, hamiltonian monte carlo.
- The emergence of concept from complicated mathematical structures and programs: e.g. reinforcement learning and hierarchial bayesian models.

RESEARCH

1) *July. 2018-March. 2019*   **Principal Component Analysis of Collective Flow in Relativistic Heavy-Ion Collisions**

Advisor: Huichao Song, Peking University
Results:

- ***The paper has been accepted by EPJC.*** Title: Principal Component Analysis of Collective Flow in Relativistic Heavy-Ion Collisions. Authors: **Ziming Liu**, Wenbin Zhao, and Huichao Song.
- ***The research was presented by me on Initial Stages 2019 (oral, June 2019 at Columbia University in New York).*** Title: Principal Component Analysis and its Applications to Relativistic Heavy-Ion Collisions.

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2) *January. 2019-March. 2019*   **The Limitations of Principal Component Analysis to Study Factorization Breaking Effects of Collective Flow**

Advisor: Jiangyong Jia, Department of Chemistry, Stony Brook University
Results:

➢ ***The paper has been submitted to Physics Letter B.*** Title: The Limitations of Principal Component Analysis to Study Factorization Breaking Effects of Collective Flow. Author List: **Ziming Liu**, Arabinda Behera, Huichao Song, and Jiangyong Jia.

3) *June. 2019- September.2019*   **Quantum-Inspired Hamiltonian Monte Carlo for Bayesian Sampling**

Advisor: Zheng Zhang, Department of Electrical and Computer Engineering, University of California, Santa Barbara

Results:.

➢ ***This work has been invited as a talk in SIAM 2021 data science workshop.***
➢ ***The paper has been submitted to International Conference of Machine Learning (ICML) 2020.***

4) *April 2019* **Influenza Modeling Based on Massive Feature Engineering and International Flow Deconvolution**

Collaborators: Yixuan Wang, Dian Wu, Zizhao Han

➢ ***This paper serves as a submitted work to the Citadel Data Open Final Competition at The New York Stock Exchange (NYSE) in April, 2019. We participated in this international event as the champion of the regional competition in Beijing.***

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 (5th place out of 200 students)   09/2019
- Shenzhen Finance Institute scholarship (7th 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
- 2nd Place in Male Rope Skipping Competition in Peking University   03/2018
- 2nd Place in Latin Dance Competition in Peking University   06/2017