

Liyi Zhang

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EDUCATION

Columbia University, New York, NY

Columbia College Class of 2021

GPA: 3.87 on 4.0 scale | *Double Majors in Statistics and Applied Mathematics*

- *Relevant past coursework*
 - *Math*: Modern Analysis I, Modern Analysis II, Analysis and Optimization, Linear Algebra, Calculus III & IV, ODE, Seminar in Applied Mathematics
 - *Statistics*: Probability Theory, Statistical Inference, Bayesian Statistics, Stochastic Processes, Linear Regression Models, Statistical Computing and Intro to Data Science, Foundations of Graphical Models
 - *Computer Science*: Data Structures, NLP, Optimization for Machine Learning
- *Other academic certifications*
 - Machine Learning – Professor John Paisley, ColumbiaX on edX
 - Neural Networks and Deep Learning; Hyperparameter Tuning, Regularization, and Optimization; Convolutional Neural Networks – Professor Andrew Ng, deeplearning.ai on Coursera

PUBLICATION

Antonio Moretti, **Liyi Zhang**, Itsik Pe'er. **Variational Combinatorial Sequential Monte Carlo in Bayesian Phylogenetic Inference**. *Machine Learning in Computational Biology (MLCB)*, 2020, **Oral Presentation**.

RESEARCH EXPERIENCE

Columbia Dept. of Computer Science – The Pe'er Lab

Undergraduate Researcher | Jan. 2020 – present

- Build probabilistic model for phylogenetic inference by sampling on discrete tree spaces with Combinatorial Sequential Monte Carlo, and using sampling computations with Variational Inference for model learning, which is a novel approach. This method explores higher probability spaces on the primates dataset, and samples meaningful phylogenetic trees. Python and TensorFlow are used.

Columbia Dept. of Statistics – Professor Andrew Gelman

Undergraduate Researcher | May 2020 – present

- Develop stacking algorithm for phylogenetic inference by isolating discrete models, using MCMC-based methods in Stan for sampling on continuous parameters, and adopting stacking for model combination.

PROJECT EXPERIENCE

Foundations of Graphical Models – Professor David Blei

In-Class Final Project | Dec. 2020

- Implemented Bayesian Neural Networks (BNN) using TensorFlow with customized layer and training. Studied robustness of BNN by implementing adversarial perturbations of the MNIST image data and compared performance across BNN and 16 deep learning models, and across levels of model pruning.

Optimization for Machine Learning – Professor Satyen Kale

In-Class Final Project | Oct. – Nov. 2019

- Implemented Stochastic Variance Reduced Gradient Descent to optimize non-convex loss functions, in a team of three. Rewrote SVRG in Python and compared its performance with Stochastic Gradient Descent, using two and three-layer neural nets and the MNIST, CIFAR10, STL, and FashionMNIST datasets.

CAREER EXPERIENCE

QTG Capital Management, Shanghai, China

Quantitative Researcher Intern | June – August 2019

- Performed analysis and cleaning on datasets on financial products, conducted clustering analyses using the K-Means algorithm for risk control, built factor models and performed feature engineering on financial and commodities futures to develop and back-test trading strategies.

SKILLS AND INTERESTS

Skills: *Proficient*: Python (+TensorFlow), R, Stan, LaTeX. *Intermediate*: Java.

Language: Mandarin Chinese: native; English: fluent; Latin: intermediate.

Interests: reading and writing, such as introducing math in machine learning on Medium; playing piano and clarinet, currently working on Bach Goldberg Variations; distance running and hiking.