Liyi Zhang

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EDUCATION

Columbia University, New York, NY *Columbia College Class of 2021*

GPA: 3.85 on 4.0 scale | *Double Majors in Statistics and Applied Mathematics*

- *Relevant past coursework*
  - *Math:* Modern Analysis I, Analysis and Optimization, Linear Algebra, Calculus III & IV, ODE
  - *Statistics:* Probability Theory, Statistical Inference, Bayesian Statistics, Stochastic Processes, Linear Regression Models, Statistical Computing and Intro to Data Science
  - *Computer Science:* Data Structures, NLP, Optimization for Machine Learning
- *Relevant current coursework*
  - Modern Analysis II, Foundations of Graphical Models, Seminar in Applied Mathematics
- *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 MCMC method in R and Stan to enable sampling in discrete spaces in phylogenetic models by isolating discrete models and using stacking of predictive distributions for model combination.

PROJECT EXPERIENCE

Foundations of Graphical Models – Professor David Blei *In-Class Individual Project | Oct. 2020*

- Implemented the Gibbs Sampler from scratch in R and wrote MCMC diagnostic methods; clustered text data using 2000+ articles from the AP dataset with the Poisson mixture model, generating meaningful topics using TFIDF-inspired term-score.

Optimization for Machine Learning – Professor Satyen Kale *In-Class Group 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: Python (+TensorFlow), R, Stan, LaTeX, Java

Language: Mandarin Chinese: native; English: fluent; Latin: intermediate reading ability

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