Michael Hu

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Education

Princeton University Fall 2017 – Spring 2021
Bachelor of Science in Engineering (BSE), Computer Science Princeton, NJ

- Minors: Statistics and Machine Learning, Robotics and Intelligent Systems
- GPA: 3.89 / 4
- Coursework: *Theoretical Machine Learning, *Deep Learning for Natural Language Processing, Probabilistic Models of Cognition, Intro to Robotics, Computer Vision, Differential Equations

* indicates graduate course

Selected Research

Meta Learning for Natural Language Processing Fall 2020 – Present
Senior Thesis. Advisors: Tom Griffiths, Karthik Narasimhan Princeton, NJ

Constrained Policy Learning with Language Spring, Summer 2020
Junior Independent Work. Advisor: Karthik Narasimhan Princeton, NJ

- Problem: Expressing safety constraints as functions is difficult for end users.
- Our Solution: Express constraints in natural language. Use language to learn a feasible policy.
- Results: Created a new safe reinforcement learning environment with diverse natural language utterances. Designed a model to solve our environment while generalizing to other baselines.

Accelerating Entropy-Based Transformer Calibration Fall 2019
Junior Independent Work. Advisor: Karthik Narasimhan Princeton, NJ

- Problem: Language models produce degenerate text over long generations.
- Our Solution: Downsample the probability of producing high-entropy tokens.
- Results: Calibrated GPT-2 to produce text more entropically consistent with natural language. Used approximations to speed up expensive entropy computations.

rRNA Expansion in Eukaryotes: from Signature Folds to Tentacles 2015 – 2018
Research Assistant. Advisors: Anton Petrov, Loren Dean Williams Atlanta, GA

- Problem: Visualizing ribosomes in a wet lab is expensive.
- Our Solution: Use known ribosomal structures to predict unknown structures.
- Results: *Paper under review.* Created ribosomal subunit maps for 20+ species, all previously unvisualized. Subsets of results have been published in peer-reviewed academic journals 2x.

Employment

Roblox, Trust and Safety Team Summer 2019
Software Engineering Intern San Mateo, CA

- Trained BERT, a deep learning language model, to classify chat messages. Identified bad actors in the Roblox community by using zero-shot learning to classify game files.
- Decreased average response time of backend service by 3x through a simplified caching layer. Onboarded 5 engineers to the code base; spearheaded testing and rollout of the service.
- Automated the labeling of training data for BERT using Snorkel, a data programming package. Briefed 20+ Roblox engineers and data scientists on Snorkel and its use cases.

BatteryPOP / Princeton Startup Immersion Program Summer 2019
Software Engineering Intern New York, NY

- Co-developed yaasgames.com, an HTML5 games website. Enabled BatteryPOP to generate ad revenue from the website by adding spots for banner and video ads. Worked with the CEO to find an HTML5 games supplier and populated yaasgames.com with 100+ games.

Honors and Awards

Princeton Center for Statistics and Machine Learning Summer Research Award 2020
- Awarded to 3 Princeton undergraduates.

Princeton Engineering Project X Summer Research Award (declined) 2020

Mary George Freshman Research Conference 2018
- Awarded to 17 Princeton freshmen. Selection based on final papers from class-wide writing course.

Service

Peer Academic Advisor Fall 2019 – Present
- Advise freshmen and sophomores on academics, extracurriculars, and career.
- Offer emotional support, especially during stressful times.

Undergraduate Teaching Assistant
- Computer Networks (COS 461) Fall 2020
- Intro to Machine Learning (COS 324) Spring 2020
- **Head TA,** Discrete Math (COS 340) Fall 2019
- Discrete Math (COS 340) Spring 2019

Journal Publications

Mestre-Fos, Santi, Petar I. Penev, Suttipong Suttapitugsakul, **Michael Hu**, Chieri Ito, Anton S. Petrov, Roger M. Wartell, Ronghu Wu, and Loren Dean Williams. "G-Quadruplexes in Human Ribosomal Rna." *Journal of Molecular Biology* 431, no. 10 (May 2019): 1940–55.

Wang, Kai, Anthony K. Guzman, Zi Yan, Shouping Zhang, **Michael Y. Hu**, Mehdi B. Hamaneh, Yi-Kuo Yu, et al. "Ultra-High-Frequency Reprogramming of Individual Long-Term Hematopoietic Stem Cells Yields Low Somatic Variant Induced Pluripotent Stem Cells." *Cell Reports* 26, no. 10 (March 2019): 2580-2592.e7.

Gómez Ramos, Lizzette M., Natalya N. Degtyareva, Nicholas A. Kovacs, Stefany Y. Holguin, Liuwei Jiang, Anton S. Petrov, Marcin Biesiada, **et al**. "Eukaryotic Ribosomal Expansion Segments as Antimicrobial Targets." *Biochemistry* 56, no. 40 (October 10, 2017): 5288–99.

Skills

Programming Languages
- Proficient with Python, JavaScript, and Go.
- Familiar with Java, C#, C, SQL, HTML, CSS, and PHP.

Data Science: PyTorch, Tensorflow, Mechanical Turk, CUDA, Jupyter.
Web Development: WordPress, Node.js, .NET Core, REST API, Container Orchestration.

Hobbies

Breakdancing, journaling, cooking