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: 3.90 / 4
- Coursework: *Theoretical Machine Learning, *Theory of Deep Learning, *Advanced NLP, Computer Vision, Robotics, Bayesian Modeling, Advanced Algorithms, Differential Equations, Real Analysis, Audio Journalism

* indicates graduate level course

Selected Research

Reinforcement Learning, Knowledge Distillation, and Language Fall 2020 – Present
Senior Thesis. Advisors: Tom Griffiths, Karthik Narasimhan Princeton, NJ

- Translating neural representations of deep reinforcement learners into language.

Safe Reinforcement Learning with Natural Language Constraints Spring, Summer 2020
Junior Independent Work. Advisor: Karthik Narasimhan Princeton, NJ

- Designed reinforcement learning agents that understand natural language constraints, such as "Don't step in puddles." Created a new dataset to test agent performance. Paper link: arxiv.org/abs/2010.05150

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

- Calibrated GPT-2, a neural language model, to produce text more entropically consistent with natural language. Constructed and implemented new approximation algorithms to reduce GPT-2 calibration costs.

rRNA Expansion in Eukaryotes: from Signature Folds to Tentacles Jan 2014 – Feb 2018
Research Assistant. Advisors: Anton Petrov, Loren Dean Williams Atlanta, GA

- Simulated and visualized the ribosomal structures of 20+ species, alleviating the need for expensive X-ray crystallography. Results published in *Journal of Molecular Biology* and *Biochemistry.* 3rd paper under review.

Employment

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

- Engineered ContentFilter, a high throughput (~15k qps) backend service that censors inappropriate text across the entire Roblox platform. Led 5 engineers to test and deploy ContentFilter. (C#, Docker)
- Trained BERT, a deep learning model, to identify bad actors in the Roblox community. Automated the labeling of training data for BERT using Snorkel, a data programming package. (Python, PyTorch)

BatteryPOP / Princeton Startup Immersion Program Summer 2018
Software Engineering Intern New York, NY

- Co-developed yaasgames.com, an HTML5 games website. Enabled BatteryPOP to generate ad revenue from yaasgames.com by adding slots for banner and video ads. (HTML, CSS, PHP)

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 in the academic year.

Undergraduate Teaching Assistant

- Computer Networks (COS 461) Fall 2020
- Introduction to Machine Learning (COS 324) Spring 2020
- Discrete Math (COS 340). Served as **Head TA** for Fall 2019. Fall, Spring 2019

Activities

Princeton Association for Computing Machinery Fall 2017 – Present

Club Ambassador (2018), Careers Chair (2019)

- Increased club membership by 50% through outreach to other computer science interest groups.
- Hosted a series of tech career discussion panels attended by 100+ students (~1.5% of the school).

Disci May 2018 – March 2019

Personal Project

- Built Disci, a virtual card game that teaches chemistry to high school students. Defined Disci's architecture and game design. Collaborated with 2 fellow Princeton students. Deployed card game to 30 alpha testers.

Publications

* indicates equal contribution

(under review) Yang, Tsung-Yen*, **Michael Hu***, Yinlam Chow, Peter J. Ramadge, and Karthik Narasimhan. "Safe Reinforcement Learning with Natural Language Constraints." *NeurIPS 2020, Deep Reinforcement Learning Workshop*. http://arxiv.org/abs/2010.05150.

(under review) Biesiada, Marcin, **Michael Hu**, Loren Dean Williams*, Katarzyna J. Purzycka*, and Anton S. Petrov*. "rRNA Expansion in Eukaryotes: from Signature Folds to Tentacles."

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, **Michael Y. Hu**, Katarzyna J. Purzycka, Dev P. Arya, Loren Dean Williams. "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 R, Java, C#, C, SQL, HTML, CSS, and PHP

Machine Learning: PyTorch, TensorFlow, NumPy, Jupyter, RStudio, AWS, Mechanical Turk
Web Development: WordPress, Node.js, .NET Core, REST API, Heroku, Docker, Container Orchestration

Hobbies

Breakdancing, journaling, cooking, finding good music on YouTube