Jonathan Daniel Chang

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EDUCATION

Cornell University — New York, USA
Ph.D. Candidate in Computer Science — *August 2019 – Present*

- **Relevant Coursework**: Theoretical Foundations of Machine Learning, Foundations of Reinforcement Learning

Brown University — Rhode Island, USA
Master of Science in Computer Science — *August 2018 – May 2019*

- **Cumulative GPA**: 4.0 out of 4.0
- **Relevant Coursework**: Mathematical Statistics I, Computational Semantics, Advanced Probablistic Models in Computer Science

Brown University — Rhode Island, USA
Bachelor of Science in Applied Mathematics and Computer Science (Hons.) — *August 2014 – May 2018*

- **Cumulative GPA**: 3.9 out of 4.0
- **Honors Thesis - Exploring Machine Learning Methodologies to Determine Phenotypes of Pregnancy**: Researching applications of clustering algorithms such as K-means and Self-Organizing Maps to train a predictive model of pregnancy outcomes based on first trimester hospital diagnoses
- **Relevant Coursework**: Machine Learning, Statistical Inference, Topics in Collaborative Robotics, Introduction to Computational Linear Algebra, Inference in Genomics and Molecular Biology, Computational Molecular Biology

PUBLICATIONS

- Jonathan D. Chang*, Kianté Brantley*, Rajkumar Ramamurthy, Dipendra Misra, Wen Sun, "Learning to Generate Better than your LLMs", *arXiv:2306.11816*, 2023
- Ge Guo, Jonathan D. Chang, Kianté Brantley, Claire Cardie, Thorsten Joachims, "Policy-Gradient Training of Language Models for Ranking", *preprint*, 2023
- Jonathan D. Chang, Qingqing Zhen, Brandon Amos, Wen Sun, Mikael Henaff, "A Large Scale Study of Deep Imitation Learning on the Arcade Learning Environment", *preprint*, 2023
- Jonathan D. Chang, Dhruv Shreenivas*, Yingbing Huang*, Kianté Brantley, Wen Sun, "Adversarial Imitation Learning via Boosting", *preprint*, 2023
- Jonathan D. Chang*, Kaiwen Wang*, Nathan Kallus, Wen Sun, "Learning Bellman Complete Representations for Offline Policy Evaluation", *International Conference on Machine Learning (ICML) Long Talk*, 2022
- Jonathan D. Chang*, Masatoshi Uehara*, Dhruv Sreenivas, Rahul Kidambi, Wen Sun, "Mitigating Covariate Shift in Imitation Learning via Offline Data Without Great Coverage", *Neural Information Processing Systems (NeurIPS)*, 2021
- Rahul Kidambi, Jonathan D. Chang, Wen Sun, "MobILE: Model-Based Imitation Learning From Observation Alone", *Neural Information Processing Systems (NeurIPS)*, 2021
- Jonathan D. Chang*, Nishanth Kumar*, Sean Hastings, Aaron Gokaslan, Diego Romeres, Devesh Jha, Daniel Nikovski, George Konidaris, Stefanie Tellex, "Learning Deep Parameterized Skills from Demonstration for Re-targetable Visuomotor Control", *arXiv:1910.10628*
- Jonathan D. Chang, Indra Neil Sarkar, "Using Unsupervised Clustering to Identify Pregnancy Co-Morbidities", *American Medical Informatics Association Summit*, 2019
- Benjamin Goddard, Jonathan D. Chang, Indra Neil Sarkar, "Using Self Organizing Maps to Compare Sepsis Patients from the Neonatal and Adult Intensive Care Unit", *American Medical Informatics Association Summit*, 2019

RESEARCH EXPERIENCE

Cornell University, Ph.D. Research — New York, USA
Graduate Research Assistant — *August 2019 – Present*

- Advised by Prof. Wen Sun, my research explores designing efficient ways of leveraging expert demonstrations for deep imitation learning algorithms.

- Investigating how to capitalize on key properties of Large Language Models and text generation to improve Reinforcement and Imitation Learning algorithms for language.
- Developing algorithms for representation learning in reinforcement learning.
- Studying how to integrate offline data in designing scalable deep reinforcement learning algorithms.

Microsoft Research Montreal, Canada
Research Intern *May 2023 – August 2023*

- Managed by Dr. Marc-Alexandre Côté and Dr. Eric Yuan, I investigated the need for multi-step planning when prompting Large Language Models, applying tree-search based learning on GSM8K.

Meta (FAIR) New York, USA
Research Intern *May 2022 – January 2023*

- Managed by Dr. Mikael Henaff, I investigated algorithms for Imitation Learning and Imitation Learning from Observations from image data for both continuous and discrete control
- Conducted extensive benchmarking for imitation learning algorithms from vision.

Human To Robots Laboratory Rhode Island, USA
Graduate Research Assistant *December 2017 – September 2019*

- Developing an end-to-end deep imitation learning algorithm to learn goal-parameterized policies from demonstration on multiple robots such as Baxter, Kinova Movo, Kuka Iiwa, and proprietary Mitsubishi arms
- Constructing a virtual reality and mixed reality teleoperation system for different robots using Unity, the Hololens, and HTC Vive

Medley Genomics Rhode Island, USA
Research Software Engineer *May 2017 – May 2019*

- Researched a somatic phylogenetic reconstruction algorithm to address the full spectrum of complexities in cancer mutations
- Analyzed the accuracy of published algorithms determining the phylogenetic topologies of intratumor heterogeneity written in R, C++, and Python

Brown Center for Biomedical Informatics Rhode Island, USA
Research Assistant *August 2017 – August 2018*

- Created an unsupervised clustering algorithm to infer phenotypes of complex conditions such as diabetes and pregnancy
- Modified a Kohonen Neural Network to handle the categorical and sparse nature of hospital datasets

Raphael Lab, Brown University Rhode Island, USA
Research Software Engineer *May 2016 – May 2017*

- Researched the application of the G-Test on intertumor mutation datasets to test independence between discrete mutation counts and a continuous profile
- Engineered scripts in Python and C to test the biological veracity of the algorithm results

Teaching & Leadership Experience

Robotics Graduate Student Organization, Cornell University New York, USA
Treasurer *August 2020 – Present*

- Organized information and social events to connect robotics graduate students across multiple disciplines

Graduate Teaching Assistant, Cornell University New York, USA
Teaching Assistant for Cornell CIS Department *August 2019 – Present*

- Developing homework for graduate level course in the theory of reinforcement learning
- Implemented many state-of-the-art deep reinforcement learning algorithms for the undergraduate A.I. class

Graduate Teaching Assistant, Brown University Rhode Island, USA
Teaching Assistant for Computational Semantics *August 2018 – May 2019*

- Implemented many state-of-the-art and classic NLP algorithms such as Transformers, Word2Vec, ELMo, and a semantic parser to use as assignments

Brown University Pre-Medicine Mentorship Program Rhode Island, USA
Founder *Dec 2016 – May 2019*

- Drafted a proposal for an inter-institutional mentorship program and proposed it to multiple deans in the university and the medical school, ultimately receiving sponsorship from the Head Dean of Alpert Medical School
- Spearheaded the infrastructural design and organization of the yearlong mentorship program between Brown Alpert Medical students and Brown Pre-medicine undergraduates to provide first-hand guidance on the medical school application process
- Mobilized a team of 10 students to implement the program through marketing, recruitment, and web development efforts

VOLUNTEER EXPERIENCE

Rhode Island Hospital Emergency Department Rhode Island, USA
Family Assistant Volunteer *Dec 2016 – May 2019*

- Served as a liaison between doctors and patients' families while providing emotional support to families for 4 to 8 hours weekly

Korean Adoptee Mentorship Program Rhode Island, USA
Volunteer Mentor *Dec 2015 – May 2019*

- Reconnected local Korean adoptees to their ethnic heritage through exposure to traditional cuisines, games, and language lessons

Brown Refugee Youth Tutoring and Enrichment Rhode Island, USA
Volunteer Tutor *Aug 2015 – Aug 2016*

- Provided relocated refugee children from the Middle East with English tutoring and with cultural context to ease assimilation into American society

AWARDS

Magna Cum Laude (2018): Awarded Magna Cum Laude for graduating in the top 20% of the graduating class at Brown University

Sigma Xi (2018): Nominated by professors in the Biomedical department and awarded membership to the Sigma Xi chapter (national honor society for scientific research) for excellence in student research during time at Brown

Outstanding Winner in the Brown Mathematical Contest for Modeling (2017): Won first place with a team at Brown for creating a dynamical systems war model for a hypothetical, multinational war simulation over the course of two days; will represent Brown in the international competition in February 2018

SKILLS & INTERESTS

Programming Languages: Python, Java, Julia, Matlab, C, MySQL, Javascript, C++, HTML/CSS, C, LaTeX

Frameworks/Libraries: Pytorch, JAX, ROS, Tensorflow, Scikit-Learn, Keras

Interests: Imitation Learning, Reinforcement Learning, Robotics, Origami, Competitive Weight-Lifting, High-Fashion, Snowboarding