

# Nishant Subramani - *Machine Learning Researcher*

nishant.subramani23@gmail.com

<http://github.com/hatat5>

<https://hatat5.github.io>

## Education

- New York University** New York, NY  
• Ph.D. Computer Science; Advisors: **Kyunghyun Cho** and **Sam Bowman** Sept 2017 – Present
  - **Courses:** Natural Language Processing, Deep Learning, Deep Generative Models, Honors Analysis of Algorithms, Networks and Mobile Systems
- Northwestern University** Evanston, IL  
• B.A./M.S. Statistics/Computer Science; **Stat GPA:** 3.963/4.000; **MS GPA:** 4.000/4.000 Sept 2013 – June 2017
  - **Graduate Courses:** Deep Learning, Machine Learning Foundations, Probabilistic Graphical Models, Data Mining, Adv Topics in ML, Statistical Pattern Recognition, Computational Learning Theory, Adv Topics in Bayesian Stats
  - **Undergrad Courses:** Machine Learning, Intro to AI, Regression Analysis, Statistical Computing, Statistical Theory & Methodology I-III, Theory of Computation, Biochemistry, Cell and Molecular Biology

## Publications

- Subramani, Nishant. "PAG2ADMG: An Algorithm for the Complete Causal Enumeration of a Markov Equivalence Class" *arXiv preprint arXiv:1612.00099*(2016). **Submitted to AISTATS 2018 as Full Paper**
- Subramani, Nishant, and Doug Downey. "PAG2ADMG: A Novel Methodology to Enumerate Causal Graph Structures" In *31st AAAI Conference on Artificial Intelligence*. 2017. **Student Abstract**
- Subramani, Nishant. "Identifying the Best Predictors of Unmet Health Care Needs in Children with DBD." *Northwestern Undergraduate Research Journal* (2015).

## Research Experience

- PhD Researcher in Deep Learning and Language** New York University  
• **PIs:** **Kyunghyun Cho** and **Sam Bowman** September 2017 – Present
  - **Project:** Working on natural language generation for machine translation, summarization, and image captioning. *Deep Learning, Neural Machine Translation (NMT), Abstractive Summarization, Image Captioning, LSTMs, Attention*
- Deep Learning Research Intern** Salesforce (Metamind Group)  
• **PI:** **Richard Socher** March 2017 – August 2017
  - **Project:** Worked on multitask learning, specifically trying to build a single system that could perform well on a myriad of NLP tasks. *Deep Learning, MultiTask Learning, BiLSTMs, NLP, Meta-learning*
- Research Assistant in Deep Learning & NLP** Northwestern University  
• **PI:** **Doug Downey** July 2014 – March 2015; March 2016 – June 2017
  - **Statistics Bachelor's Thesis:** Improved my *pag2adm* developed at ETH Zurich into a method that generates all Markov equivalent acyclic directed mixed graphs (not necessary just ancestral) from a PAG. *Causality, Ancestral Graphs, Mixed Graphs, Markov Equivalence*
  - **Master's Thesis:** Developing various methodologies to identify deep net hyperparameter settings more efficiently using active learning and sampling. *Deep Learning, Hyperparameters, LSTMs, ConvNets, Active Learning*
  - **Project 3:** Developing various ensembling methodologies to improve state-of-the-art language model performance on the Penn Tree Bank dataset. *Deep Learning, Recurrent Neural Nets (RNNs), XGBoost*
  - **Project 4:** Developing alternative dropout methodologies to increase variance of models from epoch to epoch to improve deep neural network performance on a variety of tasks. *Deep Learning, Dropout, RNNs, ConvNets*
  - **Project 5:** Developed methods to input pre-existing analogical knowledge to improve word-embeddings in Google's word2vec models. *Neural Networks, Active Learning*
- Research Assistant in Biomedical Informatics** Feinberg School of Medicine  
• **PI:** **Yuan Luo** Jan 2016 – March 2016
  - **Project:** Predicted ICU 30-day readmission rates from a multivariate panel of physiological measurements using Subgraph Augmented Non-Negative Matrix Factorization (SANMF). *Non-Negative Matrix Factorization, Frequent Subgraph Mining*
- Research Assistant in Biomedical Informatics** Stanford University  
• **PI:** **Olivier Gevaert** Jun 2015 – Jan 2016
  - **Project 1:** Used predictive models to identify a genetic basis for cellularity in brain cancer patients using gene expression and cellular pathology data. *Bayesian Networks, Structure Learning, Hierarchical Clustering*
- Master's Semester Project Student in Systems Biology** ETH Zurich  
• **PI:** **Manfred Claassen** Sept 2015 – Jan 2016
  - **Project:** Developed a methodology (*The Boundary Searcher*) to efficiently calculate the r-convex hull of a point cloud in high dimensions. *R-Convex Hull, Random Walk*
- Master's Semester Project Student in Statistics** ETH Zurich  
• **PI:** **Marloes Maathuis** Sept 2015 – Jan 2016

- **Project:** Developed a novel methodology to transform a given partial ancestral graph (PAG) to the set of all ancestral acyclic directed mixed graphs that belong in the Markov equivalence class that the PAG encodes. *Causality, Ancestral Graphs, Directed Graphs, Mixed Graphs*

## Teaching Experience

- **Teaching Assistant for NLU & Comp Semantics** New York University  
DS-GA 1012 Jan 2018 – May 2018
- **Teaching Assistant for Adv Topics in ML (Grad Seminar)** Northwestern University  
EECS 395/495 Jan 2017 – Mar 2017
  - Course Topic: Statistical Language Modeling focusing on Deep Learning.
  - Constructed seminar reading list, helping other students understand seminal deep NLP papers.
- **Teaching Assistant for Probabilistic Graphical Models (Grad Course)** Northwestern University  
EECS 474 Sept 2016 – Dec 2016
  - Helped to design course materials and structure.
  - Developed and graded assignments; held office hours.
- **Teaching Assistant for Mathematical Foundations of CS** Northwestern University  
EECS 212 Sept 2016 – Dec 2016
  - Helped to develop and grade assignments and exams; held office hours.
- **Teaching Assistant for Machine Learning** Northwestern University  
EECS 349 Feb 2016 – June 2016
  - Devised methodology for and built a mechanical TA which uses the Vancouver crowd sourcing algorithm.
  - Helped to design tree search and decision tree assignments, graded assignments, and held office hours.
- **Teaching Assistant for Computing Applications I & II** Northwestern University  
ISP 101-1 & 101-2 Sept 2014 – March 2015
  - Co-taught course with three other teaching assistants.
  - Wrote exam questions and assignments covering python and R basics.

## Skills

- **Proficient Languages/Packages:** Python, R, PyTorch
- **Familiar Languages/Packages:** TensorFlow, C/C++, C#, Matlab/Octave, Java, L<sup>A</sup>T<sub>E</sub>X
- **Machine Learning Algorithms:** Deep Nets (RNNs, LSTMs, CNNs, RBMs), Bayesian Networks, SVMs, Logistic Regression, Decision Trees, Random Forests
- **Other Computational Methods:** AdaBoost, Clustering (K-means, Hierarchical), Map-Reduce

## Research Presentations

- **PAG2ADMG.** AAI 2017, San Francisco, CA. Student Abstract Spotlight Talk. February 2017
- **PAG2ADMG.** AAI 2017, San Francisco, CA. Student Abstract Poster. February 2017
- **Pag2Admg.** Undergraduate Research Expo, Northwestern University. Poster. June 2016
- **The Boundary Searcher.** EECS Poster Fair, Northwestern University. Poster. Apr 2016
- **Predicting Unmet Health Care Needs in Children with DBD** June 2015  
Undergraduate Research Expo, Northwestern University. Poster.
- **Predicting Unmet Health Care Needs in Children with DBD** Mar 2015  
EECS Poster Fair, Northwestern University. Poster.
- **How Evil are Turnovers?** June 2014  
Undergraduate Research Expo, Northwestern University. Talk.
- **How Evil are Turnovers?** Apr 2014  
Computational Statistics Conference, Northwestern University. Poster.

## Awards & Honors

- Henry M. MacCracken Graduate Fellowship September 2017 - August 2022
- \$500 Conference Travel Grant from Weinberg College of Arts & Sciences January 2017
- \$500 Conference Travel Grant from Undergraduate Research Northwestern University January 2017
- Charles A & Ruby E Howell Endowed Scholarship (\$70,000) December 2014 - June 2017

- Intel Science Talent Search (ISTS) Outstanding Written Report Award March 2013
- National AP Scholar August 2012

### Professional Service

- Deep Learning Consultant, Talkspace (NLP for Online Psychotherapy) November 2017 - Present
- Delegate Reviewer, NIPS 2017 June 2017
- Delegate Reviewer, ICCV 2017 May 2017

### Students Advised

- Michael Chen - B.S. Student in Computer Science, Northwestern University November 2016 - Present