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## ALEXANDER M. RUSH

### Education

*Massachusetts Institute of Technology*

2009-2014. Ph.D (Expected), Computer Science.

Dissertation: *Relaxation Methods for Natural Language Decoding*.

*Columbia University*

2011-2014. Visiting Scholar, Department of Computer Science.

*Harvard University*

2007. B.A., Computer Science. (Magna Cum Laude With Highest Honors.)

### Grants and Awards

- 2012 Best Paper Award, North American Association of Computational Linguistics.
- 2010 Best Paper Award, Empirical Methods in Natural Language Processing.
- 2009 Graduate Research Fellow, National Science Foundation.
- 2006 Outstanding Undergraduate Award Finalist, Computing Research Association.
- 2005 Summer Research Fellowship, Harvard University.
- 2003 Phi Beta Kappa Award, Cheltenham High School.

### Publications

*Conference Papers*

Yin-Wen Chang, Alexander M. Rush, John DeNero, and Michael Collins. *A Lagrangian Relaxation Algorithm for Bilingual Word Alignment*. To Appear in Proceedings of ACL 2014.

Alexander M. Rush, Yin-Wen Chang, and Michael Collins. *Optimal Beam Search for Machine Translation*. Proceedings of EMNLP 2013.

Karl Stratos, Alexander M. Rush, Shay B. Cohen, and Michael Collins. *Spectral Learning of Refinement HMMs*. Proceedings of CoNLL 2013.

Alexander M. Rush, Roi Reichert, Michael Collins, and Amir Globerson. *Improved Parsing and POS Tagging Using Inter-Sentence Consistency Constraints*, Proceedings of EMNLP 2012.

Alexander M. Rush and Slav Petrov, *Vine Pruning for Efficient Multi-Pass Dependency Parsing*. Proceedings of NAACL 2012. [Best Paper Award]

Alexander M. Rush and Michael Collins. *Exact Decoding of Syntactic Translation Models through Lagrangian Relaxation*. Proceedings of ACL 2011.

Terry Koo, Alexander M. Rush, Michael Collins, Tommi Jaakkola, and David Sontag. *Dual Decomposition for Parsing with Non-Projective Head Automata*. Proceedings of EMNLP 2010. [Best Paper Award]

Alexander M. Rush, David Sontag, Michael Collins, and Tommi Jaakkola *On Dual Decomposition and Linear Programming Relaxations for Natural Language Processing*. Proceedings of EMNLP 2010.

Rebecca Nesson, Stuart M. Shieber, and Alexander M. Rush. *Induction of probabilistic synchronous tree-insertion grammars for machine translation*. Proceedings of AMTA 2006.

#### *Journal Papers*

Alexander M. Rush and Michael Collins. *A Tutorial on Dual Decomposition and Lagrangian Relaxation for Inference in Natural Language Processing*. Journal of Artificial Intelligence Research 2012.

#### Academic Internships

Research Intern, *Google Research*, June 2011 – May 2013, New York, NY.

Research with Slav Petrov on statistical dependency parsing.

Designed and implemented a hypergraph framework for structured prediction and training. Used to build high-efficiency, state-of-the art parser.

Research Intern, *USC/ISI*, June – August 2010, Marina Del Rey, CA. Research with Liang Huang on statistical machine translation.

Research Fellow (Intern), *International Genetically Engineered Machines Competition*, June – September 2005, Cambridge, MA. Research with Radhika Nagpal on biological computation.

#### Industry Positions

Lead Engineer (Platform Team), *Facebook*, June 2007 – August 2009, Palo Alto, CA.

Helped develop optimized C++ parser and interpreter for FBML, a domain-specific markup language for applications.

Built and designed a distributed system for tracking resource constraints of third-party applications. Awarded patent.

Contributor on Internationalization project which utilizes crowd-sourcing to translate Facebook into 70+ languages.

Technical Associate (Intern), *Bridgewater Associates* June – September 2006, Westport, CT. Implemented trade scheduling and equity analysis algorithms.

### Teaching

- 2013 Instructor with Michael Collins, Natural Language Processing, Columbia University, Fall.  
 Guest Instructor, Natural Language Processing, Slav Petrov, NYU, Fall.  
 Head Teaching Assistant, Natural Language Processing, Michael Collins, Columbia University, Spring (taught on Coursera, 30,000+ registered students).
- 2012 Head Teaching Assistant, Natural Language Processing, Michael Collins, Columbia University, Fall.  
 Guest Instructor, Natural Language Processing, Michael Collins, Columbia University, Fall.  
 Guest Instructor, Natural Language Processing, Slav Petrov, NYU, Fall.
- 2011 Guest Instructor, Graphical Models, David Sontag, NYU, Fall.  
 Guest Instructor, Natural Language Processing, Michael Collins, Columbia University, Fall.
- 2008 Guest Instructor, Programming Paradigms, Jerry Cain, Stanford University, Fall.
- 2006 Teaching Fellow, Intelligent Machines: Perception, Learning, and Uncertainty, Avi Pfeffer, Spring.
- 2005 Teaching Fellow, Intelligent Machines: Reasoning, Actions, and Plans, David Parkes, Fall.  
 Teaching Fellow, Bits, Harry Lewis, Spring.

### Patents

Determining user affinity towards applications on a social networking website, Thomas S. Whitnah, Alexander M. Rush, Ding Zhou, Ruchi Sangvhi, 2010.

Multiple patents pending.

### Programming Projects

[PyDecode](http://www.pydecode.org) (<http://www.pydecode.org>)

An optimized toolkit for designing inference algorithms for NLP.

[The Declassification Engine](http://www.declassification-engine.org) (<http://www.declassification-engine.org>)

Computational social science project analyzing the process of official secrecy.

Awarded a Magic grant from Brown Institute for Media Innovation.

#### Invited Talks

- 2014 Invited Talk, University of Washington, April.  
 Invited Talk, NYU, April.  
 Invited Talk, CMU, March.  
 Invited Talk, MIT, March.  
 Invited Talk, Harvard, March.  
 Invited Talk, TTIC, March.  
 Invited Talk, University of Maryland, March.
- 2013 Invited Tutorial, UMBC, October.  
 Invited Talk, CS and Social Science Seminar, UMass Amherst, October.  
 Talk, NLP Seminar, Columbia University, October.  
 Invited Talk, ML Seminar, UMass Amherst, October.  
 Invited Talk, Johnson Research Labs, NY, August.  
 Invited Talk, Society for Historians of American Foreign Relations, Arlington, June.  
 Invited Talk, Columbia University, May.  
 Invited Talk, NLP Seminar, City University of New York, May.
- 2012 Invited Tutorial, Neural Information Processing Systems (NIPS), December.
- 2011 Invited Tutorial, Google Research, Mountain View, August.  
 Tutorial. Association of Computational Linguistic (ACL), June.  
 Invited Talk, ML Seminar, University of Massachusetts, Amherst, April.  
 ML Tea, MIT, January.
- 2010 NLP Seminar, USC/ISI, June.
- 2006 Invited Talk, Computational Linguistics Seminar, University of Pennsylvania, November.

#### Reviewing

Reviewer for:  
 EMNLP, NAACL, ACL, EACL (Natural Language Processing).  
 UAI, NIPS, ICML (Machine Learning).

**Misc**

General Manager of Harvard Radio Broadcasting (WHRB).

Member ACM Programming Team, Harvard University.

Experienced in C++, Python, Javascript, Haskell, Java, PHP, OCaml, LaTeX, HTML/CSS.

Beginning student of Jazz Piano.