School of Engineering and Applied Science
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Alexander M. Rush

Appointment

Harvard University School of Engineering and Applied Sciences
2015-. Assistant Professor of Computer Science

Facebook Artificial Intelligence Research Lab
2015. Post-Doctoral Fellowship
Advisor: Yann LeCunn

Education

Massachusetts Institute of Technology
2009-2014. Ph.D, Computer Science.
2011-2014. Columbia Visiting Scholar, Department of Computer Science.
Advisor: Michael Collins
Dissertation: *Relaxation Methods for Natural Language Decoding*.

Harvard University
2007. B.A., Computer Science.

Grants, Awards, and Major Service

2018	Google, Facebook, and Amazon AWS Faculty Award
	Senior Program Chair, ICLR (Deep Learning)
	Best Paper - Runner-Up, VAST (Visualization)
	Keynote, American Machine Translation Association
2017	National Science Foundation Award - Medium
	Bloomberg and Intel AI Collaboration Faculty Awards
	Best Demo - Runner-Up, ACL
2016	Microsoft Azure and Samsung AI Award
	Invitation IJCAI Early Research Spotlight
	Best Paper - Runner-Up, EMNLP
	NIPS Deep Learning Symposium (Invited Paper)
2015	NIPS Deep Learning Symposium (Invited Paper)
	Google Faculty Award
2012	Best Paper Award, NAACL
2010	Best Paper Award, EMNLP
2009	NSF Graduate Research Fellow, Computing Research Association

Publications

(Full list: http://bit.do/alexander-rush)

Conference Papers

Yoon Kim, Sam Wiseman, Alexander M. Rush. *Deep Latent-Variable Models for Natural Language.* *EMNLP 2018 (Tutorial)*

Yuntian Deng*, Yoon Kim*, Justin Chiu, Demi Guo, Alexander M. Rush. *Latent Alignment and Variational Attention.* *NIPS 2018*

Sam Wiseman, Alexander Rush. *Learning Neural Templates for Text Generation.* *EMNLP 2018*

Sebastian Gehrmann, Yuntian Deng, Alexander Rush. *Bottom-Up Abstractive Summarization.* *EMNLP 2018*

Luke Melas-Kyriazi, George Han, Alexander Rush. *Training for Diversity in Image Paragraph Captioning.* *EMNLP 2018 (Short)*

Luong Hoang, Sam Wiseman, Alexander Rush. *Entity Tracking Improves Cloze-style Reading Comprehension.* *EMNLP 2018 (Short)*

Hendrik Strobelt, Sebastian Gehrmann, Michael Behrisch, Adam Perer, Hanspeter Pfister, Alexander M. Rush. *Seq2Seq-Vis: A Visual Debugging Tool for Sequence-to-Sequence Models .* *VAST 2018, EMNLP-BlackBox 2018 (Best Paper - Honorable Mention)*

Alexander M. Rush. *The Annotated Transformer.* *ACL NLP-OSS 2018*

Jean Senellart, Dakun Zhang, Bo Wang, Guillaume Klein, J.P. Ramatchandirin, Josep Crego, Alexander M. Rush. *OpenNMT System Description for WNMT 2018: 800 words/sec on a single-core CPU.* *WNMT 2018 (First-Place CPU Speed/Memory)*

Yoon Kim, Sam Wiseman, Andrew C. Miller, David Sontag, Alexander M. Rush. *Semi-Amortized Variational Autoencoders.* *ICML 2018*

Brandon Reagen, Udit Gupta, Robert Adolf, Michael M. Mitzenmacher, Alexander M. Rush, Gu-Yeon Wei, David Brooks. *Compressing Deep Neural Networks with Probabilistic Data Structures.* *ICML 2018, SysML 2018*

Allen Schmaltz, Yoon Kim, Alexander M. Rush, Stuart M. Shieber. *Adapting Sequence Models for Sentence Correction.* *EMNLP 2017*

Sam Wiseman, Stuart M Shieber Alexander M. Rush. *Challenges in Data-to-Document Generation.* *EMNLP 2017*

Junbo Zhao, Yoon Kim, Kelly Zhang, Alexander M. Rush, Yann LeCun. *Adversarially Regularized Autoencoders.* *ICLM 2018, NIPS 2017 Workshop*

Guillaume Klein, Yoon Kim, Yuntian Deng, Jean Senellart, Alexander M. Rush. *OpenNMT: Open-Source Toolkit for Neural Machine Translation.* *ACL Demo 2017 (Best Demo Runner-up)*

Ankit Gupta, Alexander M. Rush. *Dilated Convolutions for Modeling Long-Distance Genomic Dependencies.* *ICML CompBio 2017 (Best Poster)*

Yuntian Deng, Anssi Kanervisto, Jeffrey Ling, and Alexander M. Rush. *Image-to-Markup Generation with Coarse-to-Fine Attention.* *ICML 2017*

Hendrik Strobelt, Sebastian Gehrmann, Hanspeter Pfister, and Alexander M. Rush. *LSTMVis: A Tool for Visual Analysis of Hidden State Dynamics in Recurrent Neural Networks.* *InfoVis 2017*

Yoon Kim, Carl Denton, Luong Hoang, and Alexander M. Rush. *Structured Attention Networks.* *ICLR 2017*

Greg Yang and Alexander M. Rush. *Lie-Access Neural Turing Machines.* *ICLR 2017*

Yoon Kim and Alexander M. Rush. *Sequence-Level Knowledge Distillation.* *EMNLP 2016*

Sam Wiseman and Alexander M. Rush. *Sequence-to-Sequence Learning as Beam-Search Opimization.* *EMNLP 2016 (Best Paper Runner-Up)*

Peter Kraft, Hirsh Jain, and Alexander M. Rush. *An Embedding Model for Predicting Roll-Call Votes.* *Proceedings of EMNLP 2016*

Allen Schmaltz, Alexander M. Rush, and Stuart M. Shieber. *Word Ordering Without Syntax.* *EMNLP 2016*

Allen Schmaltz, Yoon Kim, Alexander M. Rush, and Stuart M. Shieber. *Sentence-Level Grammatical Error Identification as Sequence-to-Sequence Correction.* *Workshop Submission for AESW 2016 (Top Performing System)*

Sam Wiseman, Alexander M. Rush, and Stuart M. Shieber. *Learning Global Features for Coreference Resolution.* *NAACL 2016*

Sumit Chopra, Michael Auli, and Alexander M. Rush. *Abstractive Sentence Summarization with Attentive Recurrent Neural Networks.* *NAACL 2016*

Yoon Kim, Yacine Jernite, David Sontag, and Alexander M. Rush. *Character-Aware Neural Language Models.* *AAAI 2016*

Alexander M. Rush, Sumit Chopra, and Jason Weston. *A Neural Attention Model for Abstractive Sentence Summarization.* *EMNLP 2015.*

Jason Weston, Antoine Bordes, Sumit Chopra, Tomas Mikolov, and Alexander M. Rush. *Towards AI-Complete Question Answering A Set of Prerequisite Toy Tasks.* *Arxiv Preprint*

Sam Wiseman, Alexander M. Rush, Jason Weston, and Stuart M. Shieber. *Learning Anaphoricity and Antecedent Ranking Features for Coreference Resolution.* *ACL 2015.*

Yacine Jernite, Alexander M. Rush, and David Sontag. *A Fast Variational Approach for Learning Markov Random Field Language Models.* *ICML 2015.*

Lingpeng Kong, Alexander M. Rush, and Noah A. Smith. *Transforming Dependencies into Phrase Structures. NAACL 2015.*

Yin-Wen Chang, Alexander M. Rush, John DeNero, and Michael Collins. *A Lagrangian Relaxation Algorithm for Bilingual Word Alignment*. 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.

Service

Senior Program Chair: ICLR (Deep Learning) 2019

Area Chair: NIPS 2018; NAACL (Machine Learning) 2016; ICLR (NLP) 2017, 2018; EMNLP (Generation/Summarization) 2017; ACL (Parsing and Tagging) 2017

Tutorial Chair: NAACL 2016

Teaching

2018 Instructor, Machine Learning for NLP (Rated 4.8/5) , Harvard University, Spring.

Instructor, Advanced Machine Learning , Harvard University, Fall.

2017 Instructor, Machine Learning , Harvard University, Spring.

Instructor, Graduate Machine Learning , Harvard University, Fall.

2016 Instructor, Machine Learning for NLP (Rated 4.9/5), Harvard University, Spring.

2015 Instructor, Artificial Intelligence, Harvard University, Fall.

2013 Instructor (with Michael Collins), Natural Language Processing, Columbia University, 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.

Patents

A neural attention model for abstactive summarization (Facebook). Alexander M. Rush, Sumit Chopra, Jason Weston 2017.

Techniques for discriminative dependency parsing (Google). Slav Petrov, Alexander M. Rush, 2015.

Efficient parsing with structured prediction cascades (Google). Slav Petrov, Alexander M. Rush, 2013

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

Libraries

Seq2Seq-Vis

Collaboration with IBM to develop an interactive visualization for translation models.

OpenNMT

Open-source neural machine translation system. Used in over 200 publications, and deployed by major translation providers such as Systran International.

The Annotated Transformer

An educational line-by-Line implementation of Google's Transformer architecture. Has been viewed over 60,000 times over the past year.

Academic Internships

Research Intern, *Google Research*, 2011 – 2013 , New York, NY. Advisor: Slav Petrov.

Research Intern, *USC/ISI* , Summer 2010, Marina Del Rey, CA. Advisor: Liang Huang.

Industry

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

Developed compiler for Facebook Markup Language (FBML) to sanitize user content.

Developed system for crowd-sourced translation of Facebook user text.

Invited Talks

2019 Colloquium, Tel Aviv University, Fall.

Colloquium, University of Edinburgh, Fall.

2018 Invited Talk, University of Washington, Spring.

Invited Talk, Allen Institute for AI, Spring.

Invited Talk, MSR, Spring.

Keynote, American Machine Translation Association, Spring.

Invited Talk, University of Texas, Spring.

Invited Talk, University of Maryland, Spring.

Invited Talk, Georgetown, Spring.

Invited Talk, Lisbon ML Summer School, Summer.

Invited Talk, Columbia University, Fall.

Invited Talk, New York University - Text as Data, Fall.

Tutorial, EMNLP, Fall.

2017 Invited Talk, Google Faculty Day, Spring.

Invited Talk, New England Machine Learning Day, Spring.

Invited Talk, Google, Spring.

Invited Talk, Berkeley CS, Spring.

Invited Talk, Notre Dame, Spring.

Colloquium, TTI-Chicago, Spring.

Invited Talk, Apple, Siri Team, Spring.

Colloquium, Samsung Global AI Forum, Fall.

Invited Talk, AMD, Fall.

2016 Invited Talk, NYU, Fall.
Invited Talk, BBN Research, Fall.
Invited Talk, Bloomberg, Fall.
Invited Talk (Speech Group), MIT, Fall.
Invited Talk, IBM Research, Fall.
Colloquium, CMU, Fall.
Invited Talk, Stanford NLP, Summer.
Invited Talk, Oracle Labs, Summer.
Invited Talk, Twitter, Summer.
Colloquium, John Hopkins University, Spring.
Colloquium, Rakuten, Spring.

2014 Colloquium, University of Washington, Spring.
Colloquium, NYU, Spring.
Colloquium, CMU, Spring.
Colloquium, MIT, Spring.
Colloquium, Harvard, Spring.
Colloquium, TTIC, Spring.
Colloquium, University of Maryland, Spring.

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, Spring.
Invited Talk, NLP Seminar, City University of New York, Spring.

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, Spring.
ML Tea, MIT, January.

2010 NLP Seminar, USC/ISI, Summer.

2006 Invited Talk, Computational Linguistics Seminar, University of Pennsylvania, November.