Jason Naradowsky

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Research Interests

Machine Reading, Imitation Learning, Graphical Models, Joint inference, Machine Translation, Morphologically-rich Languages, Language Acquisition

Education

2008–2014 **PhD in Computer Science**, *University of Massachusetts Amherst*.
Advisor: David A. Smith
Certificate in Cognitive Science

2011–2014 **PhD in Computer Science**, *Macquarie University*.
Advisor: Mark Johnson

2008 **MSc, Artificial Intelligence**, *University of Edinburgh*.
Thesis: Improving Morphology Induction with Phonological Rules
Advisor: Sharon Goldwater

2007 **MS, Computational Linguistics**, *State University of New York at Buffalo*.
Thesis: The Effect of Frequencies and Unseen Events on Parser Portability
Advisor: Doug Roland

2006 **MA, Human Computer Interaction**, *State University of New York at Oswego*.
Thesis: Neural Networks for Automated Design Evaluation
Advisor: Craig Graci

2001-2005 **BS, Computer Science**, *State University of New York at Oswego*.

2001-2005 **BA, Linguistics**, *State University of New York at Oswego*.
Specialization: Artificial Intelligence, with Honors
Thesis: Baroque Music Generation using Genetic Algorithms with Theory-based Crossover
Minor: Cognitive Science

Summer Schools

2007 Linguistic Society of America Summer Institute 2007
Stanford University, Palo Alto, CA

Doctoral Thesis

Title *Learning with Joint Inference and Latent Linguistic Structure in Graphical Models*
Supervisors David A. Smith and Mark Johnson

Committee 1 Ben Marlin, Andrew McCallum, Joe Pater, and Kristina Toutanova

Committee 2 Tiberio Caetano, Ben Marlin, Luke Zettlemoyer

Description Developed a modeling framework for constructing joint factor graph models of NLP problems, and described how latent combinatorially-constrained syntactic representations can be marginalized over during training to produce task-specific syntactic distributions without the need for treebanks.

Research Experience

2016–current **Research Scientist**

Supervisor: Anna Korhonen

University of Cambridge, Cambridge, England

2016 **Senior Research Associate**

2014–2016 **Research Associate**

Supervisor: Sebastian Riedel

University College London, London, England

Developed techniques for event extraction with distance supervision, matrix factorization, and pointer networks. The resulting system improved upon the state-of-the-art on an established dataset by up to 50% while requiring less linguistic annotation and pre-processing. Made connections between α-bound theory and regularisation for cost-sensitive imitation learning, which led to improvements in both AMR parsing and coreference. Also explored multilingual word representations, probabilistic programming, task-directed parsing, and exam question answering.

2012 **Visiting Researcher**

Nara Institute of Science and Technology (NAIST), Nara, Japan

Advisor: Yuji Matsumoto

Explored techniques of incorporating syntactic information into sequence models for part-of-speech tagging in inflectional languages. Developed novel coarse-to-fine approach based on relaxations to marginal inference.

2010 **Research Intern**

Microsoft Research, Redmond, WA

Advisor: Kristina Toutanova

Research in morpheme-based alignment models for machine translation. Resulted in a model for joint morpheme segmentation and alignment based on the HMM alignment model which improved alignment quality and outperformed all previous results on monolingual morphological segmentation for Arabic.

2008-2011 **Research Assistant**

Computer Science Department, University of Massachusetts Amherst

Advisors: Andrew McCallum and David A. Smith

Research in unsupervised language learning, topic-modeling, parsing, named entity recognition, graphical models, and joint inference.

2008 **Google Summer of Code 2008**

Project: Dependency Parsing in the Natural Language Toolkit

Advisors: Sebastian Riedel and Jason Baldridge

Implemented a suite of four dependency parsers, relevant interfaces, and readers for commonly-used corpora.

2005-2006 **Research Assistant**

Psychology Department, State University of New York at Oswego

Advisors: Lin Qiu and Songmei Han

Research on cross-cultural HCI and adaptive feedback systems. Developed web applications for testing interface usability and, in a separate project, augmented a program to provide adaptive natural language critiques for Java code. Conducted a set of experiments using undergraduate student participants for both projects.

Teaching Experience

Fall 2009 Grader, Computer Science Department, University of Massachusetts Amherst

Class: CMPSCI 585: Introduction to Natural Language Processing

Instructor: David A. Smith

Advising

Masters Students

Chris Loy, University College London, 2016

Thesis: Deep Hierarchical Architectures for Polyphonic Music Transcription

James Goodman, Co-advised with Andreas Vlachos, University College London, 2015

Thesis: Semantic Parsing from English to AMR using Imitation Learning

Undergraduate Committee

Elias Zeidan, Marlboro College, 2013

Tutorials

Matrix and Tensor Factorization Methods for Natural Language Processing
Presented at ACL 2015

Invited Talks

[1] *Distantly Supervised Event Extraction with Pointer Networks*
Komachi-ken, Tokyo Metropolitan University, June 9th, 2016

[2] *Computers that Read: Uncovering the Structure of Language with Deep Learning*
Presented with Pontus Stenetorp
Artificial Intelligent Association, Osaka University, June 6th, 2016

[3] *Distantly Supervised Event Extraction with Pointer Networks*
Matsumoto-ken, NAIST, June 3rd, 2016

[4] *Artificial Intelligence: A Rationalist Perspective on the Past and Future of AI*
PechaKucha, presented with Sebastian Riedel
Embassy of Japan, London, March 23rd, 2016

[5] *Deep Sequence Models, Multimodality & Conversational Agents*
Miyake-ken, Osaka University, Nov 5th, 2015

[6] *Learning Latent Syntactic Representations with Joint Models*
Xerox Research Center, Grenoble, April 16th, 2015

[7] *Learning Latent Syntactic Representations with Joint Models*
Cambridge University, March 13th, 2015

Publications

Refereed Conference Proceedings

[1] James Goodman, Andreas Vlachos, and Jason Naradowsky. Noise reduction and targeted exploration in imitation learning for abstract meaning representation parsing. In *Association for Computational Linguistics (ACL)*, 2016.

[2] James Goodman, Andreas Vlachos, and Jason Naradowsky. Ucl+sheffield at semeval-2016 task 8: Imitation learning for amr parsing with an alpha-bound. In *Proceedings of the 10th International Workshop on Semantic Evaluation*, 2016.

[3] Jason Naradowsky, Sebastian Riedel, and David Smith. Improving nlp through marginalization of hidden syntactic structure. In *Conference on Empirical Methods in Natural Language Processing (EMNLP)*, 2012.

[4] Jason Naradowsky, Tim Vieira, and David A. Smith. Grammarless parsing for joint inference. In *24th International Conference on Computational Linguistics (COLING)*, Mumbai, India, 2012.

[5] John Lee, Jason Naradowsky, and David Smith. A discriminative model for joint morphological disambiguation and dependency parsing. In *Association for Computational Linguistics (ACL)*, 2011.

[6] Jason Naradowsky and Kristina Toutanova. Unsupervised bilingual morpheme segmentation and alignment with context-rich hidden semi-markov models. In *Association for Computational Linguistics (ACL)*, 2011.

[7] David Mimno, Hanna Wallach, Jason Naradowsky, David Smith, and Andrew McCallum. Polylingual topic models. In *Conference on Empirical Methods in Natural Language Processing (EMNLP)*, 2009.

[8] Jason Naradowsky and Sharon Goldwater. Improving morphology induction by learning spelling rules. In *International Joint Conference on AI (IJCAI)*, pages 1531–1537, 2009.

Workshop Proceedings

[1] Matko Bošnjak, Tim Rocktäschel, Jason Naradowsky, and Sebastian Riedel. A neural forth abstract machine. In *Neural Abstract Machines & Program Induction (NAMPI)*, Barcelona, 2016.

[2] Matko Bošnjak, Tim Rocktäschel, Jason Naradowsky, and Sebastian Riedel. A neural forth abstract machine. In *RNN Symposium*, Barcelona, 2016.

[3] Jason Naradowsky, Joe Pater, and David Smith. Feature induction for online constraint-based phonology acquisition. In *The Northeast Computational Phonology Workshop (NECPhon)*, New Haven, Connecticut, 2011.

[4] Jason Naradowsky, Joe Pater, David Smith, and Robert Staubs. Learning hidden metrical structure with a log-linear model of grammar. In *Computational Modelling of Sound Pattern Acquisition*, pages 59–60, Edmonton, 2010.

[5] David Mimno, Hanna Wallach, Limin Yao, and Jason Naradowsky. Polylingual topic models. In *The Learning Workshop (Snowbird)*, Clearwater, Florida, 2009.

Demo Proceedings

[1] Sameer Singh, Tim Rocktäschel, Luke Hewitt, Jason Naradowsky, and Sebastian Riedel. WOLFE: An NLP-friendly Declarative Machine Learning Stack. In *Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL)*, 2015.

Professional Service

Program Committee

2017 ACL, EACL, EthNLP
2016 ACL, AKBC, COLING, EMNLP
2015 ACL, AKBC
2014 ACL, EMNLP
2013 ACL, IJCNLP
2012 ACL, ACL-SRW, EACL, EMNLP
2011 ACL, CoNLL, EMNLP, IJCNLP
2010 EMNLP, NESCAI

Standing Reviewer

2016- Transactions of the American Association for Computational Linguistics (TACL)

Journal Reviewer

2015 Transactions on Audio, Speech and Language Processing (T-ASL)

Organizer

2016 AI4Exams, with Yusuke Miyao & Sebastian Riedel

Awards and Achievements

2015 Daiwa Foundation Small Grant Award

2014 Best Reviewer, ACL 2014

2012 East Asia and Pacific Summer Institute (EAPSI) Fellowship
National Science Foundation

2012 Best Reviewer, EMNLP 2012

2011 Cotutelle International Macquarie University Research Scholarship (iMQRES)
Macquarie University

2011 Institute for Computational and Experimental Study of Language (ICESL) Seed Grant

University of Massachusetts Amherst

2005 Oebele Van Dyk Outstanding Senior in Computer Science Award
State University of New York at Oswego

2001-2005 Presidential Scholarship
State University of New York at Oswego

Personal Details

Citizenship: USA
Date of Birth: July 9th, 1983
Languages: English (native), Latin (reading), Japanese (beginner)
Programming Languages: Scala, Java, Python, Ruby, LISP, Clojure
Notable Packages: TensorFlow