

Pat Verga | Curriculum Vitae

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Information Extraction, machine learning, natural language processing, neural nets, and knowledge bases.

Education

- **Ph.D. Computer Science** **University of Massachusetts Amherst**
Expected Sept 2018
Advisor: Andrew McCallum
- **M.S. Computer Science** **University of Massachusetts Amherst**
December 2014
GPA: 3.6
- **B.S. Neuroscience, B.A. Computer Science** **University of Massachusetts Amherst**
May 2012
GPA: 3.5, Minor: Philosophy

Research Experience

- **Research Assistant** **University of Massachusetts Amherst**
Feb 2015 – present
Information Extraction and Synthesis Lab, Prof. Andrew McCallum
Developed methods for efficient entity extraction [2], multilingual relation extraction with Universal Schema [4], and generalizing Universal Schema to unseen entities with fewer parameters [3, 5]. My model and implementation placed first in the 2016 TAC KBP Spanish slot filling and knowledge base population tracks [6, 7] and is the top performer on the kbpo.stanford.edu leaderboard.
- **Research Scientist Intern** **Chan Zuckerberg Initiative**
May 2017 – Aug 2017
Meta, Ofer Shai
Developed an efficient state of the art model for full abstract end-to-end biomedical entity and relation extraction using a Transformer attention encoder with biaffine pairwise scoring between all mention pairs [1].
- **Software Engineer Intern** **Google Research**
June 2016 – September 2016
Commonsense Team, Colin Evans and Chris Waterson
Designed and implemented models for commonsense relation extraction in 13 languages using Compositional Universal Schema.
- **Research Assistant** **University of Massachusetts Amherst**
May 2013 – Feb 2015
Center for Intelligent Information Retrieval, Prof. James Allan
Developed unsupervised clustering algorithms to efficiently group anonymous classified ads by authorship. TREC 2014 conference web retrieval track participant using an entity-based query expansion retrieval model [9].
- **Research Assistant** **University of Massachusetts Amherst**
May 2011 – May 2013
BINDS Lab, Prof. Hava Siegelmann
Computational neuroscience modeling of reconsolidation in a kernel-based attractor neural network [10]. Developed gesture recognition system for human robot interaction.
- **Research Assistant** **University of Massachusetts Amherst**
Sep 2010 – Sep 2011
Cognition & Action Lab, Profs. Rebecca Spencer and Ed Pace-Schott
Showed experimentally that sleep is able to enhance extinction memory learning and can be used to enhance exposure therapy [8, 11, 12]. Performed psychophysiological experiments on human participants. Implemented scripts to detect thalamo-cortical sleep spindles in polysomnography signal data to study the effects of sleep on learning.

Work Experience

- **Software Engineering Intern**
CRM Team

Trip Advisor
May 2013 – August 2013

Added additional logging to live site and created scripts for data aggregation.

Teaching Experience

- **Research Mentor** **University of Massachusetts Amherst**
Information Extraction and Synthesis Lab Sept 2016 – Present
Mentored numerous undergraduate, masters, and junior PhD students. Defined projects, concrete goals and subtasks. Explained different machine learning and information extraction concepts and debugged blockers.
- **Research Mentor** **University of Massachusetts Amherst**
Data Science Summer REU June 2015 – Aug 2015
Mentored an undergraduate researcher. Defined project of producing multilingual word embeddings using dictionary pairs and no sentence alignment. Met with, assisted, and guided the student to successfully complete the project.
- **Teaching Assistant** **University of Massachusetts Amherst**
Data Structures, Prof. James Allan Sep 2013 – Dec 2013
Led weekly discussion sections. Graded tests and homework assignments. Assisted students in office hours.

Professional Activities & Service

- **Department Graduate Representative**, Attended weekly faculty meetings and voted on issues representing the graduate students. Interviewed faculty candidates. 2015 – 2016.
- **Women in Engineering and Computing Career Day**, Assisted in running day-long workshop for high school girls to learn Scratch programming language. 2015 and 2016.
- **Girls Inc. Eureka! Workshop**, Assisted in running week long workshop for middle school girls to learn Scratch programming language and eventually control games with micro-controllers. 2015.

Awards / Honors

- **Howard Hughes Medical Institute Research Fellowship** University of Massachusetts Amherst, Was selected to receive 12 weeks of funding to study the effects of sleep on consolidation and generalization of fear extinction learning. 2010

Publications

[1]Patrick Verga, Emma Strubell, Ofer Shai, and Andrew McCallum. **Attending to All Mention Pairs for Full Abstract Biological Relation Extraction**. *Arxiv*, 2017.

[2]Emma Strubell, Patrick Verga, David Belanger, and Andrew McCallum. **Fast and Accurate Entity Recognition with Iterated Dilated Convolutions**. In *Proceedings of the 2017 Conference on Empirical Methods in Natural Language Processing*, pages 2660–2670, Copenhagen, Denmark, September 2017. Association for Computational Linguistics.

[3]Patrick Verga, Arvind Neelakantan, and Andrew McCallum. **Generalizing to Unseen Entities and Entity Pairs with Row-less Universal Schema**. In *Proceedings of the 15th Conference of the European Chapter of the Association for Computational Linguistics: Volume 1, Long Papers*, pages 613–622, Valencia, Spain, April 2017. Association for Computational Linguistics.

[4]Patrick Verga, David Belanger, Emma Strubell, Benjamin Roth, and Andrew McCallum. **Multilingual Relation Extraction using Compositional Universal Schema**. In *Proceedings of the 2016 Conference of*

the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, pages 886–896, San Diego, California, June 2016. Association for Computational Linguistics.

[5]**Patrick Verga** and Andrew McCallum. **Row-less Universal Schema**. In *Proceedings of the 5th Workshop on Automated Knowledge Base Construction*, pages 63–68, San Diego, CA, June 2016. Association for Computational Linguistics.

[6]Haw-Shiuan Chang, Abdurrahman Munir, Ao Liu, Johnny Tian-Zheng Wei, Aaron Traylor, Ajay Nagesh, Nicholas Monath, **Patrick Verga**, Emma Strubell, and Andrew McCallum. **Extracting Multilingual Relations under Limited Resources: TAC 2016 Cold-Start KB construction and Slot-Filling using Compositional Universal Schema**. *TAC KBP Workshop*, 2016.

[7]Bejamin Roth, Nicholas Monath, David Belanger, Emma Strubell, **Patrick Verga**, and Andrew McCallum. **Building Knowledge Bases with Universal Schema: Cold Start and Slot-Filling Approaches**. *TAC KBP Workshop*, 2015.

[8]Edward F Pace-Schott, Zoe S Rubin, Lauren E Tracy, Rebecca MC Spencer, Scott P Orr, and **Verga, Patrick W**. **Emotional trait and memory associates of sleep timing and quality**. *Psychiatry research*, 229(3):999–1010, 2015.

[9]Laura Dietz and **Patrick Verga**. **UMass at TREC WEB 2014: Entity Query Feature Expansion using Knowledge Base Links**. In *Proceedings of the TREC 2014 Conference*, 2014.

[10]Dimitri Nowicki, **Patrick Verga**, and Hava Siegelmann. **Modeling Reconsolidation in Kernel Associative Memory**. *PloS one*, 2013.

[11]Edward F Pace-Schott, Rebecca Spencer, Shilpa Vijayakumar, Nafis A K Ahmed, **Patrick W Verga**, Scott P Orr, Roger K Pitman, and Mohammed R Milad. **Extinction of conditioned fear is better learned and recalled in the morning than in the evening**. *Journal of psychiatric research*, 2013.

[12]Edward F Pace-Schott, **Patrick W Verga**, Tobias S Bennett, and Rebecca Spencer. **Sleep promotes consolidation and generalization of extinction learning in simulated exposure therapy for spider fear**. *Journal of psychiatric research*, 2012.