

William Merrill

<https://lambdaviking.com/>

Last updated September 9, 2019

RESEARCH INTERESTS

Natural language processing, computational linguistics, formal language theory, machine learning, interpretability of neural networks, parsing, historical linguistics

PROFESSIONAL EXPERIENCE

| | | |
|---------------------|-----------|--|
| AI2 | 2019– | Research Resident on AllenNLP team |
| Google | 2018 | Software Engineering Intern <i>“Exceeds expectations” rating; return offer</i> |
| Boston College | 2017 | Research Intern in Language Learning Lab |
| New York University | 2013–2015 | Research Intern in Morphology Lab |

EDUCATION

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|-----------------|-----------|---|
| Yale University | 2015–2019 | B.S. with distinction in Computer Science B.A. with distinction in Linguistics Thesis: Sequential neural networks as automata <i>Cum laude; note of excellence on thesis</i> |
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PUBLICATIONS

William Merrill. Sequential neural networks as automata. In *Proceedings of the Workshop on Deep Learning and Formal Languages: Building Bridges*, pages 1–13, Florence, August 2019. Association for Computational Linguistics. URL <https://www.aclweb.org/anthology/W19-3901>.

William Merrill, Lenny Khazan, Noah Amsel, Yiding Hao, Simon Mendelsohn, and Robert Frank. Finding hierarchical structure in neural stacks using unsupervised parsing. In *Proceedings of the 2019 ACL Workshop BlackboxNLP: Analyzing and Interpreting Neural Networks for NLP*, pages 224–232, Florence, Italy, August 2019a. Association for Computational Linguistics. URL <https://www.aclweb.org/anthology/W19-4823>.

William Merrill, Gigi Stark, and Robert Frank. Detecting syntactic change using a neural part-of-speech tagger. In *Proceedings of the 1st International Workshop on Computational Approaches to Historical Language Change*, pages 167–174, Florence, Italy, August 2019b. Association for Computational Linguistics. URL <https://www.aclweb.org/anthology/W19-4721>.

Yiding Hao, William Merrill, Dana Angluin, Robert Frank, Noah Amsel, Andrew Benz, and Simon Mendelsohn. Context-free transductions with neural stacks. In Tal Linzen, Grzegorz Chrupała, and Afra Alishahi, editors, *Proceedings of the 2018 EMNLP Workshop BlackboxNLP: Analyzing and Interpreting Neural Networks for NLP*, pages 306–315, Brussels, Belgium, November 2018. Association for Computational Linguistics. URL <https://www.aclweb.org/anthology/W18-5433>.

Jungo Kasai, Robert Frank, Pauli Xu, William Merrill, and Owen Rambow. End-to-end graph-based TAG parsing with neural networks. In *Proceedings of the 2018 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, NAACL-HLT 2018, New Orleans, Louisiana, USA, June 1-6, 2018, Volume 1 (Long Papers)*, pages 1181–1194, 2018. URL <https://aclanthology.info/papers/N18-1107/n18-1107>.

William Merrill. A semantics of subordinate clauses using delayed evaluation. *Toronto Undergraduate Linguistics Conference*, 2018. URL <https://ling.auf.net/lingbuzz/003487>.

INVITED TALKS

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| BlackboxNLP | 2018 | <i>Context-free transductions with neural stacks</i> |
| Packer Symposium | 2018 | Neural networks, L2 acquisition, and the Voynich |
| CodeHaven | 2018 | Programming, language, and <i>The Book of Thoth</i> |
| TULCon | 2018 | <i>A semantics of subordinate clauses using delayed evaluation</i> |

SELECTED PUBLIC SOFTWARE

- **StackNN**: Differentiable stacks, queues, and dequeues in PyTorch
- **Voynich2Vec**: Word embedding analysis of the Voynich manuscript

- **The Book of Thoth:** A puzzle game with dynamic spell casting in Ancient Egyptian

BLOG POSTS

NLP

- Capsule networks for NLP
- Review: Learning to transduce with unbounded memory
- Word2vec analysis of the Voynich manuscript

Translations

- The Wanderer (Old English)
- After Ragnarok (Old Norse)
- The Saga of Mary (Old Norse)

TEACHING ASSISTANT EXPERIENCE

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| CPSC 477 | Natural Language Processing | Spring 2019 |
| CPSC 477 | Natural Language Processing | Spring 2018 |
| CPSC 470 | Artificial Intelligence | Fall 2017 |

All courses were taught by Dragomir Radev at Yale

SERVICE

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| Yale Tangut Language Workshop | 2018 | Student workshop facilitator |
| Yale NACLO | 2017 | Student volunteer |
| Yale Kitan Language Workshop | 2016 | Student workshop facilitator |
| CodeHaven | 2016–2018 | Student volunteer |

LAB AFFILIATIONS

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| Computational Linguistics at Yale | 2016–2019 | <i>Robert Frank, Dana Angluin</i> |
| Language Learning Lab | 2017 | <i>Joshua Hartshorne</i> |
| Morphology Lab | 2013–2015 | <i>Alec Marantz</i> |

AWARDS AND GRANTS

- **DELFOL student travel grant** presented by Naver Labs (2019)
- **Mellon grant** for senior thesis work, presented by Benjamin Franklin College at Yale University (2019)
- **Grace Hopper prize** for computer science finalist (2017)
- Buckley Program **open essay contest finalist** (2016)
- Yale College **freshman rap battle champion** (2016)
- **Rising scientist award** presented by the Child Mind Institute (2015)
- **National Merit Scholarship** letter of commendation (2013)
- **Study of American history award** presented by the Society of Mayflower Descendants (2013)
- National Latin Exam *cum honore maximo egregio* (2010)

SELECTED COURSEWORK

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| <i>AI/NLP</i> | Selected Topics in Neural Networks Advanced Natural Language Processing Computational Vision and Biological Perception Neural Networks and Language Natural Language Processing Deep Learning Theory and Applications Computing Meanings |
| <i>CS Theory</i> | Computational Complexity Theory Computability and Logic Systems Programming and Computer Organization Design and Analysis of Algorithms Data Structures and Programming Techniques |
| <i>Linguistics</i> | Syntax I Semantics I Phonology I Indo-European Linguistics Old English Hybrid Grammars Formal Foundations of Linguistic Theory |
| <i>Math</i> | Introduction to Analysis Vector Calculus and Linear Algebra I Vector Calculus and Linear Algebra II |