

## Nelson F. Liu

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### EDUCATION

**University of Washington**, Seattle, Washington  
B.S. with Distinction in Computer Science, B.A. in Linguistics  
Expected graduation date: June 2019  
Advisor: Noah A. Smith

### PUBLICATIONS

- [1] *LSTMs Exploit Linguistic Attributes of Data*  
**Nelson F. Liu**, Omer Levy, Roy Schwartz, Chenhao Tan and Noah A. Smith. In *Proceedings of the ACL Workshop on Representation Learning for NLP* (RepL4NLP 2018). July 2018.  
**Best Paper Award.**
- [2] *AllenNLP: A Deep Semantic Natural Language Processing Platform*  
Matt Gardner, Joel Grus, Mark Neumann, Oyvind Tafjord, Pradeep Dasigi, **Nelson F. Liu**, Matthew Peters, Michael Schmitz, and Luke Zettlemoyer. In *Proceedings of the ACL Workshop for Natural Language Processing Open Source Software* (NLP-OSS 2018). July 2018.
- [3] *Discovering Phonesthemes with Sparse Regularization*  
**Nelson F. Liu**, Gina-Anne Levow, and Noah A. Smith. In *Proceedings of the NAACL Workshop on Subword and Character Level Models in NLP* (SCLem 2018). June 2018.
- [4] *ELISA System Description for LoReHLT 2017*  
Leon Cheung, Thamme Gowda, Ulf Hermjakob, **Nelson Liu**, Jonathan May, Alexandra Mayn, Nima Pourdamghani, Michael Pust, Kevin Knight, 32 others (names ordered alphabetically and by affiliation). In *Proceedings of the NIST LoReHLT 2017 Workshop*. September 2017.
- [5] *Crowdsourcing Multiple Choice Science Questions*  
Johannes Welbl, **Nelson F. Liu**, and Matt Gardner. In *Proceedings of the EMNLP Workshop on Noisy User-generated Text* (WNUT 2017). September 2017.

### UNPUBLISHED MANUSCRIPTS

- [6] *Augmenting Statistical Machine Translation with Subword Translation of Out-of-Vocabulary Words*  
**Nelson F. Liu**, Jonathan May, Michael Pust and Kevin Knight. arXiv:1808.05700. August 2018.

### RESEARCH EXPERIENCE

**University of Washington Computer Science and Engineering** Seattle, Washington  
*Noah's ARK Group Undergraduate Researcher* **September 2015 - present**

- Investigated how the properties of natural language data affect RNN generalization; RNNs trained on non-linguistic tasks learn to pick up on linguistic features, and that such linguistic features aid generalization [1].
- Studied phonesthemes, a noted exception to the arbitrariness of language, by building models to extract them from text [3].
- Built a model for predicting Supreme Court case outcomes from the text of amicus briefs and other court documents. Analyzed the resultant clusters of key phrases that were indicative of each justices decisions.
- Advisor: Professor Noah A. Smith

**Allen Institute for Artificial Intelligence (AI2)** Seattle, Washington  
*Research Intern (Part-Time)* **September 2018 - present**  
*Research Intern* **June - September 2018**

Analyzing and interpreting deep contextualized word representations to discover what linguistic knowledge they capture and what aspects they miss.

- Advisors: Dr. Matt Gardner and Professor Noah A. Smith

**USC Information Sciences Institute** Marina del Rey, California  
*Natural Language Group Research Intern* **June 2017 - September 2017**

Worked on language-independent translation of rare and out-of-vocabulary words, particularly with neural sequence to sequence models [4, 6].

- Advisors: Professor Kevin Knight and Professor Jonathan May

**Allen Institute for Artificial Intelligence (AI2)**

Seattle, Washington

*Research Intern***January - March 2017**

Conducted transfer learning experiments to improve generalization across domains in multiple choice and span-predicting reading comprehension models [5].

- Also built significant portions of `deep_qa`, a framework for machine comprehension research on top of Keras. This formed the basis of the `AllenNLP` project [2].
- Advisor: Dr. Matt Gardner

**FELLOWSHIPS,  
AWARDS &  
HONORS**

Finalist, CRA Outstanding Undergraduate Researcher Award, 2019  
 Washington Research Foundation Fellowship, 2018  
 Best Paper Award, ACL 2018 Workshop on Representation Learning for NLP (RepL4NLP 2018) [1]  
 Barry M. Goldwater Scholarship, 2018  
 Phi Beta Kappa, 2017  
 Washington Research Foundation Fellowship, 2017  
 UW HPCC Cloud Credit Grant Award, 2017  
 Mary Gates Research Scholarship, 2016  
 SciPy Scholarship, 2016

**TEACHING  
EXPERIENCE**
**Natural Language Processing (CSE 447 / CSE M 547)***Teaching Assistant***January - March 2019**

Assisting with course planning and development, leading a weekly discussion section, and holding weekly office hours. Developing new teaching material based on `AllenNLP`.

- Instructor: Professor Noah Smith

**University of Washington CSE Direct Admit Seminar***Teaching Assistant***September - December 2018**

Organizing and leading a seminar for first-year computer science students interested in getting involved in undergraduate research and pursuing research-based careers.

**Natural Language Processing Capstone (CSE 481N)***Teaching Assistant***March - June 2018**

Advised teams of senior undergraduates and masters students on the design and implementation of original NLP projects.

- Instructor: Professor Yejin Choi

**Natural Language Processing (CSE 447 / CSE M 547)***Teaching Assistant***January - March 2018**

Assisted with course planning and development, led a weekly discussion section, and held weekly office hours. Developed and administered a new PyTorch-based SQuAD reading comprehension project assignment.

- Instructor: Professor Yejin Choi

**PROFESSIONAL  
EXPERIENCE**
**scikit-learn***Google Summer of Code Developer***May - August 2016**

Contributed to the popular Python machine learning library `scikit-learn`. Implementing various enhancements to decision tree module, most notably adding a adding new impurity splitting criterion and tree pruning.

**LEADERSHIP****Machines Who Learn***Organizer***2016 - Present***Officer***2015 - 2016**

- Organizing and leading a machine learning and data science student organization at the University of Washington.
- Organizing a reading group for students interested in discussing recent and seminal papers in AI (mostly NLP, vision, and robotics).

**University of Washington Undergraduate Research Leader****2017 - Present**

- Helping undergraduates get involved in undergraduate research, and encouraging them to do so.
- Leading workshops, speaking to classes, participating in panels, and designing outreach events to help current and prospective students learn more about undergraduate research.

PROFESSIONAL SERVICE     **Reviewing:**    ACL 2018 (Secondary), EMNLP 2018 (Secondary), EMNLP 2018 Workshop on Analyzing and Interpreting Neural Networks for NLP

SELECTED PERSONAL / OPEN SOURCE PROJECTS     **AllenNLP**  
*Contributor*

A software library with abstractions for NLP research, written on top of PyTorch. Also see [2].

**scikit-learn**

*Contributor*

Popular machine learning toolkit for Python. I contribute Python and Cython patches to the project, answer questions on the project mailing list and issue tracker, and review contributions from other developers.