Kevin Stowe | PhD.

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Introduction

I am currently employed as a postdoctoral researcher with the Ubiquitous Knowledge Processing (UKP) lab under Prof. Dr. Iryna Gurevych at the Technical University of Darmstadt. My research projects include computational approaches to creative language, crisis informatics, and text analytics for social good. I develop research plans, assist with grant writing, mentor junior lab members, and coordinate within-lab research groups.
I received my joint doctorate in Linguistics and Computer Science from the University of Colorado in 2019, focused on Natural Language Processing (NLP). My research areas include computational creativity, semantics, crisis informatics, and AI for social good. I am fascinated by the variety of language utterances people produce and understand, and my work tends to deal with the computational frameworks necessary to handle these novelties. My dissertation research is on how to better represent syntactic information for automatic detection and interpretation of metaphors. I've employed novel methods for improving training data based on linguistic analysis, and improved the performance of state-of-the-art systems for multiple metaphor tasks.

Technical skills

- **Programming** Proficient in Python and Java, with some experience in C++, Ruby, R, PHP, and SQL. Also web development experience with HTML, CSS, Javascript and PHP.
- **Natural Language Processing** Extensive experience with machine learning and NLP toolkits, including HuggingFace, SciKit-Learn, ClearNLP, Stanford Core NLP, Gensim, PyTorch and Keras. Familiar with a variety of NLP tasks, including sentiment analysis, natural language generation, classification and regression with transformers, and more.
- **Linguistics** Traditional background in phonetics, phonology, morphology, syntax, and semantics. My primary interests are in lexical semantics, pragmatics, formal logic, and metaphor interpretation.
- **Management** I've managed a variety of annotation projects, including behavioral annotation of Twitter data and word sense annotation, using Excel as well as custom in-house tools. I co-lead a special interest group within our lab, as well as mentoring junior lab members and supervising student theses.
- **Professional** I pride myself in collaboration with diverse groups: I've worked with a wide variety of computer scientists, social scientists, and non-academics to accomplish research goals. I'm proficient in research and grant writing, including copy-editing in English. I'm effective at managing time and resources, and developing and executing short- and long-term research plans.

Education

- **University of Colorado, Boulder** — **Boulder, Colorado**
  PhD, Advisors: Martha Palmer, Jim Martin — *2013–2019*
  Joint degree in Linguistics and Computer Science through the Institute of Cognitive Science (ICS).

Main CS Coursework	**Main Ling Coursework**
Machine Learning	Computational Lexical Semantics
Fundamentals of Programming Languages	Construction Grammar
Natural Language Processing	Computational Phonology
User-Centered Design	Semantics and Pragmatics
Computation for Research	Phonology, Morphology, Syntax

- **Indiana University** — **Bloomington, Indiana**
  MA, Linguistics — *2009–2011*
  Coursework in corpus linguistics, computational approaches to syntax, discrete mathematics and natural language processing.

- **Michigan State University** — **East Lansing, Michigan**
  BA, Linguistics — *2004–2009*
  Coursework included core linguistics, advanced semantics and pragmatics, and German and Russian languages.

Research Projects

Current (UKP)

- **Creative Natural Language Generation**
  Working on a variety of approaches to generating creative language. We're experimenting with deep learning methods for language generation, and attempting to add functionality to allow them to produce metaphors, humor, and other challenging types of language. This work involves colleagues at the AIPHES institute at TU Darmstadt, as well as thesis students, and will explore a wide breadth of challenges, including manipulating state-of-the-art architectures, collecting appropriate data, and devising evaluation metrics that can handle creative outputs.
- **Text Analytics for Social Good**
  Working with a wide variety of researchers from around Germany, I'm involved with a variety of initiatives to use our expertise in NLP to assist with social good projects, ranging from issues of social unrest to public health. This work involves extensive data collection and annotation, and our aim is to incorporate citizen science initiatives to alleviate the workload. This collaboration involves computer scientists working on advanced models for data analysis and social scientists providing theory- and task-based guidance.

Previous

- **Dissertation : Computational Approaches to Metaphor and Syntax**
  adv: Martha Palmer & Jim Martin

  My doctoral dissertation for the University of Colorado is focused on using syntactic features coupled with deep learning to improve automatic metaphor detection. Drawing from evidence that metaphoric meaning can often be derived via syntactic features like argument structure, I've employed information from syntactic parses and lexical resources to improve deep learning models. Through a variety of strategies including improving training data and embeddings models, I've improved the performance of state-of-the-art models

on multiple metaphor detection tasks. I hope to continue to work on balancing linguistic analysis and deep learning to continue to improve state-of-the-art methods for figurative language.

- **Computational Language and Education Research Lab (CLEAR)**
  adv: Martha Palmer

  I work with Professor Martha Palmer on a variety of computational lexical resources, including VerbNet and PropBank. My responsibilities include ensuring compatability with outside resources, implementation of new infrastructure, developing interface tools for other researchers, and improving the accuracy, consistency, and coverage of the resources. Our current work involves linking VerbNet with the Generative Lexicon and improving consistency among semantic predicates, and improving automatic classification with better annotation.

  For more, see https://verbs.colorado.edu/verbnet/

- **Communicating Hazard Information in the Modern Environment (CHIME)**
  adv: Leysia Palen

  I also worked with the Empowering the Public with Information in Crisis (EPIC) lab at the University of Colorado along with the National Center for Atmospheric Research (NCAR). This project aimed to identify relevant information from social media during natural disasters in order to assist first responders, government agencies, and affected populations. We developed improved machine learning classification for tweet relevance, as well building classification based on language and location for predicting evacuation behavior.

  For more, see http://epic.cs.colorado.edu/

Publications

Dissertation

- Stowe, Kevin. Syntactic and Semantic Improvements to Computational Metaphor Processing. Advisors Martha Palmer and Jim Martin. University of Colorado. 2019.

Primary Author

- Stowe, Kevin; Moeller, Sarah; Michaelis, Laura; Palmer, Martha. Linguistic Analysis Improves Neural Metaphor Detection. *23rd Annual Conference for Computational Language Learning* (CoNLL), pg. 362-371. 2019. New Orleans, Lousiana, US.

- Stowe, Kevin; Palmer, Martha; Anderson, Jennings; Kogan, Marina; Palen, Leysia; Anderson, Kenneth M.; Morss, Rebecca; Demuth, Julie; Lazrus, Heather. Developing and Evaluating Annotation Procedures for Twitter Data during Hazard Events. in *Proceedings of the Joint Workshop on Linguistic Annotation, Multiword Expressions and Constructions (LAW-MWE-CxG-2018)*, held with the International Committee on Computational Linguistics Conference (COLING). pg 133-143. 2018. Santa Fe, New Mexico, US.

- Stowe, Kevin; Anderson, Jennings; Palmer, Martha; Palen, Leysia; Anderson, Kenneth M. Improving Classification of Twitter Behavior During Hurricane Events. in *Proceedings of the Workshop on Natural Language Processing for Social Media (SocialNLP)*, held with the 56th Meeting of the Association of Computational Linguistics (ACL). pg 67-75. 2018. Melbourne, Australia

- Stowe, Kevin; Palmer, Martha. Leveraging Syntactic Constructions for Metaphor Identification and Interpretation. in *Proceedings of the Workshop on Figurative Language Processing*, held with

the 16th Meeting of the North American Association of Computational Linguistics (NAACL). pg 17-26. 2018. New Orleans, Louisiana, US

- Stowe, Kevin; Paul, Michael J.; Palmer, Martha; Palen, Leysia; Anderson, Kenneth M. Identifying and Categorizing Disaster-Related Tweets, in *Proceedings of the International Workshop on Natural Language Processing for Social Media* at the Conference on Empirical Methods in Natural Language Processing (EMNLP). pg 1-6. 2016. Austin, Texas, US

Contributing Author

- Morss, Rebecca et al., Understanding Weather Forecast Communication, Interpretation, and Use through Analysis of Twitter Data. In 29th Conference on Weather Analysis and Forecasting. 2018. Denver, Colorado, US.
- Demuth, Julie L. et al., "sometimes da #beachlife ain't always da wave": Understanding People's Evolving Hurricane Risk Communication, Risk Assessments, and Responses Using Twitter Narratives, In *Weather, Climate, and Society*. 2018.

- Palmer, Martha et al, The Pitfalls of Shortcuts: Tales from the word sense tagging trenches. in *Essays in Lexical Semantics and Computational Lexicography - In Honor of Adam Kilgarriff*. M. Diab, A. Villavicencio, M. Apidianaki, V. Kordoni, A. Korhonen, P. Nakov, M. Stevenson (editors). Springer series Text, Speech and Language Technology. Springer, 2018.

- Morss, Rebecca et al, Hazardous Weather Predication and Communication in the Modern Information. in *Bulletin of the American Meteorological Society*. 2016. 98, pg 2653-2674

- Anderson, Jennings et al; Far Far Away in *Far Rockaway*: Responses to Risks and Impacts during Hurricane Sandy through First-Person Social Media Narratives, in *Proceedings of ISCRAM*, Rio de Janeiro, Brazil, 2016.

- Bonial, Claire; Stowe, Kevin; Palmer, Martha. Renewing and Revising SemLink, in *The GenLex Workshop on Linked Data in Linguistics*, pg 9-17, 2013. Pisa, Italy

Community

Presentations

- The Syntax and Semantics of Metaphor. For the Graduate Student Open House, University of Colorado, Mar 25th, 2019.
- Modern Computational Approaches to Metaphor. For LING 7800, Computational Lexical Semantics, instr. Martha Palmer. Nov 9th, 2018.

Committees

- Assistant Area Chair (Iryna Gurevych), Sentiment Analysis, Style and Argumentation, Empirical Methods in Natural Language Processing (EMNLP), 2020
- Assistant Area Chair (Iryna Gurevych), Sentiment Analysis, Style and Argumentation, Association for Computational Linguistics (ACL), 2020

- Program Committee Member, Conference on Computational Natural Language Learning (CoNLL), 2017, Vancouver, Canada
- Program Committee Member, Corpus Linguistics Fest, 2016, Bloomington, Indiana

Other

- Project Manager, Data Analytics Software Project (DASP), TU Darmstadt Summer Semester 2020
- Sponsor, Computer Science Senior Project, Computational Language and Education Research Website Development, 2019
- Student Volunteer, North American Association of Computational Linguistics (NAACL) 2015, Denver, Colorado
- Computer science tutor for Linguistic students, particularly in the aim of improving basic programming skills. Primarily in Python and C++, with other support as required.

Previous Employment

- **FindMyAudience (https://findmyaudience.wordpress.com/)** **Boulder, Colorado**
  NLP Consultant *May 2015–October 2015*

  I worked for FindMyAudience, a technology startup, to identify possible audiences for authors and publishing companies. Together we developed methods for identifying book similarities and consumer interests from social media and other sources using deep learning and latent semantics models.

- **Avaya Labs** **Westminster, Colorado**
  NLP Researcher *Summer 2013*

  As a research intern, I did analysis of social media data (Twitter and Facebook) using machine learning algorithms, particularly unsupervised clustering, to determine trends in user interactions with various company partners. I identified differences in positive and negative reactions based on sentiment analysis using topic modelling on social media, allowing for better interaction between companies and their customers.

- **Jackson National Life** **Okemos, Michigan**
  Software Developer *2011-2012*

  I started as a software trainee and advanced to software developer. I studied Java and SQL to improve software and workflows for company employees.