

Steven Bethard

Assistant Professor
School of Information
University of Arizona

bethard@email.arizona.edu

<http://bethard.faculty.arizona.edu/>

<http://scholar.google.com/citations?user=sXM8J5EAAAAJ>

RESEARCH INTERESTS

Natural language processing and machine learning theory and applications, including constructing timelines from unstructured text and building information extraction models for health informatics.

CHRONOLOGY OF EDUCATION

2002-08 – 2007-12 Ph.D. Computer Science and Cognitive Science, University of Colorado
Thesis: “Finding Event, Temporal and Causal Structure in Text:
A Machine Learning Approach.” Advisor: James H. Martin
1998-08 – 2002-05 B.S., B.A. Computer Science, Mathematics, Linguistics, University of Arizona

CHRONOLOGY OF EMPLOYMENT

2016-08 – present	Assistant Professor	University of Arizona, School of Information
	Assistant Professor	University of Arizona, Cognitive Science GDP
	Courtesy Appointment	University of Arizona, Linguistics
2013-08 – 2016-08	Assistant Professor	U. Alabama at Birmingham, Computer and Info. Sciences
2011-10 – 2015-10	Visiting Professor	KU Leuven Department of Computer Science
2011-09 – 2013-08	Research Associate	Institute of Cognitive Science, University of Colorado
2010-09 – 2011-08	Postdoctoral Fellow	Department of Computer Science, KU Leuven
2009-06 – 2009-08	Senior Research Scientist	JHU Human Language Technology Center of Excellence
2009-01 – 2010-08	Postdoctoral Scholar	Department of Computer Science, Stanford University
2008-01 – 2008-12	Research Associate	Institute of Cognitive Science, University of Colorado

HONORS AND AWARDS

2016-02 Kevin and Jo Ann Reilly Endowed Award (\$1000), University of Alabama at Birmingham
2009-06 Vannevar Bush Best Paper Award (\$1000), ACM/IEEE Joint Conference on Digital Libraries
2008-12 Daniel Henkel Service Award, University of Colorado Office of International Education
2002-03 NSF Graduate Research Fellowship Honorable Mention
1998-08 Flinn Scholar
1998-08 National Merit Scholar

SERVICE/OUTREACH

LOCAL/STATE OUTREACH

2015, 2016 Site coordinator, North American Computational Linguistics Olympiad

NATIONAL/INTERNATIONAL SERVICE: COMMITTEES

2016-2019 SemEval representative, Special Interest Group on the Lexicon (SIGLEX) board

NATIONAL/INTERNATIONAL SERVICE: CONFERENCE ORGANIZATION

- 2019 Area chair, Annual Meeting of the Association for Computational Linguistics (ACL)
- 2019 Area chair, North American Chapter of the Association for Computational Linguistics (NAACL)
- 2018 Organizer, Parsing Time Normalizations shared task
- 2016–2018 Co-Chair, International Workshop on Semantic Evaluation (SemEval)
- 2016, 2019 Organizer, Clinical Natural Language Processing Workshop (Clinical NLP)
- 2015–2017 Organizer, Clinical TempEval shared task
- 2015–2016 Area chair, Annual Meeting of the Association for Computational Linguistics (ACL)
- 2014 Organizer, Workshop on Computational Approaches to Causality in Language
- 2013 Publication Chair, Empirical Methods in Natural Language Processing (EMNLP)
- 2013 Faculty advisor, ACL Student Research Workshop
- 2012–2013 Organizer, SemEval Spatial Role Labeling Task
- 2011–2012 Mentor, ACL Student Research Workshop
- 2011 Organizer, American Medical Informatics Association Virtual Journal Club on Temporal Reasoning

NATIONAL/INTERNATIONAL SERVICE: GRANT REVIEWING

- 2013, 2015, 2018
US National Science Foundation, Division of Information and Intelligent Systems
- 2017 Israel Science Foundation (ISF), Individual Research Grants
- 2017 Netherlands Organization for Scientific Research (NWO), Council for the Humanities
- 2016 Swiss National Science Foundation, Division of Mathematics, Physical and Engineering Sciences

NATIONAL/INTERNATIONAL SERVICE: JOURNAL REVIEWING

- 2016–2019 Transactions of the Association for Computational Linguistics
- 2012–2013, 2015, 2019
Journal of Natural Language Engineering (JNLE)
- 2019 Transactions on Audio, Speech and Language Processing
- 2018 Journal of Biomedical Informatics
- 2018 PLOS ONE
- 2013, 2015 Cognition
- 2014 Computational Linguistics (CL)
- 2014 Journal of the American Medical Informatics Association (JAMIA)
- 2013–2014 Transactions on Asian Language Information Processing (TALIP)
- 2011–2013 Journal of Artificial Intelligence Research (JAIR)
- 2013 Journal of Language Modeling (JLM)
- 2013 Transactions on Information Forensics & Security (TIFS)
- 2010–2011 International Journal on Digital Libraries (IJDL)
- 2011 Transactions on Computational Biology and Bioinformatics (TCBB)
- 2008 Language Resources and Evaluation (LRE)

NATIONAL/INTERNATIONAL SERVICE: CONFERENCE REVIEWING

- 2009, 2011, 2013–2019
Empirical Methods in Natural Language Processing (EMNLP)

2018 Machine Learning for Healthcare (MLHC)
2009, 2011–2014, 2017–2018
Annual Meeting of the Association for Computational Linguistics (ACL)
2010, 2012–2013, 2016, 2018
North American Chapter of the Association for Computational Linguistics (NAACL)
2017 International Joint Conference on Natural Language Processing (IJCNLP)
2012, 2016 International Conference on Computational Linguistics (COLING)
2016 International Joint Conference on Artificial Intelligence (IJCAI)
2015–2016 International World Wide Web Conference (WWW)
2012, 2014 European Chapter of the Association for Computational Linguistics (EACL)
2013 American Medical Informatics Association Annual Symposium (AMIA)
2010–2013 Joint Conference on Digital Libraries (JCDL)
2012–2013 Joint Conference on Lexical and Computational Semantics (*SEM)
2011 Conference on Natural Language Learning (CoNLL)
2010 International Conference on Language Resources and Evaluation (LREC)
2007–2008 IEEE International Conference on Semantic Computing (ICSC)

NATIONAL/INTERNATIONAL SERVICE: WORKSHOP REVIEWING

2019 Workshop on Natural Language Processing and Computational Social Science
2018–2019 International Workshop on Spatial Language Understanding (SpLU)
2012–2018 International Workshop on Semantic Evaluation (SemEval)
2017 Workshop on Ethics in Natural Language Processing (EthNLP)
2016 Workshop on Cross-Platform Text Mining and Natural Language Processing Interoperability
2015 Workshop on Replicability and Reusability in Natural Language Processing (RRNLP)
2014 Workshop on Computational Approaches to Causality in Language (CAtoCL)
2014 Workshop on Computational Approaches to Code Switching (CodeSwitch)
2014 Workshop on Open Infrastructures and Analysis Frameworks for HLT (OIAF4HLT)

DEPARTMENTAL SERVICE

2018–2019 Academic Advisor for MS INFO students, University of Arizona School of Information
2017–2019 Curriculum committee, University of Arizona School of Information
2016–2017 Graduate committee, University of Arizona School of Information
2015–2016 Faculty search committee, U. of Alabama at Birmingham Computer and Info. Sci.
2014–2016 Undergrad curriculum committee, U. of Alabama at Birmingham Computer and Info. Sci.
2014–2016 Ph.D. qualifying exam committee, U. of Alabama at Birmingham Computer and Info. Sci.
2012–2013 Curriculum design committee, University of Colorado Boulder social media certificate
2004–2007 Student grants committee, University of Colorado Boulder Institute of Cognitive Science
2004 Hiring committee, University of Colorado Boulder Department of Linguistics
2007–2008 CU International Leader, University of Colorado Boulder
2005–2007 International Peer Mentor, University of Colorado Boulder

COLLEGE COMMITTEES

2019 Computational Social Science Advisory Committee,
University of Arizona College of Social and Behavioral Sciences

UNIVERSITY COMMITTEES

2018–2019 Data Science Resources and Training Steering Committee, University of Arizona

PUBLICATIONS/CREATIVE ACTIVITY

CHAPTERS IN SCHOLARLY BOOKS AND MONOGRAPHS

- González López, Samuel, Steven Bethard, and Aurelio López-López (June 2014). “[Identifying Weak Sentences in Student Drafts: A Tutoring System](#)”. In: *Methodologies and Intelligent Systems for Technology Enhanced Learning*. Ed. by Tania Di Mascio, Rosella Gennari, Pierpaolo Vitorini, Rosa Vicari, and Fernando de la Prieta. Vol. 292. Advances in Intelligent Systems and Computing, pp. 77–85.
- Bethard, Steven, Hong Yu, Ashley Thornton, Vasileios Hatzivassiloglou, and Dan Jurafsky (2005). “[Extracting opinion propositions and opinion holders using syntactic and lexical cues](#)”. In: *Computing Attitude and Affect in Text: Theory and Applications*. Ed. by James G. Shanahan, Yan Qu, and Janyce Wiebe, pp. 125–141.

CONFERENCE PROCEEDINGS

- Apidianaki, Marianna, Saif M. Mohammad, Jonathan May, Ekaterina Shutova, Steven Bethard, and Marine Carpuat, eds. (June 2018). “[Proceedings of The 12th International Workshop on Semantic Evaluation \(SemEval-2018\)](#)”.
- Bethard, Steven, Marine Carpuat, Marianna Apidianaki, Saif M. Mohammad, Daniel Cer, and David Jurgens, eds. (Aug. 2017). “[Proceedings of the 11th International Workshop on Semantic Evaluation \(SemEval-2017\)](#)”.
- Rumshisky, Anna, Kirk Roberts, Steven Bethard, and Tristan Naumann, eds. (Dec. 2016). “[Proceedings of the Clinical Natural Language Processing Workshop \(ClinicalNLP\)](#)”.
- Bethard, Steven, Marine Carpuat, Daniel Cer, David Jurgens, Preslav Nakov, and Torsten Zesch, eds. (June 2016). “[Proceedings of the 10th International Workshop on Semantic Evaluation \(SemEval-2016\)](#)”.
- Kolomiyets, Oleksandr, Marie-Francine Moens, Martha Palmer, James Pustejovsky, and Steven Bethard, eds. (Apr. 2014). “[Proceedings of the EACL 2014 Workshop on Computational Approaches to Causality in Language \(CatoCL\)](#)”.
- Yarowsky, David, Timothy Baldwin, Anna Korhonen, Karen Livescu, and Steven Bethard, eds. (Oct. 2013). “[Proceedings of the 2013 Conference on Empirical Methods in Natural Language Processing](#)”.
- Dey, Anik, Sebastian Krause, Ivelina Nikolova, Eva Vecchi, Steven Bethard, Preslav I. Nakov, and Feiyu Xu, eds. (Aug. 2013). “[51st Annual Meeting of the Association for Computational Linguistics Proceedings of the Student Research Workshop](#)”.

REFEREED JOURNAL ARTICLES

- Laparra, Egoitz, Dongfang Xu, and Steven Bethard (May 2018). “[From Characters to Time Intervals: New Paradigms for Evaluation and Neural Parsing of Time Normalizations](#)”. In: *Transactions of the Association for Computational Linguistics* 6, pp. 343–356.
- Osborne, John D., Matthew B. Neu, Maria I. Danila, Tamar Solorio, and Steven J. Bethard (Jan. 2018). “[CUILESS2016: a clinical corpus applying compositional normalization of text mentions](#)”. In: *Journal of Biomedical Semantics* 9.1, p. 2.
- Miller, Timothy, Dmitriy Dligach, Steven Bethard, Chen Lin, and Guergana Savova (2017). “[Towards generalizable entity-centric clinical coreference resolution](#)”. In: *Journal of Biomedical Informatics* 69, pp. 251–258.
- Lin, Chen, Dmitriy Dligach, Timothy A Miller, Steven Bethard, and Guergana K Savova (Mar. 2016). “[Multilayered temporal modeling for the clinical domain](#)”. In: *Journal of the American Medical Informatics Association* 23.2, pp. 387–395.

- Osborne, John D, Matthew Wyatt, Andrew O Westfall, James Willig, Steven Bethard, and Geoff Gordon (Mar. 2016). “Efficient identification of nationally mandated reportable cancer cases using natural language processing and machine learning”. In: *Journal of the American Medical Informatics Association*.
- Mulder, Wim De, Steven Bethard, and Marie-Francine Moens (Mar. 2015). “A survey on the application of recurrent neural networks to statistical language modeling”. In: *Computer Speech & Language* 30.1, pp. 61–98.
- Chambers, Nathanael, Taylor Cassidy, Bill McDowell, and Steven Bethard (Oct. 2014). “Dense Event Ordering with a Multi-Pass Architecture”. In: *Transactions of the Association for Computational Linguistics* 2, pp. 273–284.
- Sultan, Md. Arafat, Steven Bethard, and Tamara Sumner (May 2014c). “Back to Basics for Monolingual Alignment: Exploiting Word Similarity and Contextual Evidence”. In: *Transactions of the Association for Computational Linguistics* 2, pp. 219–230.
- Styler IV, William F., Steven Bethard, Sean Finan, Martha Palmer, Sameer Pradhan, Piet C. de Groen, Brad Erickson, Timothy Miller, Chen Lin, Guergana Savova, and James Pustejovsky (Apr. 2014). “Temporal Annotation in the Clinical Domain”. In: *Transactions of the Association for Computational Linguistics* 2, pp. 143–154.
- Pathak, Jyotishman, Kent R Bailey, Calvin E Beebe, Steven Bethard, David S Carrell, Pei J Chen, Dmitriy Dligach, Cory M Endle, Lacey A Hart, Peter J Haug, Stanley M Huff, Vinod C Kaggal, Dingcheng Li, Hongfang Liu, Kyle Marchant, James Masanz, Timothy Miller, Thomas A Oniki, Martha Palmer, Kevin J Peterson, Susan Rea, Guergana K Savova, Craig R Stancl, Sunghwan Sohn, Harold R Solbrig, Dale B Suesse, Cui Tao, David P Taylor, Les Westberg, Stephen Wu, Ning Zhuo, and Christopher G Chute (Nov. 2013). “Normalization and standardization of electronic health records for high-throughput phenotyping: the SHARPN consortium”. In: *Journal of the American Medical Informatics Association* 20.e2, e341–e348.
- Dligach, Dmitriy, Steven Bethard, Lee Becker, Timothy Miller, and Guergana K. Savova (Oct. 2013). “Discovering body site and severity modifiers in clinical texts”. In: *Journal of the American Medical Informatics Association*.
- Wetzler, Philipp, Steven Bethard, Heather Leary, Kirsten Butcher, Soheil Danesh Bahreini, Jin Zhao, James H. Martin, and Tamara Sumner (Oct. 2013). “Characterizing and Predicting the Multifaceted Nature of Quality in Educational Web Resources”. In: *ACM Transactions on Interactive Intelligent Systems* 3.3, 15:1–15:25.
- Levin, Michael, Stefan Krawczyk, Steven Bethard, and Dan Jurafsky (May 2012). “Citation-based bootstrapping for large-scale author disambiguation”. In: *Journal of the American Society for Information Science and Technology* 63.5, pp. 1030–1047.
- Bethard, Steven, Zhiyong Lu, James H. Martin, and Lawrence Hunter (June 2008). “Semantic Role Labeling for Protein Transport Predicates”. In: *BMC Bioinformatics* 9.1, p. 277.
- Bethard, Steven, James H. Martin, and Sara Klingenstein (Dec. 2007a). “Finding Temporal Structure in Text: Machine Learning of Syntactic Temporal Relations”. In: *International Journal of Semantic Computing (IJSC)* 1.4, pp. 441–458.

REFEREED CONFERENCE ARTICLES

- Sadeque, Farig, Stephen Rains, Yotam Shmargad, Kate Kenski, Kevin Coe, and Steven Bethard (June 2019). “Incivility Detection in Online Comments”. In: *Proceedings of the Eighth Joint Conference on Lexical and Computational Semantics*.
- Xu, Dongfang, Egoitz Laparra, and Steven Bethard (June 2019). “Pre-trained Contextualized Character Embeddings Lead to Major Improvements in Time Normalization: a Detailed Analysis”. In: *Proceedings of the Eighth Joint Conference on Lexical and Computational Semantics*.

- Yadav, Vikas, Steven Bethard, and Mihai Surdeanu (June 2019). “Alignment over Heterogeneous Embeddings for Question Answering”. In: *Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies*.
- Yadav, Vikas and Steven Bethard (Aug. 2018). “A Survey on Recent Advances in Named Entity Recognition from Deep Learning models”. In: *Proceedings of the 27th International Conference on Computational Linguistics*. [Acceptance rate 37%], pp. 2145–2158.
- Yadav, Vikas, Rebecca Sharp, and Steven Bethard (June 2018). “Deep Affix Features Improve Neural Named Entity Recognizers”. In: *Proceedings of the Seventh Joint Conference on Lexical and Computational Semantics*. [Acceptance rate 29%], pp. 167–172.
- Pradhan, Ligaj, Chengcui Zhang, Steven Bethard, and Xin Chen (Apr. 2018). “Embedding User Behavioral Aspect in TF-IDF Like Representation”. In: *2018 IEEE Conference on Multimedia Information Processing and Retrieval (MIPR)*. [Acceptance rate 20%], pp. 262–267.
- Sadeque, Farig, Dongfang Xu, and Steven Bethard (Feb. 2018). “Measuring the Latency of Depression Detection in Social Media”. In: *Proceedings of the Eleventh ACM International Conference on Web Search and Data Mining. WSDM '18*. [Acceptance rate 16%], pp. 495–503.
- Do, Quynh Ngoc Thi, Steven Bethard, and Marie-Francine Moens (Nov. 2017). “Improving Implicit Semantic Role Labeling by Predicting Semantic Frame Arguments”. In: *Proceedings of the Eighth International Joint Conference on Natural Language Processing (Volume 1: Long Papers)*. [Acceptance rate 31%], pp. 90–99.
- Pradhan, Ligaj, Chengcui Zhang, and Steven Bethard (Aug. 2017). “Infusing Latent User-Concerns from User Reviews into Collaborative Filtering”. In: *2017 IEEE International Conference on Information Reuse and Integration (IRI)*. [Acceptance rate 29%], pp. 471–477.
- Dligach, Dmitriy, Timothy Miller, Chen Lin, Steven Bethard, and Guergana Savova (Apr. 2017). “Neural Temporal Relation Extraction”. In: *Proceedings of the 15th Conference of the European Chapter of the Association for Computational Linguistics: Volume 2, Short Papers*. [Acceptance rate 24%], pp. 746–751.
- Viani, Natalia, Timothy A. Miller, Dmitriy Dligach, Steven Bethard, Carlo Napolitano, Silvia G. Priori, Riccardo Bellazzi, Lucia Sacchi, and Guergana K. Savova (2017). “Recurrent Neural Network Architectures for Event Extraction from Italian Medical Reports”. In: *Artificial Intelligence in Medicine: 16th Conference on Artificial Intelligence in Medicine, AIME 2017, Vienna, Austria, June 21-24, 2017, Proceedings*. Ed. by Annette ten Teije, Christian Popow, John H. Holmes, and Lucia Sacchi. [Acceptance rate 39%], pp. 198–202.
- Do, Quynh Ngoc Thi, Steven Bethard, and Marie-Francine Moens (Dec. 2016a). “Facing the most difficult case of Semantic Role Labeling: A collaboration of word embeddings and co-training”. In: *Proceedings of COLING 2016, the 26th International Conference on Computational Linguistics: Technical Papers*. [Acceptance rate 32%], pp. 1275–1284.
- Sapkota, Upendra, Thamar Solorio, Manuel Montes, and Steven Bethard (Aug. 2016). “Domain Adaptation for Authorship Attribution: Improved Structural Correspondence Learning”. In: *Proceedings of the 54th Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*. [Acceptance rate 28%], pp. 2226–2235.
- Pradhan, Ligaj, Chengcui Zhang, and Steven Bethard (July 2016). “Towards Extracting Coherent User Concerns and Their Hierarchical Organization from User Reviews”. In: *2016 IEEE 17th International Conference on Information Reuse and Integration (IRI)*, pp. 582–590.
- Bethard, Steven and Jonathan Parker (May 2016). “A Semantically Compositional Annotation Scheme for Time Normalization”. In: *Proceedings of the Tenth International Conference on Language Resources and Evaluation (LREC 2016)*. Ed. by Nicoletta Calzolari (Conference Chair), Khalid Choukri, Thierry Declerck, Marko Grobelnik, Bente Maegaard, Joseph Mariani, Asuncion Moreno, Jan Odijk, and Stelios Piperidis. [Acceptance rate 60%].

- Shrestha, Prasha, Nicolas Rey-Villamizar, Farig Sadeque, Ted Pedersen, Steven Bethard, and Thamar Solorio (May 2016). “[Age and Gender Prediction on Health Forum Data](#)”. In: *Proceedings of the Tenth International Conference on Language Resources and Evaluation (LREC 2016)*. Ed. by Nicoletta Calzolari (Conference Chair), Khalid Choukri, Thierry Declerck, Marko Grobelnik, Bente Maegaard, Joseph Mariani, Asuncion Moreno, Jan Odijk, and Stelios Piperidis. [Acceptance rate 60%].
- Do, Quynh Ngoc Thi, Steven Bethard, and Marie-Francine Moens (Sept. 2015). “[Adapting Coreference Resolution for Narrative Processing](#)”. In: *Proceedings of the 2015 Conference on Empirical Methods in Natural Language Processing*. [Acceptance rate 24%], pp. 2262–2267.
- Sultan, Md Arafat, Steven Bethard, and Tamara Sumner (Sept. 2015a). “[Feature-Rich Two-Stage Logistic Regression for Monolingual Alignment](#)”. In: *Proceedings of the 2015 Conference on Empirical Methods in Natural Language Processing*. [Acceptance rate 24%], pp. 949–959.
- Sapkota, Upendra, Steven Bethard, Manuel Montes, and Thamar Solorio (June 2015). “[Not All Character N-grams Are Created Equal: A Study in Authorship Attribution](#)”. In: *Proceedings of the 2015 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies*. [Acceptance rate 26%], pp. 93–102.
- Sultan, Md. Arafat, Steven Bethard, and Tamara Sumner (Sept. 2014a). “[Towards automatic identification of core concepts in educational resources](#)”. In: *2014 IEEE/ACM Joint Conference on Digital Libraries (JCDL)*. [Acceptance rate 29%], pp. 379–388.
- Sapkota, Upendra, Thamar Solorio, Manuel Montes, Steven Bethard, and Paolo Rosso (Aug. 2014). “[Cross-Topic Authorship Attribution: Will Out-Of-Topic Data Help?](#)” In: *Proceedings of COLING 2014, the 25th International Conference on Computational Linguistics: Technical Papers*. [Acceptance rate 32%], pp. 1228–1237.
- Cassidy, Taylor, Bill McDowell, Nathanael Chambers, and Steven Bethard (June 2014). “[An Annotation Framework for Dense Event Ordering](#)”. In: *Proceedings of the 52nd Annual Meeting of the Association for Computational Linguistics (Volume 2: Short Papers)*. [Acceptance rate 25%], pp. 501–506.
- Lin, Chen, Timothy Miller, Alvin Kho, Steven Bethard, Dmitriy Dligach, Sameer Pradhan, and Guergana Savova (June 2014). “[Descending-Path Convolution Kernel for Syntactic Structures](#)”. In: *Proceedings of the 52nd Annual Meeting of the Association for Computational Linguistics (Volume 2: Short Papers)*. [Acceptance rate 25%], pp. 81–86.
- Bethard, Steven, Philip Ogren, and Lee Becker (May 2014). “[ClearTK 2.0: Design Patterns for Machine Learning in UIMA](#)”. In: *Proceedings of the Ninth International Conference on Language Resources and Evaluation (LREC’14)*. [Acceptance rate 61%], pp. 3289–3293.
- Bursztein, Elie, Angelique Moscicki, Celine Fabry, Steven Bethard, John C. Mitchell, and Dan Jurafsky (Apr. 2014). “[Easy Does It: More Usable CAPTCHAs](#)”. In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI ’14. [Acceptance rate 23%], pp. 2637–2646.
- Bethard, Steven (Oct. 2013a). “[A Synchronous Context Free Grammar for Time Normalization](#)”. In: *Proceedings of the 2013 Conference on Empirical Methods in Natural Language Processing*. [Acceptance rate 24%], pp. 821–826.
- Okoye, Ifeyinwa, Tamara Sumner, and Steven Bethard (July 2013). “[Automatic extraction of core learning goals and generation of pedagogical sequences through a collection of digital library resources](#)”. In: *Proceedings of the 13th ACM/IEEE-CS joint conference on Digital libraries*. JCDL ’13. [Acceptance rate 29%], pp. 67–76.
- Kolomiyets, Oleksandr, Steven Bethard, and Marie-Francine Moens (July 2012). “[Extracting Narrative Timelines as Temporal Dependency Structures](#)”. In: *Proceedings of the 50th Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*. [Acceptance rate 19%], pp. 88–97.

- Bethard, Steven, Oleksandr Kolomiyets, and Marie-Francine Moens (May 2012). “Annotating Story Timelines as Temporal Dependency Structures”. In: *Proceedings of the Eight International Conference on Language Resources and Evaluation (LREC’12)*. [Acceptance rate 70%], pp. 2721–2726.
- Jans, Bram, Steven Bethard, Ivan Vulić, and Marie-Francine Moens (Apr. 2012). “Skip N-grams and Ranking Functions for Predicting Script Events”. In: *Proceedings of the 13th Conference of the European Chapter of the Association for Computational Linguistics*. [Acceptance rate 27%], pp. 336–344.
- Kolomiyets, Oleksandr, Steven Bethard, and Marie-Francine Moens (June 2011). “Model-Portability Experiments for Textual Temporal Analysis”. In: *Proceedings of the 49th Annual Meeting of the Association for Computational Linguistics: Human Language Technologies*. [Acceptance rate 26%], pp. 271–276.
- Gusev, Andrey, Nathanael Chambers, Divye Raj Khilnani, Pranav Khaitan, Steven Bethard, and Dan Jurafsky (Jan. 2011). “Using Query Patterns to Learn the Duration of Events”. In: *International Conference on Computational Semantics*. [Acceptance rate 42%], pp. 145–154.
- Bethard, Steven and Dan Jurafsky (Oct. 2010). “Who Should I Cite? Learning Literature Search Models from Citation Behavior”. In: *ACM Conference on Information and Knowledge Management*. [Acceptance rate 13%], pp. 609–618.
- Bursztein, Elie, Steven Bethard, John C. Mitchell, Dan Jurafsky, and Celine Fabry (May 2010). “How Good are Humans at Solving CAPTCHAs? A Large Scale Evaluation”. In: *IEEE Symposium on Security and Privacy*. [Acceptance rate 10%], pp. 399–413.
- Savova, Guergana, Steven Bethard, Will Styler, James H. Martin, Martha Palmer, James Masanz, and Wayne Ward (Nov. 2009). “Towards Temporal Relation Discovery from the Clinical Narrative”. In: *American Medical Informatics Association Annual Symposium*. [Acceptance rate 47%], pp. 568–572.
- Bethard, Steven, Soumya Ghosh, James H. Martin, and Tamara Sumner (June 2009). “Topic model methods for automatically identifying out-of-scope resources”. In: *JCDL ’09: Proceedings of the 9th ACM/IEEE-CS Joint Conference on Digital Libraries*. [Acceptance rate 28%], pp. 19–28.
- Bethard, Steven, Philipp Wetzler, Kirsten Butcher, James H. Martin, and Tamara Sumner (June 2009). “Automatically characterizing resource quality for educational digital libraries”. In: *JCDL ’09: Proceedings of the 9th ACM/IEEE-CS Joint Conference on Digital Libraries*. [Acceptance rate 28%] **Best paper award**, pp. 221–230.
- Bethard, Steven and James H. Martin (June 2008). “Learning Semantic Links from a Corpus of Parallel Temporal and Causal Relations”. In: *Proceedings of 46th Annual Meeting of the Association for Computational Linguistics: Human Language Technologies, Short Papers*. [Acceptance rate 23%], pp. 177–180.
- Bethard, Steven, William Corvey, Sara Klingenstein, and James H. Martin (May 2008). “Building a Corpus of Temporal-Causal Structure”. In: *Language Resources and Evaluation Conference (LREC)*. [Acceptance rate 70%], pp. 908–915.
- Bethard, Steven, James H. Martin, and Sara Klingenstein (Sept. 2007b). “Timelines from Text: Identification of Syntactic Temporal Relations”. In: *International Conference on Semantic Computing (ICSC)*, pp. 11–18.
- Bethard, Steven and James H. Martin (July 2006). “Identification of Event Mentions and their Semantic Class”. In: *Empirical Methods in Natural Language Processing (EMNLP)*. [Acceptance rate 31%], pp. 146–154.

REFEREED WORKSHOP ARTICLES

- Bethard, Steven, Egoitz Laparra, Sophia Wang, Yiyun Zhao, Ragheb Al-Ghezi, Aaron Lien, and Laura López-Hoffman (June 2019). “Inferring missing metadata from environmental policy texts”. In: *Proceedings of the Third Joint SIGHUM Workshop on Computational Linguistics for Cultural Heritage, Social Sciences, Humanities and Literature*.

- Lin, Chen, Timothy Miller, Dmitriy Dligach, Steven Bethard, and Guergana Savova (June 2019). “A BERT-based Universal Model for Both Within- and Cross-sentence Clinical Temporal Relation Extraction”. In: *Proceedings of the 2nd Clinical Natural Language Processing Workshop*.
- Lin, Chen, Timothy Miller, Dmitriy Dligach, Hadi Amiri, Steven Bethard, and Guergana Savova (Oct. 2018). “Self-training improves Recurrent Neural Networks performance for Temporal Relation Extraction”. In: *Proceedings of the Ninth International Workshop on Health Text Mining and Information Analysis*, pp. 165–176.
- Lin, Chen, Timothy Miller, Dmitriy Dligach, Steven Bethard, and Guergana Savova (Aug. 2017). “Representations of Time Expressions for Temporal Relation Extraction with Convolutional Neural Networks”. In: *BioNLP 2017*, pp. 322–327.
- Miller, Timothy, Steven Bethard, Hadi Amiri, and Guergana Savova (Aug. 2017). “Unsupervised Domain Adaptation for Clinical Negation Detection”. In: *BioNLP 2017*, pp. 165–170.
- Do, Quynh Ngoc Thi, Steven Bethard, and Marie-Francine Moens (Nov. 2016b). “Visualizing the Content of a Children’s Story in a Virtual World: Lessons Learned”. In: *Proceedings of the Workshop on Uphill Battles in Language Processing: Scaling Early Achievements to Robust Methods*, pp. 39–42.
- Rey-Villamizar, Nicolas, Prasha Shrestha, Farig Sadeque, Steven Bethard, Ted Pedersen, Arjun Mukherjee, and Thamar Solorio (Nov. 2016). “Analysis of Anxious Word Usage on Online Health Forums”. In: *Proceedings of the Seventh International Workshop on Health Text Mining and Information Analysis*, pp. 37–42.
- Sadeque, Farig, Ted Pedersen, Thamar Solorio, Prasha Shrestha, Nicolas Rey-Villamizar, and Steven Bethard (Nov. 2016). “Why Do They Leave: Modeling Participation in Online Depression Forums”. In: *Proceedings of The Fourth International Workshop on Natural Language Processing for Social Media*, pp. 14–19.
- Lin, Chen, Timothy Miller, Dmitriy Dligach, Steven Bethard, and Guergana Savova (Aug. 2016). “Improving Temporal Relation Extraction with Training Instance Augmentation”. In: *Proceedings of the 15th Workshop on Biomedical Natural Language Processing*, pp. 108–113.
- Rey-Villamizar, Nicolas, Prasha Shrestha, Thamar Solorio, Farig Sadeque, Steven Bethard, and Ted Pedersen (June 2016). “Semi-supervised CLPsych 2016 Shared Task System Submission”. In: *Proceedings of the Third Workshop on Computational Linguistics and Clinical Psychology*, pp. 171–175.
- Sultan, Md Arafat, Steven Bethard, and Tamara Sumner (June 2016). “DLS@CU at SemEval-2016 Task 1: Supervised Models of Sentence Similarity”. In: *Proceedings of the 10th International Workshop on Semantic Evaluation (SemEval-2016)*, pp. 650–655.
- Sadeque, Farig, Thamar Solorio, Ted Pedersen, Prasha Shrestha, and Steven Bethard (Sept. 2015). “Predicting Continued Participation in Online Health Forums”. In: *Proceedings of the Sixth International Workshop on Health Text Mining and Information Analysis*, pp. 12–20.
- Miller, Timothy, Steven Bethard, Dmitriy Dligach, Chen Lin, and Guergana Savova (July 2015). “Extracting Time Expressions from Clinical Text”. In: *Proceedings of BioNLP 15*, pp. 81–91.
- Maharjan, Suraj, Elizabeth Blair, Steven Bethard, and Thamar Solorio (June 2015). “Developing Language-tagged Corpora for Code-switching Tweets”. In: *Proceedings of The 9th Linguistic Annotation Workshop*, pp. 72–84.
- Do, Quynh Ngoc Thi, Steven Bethard, and Marie-Francine Moens (Sept. 2014). “Text Mining for Open Domain Semi-Supervised Semantic Role Labeling”. In: *Proceedings of the 1st International Workshop on Interactions between Data Mining and Natural Language Processing*.
- Miller, Timothy, Steven Bethard, Dmitriy Dligach, Sameer Pradhan, Chen Lin, and Guergana Savova (Aug. 2013). “Discovering Temporal Narrative Containers in Clinical Text”. In: *Proceedings of the 2013 Workshop on Biomedical Natural Language Processing*, pp. 18–26.

- Bethard, Steven, Ifeyinwa Okoye, Md. Arafat Sultan, Haojie Hang, James H. Martin, and Tamara Sumner (June 2012). “[Identifying science concepts and student misconceptions in an interactive essay writing tutor](#)”. In: *Proceedings of the Seventh Workshop on Building Educational Applications Using NLP*, pp. 12–21.
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- Ogren, Philip V., Philipp G. Wetzler, and Steven J. Bethard (Sept. 2009). “ClearTK: A Framework for Statistical Natural Language Processing”. In: *Unstructured Information Management Architecture Workshop at the Conference of the German Society for Computational Linguistics and Language Technology*.
- Bursztein, Elie and Steven Bethard (Aug. 2009). “[Decaptcha: Breaking 75% of eBay Audio CAPTCHAs](#)”. In: *3rd USENIX Workshop on Offensive Technologies*, p. 8.
- Bethard, Steven, Vicky Tzuyin Lai, and James H. Martin (June 2009). “[Topic Model Analysis of Metaphor Frequency for Psycholinguistic Stimuli](#)”. In: *Proceedings of the Workshop on Computational Approaches to Linguistic Creativity*, pp. 9–16.
- Ogren, Philip and Steven Bethard (June 2009). “[Building Test Suites for UIMA Components](#)”. In: *Proceedings of the Workshop on Software Engineering, Testing, and Quality Assurance for Natural Language Processing (SETQA-NLP 2009)*, pp. 1–4.
- Wetzler, Philipp G, Steven Bethard, Kirsten Butcher, James H Martin, and Tamara Sumner (Apr. 2009). “[Automatically assessing resource quality for educational digital libraries](#)”. In: *WICOW '09: Proceedings of the 3rd workshop on Information credibility on the web*, pp. 3–10.
- Ogren, Philip V., Philipp G. Wetzler, and Steven J. Bethard (May 2008). “[ClearTK: A UIMA Toolkit for Statistical Natural Language Processing](#)”. In: *UIMA for NLP workshop at Language Resources and Evaluation Conference (LREC)*.
- Bethard, Steven, Rodney Nielsen, James H. Martin, Wayne Ward, and Martha Palmer (Mar. 2007). “[Semantic integration in learning from text](#)”. In: *AAAI Spring Symposium on Machine Reading*.
- Bethard, Steven, Hong Yu, Ashley Thornton, Vasileios Hatzivassiloglou, and Dan Jurafsky (Mar. 2004). “[Automatic extraction of opinion propositions and their holders](#)”. In: *AAAI Spring Symposium on Exploring Attitude and Affect in Text: Theories and Applications*.
- Pradhan, Sameer S., Gabriel Illouz, Sasha J. Blair-Goldensohn, Andrew Hazen Schlaikjer, Valerie Krugler, Elena Filatova, Pablo A. Duboue, Hong Yu, Rebecca J. Passonneau, Steven Bethard, Vasileios Hatzivassiloglou, Wayne Ward, Dan Jurafsky, Kathleen R. McKeown, and James H. Martin (2002). “[Building a foundation system for producing short answers to factual questions](#)”. In: *Text REtrieval Conference (TREC)*.

REFEREED SHARED TASK ARTICLES

- Yadav, Vikas, Egoitz Laparra, Ti-Tai Wang, Mihai Surdeanu, and Steven Bethard (June 2019). “University of Arizona at SemEval-2019 Task 12: Deep-Affix Named Entity Recognition of Geolocation Entities”. In: *Proceedings of The 13th International Workshop on Semantic Evaluation*.
- Laparra, Egoitz, Dongfang Xu, Ahmed Elsayed, Steven Bethard, and Martha Palmer (June 2018). “[SemEval 2018 Task 6: Parsing Time Normalizations](#)”. In: *Proceedings of The 12th International Workshop on Semantic Evaluation*, pp. 88–96.
- Xu, Dongfang, Vikas Yadav, and Steven Bethard (May 2018). “[UArizona at the MADE1.0 NLP Challenge](#)”. In: *Proceedings of the 1st International Workshop on Medication and Adverse Drug Event Detection*. Ed. by Feifan Liu, Abhyuday Jagannatha, and Hong Yu. Vol. 90. Proceedings of Machine Learning Research, pp. 57–65.

- Sadeque, Farig, Dongfang Xu, and Steven Bethard (Sept. 2017). “[UARizona at the CLEF eRisk 2017 Pilot Task: Linear and Recurrent Models for Early Depression Detection](#)”. In: *CEUR workshop proceedings: Working Notes of CLEF 2017 - Conference and Labs of the Evaluation Forum*.
- Bethard, Steven, Guergana Savova, Martha Palmer, and James Pustejovsky (Aug. 2017). “[SemEval-2017 Task 12: Clinical TempEval](#)”. In: *Proceedings of the 11th International Workshop on Semantic Evaluation (SemEval-2017)*, pp. 565–572.
- Bethard, Steven, Guergana Savova, Wei-Te Chen, Leon Derczynski, James Pustejovsky, and Marc Verhagen (June 2016). “[SemEval-2016 Task 12: Clinical TempEval](#)”. In: *Proceedings of the 10th International Workshop on Semantic Evaluation (SemEval-2016)*, pp. 1052–1062.
- Bethard, Steven, Leon Derczynski, Guergana Savova, James Pustejovsky, and Marc Verhagen (June 2015). “[SemEval-2015 Task 6: Clinical TempEval](#)”. In: *Proceedings of the 9th International Workshop on Semantic Evaluation (SemEval 2015)*, pp. 806–814.
- Gung, James, John Osborne, and Steven Bethard (June 2015). “[CUAB: Supervised Learning of Disorders and their Attributes using Relations](#)”. In: *Proceedings of the 9th International Workshop on Semantic Evaluation (SemEval 2015)*, pp. 417–421.
- Sultan, Md Arafat, Steven Bethard, and Tamara Sumner (June 2015b). “[DLS@CU: Sentence Similarity from Word Alignment and Semantic Vector Composition](#)”. In: *Proceedings of the 9th International Workshop on Semantic Evaluation (SemEval 2015)*. **Winner of the English shared task**, pp. 148–153.
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- Sultan, Md Arafat, Steven Bethard, and Tamara Sumner (Aug. 2014b). “[DLS@CU: Sentence Similarity from Word Alignment](#)”. In: *Proceedings of the 8th International Workshop on Semantic Evaluation (SemEval 2014)*. **Winner of the shared task**, pp. 241–246.
- Bethard, Steven (June 2013b). “[ClearTK-TimeML: A minimalist approach to TempEval 2013](#)”. In: *Second Joint Conference on Lexical and Computational Semantics (*SEM), Volume 2: Proceedings of the Seventh International Workshop on Semantic Evaluation (SemEval 2013)*. **Winner of the shared task**, pp. 10–14.
- Kolomiyets, Oleksandr, Parisa Kordjamshidi, Marie-Francine Moens, and Steven Bethard (June 2013). “[SemEval-2013 Task 3: Spatial Role Labeling](#)”. In: *Second Joint Conference on Lexical and Computational Semantics (*SEM), Volume 2: Proceedings of the Seventh International Workshop on Semantic Evaluation (SemEval 2013)*, pp. 255–262.
- Okoye, Ifeyinwa, Steven Bethard, and Tamara Sumner (June 2013). “[CU: Computational Assessment of Short Free Text Answers - A Tool for Evaluating Students’ Understanding](#)”. In: *Second Joint Conference on Lexical and Computational Semantics (*SEM), Volume 2: Proceedings of the Seventh International Workshop on Semantic Evaluation (SemEval 2013)*, pp. 603–607.
- Sultan, Md. Arafat, Steven Bethard, and Tamara Sumner (June 2013). “[DLS@CU-CORE: A Simple Machine Learning Model of Semantic Textual Similarity](#)”. In: *Second Joint Conference on Lexical and Computational Semantics (*SEM), Volume 1: Proceedings of the Main Conference and the Shared Task: Semantic Textual Similarity*, pp. 176–180.
- Kordjamshidi, Parisa, Steven Bethard, and Marie-Francine Moens (June 2012). “[SemEval-2012 Task 3: Spatial Role Labeling](#)”. In: **SEM 2012: The First Joint Conference on Lexical and Computational Semantics – Proceedings of the Sixth International Workshop on Semantic Evaluation (SemEval 2012)*, pp. 365–373.

Bethard, Steven and James H. Martin (June 2007). “[CU-TMP: Temporal Relation Classification Using Syntactic and Semantic Features](#)”. In: *Proceedings of the Fourth International Workshop on Semantic Evaluations (SemEval-2007)*, pp. 129–132.

REFEREED DEMONSTRATION ARTICLES

Manning, Christopher, Mihai Surdeanu, John Bauer, Jenny Finkel, Steven Bethard, and David McClosky (June 2014). “[The Stanford CoreNLP Natural Language Processing Toolkit](#)”. In: *Proceedings of 52nd Annual Meeting of the Association for Computational Linguistics: System Demonstrations*, pp. 55–60.

TECHNICAL REPORTS

Baker, Kathy, Steven Bethard, Michael Bloodgood, Ralf Brown, Chris Callison-Burch, Glen Coppersmith, Bonnie Dorr, Wes Filardo, Kendall Giles, Anni Irvine, Mike Kayser, Lori Levin, Justin Martineau, Jim Mayfield, Scott Miller, Aaron Phillips, Andrew Philpot, Christine Piatko, Lane Schwartz, and David Zajic (Jan. 2010). *Semantically Informed Machine Translation (SIMT)*. Tech. rep. Johns Hopkins University Human Language Technology Center of Excellence.

THESIS

Bethard, Steven (Dec. 2007). “[Finding Event, Temporal and Causal Structure in Text: A Machine Learning Approach](#)”. PhD thesis. University of Colorado at Boulder.

SCHOLARLY PRESENTATIONS

COLLOQUIA

- 6 Apr 2018 University of Arizona (CogSci): “Teaching Computers the Language of Time”
- 16 Mar 2018 University of Arizona (MIS): “Parsing the Language of Time”
- 22 Apr 2016 University of Arizona (iSchool): “Parsing the Language of Time”
- 28 Mar 2016 University of Southern Mississippi: “Parsing the Language of Time”
- 3 Mar 2016 University of South Alabama: “Parsing the Language of Time”
- 9 Feb 2016 University of Colorado Boulder: “Parsing the Language of Time”
- 21 Jan 2016 University of California Davis: “Parsing the Language of Time”
- 18 Mar 2015 Northeastern University: “Extracting Timelines from Unstructured Text”
- 20 Feb 2015 Tufts University: “Extracting Timelines from Unstructured Text”
- 9 Jul 2014 i2b2 Academic Users’ Group Annual Meeting: “State of the Art in Timeline Extraction”
- 18 Jun 2012 University of Arizona: “Extracting Timelines from Unstructured Text”
- 7 Mar 2012 Radboud University Nijmegen: “Extracting Timelines from Unstructured Text”
- 3 Feb 2012 University of Chicago: “Extracting Timelines from Unstructured Text”
- 27 Jan 2012 Indiana University: “Extracting Timelines from Unstructured Text”
- 14 Jan 2011 University of Arizona: “Exploring ERP effects of metaphor via crowdsourcing”
- 15 Jul 2008 Johns Hopkins University: “Extracting event structure: building models and corpora”
- 12 Jun 2008 University of Pittsburgh: “Building corpora to support the semantic analysis of text”
- 9 Feb 2007 Western State College: “Meaning from Text: Teaching Computers to Read”
- 26 Feb 2007 University of Texas at Dallas: “Timelines from Text: Research and Resources”
- 6 Apr 2010 Xerox-PARC: “Learning the Temporal Ordering of Textual Events”
- 1 Jun 2010 NSF workshop on Chinese temporal and discourse annotation: “Mechanical Turk and Web Counts: Collecting and Using Distributional Information about Event Durations”

CONFERENCES

- 16 Feb 2019 2019 AAAS Annual Meeting, Machine Learning and Human Language scientific session: “Human Annotation and Machine Learning in Understanding the Language of Time”
- 5 Nov 2016 EMNLP 2016 Workshop on Uphill Battles in Language Processing: “Visualizing the Content of a Children’s Story in a Virtual World: Lessons Learned”
- 16 Jun 2016 10th International Workshop on Semantic Evaluation (SemEval-2016): “SemEval-2016 Task 12: Clinical TempEval”
- 5 Jun 2015 9th International Workshop on Semantic Evaluation (SemEval-2015): “SemEval-2015 Task 6: Clinical TempEval”
- 4 Jun 2015 9th International Workshop on Semantic Evaluation (SemEval-2015): “CUAB: Supervised Learning of Disorders and their Attributes using Relations”
- 29 May 2014 Ninth International Conference on Language Resources and Evaluation (LREC 2014): “ClearTK 2.0: Design Patterns for Machine Learning in UIMA”
- 19 Oct 2013 Conference on Empirical Methods in Natural Language Processing (EMNLP 2013): “A Synchronous Context Free Grammar for Time Normalization”
- 14 Jun 2013 7th International Workshop on Semantic Evaluation (SemEval-2013): “ClearTK-TimeML: A minimalist approach to TempEval 2013”
- 24 May 2012 Eighth International Conference on Language Resources and Evaluation (LREC 2012): “Annotating Story Timelines as Temporal Dependency Structures”
- 6 Jun 2012 NAACL 2010 Workshop on Creating Speech and Language Data with Amazon’s Mechanical Turk: “Crowdsourcing and language studies: the new generation of linguistic data”
- 17 Jun 2009 Joint Conference on Digital Libraries (JCDL 2009): “Automatically characterizing resource quality for educational digital libraries”
- 16 Jun 2009 Joint Conference on Digital Libraries (JCDL 2009): “Topic Model Methods for Automatically Identifying Out-of-Scope Resources”
- 4 Jun 2009 NAACL-HLT 2009 Workshop on Computational Approaches to Linguistic Creativity (CALC-09): “Topic Model Analysis of Metaphor Frequency for Psycholinguistic Stimuli”
- 17 Jun 2008 46th Annual Meeting of the Association for Computational Linguistics: “Learning Semantic Links from a Corpus of Parallel Temporal and Causal Relations”
- 28 May 2008 Sixth International Conference on Language Resources and Evaluation (LREC 2008): “Building a Corpus of Temporal-Causal Structure”
- 17 Sep 2007 First IEEE International Conference on Semantic Computing (ICSC 2007) “Timelines from Text: Identification of Syntactic Temporal Relations”
- 24 Jun 2007 Fourth International Workshop on Semantic Evaluations (SemEval-2007): “CU-TMP: Temporal Relation Classification Using Syntactic and Semantic Features”
- 26 Mar 2007 AAAI Spring Symposium on Machine Reading: “Semantic integration in learning from text”
- 22 Jul 2006 Empirical Methods in Natural Language Processing (EMNLP 2006): “Identification of Event Mentions and their Semantic Class”
- 22 Mar 2004 AAAI Spring Symposium on Exploring Attitude and Affect in Text: “Automatic extraction of opinion propositions and their holders”

AWARDED GRANTS AND CONTRACTS

FEDERAL

2018-09 – 2021-08 \$1,500,000 PI: Hoffman US National Science Foundation, SBE, SMA
[A Data Science Platform and Mechanisms for Its Sustainability](#)
 Role: Co-PI

2018-09 – 2021-07 \$1,250,000 PI: Miller US National Institutes of Health, NLM, R01
[Automated Domain Adaptation for Clinical Natural Language Processing](#)
 Role: Site PI

2017-12 – 2021-11 \$4,676,602 PI: Surdeanu Defense Advanced Research Projects Agency
[GRASP: Global Reading and Assembly for Semantic, Probabilistic World Models](#)
 Role: Co-PI

2016-01 – 2019-12 \$3,300,000 PI: Elhadad US National Institutes of Health, BD2K R01
[Extended Methods and Software Development for Health NLP](#)
 Role: Site PI

2015-09 – 2018-09 \$2,007,965 PI: Savova US National Institutes of Health, NLM, R01
[Temporal Relation Discovery for Clinical Text](#)
 Role: Site PI

2013-03 – 2014-01 \$19,000 PI: Bethard US National Science Foundation, CISE, IIS
[ACL 2013 Student Research Workshop](#)
 Role: Principal Investigator

2012-09 – 2015-11 €1,993,326 PI: Moens EU FP7 ICT FET-Open
[Machine Understanding for Interactive Storytelling](#)
 Role: Co-PI

2007-09 – 2008-09 \$138,213 PI: Martin US National Science Foundation, CISE, IIS
[SGER: Relevance Models for Digital Repository Management](#)
 Role: Senior Personnel

2006-08 – 2006-12 \$10,000 US Department of Homeland Security
Dissertation Grant Award

2003-08 – 2006-08 \$82,800 plus tuition US Department of Homeland Security
Graduate Fellowship

INSTITUTIONAL

2015-11 – 2017-11 \$132,557 PI: Wells University of Alabama Health Services Foundation
[Natural Language Processing to Identify COPD Exacerbations in Real Time](#)
 Role: Co-Investigator

MENTORING

POSTDOCTORAL ADVISOR

Egoitz Laparra, School of Information, University of Arizona, 2017-2019

Cynthia M Kroeger, Nutrition Obesity Research Center, University of Alabama at Birmingham, 2015-2016
 NIH F32 “Research-reporting fidelity within dietary weight-loss supplement literature”

THESIS ADVISOR

Vikas Yadav, Ph.D., Information, University of Arizona, expected 2021

Dongfang Xu, Ph.D., Information, University of Arizona, expected 2020

Farig Sadeque, Ph.D., Information, University of Arizona, 2019

Thesis: *User behavior in social media: engagement, incivility, and depression*

John Osborne, Ph.D., Computer and Information Sciences, U. of Alabama at Birmingham, 2016

Thesis: *Machine Learning of Composite Concepts and the Alleviation of The Content Completeness Problem in Text Mention Normalization*

Upendra Sapkota, Ph.D., Computer and Information Sciences, U. of Alabama at Birmingham, 2015

Thesis: *Domain adaptation for authorship attribution*

THESIS CO-ADVISOR

Rongbing Xie, Ph.D., Public Health, University of Alabama at Birmingham, 2017

Thesis: *Modeling depression treatment strategies for human immunodeficiency virus (HIV) positive patients*

Quynh Thi Ngoc Do, Ph.D., Computer Science, KU Leuven, 2017

Thesis: *Domain adaptation in natural language processing for visualizing a children's story in a virtual world*

Bram Jans, M.S., Computer Science, KU Leuven, 2011

Thesis: *Construction and evaluation of databases of narrative event chains*

Saurabh Shekhar Verma, M.S., Artificial Intelligence, KU Leuven, 2011

Thesis: *Identification and Classification of Temporally Relevant Events in Text*

Carine Yu, M.S., Artificial Intelligence, KU Leuven, 2011

Thesis: *The Bedtime Story Generator*

MEMBER OF THESIS COMMITTEE

Md. Arafat Sultan, Ph.D., Computer Science, University of Colorado Boulder, 2016

Thesis: *Short-Text Semantic Similarity: Algorithms and Applications*

Samuel González López, Ph.D., Computer Science, I. N. de Astrofísica, Óptica y Electrónica, Mexico, 2015

Thesis: *Linguistic Analysis of Research Drafts of Undergraduate Students*

Ralph Frank McSweeney IV, M.S., Computer and Information Sciences, U. of Alabama at Birmingham, 2015

Thesis: *Malware Detection through Disassembled Function Analysis*

Ifeyinwa Okoye, Ph.D., Computer Science, University of Colorado Boulder, 2013

Thesis: *Applying the theory of conceptual change to improve students' understanding of science concepts with an educational recommender system*

Oleksandr Kolomiyets, Ph.D., Computer Science, KU Leuven, 2012

Thesis: *Algorithms for Temporal Information Processing of Text and their Applications*

Raquel Mochales Palau, Ph.D., Computer Science, KU Leuven, 2011

Thesis: *Automatic Detection and Classification of Argumentation in a Legal Case*

COURSES TAUGHT

2019-Sp	Instructor	LING 439/539: Statistical Natural Language Processing	13	undergrad	31	grad
2018-Fa	Instructor	ISTA 457 / INFO 557: Neural Networks	10	undergrad	21	grad
2018-Sp	Instructor	ISTA 457 / INFO 557: Neural Networks	8	undergrad	26	grad
2017-Sp	Instructor	ISTA 116: Statistical Foundations for the Information Age	64	undergrad		
2016-Fa	Instructor	ISTA 116: Statistical Foundations for the Information Age	59	undergrad		
2016-Sp	Instructor	CS 460/660/760: Artificial Intelligence	12	undergrad	9	grad
2015-Fa	Instructor	CS 201: Introduction to Programming	48	undergrad		
2015-Fa	Instructor	CS 499: Senior Capstone	25	undergrad		
2015-Sp	Instructor	CS 460/660/760: Artificial Intelligence	9	undergrad	19	grad
2014-Fa	Instructor	CS 201: Introduction to Programming	63	undergrad		
2014-Fa	Instructor	CS 499: Senior Capstone	16	undergrad		
2014-Sp	Instructor	CS 460/660/760: Artificial Intelligence	4	undergrad	24	grad

2013-Fa	Instructor	CS 499: Senior Capstone	5 undergrad
2008-Fa	Instructor	CSCI 3202: Introduction to Artificial Intelligence	57 undergrad
2002-Sp	Section Leader	CSC 345: Analysis of Discrete Structures	20 undergrad
2001-Fa	Section Leader	CSC 245: Introduction to Discrete Structures	20 undergrad
2001-Sp	Section Leader	CSC 335: Object-Oriented Programming and Design	20 undergrad
2000-Fa	Section Leader	CSC 227: Program Design and Development	20 undergrad
2000-Sp	Section Leader	CSC 127a: Introduction to Computer Science	20 undergrad