Daniel Bauer, Ph.D.

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RESEARCH INTERESTS

Artificial Intelligence; Natural Language Processing (Semantics, Multimodal Language Understanding, NLP applications); Computer Science Education.

EDUCATION

2010-2017 Ph.D. Computer Science, Columbia University
Thesis: *Grammar-Based Semantic Parsing into Graph Representations*

2007-2009 M.Sc. Language Science and Technology, Saarland University, Germany

2004-2007 B.Sc. Cognitive Science, University of Osnabrück, Germany

TEACHING APPOINTMENTS

2018 - current Lecturer in Discipline (Natural Language Processing)
Columbia University, Computer Science Department

2017 Associate in Discipline (Natural Language Processing)
Columbia University, Computer Science Department

2014-2016 Preceptor, Columbia University, Computer Science Department

RESEARCH EXPERIENCE

Summer 2016
Summer 2015 Graduate Research Assistant, Center for Computational Learning Systems and Spoken Language Processing, Columbia University
Project *Detecting Relations and Anomalies in Text and Speech* under the DARPA *DEFT* program.

Summer 2013
Summer 2012 Visiting Research Assistant, Information Sciences Institute, University of Southern California, Marina del Rey
Work on semantics-based machine translation. Developed a software toolkit for graph grammars.

2010-2013 Graduate Research Assistant, Center for Computational Learning Systems, Columbia University
NSF funded project *From Text to Pictures*. Work on semantic parsing with FrameNet. Work on meaning representation for text-to-scene generation in the *WordsEye* system.

2008-2009 Research Assistant, Cluster of Excellence on Multimodal Computing and Interaction, Saarland University.

NON-ACADEMIC WORK

2013-2014 Co-Founder / VP Research and Engineering, WordsEye Inc., New York

INVITED TALKS

2016 International Workshop on Tree Adjoining Grammars and Related Formalisms, Düsseldorf, Germany
Tutorial on graph grammars.

2014 Samsung Research America, Palo Alto
Toward Context Aware Language Processing Systems.

2012 CUNY Graduate Center, New York
Semantics-Based Machine Translation with Hyperedge Replacement Grammars.

PROFESSIONAL SERVICE

Peer reviewer for ACL Rolling Review, EMNLP, ACL, NAACL, LREC, COLING, SIGCSE, ITiCSE.
Internal reviewer for the Avanessians Doctoral Fellowships.
Reviewer for DFG (German Research Society), and Mitacs.
National Advisory Board for College Board AP Computer Science A.
Scientific advisory board for Aiphabet Inc. and OptimaLex Inc.
Guest Editor for *XRDS: The ACM Magazine for Students*, Fall 2014 issue on *Natural Language* Vol. 21 (1)

UNIVERSITY SERVICE

2023-current SEAS COI (Committee on Instruction) representative for the CS department.

2021-2022 undergraduate curriculum refresh workgroup, Computer Science, Columbia University.

2020-current TA/CA coordinator, Department of Computer Science, Columbia University.

2018-current Lecturer Search Committee, Department of Computer Science, Columbia University.

2017-current Academic Committee, Department of Computer Science, Columbia University.

2017-current Faculty advisor for CS majors in the Columbia School of General Studies.

2017-current Reviewed applicants for the CS MS and Data Science MS programs.

PUBLICATIONS

DeChant, C., Akinola, I., and **Bauer, D.** (2023). Learning to summarize and answer questions about a virtual robot's past actions. *Autonomous Robots*, 47:1103–1118

Arora, A., Malireddi, H., **Bauer, D.**, Sayeed, A., and Marton, Y. (2022). Multi-task learning for joint semantic role and proto-role labeling. arXiv preprint, cs.CL 2210.07270, https://arxiv.org/abs/2210.07270

DeChant, C. and **Bauer, D.** (2022b). Roboreport: Summarizing a virtual robot's past actions in natural language. In *Language and Robot Learning Workshop, Conference on Robot Learning (CoRL)*

DeChant, C. and **Bauer, D.** (2022a). Do you see what i see? using questions and answers to align representations of robotic actions. In *Aligning Robot Representations with Humans Workshop, Conference on Robot Learning (CoRL)*

Bauer, D., Longley, T., Ma, Y., and Wilson, T. (2022). NLP in human rights research – extracting knowledge graphs about police and army units and their commanders. In *Linguistic Annotation Workshop, LREC*

DeChant, C. and **Bauer, D.** (2021b). Toward robots that learn to summarize their actions in natural language: a set of tasks. In *Conference on Robot Learning (CoRL 21)*

DeChant, C. and **Bauer, D.** (2021a). Learning word representations in a developmentally realistic order. Technical report, Columbia University, Computer Science

Bauer, D. and Rambow, O. (2016). Hyperedge replacement and nonprojective dependency structures. In *International Workshop on Tree Adjoining Grammars and Related Formalisms (TAG+12)*

Oepen, S., Steedman, M., Drewes, F., Kallmeyer, L., and **Bauer, D.** (2015). Typical or desirable features of graphs in NLP. *Formal Models of Graph Transformation in Natural Language Processing (Dagstuhl Seminar 15122)*, Dagstuhl Reports 5(3)

Ulinski, M., Balakrishnan, A., **Bauer, D.**, Coyne, B., Hirschberg, J., and Rambow, O. (2014). Documenting endangered languages with the WordsEye Linguistics Tool. In *Workshop on the Use of Computational Methods in the Study of Endangered Languages (ComputEL)*

Agarwal, A., **Bauer, D.**, and Rambow, O. (2014). Using frame semantics in natural language processing. In *Frame Semantics in NLP: A Workshop in Honor of Chuck Fillmore*

Braune, F., **Bauer, D.**, and Knight, K. (2014). Mapping between English strings and reentrant semantic graphs. In *Language Resources and Evaluation Conference (LREC)*

Chiang, D., Andreas, J., **Bauer, D.**, Hermann, K.-M., Jones, B., and Knight, K. (2013). Parsing graphs with Hyperedge Replacement Grammars. In *Annual meeting of the Association for Computational Linguistics (ACL)*

Bauer, D. (2013b). Understanding descriptions of visual scenes using graph grammars. In *AAAI Conference on Artificial Intelligence (AAAI), Doctoral Consortium*

Bauer, D. (2013a). Towards deep semantic processing with FrameNet. In *International FrameNet Workshop*

Jones, B.*, Andreas, J.*, **Bauer, D.***, Hermann, K.-M.*, and Knight, K. (2012). Semantics-based machine translation with Hyperedge Replacement Grammars. In *International Conference on Computational Linguistics*. *First authorship shared

Coyne, B., Klapheke, A., Rouhizadeh, M., Sproat, R., and **Bauer, D.** (2012). Annotation tools and knowledge representation for a text-to-scene system. In *International Conference on Computational Linguistics*

Bauer, D., Coyne, B., and Rambow, O. (2012a). Frame-based representation of lexical, graphical, and factual knowledge for text-to-scene generation. In *Concept Types and Frames in Language, Cognition, and Science (CTF'12)*

Bauer, D., Fürstenau, H., and Rambow, O. (2012b). The dependency-parsed FrameNet corpus. In *Language Resources and Evaluation Conference (LREC)*

Bauer, D. and Rambow, O. (2011). Increasing coverage of syntactic subcategorization patterns in FrameNet using Verbnet. In *IEEE International Conference on Semantic Computing (ICSC), short papers.*

Rouhizadeh, M., **Bauer, D.**, Coyne, B., Rambow, O., and Sproat, R. (2011). Collecting spatial information for locations in a text-to-scene conversion system. In *Workshop on Computational Models for Spatial Language Interpretation and Generation (CoSLI)*

Coyne, B., **Bauer, D.**, and Rambow, O. (2011). VigNet: grounding language in graphics using frame semantics. In *ACL Workshop on Relational Models of Semantics (RELMS 2011)*

Bauer, D. and A.Koller (2010). Sentence generation as planning with probabilistic LTAG. In *International Conference on Tree Adjoining Grammars and Related Formalisms (TAG+10)*