Denis R Newman-Griffis
Curriculum Vitae

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Research Interests
Artificial Intelligence, Natural Language Processing, Health Equity,
Disability and Occupational Health, Computational Text Analysis, Medical Informatics

Education

2014–2020 **Doctor of Philosophy**, *The Ohio State University, Department of Computer Science and Engineering*, Columbus, OH, USA.
Thesis titled "Capturing Domain Semantics with Representation Learning: Applications to Health and Function." (Web link) Co-advised by Dr. Eric Fosler-Lussier and Dr. Albert Lai (Washington University in St. Louis).

2008–2012 **Bachelor of Arts**, *Carleton College*, Northfield, MN, USA, *Magna cum laude*.
Majors: Computer Science & Russian

Appointments

2020– **Postdoctoral Scholar**, *University of Pittsburgh, Department of Biomedical Informatics*, Pittsburgh, PA, USA.

2020– **Visiting Postdoctoral Fellow**, *National Institutes of Health Clinical Center, Rehabilitation Medicine Department*, Bethesda, MD, USA.

2021– **Affiliated Fellow**, *Department of Veterans Affairs, Center for Health Equity Research and Promotion*, Pittsburgh, PA, USA.

2015–2020 **Pre-Doctoral Fellow**, *National Institutes of Health Clinical Center, Rehabilitation Medicine Department*, Bethesda, MD, USA.

Research Contributions

Artificial intelligence for human function and disability
○ Developed information extraction methods for analyzing descriptions of activity and disability in medical documents.
○ Leading development and characterization of functional status information as a new domain for artificial intelligence and medical informatics.
○ Co-organizer of First International Workshop on Artificial Intelligence for Function, Disability, and Health (co-located with IJCAI-PRICAI 2020).

Representation learning for insight into specialized domains
○ Developed a novel representation learning method for capturing domain semantics of words and doncepts.
○ Developed protocols and tools for using learned representations to analyze text characteristics.

○ Software: `https://github.com/OSU-slatelab/JET`, `https://github.com/drgriffis/text-essence`

Insight into artificial intelligence research from applications

○ Deep study of data sets and evaluation methodologies to identify new research problems for AI.
○ Developed a conceptual framework for *Translational NLP*, for co-development of basic and applied NLP research.

Publications

*=equal contributor

Refereed journal articles

J3 **Denis Newman-Griffis**, Guy Divita, Bart Desmet, Ayah Zirikly, Carolyn P Rosé, and Eric Fosler-Lussier. Ambiguity in medical concept normalization: an analysis of types and coverage in electronic health record datasets. *Journal of the American Medical Informatics Association*. (2020) ocaa269. DOI: 10.1093/jamia/ocaa269.

J2 Thanh Thieu, Jonathan Camacho Maldonado, Pei-Shu Ho, Min Ding, Alex Marr, Diane Brandt, **Denis Newman-Griffis**, Ayah Zirikly, Leighton Chan, Elizabeth Rasch. A comprehensive study of mobility functioning information in clinical notes: entity hierarchy, corpus annotation, and sequence labeling. *International Journal of Medical Informatics*, (2020) 147:104351. DOI: 10.1016/j.ijmedinf.2020.104351

J1 **Denis Newman-Griffis**, Julia Porcino, Ayah Zirikly, Thanh Thieu, Jonathan Camacho Maldonado, Pei-Shu Ho, Min Ding, Leighton Chan, Elizabeth Rasch. Broadening horizons: the case for capturing function and the value of health informatics in its use. *BMC Public Health*, (2019) 19:1288. DOI: 10.1186/s12889-019-7630-3

Refereed conference proceedings

C11 Bart Desmet, Julia Porcino, Ayah Zirikly, **Denis Newman-Griffis**, Guy Divita, and Elizabeth Rasch. Development of Natural Language Processing Tools to Support Determination of Federal Disability Benefits in the U.S. In *Proceedings of the Workshop on Language Technologies for Government and Public Administration*, (2020) 1-6.

C10 **Denis Newman-Griffis** and Eric Fosler-Lussier. Writing habits and telltale neighbors: analyzing clinical concept usage patterns with sublanguage embeddings. In *Proceedings of the Tenth International Workshop on Health Text Mining and Information Analysis (LOUHI 2019)*, (2019) 146-156. DOI: 10.18653/v1/D19-6218

C9 Gordon E. Moon, **Denis Newman-Griffis**, Jinsung Kim, Aravind Sukumaran-Rajam, Eric Fosler-Lussier, P. Sadayappan. Parallel Data-Local Training for Optimizing Word2Vec Embeddings for Word and Graph embeddings. To appear in *Proceedings of the 5th Workshop on Machine Learning in HPC Environments*, 2019.

C8 **Denis Newman-Griffis** and Eric Fosler-Lussier. HARE: a Flexible Highlighting Annotator for Ranking and Exploration. In *Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing: Systems Demonstrations*, (2019) 85-90. DOI: 10.18653/v1/D19-3015

C7 **Denis Newman-Griffis***, Ayah Zirikly*, Guy Divita*, and Bart Desmet. Classifying the reported ability in clinical mobility descriptions. In *Proceedings of the 18th BioNLP Workshop and Shared Task*, (2019) 1-10. DOI: 10.18653/v1/W19-5001

C6 Brendan Whitaker*, **Denis Newman-Griffis***, Aparajita Haldar*, Hakan Ferhatosmanoglu, and Eric Fosler-Lussier. Characterizing the impact of geometric properties of word embeddings on task performance. In *Proceedings of the 3rd Workshop on Evaluating Vector Space Representations for NLP*, (2019) 8-17. DOI: 10.18653/v1/W19-2002

C5 **Denis Newman-Griffis** and Ayah Zirikly. Embedding Transfer for Low-Resource Medical Named Entity Recognition: A Case Study on Patient Mobility. In *Proceedings of the BioNLP 2018 Workshop*, (2018) 1-11. DOI: 10.18653/v1/W18-2301

C4 **Denis Newman-Griffis**, Albert M Lai, and Eric Fosler-Lussier. Jointly Embedding Entities and Text with Distant Supervision. In *Proceedings of The Third Workshop on Representation Learning for NLP*, (2018) 195-206. DOI: 10.18653/v1/W18-3026

C3 Thanh Thieu, Jonathan Camacho, Pei-Shu Ho, Julia Porcino, Min Ding, Lisa Nelson, Elizabeth Rasch, Chunxiao Zhou, Leighton Chan, Diane Brandt, **Denis Newman-Griffis**, Ao Yuan, and Albert M Lai. Inductive identification of functional status information and establishing a gold standard corpus: A case study on the Mobility domain. In *2017 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, 2017.

C2 **Denis Newman-Griffis**, Albert M Lai, and Eric Fosler-Lussier. Insights into Analogy Completion from the Biomedical Domain. In *BioNLP 2017*, (2017) 19-28. DOI: 10.18653/v1/W17-2303

C1 **Denis R Griffis**, Chaitanya Shivade, Eric Fosler-Lussier, and Albert M Lai. A Quantitative and Qualitative Evaluation of Sentence Boundary Detection for the Clinical Domain. In *Proceedings of the AMIA Summit on Clinical Research Informatics (AMIA-CRI)*, 2016.

Invited Talks

2020 **Denis Newman-Griffis**. The EHR Language Garden: Leveraging Variability in Health Documentation. George Washington University, September 2020.

2019 **Denis Newman-Griffis**. Finding mobility-related information in medical evidence with natural language processing. US Social Security Administration (Data Science Seminar Series), October 2019.

2018 **Denis Newman-Griffis**. Natural language processing approaches to extracting patient functioning from clinical data. Stanford University, Center for Population Health Sciences, March 2018.

Teaching and Mentoring

Research Mentoring

2018–2019 Advised undergraduate researcher (Brendan Whitaker, OSU Mathematics); Research project on properties of language representations that contribute to downstream tasks.
- Brendan awarded 3rd place presenter in Statistical and Mathematical Modeling section of 2019 Ohio State Denman Undergraduate Research Forum.
- Resulted in co-first author paper accepted to RepEval 2019.

Classroom Teaching

Autumn 2017 CSE 3521 - Survey of Artificial Intelligence I: Basic Techniques
Dept. of Computer Science and Engineering, The Ohio State University
- Served as instructor of record for upper-level undergraduate course on AI concepts and methodologies.
- Developed and implemented teaching materials and assessments for 40 students. Held office hours, oversaw two undergraduate Teaching Assistants.

Fellowships and Awards

2015–2020 **Pre-Doctoral Fellow**, *National Institutes of Health, Clinical Center*.

Professional Experience

2012–2014 **Software Developer**, *Fulcrum Software Solutions*, Dublin, OH, USA.
Designed, developed, and deployed applications in the business and healthcare sectors, using the .NET development stack.
○ Acted as client contact for design and troubleshooting on multiple projects.

Service and Leadership

Organizer

2020 **Lead Organizer**, *First International Workshop on Artificial Intelligence for Function, Disability, and Health*.
Convened and led international organizing committee for new workshop co-located with IJCAI-PRICAI 2020, held January 7-8, 2021.

Departmental Service

2015–2018 **AI Seminar Coordinator**, *The Ohio State University*, Columbus, OH, USA.
Coordinated bi-weekly seminar series for student presentations on ongoing AI research at Ohio State.

Reviewer

Journals *Computational Linguistics*, *PLOS One*, *Computers in Industry*, *IEEE Transactions on Audio, Speech, and Language Processing*, *BMC Medical Informatics and Decision Making*, *Informatics in Medicine Unlocked*

Conferences ACL (2016-2020), EMNLP (2017-2020), NAACL (2021), COLING (2018, 2020), AACL (2020), AAAI (2020-2021), AMIA Annual Symposium (2016-2020), AMIA Informatics Summit (2018-2020)

Workshops BioNLP (2019-2020), ACL Student Research Workshop (2020), NAACL Student Research Workshop (2019), EACL Student Research Workshop (2021)

Other

2014–2018 **Volunteer Judge**, *Ohio State Science Day*.
2016–2017 **President**, *Columbus Symphony Chorus*, Columbus, OH, USA.

Professional Development

2020–2021 **Micro-Credential: Leading People in Organizations**, *University of Pittsburgh, Katz College of Business*.

2016 **Coursework in College Teaching**, *The Ohio State University, University Center for the Advancement of Teaching*.

Affiliations

AMIA American Medical Informatics Association
ACL Association for Computational Linguistics
ACM Association for Computing Machinery
ASEE American Society for Engineering Education