

TRAVIS R. GOODWIN

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Educational History

- Ph.D., Computer Science, May 12, 2018, University of Texas at Dallas, Richardson, TX
Dissertation: *Medical Question Answering and Patient Cohort Retrieval*
Advisor: Sanda M. Harabagiu
- M.S., Computer Science, May 18, 2013, University of Texas at Dallas, Richardson, TX
Track: Intelligent Systems
- B.S., Computer Science, May 21, 2011, University of Texas at Dallas, Richardson, TX
Honors: Magna Cum Laude, Department of Computer Science Honors

Employment History

- Independent Research Scholar (2019–present)
Intramural Research Program
National Library of Medicine
National Institutes of Health
Bethesda, Maryland, 20894-0001
- Postdoctoral Research Fellow (2018–2019)
National Library of Medicine Research Participation Program (Contractor with ORISE)
Lister Hill National Center for Biomedical Communications
National Library of Medicine
National Institutes of Health
Bethesda, Maryland, 20894-0001
- Research Assistant (2015–2018)
Department of Computer Science
University of Texas at Dallas
Richardson, Texas, 75083-0688
- Teaching Assistant (2014–2015)
Department of Computer Science
University of Texas at Dallas
Richardson, Texas, 75083-0688
- Research Fellow (2012–2014)
Department of Computer Science
University of Texas at Dallas
Richardson, Texas, 75083-0688

Professional Recognitions and Honors

BEST PAPERS

- **Clinical Research Informatics Distinguished Paper Award**
Ramon Maldonado, Travis R. Goodwin, and Sanda Harabagiu

“Memory-Augmented Active Deep Learning for Identifying Relations Between Medical Concepts in Electroencephalography Reports”

Proceedings of the American Medical Informatics Association Informatics Summit, 2018.

- **Homer Warner Award**

Travis R. Goodwin and Sanda M. Harabagiu

“Inferring Clinical Correlations from EEG Reports with Deep Neural Learning”

Proceedings of the American Medical Informatics Association Annual Symposium, 2017.

- **Nominated for Distinguished Paper Award**

Ramon Maldonado, Travis R. Goodwin and Sanda M. Harabagiu

“Active Deep Learning-Based Annotation of Electroencephalography Reports for Cohort Identification”

Proceedings of the American Medical Informatics Association Summit on Translational Bioinformatics, 2017.

- **Best Student Paper Award**

Travis R. Goodwin and Sanda M. Harabagiu

“Medical Question Answering for Clinical Decision Support”

The 25th ACM International Conference on Information and Knowledge Management, 2016.

FELLOWSHIPS

- *Independent Research Scholar Fellowship* (2019–present)
- *Biomedical Informatics Postdoctoral Research Fellowship* (2018–2019)
- *Excellence in Education Doctoral Fellowship* (2012–2015)

OTHER AWARDS

- *Fellows Award for Research Excellence* 2020
National Institutes of Health
- *Doctoral Dissertation Award – First Place* 2019
American Medical Informatics Association
- *SIGIR Travel Grant Award* 2016
Conference on Information and Knowledge Management (CIKM)
ACM Special Interest Group on Information Retrieval
- *ICHI Travel Award* 2015
IEEE International Conference on Healthcare Informatics Doctoral Consortium

Professional Memberships

- JAMIA (Journal of the American Medical Informatics Association) Student Editorial Board (2019–present)
- AMIA (American Medical Informatics Association) (2016–present)
- ACM (Association for Computing Machinery) (2015–present)
- ACM-SIGIR (ACM Special Interest Group on Information Retrieval) (2016–present)

Achievements in Original Investigation

JOURNAL ARTICLES (REFEREED)

- J1 Travis R. Goodwin and Dina Demner-Fushman “A Customizable Deep Learning Model for Nosocomial Risk Prediction from Critical Care Notes with Indirect Supervision”, *Journal of the American Medical Informatics Association*, Volume 27, Issue 4, Pages 567–572, 2020.
- J2 Travis R. Goodwin and Sanda M. Harabagiu (2018) “Learning Relevance Models for Patient Cohort Retrieval”, *Open Access Journal of the American Medical Informatics Association*, Volume 1 Issue 2, 2018.
- J3 Travis R. Goodwin and Sanda M. Harabagiu (2017) “Knowledge Representations and Inference Techniques for Medical Question Answering”, *ACM Transactions on Intelligent Systems and Technology*, Volume 9 Issue 2, October 2017 (26 pages)
- J4 Travis R. Goodwin, Ramon M. Maldonado and Sanda M. Harabagiu (2017) “Automatic Recognition of Symptom Severity from Psychiatric Evaluation Reports”, *Journal of Biomedical Informatics*, 75 S71-S84
- J5 Travis R. Goodwin and Sanda M. Harabagiu (2013) “Graphical Induction of Qualified Medical Knowledge”, *International Journal of Semantic Computing*, Vol 7(4):377-406

CONFERENCE PROCEEDINGS (REFEREED)

- C1 Travis R. Goodwin, Max Savery, and Dina Demner-Fushman, “Flight of the PEGASUS? Comparing Transformers on Few-shot and Zero-shot Multi-document Abstractive Summarization”, in *Proceedings of the 28th International Conference on Computational Linguistics*, Barcelona, Spain, December 2020.
- C2 Travis R. Goodwin and Dina Demner-Fushman, “Enhancing Question Answering by Injecting Ontological Knowledge through Regularization”, in *Proceedings of Deep Learning Inside Out (DeeLIO): The First Workshop on Knowledge Extraction and Integration for Deep Learning Architectures*, Online, November 2020.
- C3 Travis R. Goodwin, Max Savery, and Dina Demner-Fushman, “Towards Zero-Shot Conditional Summarization with Adaptive Multi-Task Fine-Tuning”, in *Findings of the Association for Computational Linguistics: EMNLP 2020*, Online, November 2020.
- C4 Travis R. Goodwin and Dina Demner-Fushman, “Deep Learning from Incomplete Data: Detecting Imminent Risk of Hospital-acquired Pneumonia in ICU Patients”, in *Proceedings of the American Medical Informatics Association Annual Symposium (AMIA 2019)*, Washington, DC, USA, November 2019.
- C5 Asma Ben Abacha, Yassine Mrabet, Mark Sharp, Travis R. Goodwin, Sonya E. Shooshan, and Dina Demner-Fushman, “Bridging the Gap Between Consumer’s Medication Questions and Trusted Answers”, in *Proceedings of MedInfo 2019*, Lyon, France, August 2019.
- C6 Travis R. Goodwin and Sanda M. Harabagiu, “The Impact of Inferring Treatments on Information Retrieval for Precision Medicine”, in *Proceedings of the American Medical Informatics Association Annual Symposium (AMIA 2018)*, San Francisco, CA, USA, November 2018.
- C7 Travis R. Goodwin, Michael A. Skinner, and Sanda M. Harabagiu, “Automatically Linking Registered Clinical Trials to their Published Results with Deep Highway Networks”, in *Proceedings of the American Medical Informatics Association Informatics Summit (AMIA-TBI 2018)*, San Francisco, CA, USA, March 2018.
- C8 Ramon Maldonado, Travis R. Goodwin, and Sanda Harabagiu, “Memory-Augmented Active Deep Learning for Identifying Relations Between Medical Concepts in Electroencephalography Reports”, *Proceedings of the American Medical Informatics Association Informatics Summit (AMIA-TBI 2018)*, San Francisco, CA, USA, March 2018 (**Clinical Research Informatics Distinguished Paper Award**)
- C9 Travis R. Goodwin and Sanda M. Harabagiu, “Inferring Clinical Correlations from EEG Reports with Deep Neural Learning’0”, in *Proceedings of the American Medical Informatics Association Annual Symposium (AMIA)*, pp 770-779, Washington, DC, USA, November 2017 (**Homer Warner Award**)

- C10 Ramon Maldonado, Travis R. Goodwin, Michael A. Skinner and Sanda M. Harabagiu, “Deep Learning Meets Biomedical Ontologies: Knowledge Embeddings for Epilepsy”, in *Proceedings of the American Medical Informatics Association Annual Symposium (AMIA)*, pp 1226-1235, Washington, DC, USA, November 2017
- C11 Travis R. Goodwin, Michael E. Bowen, and Sanda Harabagiu, “A Data-driven Method for the Early Identification of Diabetes and Prediabetes”, in *Proceedings of the American Medical Informatics Association Annual Symposium (AMIA)*, pp 2015, Washington, DC, USA, November 2017
- C12 Stuart J. Taylor, Travis R. Goodwin and Sanda M. Harabagiu, “An Evaluation of Syntactic Dependency Parsers on Clinical Data”, in *Proceedings of the American Medical Informatics Association Annual Symposium (AMIA)*, pp 2205, Washington, DC, USA, November 2017
- C13 Ramon Maldonado, Travis R. Goodwin and Sanda M. Harabagiu, “Active Deep Learning-Based Annotation of Electroencephalography Reports for Cohort Identification”, in *Proceedings of the American Medical Informatics Association Joint Summits on Clinical Research Informatics (AMIA-CRI)*, pp 229-238, San Francisco, CA, USA, March 2017
- C14 Travis R. Goodwin and Sanda M. Harabagiu, “Deep Learning from EEG Reports for Inferring Underspecified Information”, in *Proceedings of the American Medical Informatics Association Joint Summits on Clinical Research Informatics (AMIA-CRI)*, pp 112-121, San Francisco, CA, USA, March 2017
- C15 Travis R. Goodwin and Sanda M. Harabagiu, “Multi-Modal Patient Cohort Identification from EEG Report and Signal Data”, in *Proceedings of the American Medical Informatics Association Annual Symposium (AMIA)*, pp 1794-1803, Chicago, IL, USA, November 2016
- C16 Travis R. Goodwin, Ramon Maldonado and Sanda M. Harabagiu, “Identifying Symptom Severity Levels by Combining Learning-to-Rank and Linear Regression”, in *Proceedings of the American Medical Informatics Association Annual (AMIA) Workshop of the National Institute of Mental Health (NIMH) Centers of Excellence in Genomic Science (CEGS) Neuropsychiatric Genome-Scale and RDoC Individualized Domains (N-GRID) Challenge*, Chicago, IL, USA, November 2016
- C17 Travis R. Goodwin and Sanda M. Harabagiu, “Medical Question Answering for Clinical Decision Support”, in *Proceedings of the Twenty-fifth ACM International Conference on Information and Knowledge Management (CIKM 2016)*, pp 297-306, Indianapolis, Indiana, USA, October 2016. (**Best Student Paper Award**)
- C18 Travis R. Goodwin and Sanda M. Harabagiu, “Interaction of Risk Factors Inferred from Electronic Medical Records”, in *Proceedings of the American Medical Informatics Association Summit on Translational Bioinformatics (AMIA-TBI 2016)*, pp 78-87, San Francisco, CA, USA, March 2016
- C19 Travis R. Goodwin and Sanda M. Harabagiu, “Embedding Open-domain Common-sense Knowledge from Text”, in *Proceedings of the Tenth International Conference on Language Resources and Evaluation (LREC-2016)*, May 2016
- C20 Travis R. Goodwin and Sanda M. Harabagiu, “A Predictive Chronological Model of Multiple Clinical Observations”, in *Proceedings of the International Conference on Healthcare Informatics (ICHI)*, pp 253-262, October 2015
- C21 Ramon Maldonado, Travis R. Goodwin, Sanda M. Harabagiu and Michael A. Skinner, “The Role of Semantic and Discourse Information in Learning the Structure of Surgical Procedures”, in *Proceedings of the International Conference on Healthcare Informatics (ICHI)*, pp 223-232, October 2015
- C22 Travis R. Goodwin and Sanda M. Harabagiu, “A Probabilistic Reasoning Method for Predicting the Progression of Clinical Findings from Electronic Medical Records”, in *Proceedings of the American Medical Informatics Association Summit on Translational Bioinformatics (AMIA-TBI 2015)*, pp 61-65, San Francisco, CA, USA, March 2015
- C23 Travis Goodwin and Sanda M. Harabagiu, “Clinical Data-Driven Probabilistic Graph Processing”, in *Proceedings of the Ninth International Conference on Language Resources and Evaluation (LREC)*, pp 101-108, Reykjavik, Iceland, May 2014

- C24 Travis Goodwin and Sanda M. Harabagiu, “Automatic Generation of a Qualified Medical Knowledge Graph and Its Usage for Retrieving Patient Cohorts from Electronic Medical Records”, in *Proceedings of the IEEE International Conference on Semantic Computing (ICSC)*, pp 363–370, Irvine CA, September 2013
- C25 Travis Goodwin and Sanda M. Harabagiu, “The Impact of Belief Values on the Identification of Patient Cohorts”, in *Proceedings of the Fourth International Conference of the CLEF Initiative (CLEF)*, pp 155–166, Valencia, Spain, September 2013
- C26 Travis Goodwin, Bryan Rink, Kirk Roberts, and Sanda M. Harabagiu, “UTDHLT: COPACETIC System for Choosing Plausible Alternatives”, in *Proceedings of the 6th International Workshop on Semantic Evaluation (SemEval)*, Montreal, Canada, June 2012.
- C27 Kirk Roberts, Travis Goodwin and Sanda M. Harabagiu, “Annotating Spatial Containment Relations Between Events”, in *Proceedings of the Eighth International Conference on Language Resources and Evaluation (LREC)*, Istanbul, Turkey, May 2012.

CONFERENCE PROCEEDINGS (NON-REFEREED)

- N1 Travis R. Goodwin, Dina Demner-Fushman, Kin Wah Fung, and Phong Do, “Overview of the TAC 2019 Track on Drug-Drug Interaction Extraction from Drug Label.” in *Proceedings of the Text Analysis Conference (TAC) 2019*, Gaithersburg, MD, USA, November, 2019.
- N2 Dina Demner-Fushman, Kin Wah Fung, Phong Do, Richard D. Boyce, and Travis R. Goodwin, “Overview of the TAC 2018 Drug-Drug Interaction Extraction from Drug Labels Track.” in *Proceedings of the Text Analysis Conference (TAC) 2018*, Gaithersburg, MD, USA, November, 2018.
- N3 Stuart J. Taylor, Sanda M. Harabagiu, and Travis R. Goodwin, “UTD HLTRI at TREC 2018: Precision Medicine Track”, in *Proceedings of the Text REtrieval Conference (TREC) 2018*, Gaithersburg, MD, USA, November, 2018.
- N4 Travis R. Goodwin, Michael A. Skinner, and Sanda M. Harabagiu, “UTD HLTRI at TREC 2017: Precision Medicine Track”, in *Proceedings of the Text REtrieval Conference (TREC) 2017*, Gaithersburg, MD, USA, November, 2017.
- N5 Travis Goodwin and Sanda M. Harabagiu, “UTD at TREC 2014: Query Expansion for Clinical Decision Support”, in *Proceedings of the Text REtrieval Conference (TREC) 2014*, Gaithersburg, MD, USA, November, 2014.
- N6 Travis Goodwin, Bryan Rink, Kirk Roberts, and Sanda Harabagiu, “UTDHLT: COPACETIC System for Choosing Plausible Alternatives”, in *SEM 2012: The First Joint Conference on Lexical and Computational Semantics, Volume 2: Proceedings of the Sixth International Workshop on Semantic Evaluation (SemEval 2012)*, Montréal, Canada, June, 2012.
- N7 Travis Goodwin, Kirk Roberts, Bryan Rink and Sanda M. Harabagiu, “Cohort Shepherd II: Verifying Cohort Constraints from Hospital Visits”, in *Proceedings of the Text REtrieval Conference (TREC) 2012*, Gaithersburg, MD, USA, November, 2012.
- N8 Travis Goodwin, Kirk Roberts, Bryan Rink and Sanda M. Harabagiu, “Cohort Shepherd: Discovering Cohort Traits from Hospital Visits”, in *Proceedings of the Text REtrieval Conference (TREC) 2011*, Gaithersburg, MD, USA, November, 2011.

PRESENTATIONS TO PROFESSIONAL MEETINGS (REFEREED)

- P1 Travis R. Goodwin and Dina Demner-Fushman, “Distributed High Performance Computing for MIMIC-III: Lessons Learned Implementing MIMIC on SparkSQL”, *American Medical Informatics Association Annual Symposium*, Online, November 2020
- P2 Travis R. Goodwin, Max Savary, and Dina Demner-Fushman, “Flight of the PEGASUS? Comparing Transformers on Few-shot and Zero-shot Multi-document Abstractive Summarization”, *The 28th International Conference on Computational Linguistics*, Barcelona, Spain, December 2020.

- P3 Travis R. Goodwin and Dina Demner-Fushman, “Enhancing Question Answering by Injecting Ontological Knowledge through Regularization”, *Deep Learning Inside Out (DeeLIO): The First Workshop on Knowledge Extraction and Integration for Deep Learning Architectures*, Online, November 2020.
- P4 Travis R. Goodwin and Dina Demner-Fushman, “Deep Learning from Incomplete Data: Detecting Imminent Risk of Hospital-acquired Pneumonia in ICU Patients”, *American Medical Informatics Association Annual Symposium (AMIA 2019)*, Washington, DC, USA, November 2019.
- P5 Travis R. Goodwin, “Medical Question Answering and Patient Cohort Retrieval”, *American Medical Informatics Association Annual Symposium*, Washington, DC, USA, November 2019
- P6 Travis R. Goodwin and Sanda Harabagiu, “The Impact of Inferring Treatments on Information Retrieval for Precision Medicine.”, *American Medical Informatics Association Informatics Summit*, San Francisco, CA, USA, March 25-28, 2019
- P7 Travis R. Goodwin, Michael A. Skinner, and Sanda M. Harabagiu, “Automatically Linking Registered Clinical Trials to their Published Results with Deep Highway Networks”, *American Medical Informatics Association Informatics Summit (AMIA-TBI)*, San Francisco, CA, USA, March 2018
- P8 Travis R. Goodwin and Sanda M. Harabagiu, “Inferring Clinical Correlations from EEG Reports with Deep Neural Learning”, *American Medical Informatics Association Annual Symposium (AMIA)*, Washington, DC, USA, November 2017
- P9 Travis R. Goodwin and Sanda M. Harabagiu, “Deep Learning from EEG Reports for Inferring Underspecified Information”, *American Medical Informatics Association Joint Summits on Clinical Research Informatics (AMIA-CRI)*, pp 112-121, San Francisco, CA, USA, March 2017
- P10 Travis R. Goodwin and Sanda M. Harabagiu, “Inferring Clinical Correlations from EEG Reports with Deep Neural Learning”, *American Medical Informatics Association Annual Symposium (AMIA)*, Washington, DC, USA, November 2017
- P11 Travis R. Goodwin and Sanda M. Harabagiu, “Multi-Modal Patient Cohort Identification from EEG Report and Signal Data”, *American Medical Informatics Association Annual Symposium (AMIA)* Chicago, IL, USA, November 2016
- P12 Travis R. Goodwin, Ramon Maldonado and Sanda M. Harabagiu, “Identifying Symptom Severity Levels by Combining Learning-to-Rank and Linear Regression”, *American Medical Informatics Association Annual (AMIA) Workshop of the National Institute of Mental Health (NIMH) Centers of Excellence in Genomic Science (CEGS) Neuropsychiatric Genome-Scale and RDoC Individualized Domains (N-GRID) Challenge*, Chicago, IL, USA, November 2016
- P13 Travis R. Goodwin and Sanda M. Harabagiu, “Medical Question Answering for Clinical Decision Support”, *ACM International Conference on Information and Knowledge Management (CIKM)*, Indianapolis, Indiana, USA, October 2016.
- P14 Travis R. Goodwin and Sanda M. Harabagiu, “Embedding Open-domain Common-sense Knowledge from Text”, *International Conference on Language Resources and Evaluation (LREC)*, May 2016
- P15 Travis R. Goodwin and Sanda M. Harabagiu, “Interaction of Risk Factors Inferred from Electronic Medical Records”, *American Medical Informatics Association Summit on Translational Bioinformatics (AMIA-TBI)*, San Francisco, CA, USA, March 2016
- P16 Travis Goodwin and Sanda M. Harabagiu, “A Predictive Chronological Model of Multiple Clinical Observations”, *IEEE International Conference on Healthcare Informatics (ICHI)*, October 2015
- P17 Travis Goodwin and Sanda M. Harabagiu, “A Probabilistic Reasoning Method for Predicting the Progression of Clinical Findings from Electronic Medical Records”, *American Medical Informatics Association Summit on Translational Bioinformatics (AMIA-TBI)*, San Francisco, CA, USA, March 2015