

RESEARCH INTERESTS

Machine Learning, Data Mining, Time Series, Natural Language Processing, Healthcare, Fairness in AI systems

ACADEMIC APPOINTMENTS

Massachusetts Institute of Technology, Cambridge, MA Starting 01/2022
Postdoctoral Associate, CSAIL, PI: Marzyeh Ghassemi

EDUCATION

Worcester Polytechnic Institute, Worcester, MA 08/2016-12/2021
PhD, Data Science
MS, Data Science 12/2018
Advised by Elke Rundensteiner and Xiangnan Kong

SUNY Geneseo, Geneseo, NY 08/2012-05/2016
BA, Applied Mathematics, minor in Biomathematics

RESEARCH EXPERIENCE

Worcester Polytechnic Institute, Research Fellow, PI: Elke Rundensteiner 08/2016-12/2021
Microsoft, PhD Intern with Dipankar Ray 05/2021-08/2021
UMass Medical School, Research Intern with Jomol Matthew 08/2018-09/2019
University of Arizona, Research Intern, PI: Shirley Papuga 2015

GRANTS

NSF-III: Timely Classification for Actionable Predictions (Under Review)
PI: Elke Rundensteiner, Co-PI: Xiangnan Kong.
This grant proposal is written based on my research and I am responsible for 90% of the writing.

SELECTED HONORS & AWARDS

🏆 **Best Poster**, International Conference on Health Informatics 2020
🏆 **Outstanding Graduate Research Award**, WPI 2019
🏆 **Best Poster**, Graduate Research Innovation and Exchange, WPI 2019
🏆 **People's Choice Poster Award**, Graduate Research Innovation and Exchange, WPI 2017
GAANN Fellow (Annual Tuition + Stipend Award), U.S. Dept. of Education 2016-2021

PUBLICATIONS

I have published in KDD, NeurIPS, AAAI, ACL, CIKM, ECML, IEEE BigData, HEALTHINF, and IEEE BHI.

REFEREED

19. *Recovering the Propensity Score from Biased Positive Unlabeled Data.*
Walter Gerych, **Thomas Hartvigsen**, Luke Buquicchio, Emmanuel Agu, Elke Rundensteiner.
AAAI, 2022.
18. *Recurrent Bayesian Classifier Chains for Exact Multi-label Classification.*
Walter Gerych, **Thomas Hartvigsen**, Luke Buquicchio, Emmanuel Agu, Elke Rundensteiner.
NeurIPS, 2021.

17. *Learning Saliency Maps to Explain Deep Time Series Classifiers.*
Prathyush Parvatharaju, Ramesh Doddaiiah, **Thomas Hartvigsen**, Elke Rundensteiner.
CIKM, 2021.
16. *Energy-Efficient Models for High-Dimensional Spike Train Classification using Sparse Spiking Neural Networks.*
Hang Yin, John Boaz Lee, Xiangnan Kong, **Thomas Hartvigsen**, Sihong Xie.
KDD, 2021.
15. *Semi-Supervised Knowledge Amalgamation for Sequence Classification.*
Jidapa Thadajarassiri, **Thomas Hartvigsen**, Xiangnan Kong, Elke Rundensteiner.
AAAI, 2021.
14. *Variational Open-Set Recognition.*
Luke Buquicchio, Walter Gerych, Kavin Chandrasekaran, Abdulaziz Alajaji, Hamid Mansoor, **Thomas Hartvigsen**, Elke Rundensteiner, Emmanuel Agu.
IEEE BigData, 2021.
13. *Human-like Explanation for Text Classification with Limited Attention Supervision.*
Dongyu Zhang, Cansu Sen, Jidapa Thadajarassiri, **Thomas Hartvigsen**, Xiangnan Kong, Elke Rundensteiner.
IEEE BigData, 2021.
12. *Recurrent Halting Chain for Early Multi-label Classification.*
Thomas Hartvigsen, Cansu Sen, Xiangnan Kong, Elke Rundensteiner.
KDD, 2020.
11. *Human Attention Maps for Text Classification: Do Humans and Neural Networks Focus on the Same Words?*
Cansu Sen, **Thomas Hartvigsen**, Biao Yin, Xiangnan Kong, Elke Rundensteiner.
ACL, 2020.
10. *Learning to Selectively Update State Neurons in Recurrent Networks.*
Thomas Hartvigsen, Cansu Sen, Xiangnan Kong, Elke Rundensteiner.
CIKM, 2020.
9. *Learning Similarity-Preserving Word Meta-Embedding.*
Jidapa Thadajarassiri, Cansu Sen, **Thomas Hartvigsen**, Xiangnan Kong, Elke Rundensteiner.
IEEE BigData, 2020.
8. *Clinical Performance Evaluation of a Machine Learning System for Predicting Hospital-Acquired Clostridium Difficile Infection.*
Erin Teeple, **Thomas Hartvigsen**, Cansu Sen, Kajal Claypool, Elke Rundensteiner.
HEALTHINF, 2020. 🏆 **Best Poster**.
7. *Adaptive-Halting Policy Network for Early Classification.*
Thomas Hartvigsen, Cansu Sen, Xiangnan Kong, Elke Rundensteiner.
KDD, 2019.
6. *Patient-Level Classification of Clinical Note Sequences Guided by Attributed Hierarchical Attention.*
Cansu Sen, **Thomas Hartvigsen**, Xiangnan Kong, Elke Rundensteiner.
IEEE BigData, 2019.
5. *Learning Temporal Relevance in Longitudinal Medical Notes.*
Cansu Sen, **Thomas Hartvigsen**, Xiangnan Kong, Elke Rundensteiner.
IEEE BigData, 2019.
4. *Comparing General and Locally-Learned Word Embeddings for Clinical Text Mining.*
Jidapa Thadajarassiri, Cansu Sen, **Thomas Hartvigsen**, Xiangnan Kong, Elke Rundensteiner.
IEEE BHI, 2019.
3. *Detecting MRSA Infections by Fusing Structured and Unstructured Electronic Health Record Data.*
Thomas Hartvigsen, Cansu Sen, Elke Rundensteiner.
BIOSTEC, 2018.

2. *Early Prediction of MRSA Infections using Electronic Health Records.*
Thomas Hartvigsen, Cansu Sen, Sarah Brownell, Erin Teeple, Xiangnan Kong, Elke Rundensteiner.
 HEALTHINF, 2018. 🏆 **Best Student Paper runner up.**
1. *CREST - Risk Prediction for Clostridium Difficile Infection Using Multimodal Data Mining.*
 Cansu Sen, **Thomas Hartvigsen**, Kaja Claypool, Elke Rundensteiner.
 ECML, 2017.

IN-SUBMISSION

7. *TOXIGEN: Controlling Language Models to Generate Implied and Adversarial Toxicity.*
Thomas Hartvigsen, Saadia Gabriel, Hamid Palangi, Maarten Sap, Dipankar Ray, Ece Kamar.
6. *Continuous-Time Attention Network for Irregularly-Sampled Time Series Classification.*
Thomas Hartvigsen, Jidapa Thadajarassiri, Xiangnan Kong, Elke Rundensteiner.
5. *Early Classification of Irregular Time Series.*
Thomas Hartvigsen, Walter Gerych, Jidapa Thadajarassiri, Xiangnan Kong, Elke Rundensteiner.
4. *Knowledge Amalgamation for Multi-Label Classification via Label Dependency Transfer.*
 Jidapa Thadajarassiri, **Thomas Hartvigsen**, Walter Gerych, Xiangnan Kong, Elke Rundensteiner.
3. *Positive Unlabeled Learning with a Sequential Selection Bias.*
 Walter Gerych, **Thomas Hartvigsen**, Luke Buquicchio, Kavin Chandrasekaran, Abdulaziz Alajaji, Hamid Mansoor, Elke Rundensteiner, Emmanuel Agu.
2. *SAIL: Recurrent Classifier Chains with Incomplete Labels.*
 Walter Gerych, **Thomas Hartvigsen**, Emmanuel Agu, Elke Rundensteiner.
1. *SkipSNN: Efficiently Classifying Sparse and Noisy Spike Trains.*
 Hang Yin, Xiangnan Kong, Liping Liu, Xin Dai, **Thomas Hartvigsen**.

SELECTED TALKS

Harvard University , invited <i>Adaptive-Halting Policy Networks for Early Classification</i> Host: Prof. Finale Doshi-Velez	Cambridge, MA 2020
Florida State University , invited <i>Adaptive-Halting Policy Networks for Early Classification</i> Host: Prof. Karen Works	Panama, FL 2020
The MITRE Corporation , invited <i>Adaptive-Halting Policy Networks for Early Classification</i>	Bedford, MA 2020
Computational Sustainability Doctoral Consortium <i>Adaptive-Halting Policy Networks for Early Classification</i>	Virtual Event 2020
Worcester Polytechnic Institute, 3MT Competition <i>Early Classification of Clinical Time Series</i>	Worcester, MA 2020
University of Minnesota, Institute for Mathematics and its Applications <i>Adaptive-Halting Policy Networks for Early Classification</i>	Minneapolis, MN 2019
Northeastern University, New England Machine Learning Day <i>Adaptive-Halting Policy Networks for Early Classification</i> , poster	Boston, MA 2019
Worcester Polytechnic Institute, Arts and Sciences Week , invited <i>Recurrent Models for Clinical Time Series</i>	Worcester, MA 2019

TEACHING/MENTORING

I have supervised two Masters Theses and eight NSF-funded REU students.

Students Advised

• Prathyush Parvatharaju (MS Thesis), WPI	2019-2021
– Masters Thesis: <i>Learning Saliency Maps to Explain Deep Time Series Classifiers</i>	
• Ramesh Doddaiiah, PhD, WPI	2020-2021
• Aleksa Perucic, MS, WPI	2019-2020
– Masters Thesis: <i>SIFT - A Deep Network for Irregular Multivariate Time Series</i>	
• Liubuo (Yuuna) Klindziuk, BS, Amherst College	2019
• Daniel Johnston, BS, Columbia University	2019
• Lolita Nazarov, BS, StonyBrook University	2019
• Julia Friend, BS, Oberlin College	2018
• Alex Hauck, BS, Valparaiso University	2018
• Sruthi Kurada, Advanced Math & Science Academy Charter School	2018
• Sarah Brownell, BS, Simmons University	2017
• Sean Tocci, BS, UMass Dartmouth	2017
Developed workshop on Deep Learning with PyTorch for Undergrads, WPI.	2019

SERVICE

Program Committee: AAAI ('21, '22), CVPR ('21), ICCV ('21), ACL ('21, '22), EMNLP ('21), NAACL ('22)	
External Reviewer: KDD ('18, '19, '20)	
Conference Volunteer: KDD ('19, '20, '21), NeurIPS ('20, '21)	
Organized Deep Learning Reading Group, WPI	2019-2020
Graduate Student Advisory Council to the Dean of Arts & Sciences, WPI	2018-2020
Graduate Student Government Senate, WPI	2018
Data Science Graduate Student Council, WPI	2016-2019