

ZHU WANG

✉ zhu.wang@kellogg.northwestern.edu  [Personal Website](#)  [Github](#)  [Google Scholar](#)

♥ RESEARCH INTERESTS

My research interests are primarily in learning representations, optimization, and applications via deep graph models and Multi-modal LLMs. Particularly, I am working on their interdisciplinary field therein to solve ontology matching, computer vision and multi-modal related tasks and applications.

🎓 EDUCATION

University of Illinois Chicago 2025

Ph.D., Computer Science

Advisor: Sathya N. Ravi, Isabel Cruz (deceased)

Thesis: Semantic-driven Multimodal Learning: Gradient-based Methods and Applications

University of Pittsburgh 2015

MS, Information Science. Advisor: Paul Munro

Northeastern University, China 2012

B.Mgt., Information Management and System. Advisor: Zhuchao Yu

🏢 RESEARCH EXPERIENCE

Postdoctoral Fellow, Northwestern University 02/2025 - present

Research Assistant, AIOpt Lab, University of Illinois at Chicago 2022 - 2025

Multimodal representation learning and applications

Research & Data science Intern, CCCIS, Chicago, IL 05/2022 - 08/2022

Vehicle damage prediction via computer vision models and knowledge graphs

Teaching Assistant, University of Illinois at Chicago 2016 - 2022

Courses: Program Design I & II, Introduction to Data Science, Introduction to Machine Learning, Database Systems, Data and Web Semantics

Research Assistant, ADVIS Lab, University of Illinois at Chicago 2016 - 2021

Applying deep learning methods on ontology matching; Data management and analytics for public health

Research Assistant, PICSO Lab, University of Pittsburgh 2014 - 2016

📖 PUBLICATIONS

[c1] **DesignCLIP: Multimodal Learning with CLIP for Design Patent Understanding**
Proceedings of the 2025 Conference on Empirical Methods in Natural Language Processing (Findings of EMNLP 2025)

Zhu Wang, Homaira Huda Shomee, Sathya N Ravi, Sourav Medya

[c2] **From Heart to Words: Generating Empathetic Responses via Integrated Figurative Language and Semantic Context Signals**

The 63rd Annual Meeting of the Association for Computational Linguistics (Findings of ACL 2025)

Gyeongun Lee, Zhu Wang, Sathya N Ravi, Natalie Parde

[c3] **A Survey on Patent Analysis: From NLP to Multimodal AI**

The 63rd Annual Meeting of the Association for Computational Linguistics (ACL 2025)

Homaira Huda Shomee, Zhu Wang, Sathya N Ravi, Sourav Medya

- [c4] **Optimizing Neural Network Training and Quantization with Rooted Logistic Objectives**
The 28th International Conference on Artificial Intelligence and Statistics (AISTATS 2025)
Zhu Wang, Praveen Raj Veluswami, Harsh Mishra, Sathya N Ravi
- [c5] **IMPACT: A Large-scale Integrated Multimodal Patent Analysis and Creation Dataset for Design Patents**
Thirty-eighth Conference on Neural Information Processing Systems (NeurIPS 2024)
Homaira Huda Shomee, **Zhu Wang**, Sathya N Ravi, Sourav Medya
- [c6] **Implicit Differentiable Outlier Detection Enable Robust Deep Multimodal Analysis**
Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS 2023)
Zhu Wang, Sourav Medya, Sathya N. Ravi
TL;DR: An end-to-end VLM framework incorporating explicit knowledge graphs and OOD-detection.
- [w1] **EmpatheticFIG at WASSA 2024 Empathy and Personality Shared Task: Predicting Empathy and Emotion in Conversations with Figurative Language**
Workshop on Computational Approaches to Subjectivity, Sentiment, & Social Media Analysis at (ACL 2024)
Gyeongun Lee, **Zhu Wang**, Sathya N Ravi, Natalie Parde
- [w2] **Contextualized Structural Self-supervised Learning for Ontology Matching**
The 18th International Workshop on Ontology Matching (OM@ISWC 2023)
Zhu Wang
- [w3,4] **AgreementMakerDeep Results for OAEI 2021, 2022**
The 16th/17th International Workshop on Ontology Matching (OM@ISWC 2021, 2022)
Zhu Wang, Isabel Cruz
- [w5] **Analysis of the impact of covid-19 on education based on geotagged twitter**
Workshop on Modeling and Understanding the Spread of COVID-19 (SIGSPATIAL 2020)
Zhu Wang, Isabel Cruz
- [w6] **Predictive analytics using text classification for restaurant inspections**
Workshop on Smart Cities and Urban Analytics (SIGSPATIAL 2017)
Zhu Wang, Booma Sowkarthiga Balasubramani, Isabel Cruz
-  **PREPRINT**
-
- [p1] **Targeted Unlearning Using Perturbed Sign Gradient Methods With Applications On Medical Images**
George Nahass, **Zhu Wang**, Homa Rashidisabet, Won Hwa Kim, Sasha Hubschman, Jeffrey C Peterson, Ghasem Yazdanpanah, Chad A Purnell, Pete Setabutr, Ann Q Tran, Darvin Yi, Sathya N Ravi. <https://arxiv.org/abs/2505.21872>
-  **PAPER IN REVIEW**
-
- [u1] **Improving Training-free Open-vocabulary Segmentation using Diffused Cuts**
Zhu Wang, Harsh Mishra, Sathya N Ravi
- [u2] **Utilizing 2D Attention-Based Models for Memory Efficient 3D Reconstruction**
Raj Mehta, Jason Alan Sulskis, **Zhu Wang**, Sathya N Ravi
- [u3] **What Makes Writing Work? Linguistic Features of Accepted vs. Rejected ICLR Submissions**
Huilian Sophie Qiu, Zhenghao Vermous Kang, Wenjing Huang, **Zhu Wang**, Brian Uzzi

INVITED TALKS & POSTER

Rooted Logistic Loss for Efficient Multimodal Learning with Quantization and Pruning

Multimodal Artificial Intelligence TTIC Workshop 2024

August 2024

Integrating Semantic Insights in Gradient Based Multimodal Learning

University of Chicago

December 2023

Accelerated Neural Network Training with Rooted Losses

2023 Conference on the Mathematical Theory of Deep Neural Networks

November 2023

Multimodal Representation Learning and Applications

NICO, Northwestern University

November 2023

Multimodal Representation Learning

University of Chicago

October 2023

Differentiable Outlier Detection Enable Robust Deep Multimodal Analysis

Midwest Machine Learning Symposium 2023

May 2023

ACADEMIC SERVICES

Conference Reviewer/Program Committee member: AISTAT 23 &24 &25, NeurIPS 23 &24 &25, ICLR 24 &25 &26, ICML 24 &25, ECCV 24, MICCAI 24 &25, AAAI 25, SDM2025, ICCV 25, WACV 26, CVPR 26

Guest Editor/Journal Reviewer: Special issue on Ontology Matching and Machine Learning of the Semantic Web Journal, Journal of Social Computing

Mentorship:

UIC PhD: Gyeongun Lee (CS), Homaira Huda Shomee (CS), George Nahass (Medical School)

UIC CS Master: Praveen Raj Veluswami, Harsh Mishra, Raj Mehta

UIC CS Undergrad GPIP interns: Yiming Wang, Angela Xu, Jenny Vuong, Brian Wilk

AWARDS

Graduate Student Council Travel Award, University of Illinois at Chicago

2018, 2023

Graduate SIS Scholarship, University of Pittsburgh

2015

National Undergraduate Scholarships, Northeastern University, China

2008-2012

SKILLS

Language/Script: JAVA, Python, PHP, SQL, R, JavaScript, XML

Tools: TensorFlow, PyTorch, OWL API, RDFlib, Neo4j, Maven, MangoDB, Spark, L^AT_EX