Aneesh Komanduri

CONTACT INFORMATION

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scholar.google.com/citations?user=IMtCc1QAAAAJ&hl=en

EDUCATION

University of Arkansas Fayetteville, Arkansas

Ph.D., Computer Science **2021 - 2026**

- **Advisor:** Dr. Xintao Wu

M.S., Computer Science, GPA: 4.0 **2021 - 2024**

- **Relevant Courses:** Statistical Methods, Regression Analysis, Machine Learning, Deep Learning, Computer Vision, Natural Language Processing, Advanced Information Retrieval, AI Ethics

B.S., Computer Science/Engineering & Applied Mathematics **2017 - 2021**

- Graduated *Summa Cum Laude*

SKILLS

- Languages: Python, C/C++, Java, Javascript, SQL
- ML Frameworks: PyTorch, Tensorflow, scikit-learn, Pyro
- Machine Learning: Large Language Models, Diffusion Probabilistic Models, Parameter Efficient Fine-tuning (e.g., LoRA), Variational Autoencoders, Normalizing Flows, Causality
- Technologies: Flask, Django, AWS, Databricks, Postgres, Apache Spark, ReactJS
- Applications: LaTeX, Jupyter Notebook, VSCode, PyCharm, Git, RStudio, MATLAB

RESEARCH EXPERIENCE

Social Awareness & Intelligent Learning Lab (SAIL) Fayetteville, Arkansas

Graduate Research Assistant **Oct 2021 - Present**

- Proposed theory and learning frameworks toward identifiable causal representation learning and high-fidelity counterfactual generation
- Currently investigating causal reasoning in large vision-language models, interpretability in large-scale generative models, and applications of causal generative modeling

PUBLICATIONS

Aneesh Komanduri, Karuna Bhaila, and Xintao Wu. CausalVLBench: Benchmarking Visual Causal Reasoning in Large Vision-Language Models. *Proceedings of the 2025 Conference on Empirical Methods in Natural Language Processing (**EMNLP**)*. 2025.

Aneesh Komanduri. Toward Causal Generative Modeling: From Representation to Generation. *Proceedings of AAAI Conference on Artificial Intelligence (**AAAI**)*. 2025.

Aneesh Komanduri, Chen Zhao, Feng Chen, and Xintao Wu. Causal Diffusion Autoencoders: Toward Counterfactual Generation via Diffusion Probabilistic Models. *Proceedings of 27th European Conference on Artificial Intelligence (**ECAI**)*. 2024.

Aneesh Komanduri, Yongkai Wu, Feng Chen, and Xintao Wu. Learning Causally Disentangled Representations via the Principle of Independent Causal Mechanisms. *Proceedings of the 33rd International Joint Conference on Artificial Intelligence (**IJCAI**)*, 2024.

Aneesh Komanduri, Xintao Wu, Yongkai Wu,and Feng Chen. From Identifiable Causal Representations to Controllable Counterfactual Generation: A Survey on Causal Generative Modeling. *Transactions on Machine Learning Research (**TMLR**)*. 2024.

Aneesh Komanduri, Yongkai Wu, Wen Huang, Feng Chen, and Xintao Wu. SCM-VAE: Learning Identifiable Causal Representations via Structural Knowledge. *IEEE International Conference on Big Data (**BigData**)*, 2022.

Aneesh Komanduri and Justin Zhan, Neighborhood Random Walk Graph Sampling for Regularized Bayesian Graph Convolutional Neural Networks. *IEEE International Conference on Machine Learning and Applications (**ICMLA**)*, 2021.

Industry Experience

NEC Laboratories America, Inc. Princeton, New Jersey

Research Intern, Data Science & System Security **May 2025 - Aug 2025**

- Developed core components of an in-house LLM-based AI chatbot service for IT Ticket service requests data
- Designed a hybrid concept and embedding refinement framework for historical ticket data to achieve efficient retrieval augmented generation (RAG) for new user requests
- Implemented a post-hoc weakly-supervised solution-aware contrastive learning algorithm to learn context-rich refined semantic embeddings for improved RAG performance

Phillips 66 Bartlesville, Oklahoma

Digital Security and Cloud Engineering Intern **May 2020 - Aug 2020**

- Developed infrastructure as code templates with Terraform and built CI/CD pipelines for the creation of resources such as SQL Servers, Blob Storages, Key Vaults, and Firewall rules for Azure Data Factory in a production environment
- Automated the process of keeping inventory on cloud instance security group rules for accounts throughout the company by creating a Python script to pull data using the Dome9 REST API

Honors and Awards

1st Place Graduate Student Poster @ NSF 2024 DART Conference ($1,500) Sep. 2024
Awarded by Arkansas Economic Development Commission (AEDC)

Doctoral Academy Fellowship ($48,000) 2021-2025
University of Arkansas Graduate School and International Education

Congressional Letter for STEM Outreach July 2021
U.S. House of Representatives

Lawrence Jesser Toll, Jr. Endowed Scholarship ($1,000) 2020-2021
University of Arkansas Department of Mathematical Sciences

Silas Hunt Distinguished Scholarship ($32,000) 2017-2021
University of Arkansas

Service

Conference Reviewer

- AAAI Conference on Artificial Intelligence (AAAI'26)
- European Conference on Artificial Intelligence (ECAI'25)
- ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD'25)
- Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD'25)
- International Joint Conference on Artificial Intelligence (IJCAI'25)
- International Conference on Machine Learning (ICML'25)
- International Conference on Learning Representations (ICLR'25)
- Conference on Neural Information Processing Systems (NeurIPS'24)
- Learning on Graphs Conference (LoG'24)
- IEEE International Conference on Machine Learning and Applications (ICMLA'24)

Journal Reviewer

- Transactions on Machine Learning Research (TMLR)
- International Journal of Data Science and Analytics (IJDSA)

- Pattern Recognition Journal
- IEEE Access

Workshop Reviewer

- Causality and Large Models Workshop (CaLM@NeurIPS'24)
- Structured Probabilistic Inference and Generative Modeling Workshop (SPIGM@ICML'24)

Teaching & Mentorship Experience

UNITE, Army Educational Outreach Program (AEOP) Fayetteville, Arkansas

Lead Research Mentor (`https://github.com/akomand/AEOP_Research_2021`) **2020, 2021**

- Guided High School students from underrepresented communities with research in data science
- Created lesson plans to teach data/text preprocessing, classification/regression, word embeddings, entity extraction, topic modeling, language models, transformers, implementations in Python, deep learning pipeline in PyTorch, and applications in question answering
- Assisted students in the development of a machine learning research paper and helped students present research to be evaluated by the Department of Defense education initiative

University of Arkansas Fayetteville, Arkansas

Teaching Assistant **Jan 2020 - Dec 2020**

- **Courses:** CSCE 2004 (Programming Foundations I) and CSCE 3193 (Programming Paradigms)
- Taught two lab sections weekly for a total of over 45 computer science & engineering students and held office hours for over 200 students
- Created, debugged, graded, and provided feedback on object-oriented and functional programming assignments (C++/Java/Python) and exams and held office hours for 200+ students