UTKARSHANI JAIMINI

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EDUCATION

University of South Carolina Columbia, SC
Doctor of Philosophy in Computer Science, GPA: 4.00/4.00 Defense – Feb 2025, Graduation: April 2025

Wright State University Dayton, OH
Master of Science in Computer Science, GPA: 3.83/4.00 August 2018

EXPERIENCE

Artificial Intelligence Institute, **Research Assistant** August 2019 - Present; Columbia, SC
Advised by Dr. Amit Sheth

- *Auditing and Robustifying AI-generated Content Detection Systems via Anti-content Sampling*
  - Investigated the robustness of the current SOTA AI-detection systems (RADAR, RAIDAR, Intrinsic dimension persistent homology dimension, Binocular, Ghostbuster) and the influence of cross-LLM paraphrasers (ChatGPT T5, Llama, Pegasus, Mistral) towards political text and biases towards the marginal communities
  - Curated an election dataset from Subreddit and YouTube news channel comments from the year 2019 to 2024
  - In collaboration with Dr. Amitava Das (USC) and Dr. Ashiqur KhudaBukhsh (RIT University)
- *Root Cause Analysis in Rocket Assembly Pipeline in Smart Manufacturing*
  - Developed causal models and methodologies for root cause analysis in assembly pipelines to reduce the downtime
  - Directed the use and development of neuro-symbolic AI techniques (causal knowledge graphs) for identifying and mitigating causal factors leading to anomalies, and inefficiencies in rocket assembly pipeline utilizing real-time data
  - Created a real-time dynamic knowledge graph of the system reusing ontologies such as Causal, SOSA, DULCE, Autonomous robotic (IEEE1872.2) and driving scene
  - In Collaboration with neXt Future Factories at McNair Center for Aerospace Innovation and Research (USC)

Bosch Center for Artificial Intelligence, **Intern** Summer 2023 and 2021; Pittsburgh, PA
Mentored by Dr. Cory Henson

- *Designed and developed Causal Neuro-symbolic AI approach for generating root cause analysis explanations in multi-object collision videos (CLEVRER-Humans multi-modal dataset)* May - Aug 2023
  - Leveraging the causal Bayesian network representation, developed a causal ontology (RDF, RDF-star) and generated Hyper-relational Causal Knowledge Graph (CausalKG) with additional domain knowledge for enhanced user explainability during collision events
  - Extracted additional event information from the event text description using Berkeley NER semantic parser
  - Used GNN based (StarE) and other knowledge graph embeddings (TransE, HolE, ComplEx, FocusE) with numerical literals to generate causal explanations and predictions for the collision events
- *Implemented Neuro-symbolic AI approaches to enhance autonomous driving systems, contributing to better safety and system explainability (PandaSet driving scene dataset)* May - Aug 2021
  - Developed Hyper-relational Causal Knowledge Graph (CausalKG) using RDF and RDF-Star to model causal relationships and counterfactual scenarios in the autonomous driving systems
  - Estimated and Augmented the CausalKG with the causal effect weights of various pedestrian behavior and road signs on the stopping of the vehicle

Siemens Incorporation, **Intern** May - Aug 2022; Princeton, NJ
Mentored by Dr. Tongtao Zhang and Georgia Olympia Brikis

- *Developed an industrial metaverse knowledge graph to promote interoperability in design and engineering applications*
  - Analyzed the computational fluid dynamic simulation (CFD) using Physics-Informed AI and surrogate modeling of aerodynamic of the vehicle in a wind tunnel (CAD)
  - Led the conceptualization, design and development of Metaverse Knowledge Graph aimed at improving interoperability and reusability in industrial engineering and design applications through semantic modeling
  - Modeled the CAD and the Universal Scene Description (USD) into the knowledge graph following the industrial standard ontologies such as ISO, SOSA.

Kno.e.sis at Wright State University, **Research Assistant** January 2016 – July 2019; Dayton, OH
Advised by Dr. Amit Sheth and Dr. Krishnaprasad Thirunarayan

- *kHealth: Semantic Multisensory Mobile Approach to Personalized Asthma Care*
  - Developed a personalized Bayesian inference model using Markov chain Monte Carlo (MCMC) and the HIPAA compliant multi-modal patient health data, enhancing asthma management and reducing clinician workload

– Investigated the role of outdoor allergens on the onset of the asthma symptom in individual patient using Weibull Survival analysis

TECHNICAL SKILLS

Languages	Python, R, Julia, Matlab, MySQL, C, Java, SPARQL, SPARQL-Star, RDF, RDF-Star
Frameworks	Pytorch, Tensorflow, CUDA
Developer Tools	RStudio, Hugin, CausalFusion, Genie, Git, Docker, Conda, Google Cloud Platform, AWS
Libraries	Pandas, NetworkX, PyMC, Seaborn, Matplotlib, NumPy, Scikit-Learn, Tensorflow, Keras

PUBLICATIONS

1. Auditing and Robustifying **AI-generated Content Detection Systems** via Anti-content *Sampling*. Dutta, A., Jaimini, U., Muthuselvam, S., Bhatt, U., Das, A., KhudaBukhsh, A. 19th International AAAI Conference on Web and Social Media (**ICWSM**) (In review) 2025
2. Causal Neuro-Symbolic AI for **Root Cause Analysis in Smart Manufacturing**. Jaimini, U., Henson, C., Sheth, A., and Harik, R. 23rd International Semantic Web Conference (**ISWC**) 2024
3. **Causal Knowledge Graph** for Scene Understanding in in **Autonomous Driving**. Jaimini, U., Henson, C., and Sheth, A. 23rd International Semantic Web Conference (**ISWC**) 2024
4. **Visual Causal Question and Answering** with Knowledge Graph Link Prediction. Jaimini, U., Henson, C., and Sheth, A. (Poster, Demo) 23rd International Semantic Web Conference (**ISWC**) 2024
5. **Personalized Bayesian Inference** for Explainable Healthcare Management, and Intervention. Jaimini, U., Thirunarayan, K., Kalra, M., Dawson, R., and Sheth, A. Human-Centered XAI: Enhancing AI Acceptability for Healthcare Workshop at International Conference of Healthcare Informatics (**ICHI**) 2024
6. **MetaverseKG**: Knowledge Graph for Engineering and Design Application in **Industrial Metaverse**. Jaimini, U., Zhang, T., & Brikis, G. O. 21st International Semantic Web Conference (ISWC) 2022
7. Personalized Healthcare and **Causal Intervention**. Jaimini, U., Thirunarayan, K., Valtorta, M., Kalra, M., and Sheth, A. Extended Abstract in 6th Machine Learning for Health (ML4H) workshop at **NeurIPS** 2020

PRESENTATION

- (Invited Speaker) Shell Technology Center on "Causal Neuro-symbolic AI Applications in Industrial Setting" 2024
- (Tutorial) The Web Conference on "Causal AI for Web and Healthcare" 2023
- (Invited Speaker) Knowledge Graph conference (KGC), Workshop on Representing and Reasoning with Imperfect Knowledge on "CausalKG: Causal Knowledge Graph" 2022
- (Tutorial) AAMAS on Multiagent CoPilot in Industrial Application 2025

FELLOWSHIP & AWARDS

- Awarded AnitaB.org Grace Hopper Scholarship. Sponsored by Two Sigma 2020
- Received Scholarship for a CRA-WP Grad Cohort for Women 2020
- Received Travel grant for conferences like (ISWC, IEEE SmartComp, ICHI, ACM OCWiC, ACM-W TriWiC)

LEADERSHIP & COMMUNITY EXPERIENCE

Wright State University Dayton, OH

Project Lead, knowledge-enabled semantic multisensory mobile approach to personalized healthcare for pediatric asthma

– Spearheaded the end-to-end development and deployment of an *approx. $1M NIH-NICHD* funded project on personalized and explainable decision making
– Collaborated with external clinical collaborators and recruited 150 pediatric asthma patients for the study
– Mentored and supervised graduate and undergraduate students in the design, tool creation, mobile application development, and data analytics

Organization Leadership

- Organizing a workshop on Causal Neuro-symbolic Artificial Intelligence (CausalNeSy AI) at Extended Semantic Web Conference (ESWC) 2025
- Organized and Program Committee for Conference on "Collaboration Assistants for Society (CASY)", 2021-2020
- Lead a research roundtable on "Causality and inductive bias for stability, robustness, and generalization & Detecting failure modes of machine learning systems" at ML4H 2021

Reviewer

- Reviewer for several top-tier **conferences** (The Web Conference, ACM KDD, WSDM) and
- **Journals** (Transactions on Fuzzy Systems, Semantic Web Journal, Journal of Web Semantics, Journal of Medical Internet Research, Nature Digital Medicine, IEEE Sensors, Springer Nature Scientific reports)