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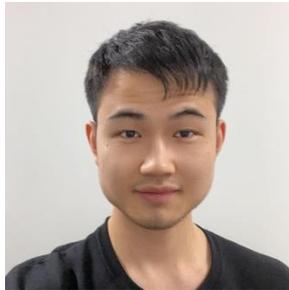


Institute for Artificial
Intelligence
UNIVERSITY OF GEORGIA

Faculty Candidate Seminar

February 27, 2026

10:00 – 11:15 am - Room: Boyd 306



Harmonizing Neural Processing and Structured Knowledge Intelligence for Social-Wellness

Dr. Yu Wang

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Abstract:

Human knowledge emerges through sustained interaction with the physical world and is internalized through two complementary mechanisms: (1) implicit representations encoded in neural parameters and (2) explicit structured formats such as mathematical equations, graphs, charts, and tables. Neural representations offer flexibility and strong statistical generalization but are often opaque and difficult to control. In contrast, structured knowledge explicitly encodes rules and symbolic constraints, enabling interpretable and principled processing, though typically with reduced adaptability. Advancing modern AI frameworks requires a principled integration of these two paradigms, leveraging their complementary strengths while mitigating their respective limitations (e.g., neural-symbolic learning, graph machine learning, and agentic workflows). This talk explores how to harmonize neural processing with structured knowledge intelligence, with a particular focus on Retrieval-Augmented Generation (RAG) systems. We address two fundamental questions: (1) How can structured knowledge signals be incorporated into neural RAG pipelines to rigorously guide, constrain, and regularize neural processing? (2) How can structured knowledge be systematically abstracted, refined, or induced from neural outputs through feedback-driven mechanisms? To answer these questions, the talk presents a unified framework spanning structured knowledge mining, representation, and integration, emphasizing both effectiveness (e.g., mitigating hallucination and enhancing retrieval accuracy) and trustworthiness (e.g., enhancing privacy-preserving and providing error-bounded guarantee). We illustrate this framework through social-wellness applications, including social computing, network system management, and scientific natural hazard modeling, demonstrating how structured-neural harmonization enables more social-responsible RAG systems in real-world environments.

Biography:

Yu Wang is a tenure-track Assistant Professor in the Department of Computer Science at the University of Oregon, where he directs the Knowledge Intelligence for Discovery and Decision-Making (KIND) Lab. His research focuses on structured knowledge intelligence, with emphases on neural-symbolic learning, agentic AI, and information retrieval, spanning interdisciplinary applications in social computing, document analysis, and infrastructure systems. Dr. Wang serves as the leading Principal Investigator on NSF-III and NSF NAIRR Pilot research projects. His work has received several recognitions, such as 2025 SIGKDD Best Dissertation Award Honorable Mention and NeurIPS Graph Learning Frontiers Best Paper Award. He actively contributes to the research community as a program committee member, conference/workshop organizer, and tutorial presenter at major venues. His long-term research vision is to advance neural processing through structured knowledge intelligence, enabling human-interpretable and socially responsible AI systems for real-world impact.