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DEPARTMENT OF
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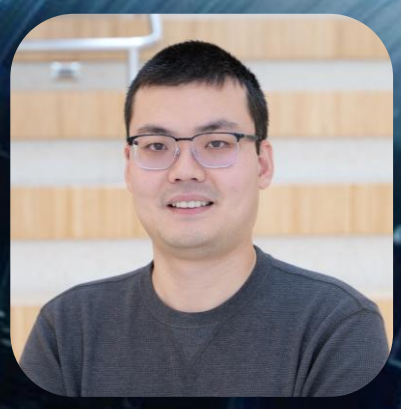
SEMINAR 2026 SERIES

SCALABLE COMPUTING AND AI SYSTEMS FOR GRAPH AND SPATIAL DATA ANALYTICS



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Department of Computer Sciences of the Luddy School of Informatics, Computing, and Engineering (SICE)
Indiana University Bloomington

DATE & TIME
7 JUL 2026 (TUE)
10:30 - 11:30 AM

VENUE
JC3_UG06, Tin Ka Ping Global Conference Classroom, Jockey Club Campus of Creativity

ABSTRACT

Massive graph-structured and spatial datasets are ubiquitous in today's data-driven world, powering critical applications from social media and finance to digital twins and natural disaster responses. However, analyzing these datasets demands compute-intensive operations that overwhelm traditional software stacks and necessitate the full power of modern heterogeneous hardware, such as GPUs.

In this talk, I first identify the computing gap, data gap, and user gap that collectively hinder the widespread adoption of advanced analytics tools. This motivates my overarching vision: democratizing graph and spatial analytics through a synergy of agentic AI automation and accelerated computing. At the core of this vision lies T-thinker, a novel "think-like-a-task" parallelization paradigm I developed specifically for backtracking search algorithms. I will demonstrate how T-thinker dramatically accelerates a broad class of compute-intensive graph algorithms across both CPU and GPU architectures. Looking ahead, I outline my roadmap to encapsulate structural analytics primitives into a reusable library, "struct", which can not only be used by human analysts, but also empower AI agents with native graph reasoning capabilities for fully automated analytics. Finally, I will extend these principles to spatial data analytics, illustrating how both T-thinker and AI agents can effectively lower the technical barrier, enabling non-expert users to execute complex spatial workflows with ease.

SPEAKER'S BIOGRAPHY

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