



University of
Pittsburgh

School of Computing
and Information

Proposal Defense
Doctor of Philosophy in Computer Science

“Building Context-Aware LLM Agents for Real-World Assistance” by Zhiwei Ren

Date: October 9, 2026

Time: 3 to 5 p.m.

Place: 6106 Sennott Square, 3810 Forbes Ave, Pittsburgh PA 15213

Committee:

- Longfei Shangguan, Associate Professor, Department of Computer Science, School of Computing and Information
- Stephen Lee, Associate Professor, Department of Computer Science, School of Computing and Information
- Lorraine (Xiang) Li, Assistant Professor, Department of Computer Science, School of Computing and Information
- Pengfei Zhou, Assistant Professor, Department of Informatics and Networked Systems, School of Computing and Information

Abstract:

Large language model (LLM) agents are increasingly expected to assist people in everyday settings, where an appropriate response often depends on information beyond the request itself. Such context includes users’ physical and physiological states, personal preferences and activity histories, surrounding environments, and the state of devices and applications. Yet simply supplying more information does not guarantee better assistance. Context can be noisy, irrelevant, incomplete, or difficult to relate to the task at hand. Even when an agent correctly recognizes a contextual cue, it may still fail to respond appropriately.

This proposal explores the design of context-aware LLM agents that better understand users’ needs and provide assistance informed by their personal and environmental context. This talk presents research on incorporating sensor-derived information into personalized assistance and extracting user-relevant information from complex environments. It also examines the challenges of interpreting and using context appropriately, and outlines future research toward more reliable and adaptive personal agents. Through system development and empirical evaluation, this research aims to establish design principles and practical approaches for building LLM agents that can more effectively understand and use contextual information to support users in real-world settings.