Keynote Speech

A Proposed Closed-Loop Agentic AI Framework for Effective Academic Workflows: Experiences and Lessons Learned

Speaker,

Wei-Chang Yeh, PhD

ASPEED, NTHU, and CYCU Chair Professor, National Tsing-Hua University

Speaker Biography:

Dr. Wei-Chang Yeh is the ASPEED Chair Professor and Chair Professor in the Department of Industrial Engineering and Engineering Management at National Tsing Hua University (NTHU), Taiwan, and also serves as Chair Professor at Chung Yuan Christian University. He received his M.S. and Ph.D. degrees in Industrial Engineering from the University of Texas at Arlington. His research focuses on algorithm design, exact solution methods, soft computing, network reliability, and NP-hard optimization problems.

Dr. Yeh has published more than 300 SCI-indexed journal papers and holds more than 70 patents. He has been listed among Stanford/Elsevier's Top 2% Scientists worldwide for both career-long and single-year impact since 2020. His honors include two Outstanding Research Awards, one Distinguished Scholars Research Project Award, and two Overseas Research Fellowships from Taiwan's MOST/NSTC.

He serves as an Associate Editor for IEEE Transactions on Reliability, IEEE Access, and Reliability Engineering & System Safety. He is the proposer of Simplified Swarm Optimization (SSO) and the Binary-Addition-Tree (BAT) framework. Dr. Yeh is also an NVIDIA University Ambassador for the Deep Learning Institute and has received NVIDIA research grant support.

Abstract/Outline

This keynote presents a generalizable, closed-loop agentic AI framework for transforming academic work. Instead of treating AI as a single assistant, the proposed framework organizes multiple cooperating agents to support the repetitive operational loops behind teaching, grading, thesis supervision, peer review, student guidance, and laboratory coordination. Each agent follows a structured, self-correcting cycle of perceiving, planning, acting, evaluating, and revising until defined quality goals are met. Framed as an exercise in systematic innovation, complex academic workflows can be decomposed into traceable, improvable, and reusable components.

The talk focuses less on any specific hardware platform and more on the design logic of academic agent systems. Five agents are introduced: a NarratorAgent for narrated slide generation, a ReviewerAgent for peer-review support, a ThesisAgent for longitudinal thesis feedback, an OrchestratorAgent for task routing, and a TeachingAgent for adaptive instruction. Rather than presenting them as a feature list, the keynote examines the key design questions behind real deployment: how responsibilities are divided, how agents hand work to one another, how disagreements are detected and resolved, how model routing is managed, and where human judgment remains essential.

Drawing on deployment experience, the keynote shares transferable lessons on architecture, reliability control, privacy-aware operation, and human-AI collaboration. The central message is that academic AI should augment rather than replace professors, reviewers, and mentors. Cooperating agents can absorb invisible academic labor, while scholars retain responsibility for interpretation, ethical judgment, mentoring, and final decisions.