Nanzan Academic Seminar

Guest Lectures by

Dr. Thorsten Koch[*]

and

Dr. Ying Chen[**]

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Date: Tuesday, April 14th

Venue: Room S56, Building S

Organizer: Takayuki Shiohama

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Program

13:35-13:40: Opening

13:40-15:10: Thorsten Koch

Title: Algorithmic Intelligence

Abstract: We are entering an era of algorithmic intelligence, in which computers routinely tackle tasks that once seemed to require human ingenuity. Daily headlines about advances in artificial intelligence and quantum computing can give the impression that “hard” problems are rapidly disappearing. In this talk, we examine what is meant by "hard-to-solve" in the context of combinatorial optimization, AI, GPUs, QUBO, and quantum computing. We present results from concrete applications, including Steiner tree problems in graphs and real-world gas network optimization. We conclude by reflecting on how emerging algorithmic paradigms and quantum computing may reshape our understanding of computational hardness in the years ahead.

15:10-15:30: Coffee Break

15:30-17:00: Ying Chen

Title: Inference and Decision-Making the Quantum-AI Era: An Algorithmic Intelligence Framework

Abstract: As we enter an era dominated by artificial intelligence and quantum computing, the role of applied math is more vital than ever — not only in making sense of data, but in shaping algorithms that drive intelligent decision-making under uncertainty. This talk presents an applied math lens on algorithmic intelligence, grounded in recent work on hybrid AI-quantum models, digital twins, and optimization in complex systems such as finance, healthcare, and logistics. I will share insights from applied collaborations involving AI-driven forecasting, reinforcement learning, and quantum circuit learning — highlighting how algorithmic intelligence thinking ensures robustness, interpretability, and transferability in modern learning systems.