

Prof. John Kitchin

Talk Title: Designing the Future Engineer: How AI Is Transforming Learning, Work, and Discovery



Abstract: Artificial intelligence is reshaping what it means to be an engineer and it is changing how we learn, design, and discover. This talk explores the convergence of generative AI, data-driven modeling, and autonomous experimentation, and what that means for engineering education and workforce development. From intelligent tutors and code-generation assistants to self-driving laboratories and agentic research systems, AI is expanding both the cognitive and creative boundaries of the profession. Drawing on examples from open-source educational ecosystems such as pycse, and recent research on agentic science and generative optimization, we will discuss how future engineers can be trained not only to use AI tools, but to think with them, integrating computation, ethics, and domain expertise into continuous, collaborative learning. We will also discuss challenges of buy-in, resources, resistance from both faculty and students, and the need to maintain a balance of traditional learning approaches with the new opportunities AI offers.

Bio:

Prof. Carl Laird is the John E. Swearingen Professor and Department Head in the Chemical Engineering Department at Carnegie Mellon University. His international reputation centers on pioneering high-performance computing strategies for large-scale nonlinear and discrete optimization problems, parallel scientific computing strategies, and the development of open-source optimization capabilities, including both modeling and solvers. He has worked in several application areas, including process and energy systems, product manufacturing, biopharmaceutical processes, homeland security, and large-scale infectious disease spread. He is the recipient of several research awards, including the Steven J. Fenves Award for Systems Research, Carnegie Mellon College of Engineering, the INFORMS Computing Society Prize, CAST Division Outstanding Young Researcher Award, National Science Foundation Faculty Early Development (CAREER) Award, and the

prestigious Wilkinson Prize for Numerical Software for his work on IPOPT, a software library for solving nonlinear, nonconvex, large-scale continuous optimization problems.

Website: <https://www.allthingsoptimal.com/>