

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:

John Kitchin completed his B.S. in Chemistry at North Carolina State University. He completed a M.S. in Materials Science and a PhD in Chemical Engineering at the University of Delaware in 2004 under the advisement of Dr. Jingguang Chen and Dr. Mark Barteau. He received an Alexander von Humboldt postdoctoral fellowship and lived in Berlin, Germany for 1 ½ years studying alloy segregation with Karsten Reuter and Matthias Scheffler in the Theory Department at the Fritz Haber Institut. Professor Kitchin began a tenure-track

faculty position in the Chemical Engineering Department at Carnegie Mellon University in January of 2006. He is currently the John E. Swearingen Professor. At CMU, Professor Kitchin works in the areas of alloy catalysis and molecular simulation. He was awarded a DOE Early Career award in 2010 to investigate multifunctional oxide electrocatalysts for the oxygen evolution reaction in water splitting using experimental and computational methods. He received a Presidential Early Career Award for Scientists and Engineers in 2011. He completed a sabbatical in the Accelerated Science group at Google learning to apply machine learning to scientific and engineering problems in 2018.

Website: <https://kitchingroup.cheme.cmu.edu/>

John Kitchin's YouTube Channel

<https://www.youtube.com/channel/UCQp2VLAOlq142YN3JO3y8w>