

AG. HALL 203 | TUESDAY, NOVEMBER 18 PM | 1-2PM



SCHOOL OF
**BIOSYSTEMS AND
AGRICULTURAL ENGINEERING**
College of Engineering, Architecture and Technology

BAE SEMINAR SERIES

Machine Learning and Artificial Intelligence for Sustainable Systems: Opportunities and Frontiers

AJAY KUMAR, PH.D.

Dr. Ajay Kumar, Ph.D., P.E. is a Professor in the Department of Biosystems and Agricultural Engineering at Oklahoma State University. He earned his Ph.D. in Agricultural and Biological Systems Engineering from the University of Nebraska-Lincoln and has over fifteen years of academic and research experience in bioenergy, bioprocessing, and sustainable technologies. Dr. Kumar leads cutting-edge research on biomass thermochemical conversion, waste-to-energy systems, and machine learning applications. He has published over 65 peer-reviewed journal articles, received more than \$9 million in research funding from federal, regional and industry sponsors and is recognized among the world's top 2 percent of scientists by Elsevier. His work integrates AI, data analytics, and engineering innovation to advance circular economy and renewable energy solutions.



ABSTRACT

Artificial intelligence (AI) and machine learning (ML) are transforming how we use diverse data, whether quantitative, qualitative, textual, or images, to make better predictions, optimize complex systems, and enable automation across engineering and sustainability domains. This talk will explore the integration of AI and ML in applications ranging from waste classification and automation in biomass conversion to data-driven analysis. Drawing from recent research and case studies, Dr. Kumar will discuss how deep learning algorithms and large language models can enhance predictive modeling, process control, and resource optimization in renewable energy and waste-to-energy systems. The presentation will also highlight current challenges, ethical considerations, and emerging opportunities for applying AI to build sustainable and efficient engineering solutions for the future.