# Fall 2024 UK Artificial Intelligence and Machine Learning Research Symposium

## Schedule of Events - Tuesday, Nov 12
### in the Gatton Student Center

| Time | Event | Location |
|---|---|---|
| **8:00 - 8:30am** | Registration and Continental Breakfast | Ballroom C |
| **8:30 - 8:40am** | **Welcome & Opening Remarks**<br>• Dr. Katherine Thompson | Ballroom B |
| **8:40 - 9:30am** | **Dr. Jing Qin**, Department of Mathematics, University of Kentucky<br>*"Dimensionality Reduction in Image Processing and Machine Learning"*<br><br>High-dimensional data, such as images and videos, often demand substantial computational resources for processing. Dimensionality reduction not only improves the efficiency of data processing algorithms but also enhances robustness to noise and outliers. As the dimension increases, the curse of dimensionality amplifies the need for larger datasets to maintain prediction accuracy, often leading to overfitting in machine learning models. In this talk, we introduce image processing models based on dimensionality reduction that exploit sparse and low-rank structures within high-dimensional data, with applications in video recovery, moving object detection, and hand gesture recognition. In addition, we explore the trade-offs of reducing embedding dimensions in NLP models for named entity recognition, demonstrating the potential of dimensionality reduction for resource-constrained or large-scale applications. | Ballroom B |
| **9:30 - 10:20am** | **Dr. Thanos Gentimis**, Experimental Statistics Department, Louisiana State University<br>*"Unlocking the Power of AI: Transformative Applications from Agriculture to Healthcare"*<br><br>Artificial Intelligence is revolutionizing a wide range of fields, offering innovative solutions to complex problems. This presentation will delve into research applications that span from optimizing agricultural systems to improving healthcare outcomes, illustrating the broad applicability of AI techniques. Through accessible examples, the talk will clarify key AI concepts and demonstrate how these technologies can be used effectively across different sectors. Designed for attendees with a basic understanding of statistics and a general familiarity with AI, the session aims to provide insights into the far-reaching potential of AI-driven approaches in real-world scenarios. | Ballroom C |
| **10:20 - 10:30am** | Coffee Break | Ballroom B |
| **10:30 - 11:20am** | **Yakun Zhang**, Department of Crop and Soil Science, Oregon State University<br>*"Applications of big data and machine learning in soil science: what do we need from domain science in the era of artificial intelligence?"*<br><br>Soil is a nonrenewable natural resource, essential for maintaining food security, sequestering carbon, cycling water and nutrients, and providing physical support for living organisms. For the sustainable use of soil resources, it's important to quantify the soil variability in space and time and understand how it interacts with environmental and human factors. Recent advances in big geospatial soil datasets, in situ soil monitoring networks, proximal and remote sensing technologies, and machine learning (ML) algorithms offer opportunities to accurately map soil at high resolutions and monitor its changes under land use and climate change. Unlike the success achieved in Computer Vision and Natural Language Processing, key challenges exist in the applications of big data and ML in soil science. In this talk, I will present three case studies to illustrate the challenges faced by modern soil scientists, related to multi-scale/multi-modal data fusion, lack of spatial-temporally explicit ML algorithms, insufficient ground-based observations for robust domain adaptation, and explainable and soil science knowledge-guided ML. Addressing these challenges requires a rethink of the current ML architecture and co-development of standard benchmark soil science datasets by soil scientists (domain scientists) and data scientists. | Ballroom B |
| **11:20am - 12:10pm** | **Roman Yampolskiy**, Department of Computer Science and Engineering, University of Louisville<br>*"Artificial Intelligence Safety and Security"*<br><br>Many scientists, futurologists and philosophers have predicted how AI will enable humanity to achieve radical technological breakthroughs in the years ahead. In his talk, Dr. Yampolskiy will cover current progress in artificial intelligence and predicted future developments, including artificial general intelligence. The talk will address some obstacles to progress in development of safe AI as well as ethical issues associated with advanced intelligent machines. The problem of control will be covered in the context of safety and security of AI. | Ballroom B |
| **12:10 - 1:00pm** | Networking Lunch (Food Provided) | |
| **1:00 - 1:30pm** | **Trey Conatser**<br>*"Emerging Practices in Teaching and Learning with AI"*<br><br>Nearly two years since the public release of ChatGPT, educators have come a long way in developing frameworks and applications for AI in teaching and learning. While initial efforts focused on text-based chatbots and trended towards AI mitigation in assessment design and regulating the use of AI in coursework, educational research and practice have explored how a broader range of AI tools and systems can be leveraged—ethically and effectively—as part of the pedagogical infrastructure of courses and programs. During this interactive presentation, we will consider several emerging use cases for AI in teaching and learning, as well as emerging developments in AI that educators will need to address in ways that enhance learning outcomes, critical literacies, and student success. | Ballroom C |
| **1:30 - 3:30pm** | **Non-technical AI/ML Workshop: James Brusuelas**<br><br>The non-technical workshop is geared toward faculty and students in non-STEM disciplines who want to get started with implementing AI in their research and teaching. What modalities are you working with (text, film, images)? Do you need train a model? Or are currently accessible models like ChatGPT, Llama, and Generative AI more suited to your needs? Are those models even helpful? We'll address issues such as these through presentations, discussion, and real-time examples. | |