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21 December 2023

The Director
University of Missouri South African Education Program (UMSAEP)
213 Hulston Hall
Columbia
MO 65211

Dear Prof. Uphoff,

This serves as my report of the activities associated with the award made to me at the University of the Western Cape (UWC) under the University of Missouri South African Education Program for a research visit undertaken from 2nd - 16th June 2023

UMSAEP University of Missouri Visit Report 2nd - 16th June 2023

Prof. Osden Jokonya, Department of Information Systems, EMS, University of the Western Cape

Host Colleagues from the University of Missouri

Prof. Haitao Li (UMSL), Prof. J Scott Christianson (UMC), Prof. Noel Aloysius (UMC), Prof. Jejung Lee (UMKC), Prof. Sejun Song (UMKC)

UMSL Department of Supply Chain and Analytics



I presented at a seminar on Big Data Adoption in the Supply Chain and Logistics Industry at the UMSL Department of Supply Chain and Analytics organised by Prof. Haitao Li. The seminar aimed to explore the profound implications of big data adoption in organizations, with a specific focus on the intricate dynamics of the supply chain and logistics industry. The seminar, conducted sought to provide insights into the potential value of big data and the strategies to build a compelling business case for its adoption. Attendees, including students, and faculty were welcomed to an engaging discussion on the transformative potential of big data within the supply chain and logistics sector. Attendees were encouraged to apply the insights gained in their academic pursuits. In



conclusion, the seminar at UMSL Department of Supply Chain and Analytics served as a platform for knowledge exchange, fostering a deeper understanding of the potential and challenges associated with big data adoption in the supply chain and logistics industry.

Visit to the Danforth Plant Science Centre



The visit to the Danforth Plant Science Centre organised by Prof. Michael Costello from UMSL was a transformative experience, offering a profound understanding of the centre's commitment to advancing plant science for the betterment of humanity. The centre's diverse community, composed of over 400 scientists from 35+ countries, collaboratively focuses on research at the intersection of food, energy, and the environment. The visit to the Danforth Plant Science Centre has provided an appreciation for the centre's role in advancing plant science and addressing global challenges. The initiatives align with the goals of fostering innovation, supporting entrepreneurship, and making tangible contributions to food security. Collaborative efforts between the centre and stakeholders hold immense promise for transformative change.

Visit to the Hydrology Lab - University of Missouri Columbia



I visited the Hydrology Lab at the University of Missouri Columbia, where I had the opportunity to witness work in water management. The visit included lab sessions and field visits, providing valuable insights into the research conducted at the university. I witnessed first-hand the experiments and analyses conducted by the team at the Hydrology Lab. Another highlight of the visit was the field trip to the university farm where various experiments were underway, focusing on weed control and water management. The use of sensors, including weather stations and soil moisture sensors, was particularly impressive. The sensor technologies are crucial for efficient water usage, a subject of importance to the water scarcity province of Western Cape.



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Entrepreneurship Start-Up Bootcamp at the University of Missouri Columbia



I participated in the Entrepreneurship Start-Up Bootcamp hosted at the University of Missouri Columbia campus. This annual event, organized by the Centre of Entrepreneurship, was specifically tailored for veterans and aimed to empower them in their entrepreneurial pursuits. I had the privilege of not only participating in the boot camp but also delivering a speech on entrepreneurship to inspire and guide the participants. I hope the knowledge gained, connections established, and inspiration received during the boot camp will play a pivotal role in shaping the entrepreneurial journeys of the participating veterans. Accompanied by Prof. J. Scott Christianson, I visited some innovative start-up companies in Columbia, where we had the opportunity to explore the dynamic landscape of entrepreneurship. One notable company we visited was MK Machining, founded in 2015, and dedicated to delivering innovative products to the precision shooting community. Another stop on our journey was Relevance, a forward-thinking agency specializing in cutting-edge strategies for companies striving to dominate their industries. The visit to start-up companies in Columbia was a valuable experience that showcased the innovation within the entrepreneurial ecosystem.

University of Missouri Kansas City Visit



The visit to the University of Missouri Kansas City (UMKC) and various agricultural sites in Kansas City was an exploration of innovative farming practices and potential collaborations between UMKC and UWC initiatives in the Western Cape. The visit encompassed visits to local farms and meetings with stakeholders involved in urban farming projects. A meeting with the Dean (Faculty of Science and Engineering) provided valuable insights into the university's initiatives and resources. Discussions focused on potential areas of support from the faculty, emphasizing collaborative opportunities that align with the goals of sustainable agriculture and community development. A visit to the local farmer's market in Kansas City provided a first-hand look at the local agricultural scene. Interactions with local farmers and vendors showcased the diversity of produce and the importance of community-supported agriculture. The experience served as a valuable comparison for potential projects in Cape Town, particularly in promoting local and sustainable food systems.



Visits to Urban Farms



The Westport urban farm visit showcased innovative farming practices in an urban setting. Discussions with farm representatives shed light on successful community engagement models, sustainable farming techniques, and the impact on local food security. A visit to Juniper Garden Refugee Farm highlighted the role of agriculture in empowering refugees. The project not only contributes to food production but also serves as a means of integration and community-building. The visit to Antioch Urban Grower provided insights into sustainable urban agriculture practices. A meeting took place with Director Prof. John Kevern, actively involved in water quality projects in Cape Town. Discussions revolved around potential collaborations and knowledge exchange in the field of water quality management. The meeting identified opportunities for joint projects that could address water-related challenges in Cape Town. The visit to UMKC was a fruitful exploration of sustainable farming practices and potential collaborations.

Outputs

- a) A decision-making support tool developed to assist smallholder farmers in optimizing their food supply chains. A research paper titled “Data-Driven Optimization for Agriculture and Food Supply Chains ” in collaboration with the University of Missouri St Louis colleagues. Several seminars were presented to different stakeholders on the importance of the decision-making support tool developed to assist smallholder farmers in optimizing their food supply chains. Masters students from UMSL and UWC participated in the project as well.
- b) A research paper titled “The application of sensors in promoting efficient water usage, in water-scarce regions”, in collaboration with the University of Missouri Columbia Hydro lab colleagues.
- c) A research paper titled “The application of sensors in promoting efficient fertilizer usage in resource-scarce smallholder farmers in the Western Cape”, in collaboration with the University of Missouri Kansas City Computer Lab.

Ongoing work

- Application of a decision-making support tool developed to assist smallholder farmers in optimizing their food supply chains is underway with data supplied by other stakeholders in the value chain in collaboration with the University of Missouri St Louis colleagues
- The application of sensors in promoting efficient water usage, particularly in water-scarce regions like the Western Cape in collaboration with the University of Missouri Columbia Hydro lab. Ongoing research and practical implementations will likely contribute to the advancement of sustainable and technology-driven agriculture in water-scarce regions like the Western Cape.
- The application of sensors in promoting efficient fertilizer usage, particularly in resource-scarce smallholder farmers in the Western Cape in collaboration with the University of Missouri KC Computer Lab. Ongoing



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research and practical implementations will likely contribute to the advancement of sustainable and technology-driven agriculture in resource-scarce regions like the Western Cape. A nutrient sensor lab for resource-scarce smallholder farmers in the Western Cape is under development.

Acknowledgments

I would like to express my sincere gratitude for the financial and logistics support extended to our project from UMSAEP (University of Missouri System Academic Excellence Program), the University of Missouri St Louis, the University of Missouri Columbia, and the University of Missouri Kansas City. The financial support provided by UMSAEP and the individual campuses has enabled us to pursue our goals and make significant strides in our work. I am truly grateful for the dedication to advancing research and academic excellence demonstrated by UMSAEP and the University of Missouri campuses. Your support has not only impacted the project directly but has also enhanced the overall academic and research environment, fostering innovation and knowledge dissemination. Once again, thank you for your invaluable support, which has been instrumental in the realization of our goals and aspirations. I look forward to continued collaboration and the positive outcomes that will result from the joint efforts.

Yours, sincerely

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