UMSAEP AWARD REPORT

Visit to

Missouri, St Louis, USA

From

1 September 2022 to 31 September 2022

By: Prof Lloyd Leach

On behalf of doctoral student Ms Rucia November

Department of Sport Recreation and Exercise Science
Faculty of Community and Health Sciences
University of the Western Cape

UMSL Host: Prof Haiyan Cai
Department of Mathematics at the
University of Missouri - St. Louis

1. Overview

The visit to UMSL was undertaken by Ms Rucia November who is a doctoral student under my supervision and the co-supervision of Prof Cai. The purpose of this visit was consequent upon Ms November completing the quantitative data collection of her doctoral studies in SA, as well as the short course on CODATA-RDA offered by the School of Research Data Science at the University of Missouri, Columbia, from September 2021 to June 2022, so that she could explore the use of mathematical, statistical and computational science in the field of sport science with Prof Cai and colleagues at the University of Missouri for analysing the quantitative data in her doctoral study. For my visit to the USA, Ms November was hosted by Prof Haiyan Cai and his colleagues in the Department of Joint Engineering, Benton Hall at St Louis.

2. Description of Linkage Activities

Due to recent technological innovations in mathematical, statistical and computational science, there has been a particular increase in systems and devices that collect and provide performance data in the field of sport science. These innovations have been embraced and widely adopted by professional sports organizations, and the use of sport performance data is broadly considered as a potential game-changer in match analysis and sport performance. However, many of these systems and applications have not been applied comprehensively in a South African context, and leaves much to be learned and gained from such an experience. Thus, the purpose of this academic exchange for Ms November was to explore the role of mathematical, statistical and computational innovation in the field of sport science for her doctoral study. Below are some of the academic and educational activities that Ms November attended at the UMSL during her visit.

2.1 UMSL

- Ms November met with Prof Haiyan Cai, Associate Dean of Joint Engineering at UMSL and gained invaluable information and knowledge regarding her statistical data analysis.

- Prof Cai assisted her in understanding new techniques and approaches to computational data analysis and personal capacity-building.
- In this regard, Ms November was able to begin working on one of the manuscripts in her doctoral study for submission to a peer-reviewed and accredited journal. The manuscript has since been submitted to Frontiers for review.

2.2 North Carolina State University

- Ms November attended an online meeting in the begin of September 2022 on Sport Analytics with Prof Erin Schliep, Associate Professor, NC State University.

2.3 Washington University, St Louis

- Ms November attended an online session on optimal correlation- based prediction, video imputation and prediction, and tree-base aggregation in statistical learning facilitated by the Statistics Department at Washington University. This was very useful and has enabled her to implement these techniques in her doctoral research in sport science.
- Furthermore, Ms November was privileged to attend various seminars (virtually) on systems analysis and innovation that was offered by the Washington University.

Being exposed to the mathematical systems on innovative techniques in computational data analysis was very fruitful, and presented Ms November with a steep learning curve for her personal study.

3. Outcomes

As an aspirant academic, Ms November have gained new knowledge in the use of mathematical, statistical and computational science in the field of sport science, and she expresses her sincere appreciation and thanks to all the staff who she has met during this time for their kindness and hospitality. More

especially, we both would like to express our sincere appreciation and thanks to UM and UWC for providing us with this opportunity to learn and grow and build our capacity as academics and researchers for the benefit our students, department and institution.

4. Photo Material

Photo 1: Ms Rucia November and Prof Haiyan Cai who hosted her at UMSL and was instrumental in supporting her academic growth and her doctoral studies, while at the University of Missouri, St Louis.

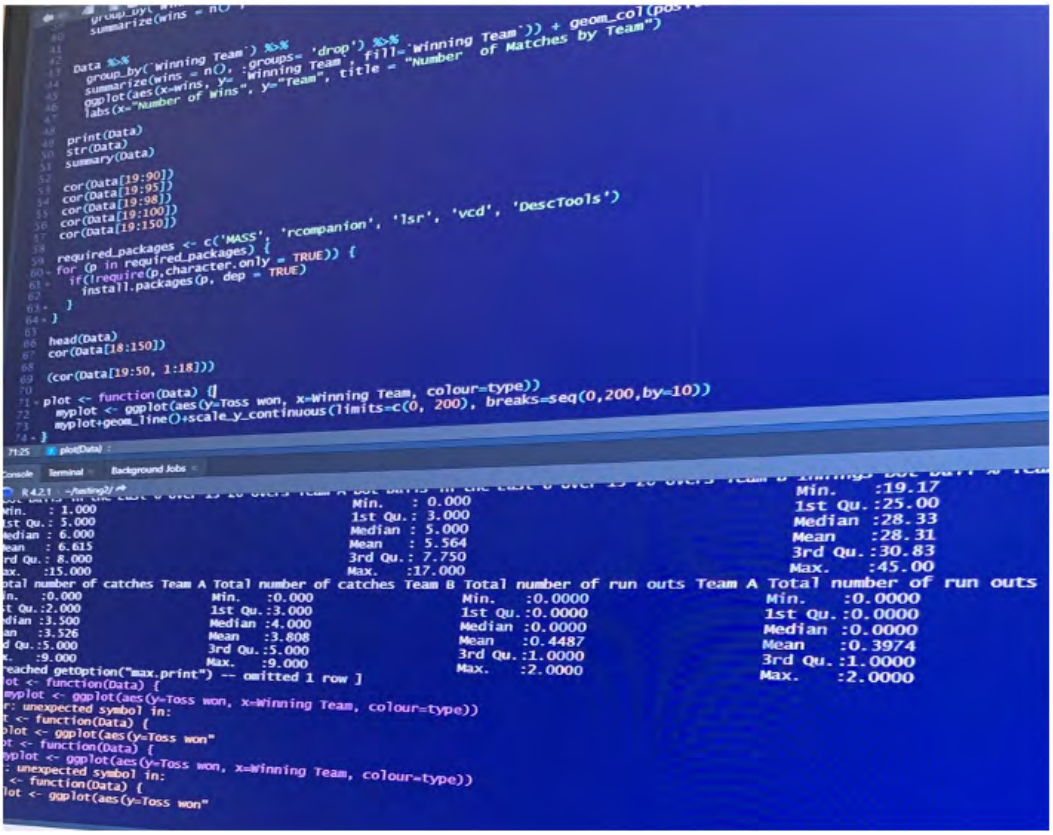

Image 1. Computational analysis in R.

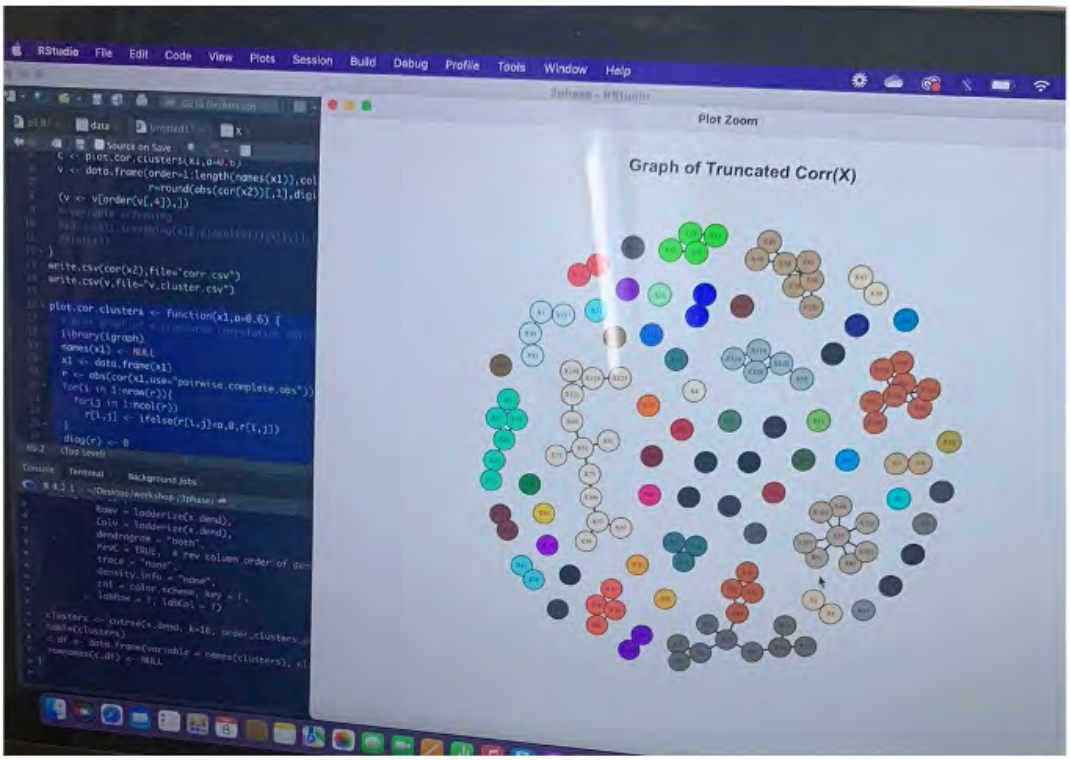

Image 2: Advanced computational imaging in R.

Images 1 and 2 are some of the analyses in R that Ms November participated in, while at UMSL that was instrumental in supporting her doctoral studies and academic growth.