## Position

*Postdoctorant*

## Home institution

Université Evangélique en Afrique (Democratic Republic of Congo)

## Current/Host institution

Université d'Abomey-Calavi (Republic of Benin)

## Background

Three years of research experience utilizing biostatistics and statistical R programming with experience as data analyst (data mining, data management and modeling) in several agriculture, food security and health-related research projects. Developing statistical analysis plan and handling real data sets in multidiscipline projects with interest in eco-epidemiology, nonparametric classification, machine learning and variable selection. Experienced in the supervision of quality survey data collection for the purposes of research. Good knowledge of epidemiology, statistics, research methods and experience in working with data analysis software. In addition to completing a master degree in Biostatistics and a master degree in Tropical Animal Health with an epidemiology emphasis.

## Research project

Generalized linear models (GLM), Species Distribution Modelling (SDM) or Ecological Niche Modelling (ENM) have been used to predict the geographical area in which ticks species occur but recent improvement in predictive accuracy demonstrated by Random Forest (RF) algorithms represents practical value for decision makers and policy makers. Unfortunately, few researches have been conducted in order to assess RF regression performance in particular situations such as forecasting extremely over-dispersed continuous variables, despite its growing interest. This research will aim to contribute to the improvement of RF regression accuracy in ecological niche assessment of diseases' vectors abundance. Specifically it will consist to assess the influence of explanatory variable's types and over-dispersion in the response variable on RF performance in regression tasks, determine how the sample design affect the RF accuracy in forecasting over-dispersed continuous variables, compare the performance of different variants of Weighted Random Forests and balanced Random Forest (bRF) to the Breiman RF algorithm both in terms of prediction accuracy and identification of important variables in predicting over-dispersed continuous variables. The effect of spatial autocorrelation on the performance of RF regression when forecasting over-dispersed count variable will be assessed. In addition, the predictive power of RF in predicting *R. appendiculatus* abundance and identifying determinants of their abundance will be assessed.

## Awards and distinctions

- Belgian Directorate General for Development Co-operation Framework Agreement (3-III DGD/ITM 2014-2016), Project 920108; Collaborative MSTAH ITM/UP awarded to the Department of Veterinary Tropical Diseases, Faculty of Veterinary Science, University of Pretoria.
- DAAD In-Country/In-Region Scholarship Programme FSA/UAC, 2020
- Doctoral Regional Research Grant #RU/2020/GTA/DRG/019

## Profiles and Curriculum (ResearchGate page. Google scholar, LinkedIn, etc.)

- https://www.researchgate.net/profile/Mushagalusa-Ciza-Arsene
- https://www.linkedin.com/in/ciza-ars%C3%A8ne-mushagalusa-58a254101/

## Total number of publications (Articles, communications, technical documents)

- Articles: 05

## Publications


- Ndjadi, S.S., Ahoton, L.E. Kizungu, R.V., Saidou A., Mugumaarhahama, Y., Mushagalusa, A.C., Safina, F.B. and Mushagalusa, G.N., 2021. Assessment of the sustainability of market gardening farms in South Kivu (Eastern of Democratic Republic of Congo), Cahiers Agricultures, 30:15. DOI: https://doi.org/10.1051/cagri/2020050
- Mugumaarhahama, Y., Mutwedu, V.B., Kazamwali, L.M., Mushagalusa, A.C., Bantuzeko, F.K., Ndjadi, S.S., Ndeko, A.B., Cirezi, N.C., Azine, P.C., Ayagirwe, R.B.-B., 2020. Typology of smallholder's pig production systems in South Kivu, Democratic Republic of Congo: Challenges and opportunities. Journal of Agriculture and Rural Development in the Tropics and Subtropics, 121:135-146.
- Etter, EM, Mushagaluza, C. A, Mapendere, C, Ferguson, W, Jori, F. and Penrith, M.-L. (2019). Understanding ASF dynamic in South Africa: from spatio-temporal analysis at national level to fine special network analysis. Frontiers in Veterinary Science, Conference Abstract: GeoVet 2019. Novel spatio-temporal approaches in the era of Big Data. doi:10.3389/conf.fvets.2019.05.00083
- Mutwedu, V.B., Buuma, K.B., Mushagalusa, A.C.., Bisimwa, N.P., Cizungu, N.C., Ayagirwe, R.B.B., 2019 Prevalence and economic losses of calf foetal wastage in Ruzizi 2 (ELAKAT) slaughterhouse, Bukavu, DR Congo, veterinary world, Vol.2 (2):38-41.
- Mugumaarhahama, Y., Ayagirwe, R B B, Mutwedu, V.B., Sadiki, J.M., Baenyi, P., Mushagalusa, A.C. and Bisimwa, E.B., (2016). Local chicken production system assessment in two agro-ecological zones of South-Kivu (Democratic Republic of Congo). Livestock Research for Rural Development. Volume 28 (1).