



COVID-19 Research by UNESWA Scientists

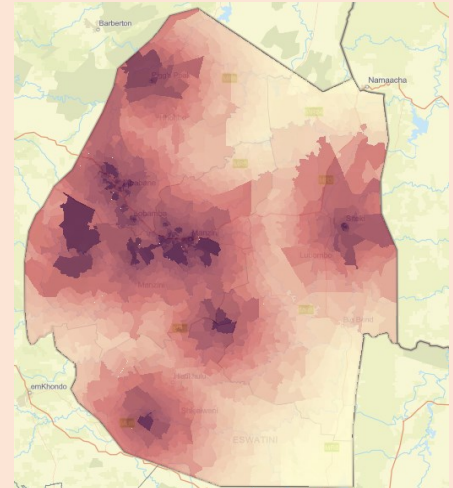
Since the start of the COVID-19 pandemic, announced by the World Health Organisation on 11th March 2020, UNESWA scientists have been working hard to understand the disease. We talked to some of the scientists at the forefront of this research to better understand what they are doing and how their research is contributing to national and global efforts to curb COVID-19.

Department of Geography & Environmental Science and Planning (GEP)

Geographic Information Systems (GIS) technology is routinely used to support city and regional planning. The same technology is being used to investigate and understand the spread, guide control measures, and assess strategies for the COVID-19 response.

At the cutting edge of this work, Dr. Wisdom Dlamini and his team have used geographic data for Eswatini and information of report-

ed cases, to model transmission risk of COVID-19, susceptibility risk, insufficient resource risk, and exposure risk. The team have published various maps to indicate different risks and to assist in awareness raising and complement the government's efforts on response design including putting measures in place to minimise the spread of the virus in the country. You can find out more and follow Dr Wisdom Dlamini's work [here](#)

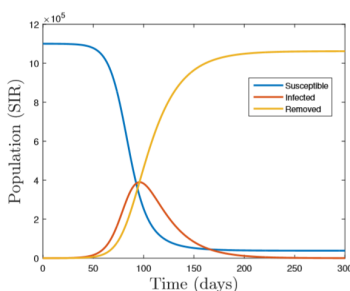


Modelling GIS map showing predicted risks of exposure

Departments of GEP, Mathematics, Physics and Statistics

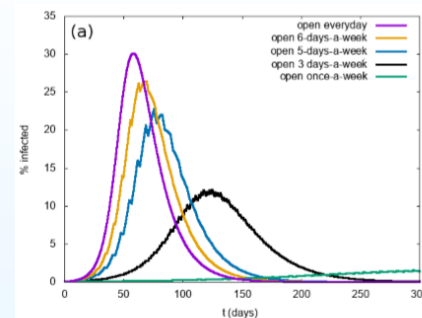
Mathematicians and statisticians are frequently called upon to make predictions on how a disease spreads through a population and determine the most important factors that should be targeted in order to eliminate a disease. To do this, they use mathematical modelling based on things we know and things we do not know about a disease. Models are particularly useful in scenarios with lack of availability in data, which is the case with COVID-19, they essentially help bridge the gap

Preliminary results: Numerical simulations



Using mathematics to predict how many people could be affected by COVID-19

Simulations Results



Simulating shopping scenarios to predict how many people could be infected by COVID-19

between what is known and what we want to know. This approach provides a low-cost way of comparing different scenarios so decision makers such as governments and policymakers can make informed decisions on the best approach to take. Such models can be used to estimate key epidemiological characteristics of COVID-19 such as the incubation period, transmissibility, severity, as well as the likely impacts of

different Government interventions such as social distancing, screening, travel restrictions, contact tracing and more.

Leading this critical work at UNESWA is a multidisciplinary team comprising of statisticians, mathematicians, physicists and epidemiologists. The team comprises of Prof. Eugene Zwane, Prof. Simiso Mkhonta, Dr. Sabelo Dlamini, Dr. Vusi Mpendulo Magagula, Dr. Joseph Malinzi and Dr. Sidumo Masango. The team have built and are running mathematical models to simulate different scenarios how COVID-19 can impact Eswatini. So far, the team are working hard to conceptualise the transmission dynamics of the new coronavirus and are determining the most important factors that should be targeted in order to eliminate this pandemic.

Department of Chemistry

When the first cases of COVID-19 were detected in Eswatini, Dr. Thabile Ndlovu together with Prof. Themb'a Mahlaba and colleagues began preparing hand sanitiser for use at the University and distribution to less privileged sectors of the Kingdom of Eswatini. Using WHO recommended formulations the team successfully developed an effective product. Dr. Thabile Ndlovu and her team are also measuring the alcohol content and efficacy of hand sanitisers being



sold on the market. The shortages of hand sanitizers has meant unscrupulous vendors are trying to

sell fake products. The new coronavirus is transferred from person to person through droplets of water e.g. when we cough, sneeze and even breathe. If the public buy fake products (or products that do not have the minimum alcohol content) and use them believing they have sanitised their hands we stand to see the virus spread even more especially as the persons hands will be wet. Alcohol not only kills the germs on your hands but it quickly evaporates leaving your hands dry.

Department of Biological Sciences

Even before there was any mention of COVID-19, UNESWA scientists were studying viruses. Prof. Ara Monadjem has been collaborating with leading international virologists in researching the presence of viruses and bacteria in animals across Africa for over 10 years. When humans and animals interact e.g. through the handling, hunting and preparing of wild animals as is common in the illegal wildlife and bushmeat trade, these bacteria and viruses can transfer to humans



Mops midas—an insect eating bat caught for studying. The bat was released unharmed after it was studied. Picture credit: Prof Ara Monadjem.

causing zoonotic diseases. Over 75% of emerging infectious diseases originate in animals.

This new coronavirus is not the first zoonotic disease to devastate the world, and it won't be the last. In historic times the bubonic plague and influenza (such as the Spanish Flu) – both of which are zoonotic diseases - killed tens of millions of people across the world. In

Eswatini, we know too well the devastation HIV has caused in our country especially when it first emerged 40 years ago and there was no treatment. HIV is a zoonotic disease that was first transmitted from chimpanzees and monkeys to humans through the hunting and preparation of bushmeat. Prof. Ara Monadjem and his team are focussed on the viruses and bacteria carried by small mammals such as bats and rodents. However, these creatures also play critical ecological roles that can have huge economic implications for humans. For example, bats are highly beneficial to the agriculture industry by eating insects that normally decimate farmers' crops. Work done in the lowveld of Eswatini and in northern Limpopo in RSA has shown how a single bat consumes 40% or more of its body weight in insects per night – this equates to over 10,000 insects in a single night, saving farmers over 600USD per hectare in pesticide use. Last year Prof. Ara Monadjem and his team published two papers on how bat [biology](#) and [ecology](#) can be used to predict the outbreak of Ebolavirus. He's currently awaiting the publication of his work on the

“Never handle or kill a wild animal unnecessarily”

different coronaviruses carried by bats in Eswatini. We asked him what people can do to minimise their risk of catching illnesses from animals such as bats.

‘First, there is no evidence that COVID-19 originated from African bats to humans, and bats do not spread COVID-19 - humans do. Secondly, don't interact with bats; leave them alone. Never handle or kill a wild animal unnecessarily. If you have bats in your house, help them to relocate by putting up a simple bat box such as on the side of your house to encourage them to roost there. Bats are our friends. They can really help you by eating insects such as mosquitos, as well as pollinate your crops and eating the pests that damage crops in your fields’, says Prof. Ara Monadjem.

You can find more information on bats and COVID-19, please follow the link [here](#). To find out how you can build your own simple bat box to enjoy the benefits of having bats near your farm or home then click [here](#).

Departments of Biological Sciences, Computer Science and Physics

Since the COVID-19 crisis began, Prof. Themb'a Mahlaba, Dr Shell-May Liao, Dr Andile Metfula, Dr Sara Padidar and Mr Chris Mavuso have been dedicated to developing the UNESWA COVID-19 [website](#). The aim of the website is to assist the public in understanding what is happening in Eswatini with COVID-19 and transforming the Ministry of Health's regular updates into easy to understand visuals. Chris Mavuso built the site and has used his creative talents to develop a sleek and professional website.

New UNESWA faculty members physicist Dr Shell-May Liao and biologist Dr Sara Padidar have prepared the [Eswatini COVID-19 dashboard](#) and keep it up to date every day. They are working with colleagues at Wits University, RSA, in understanding how the disease is spreading across Africa and what that means for the region. As the leading tertiary education

institution in the Kingdom, the University has a responsibility to assist the public to understand more about this disease and how they can protect themselves. 'We recognised it's a stressful time for parents whose children may not understand why they are home from school but are not allowed to go out and play with their friends,' says Dr Sara Padidar. The University has developed a free downloadable factsheet in both [English](#) and [siSwati](#) to assist children to also understand this disease.

Prof Themb'a Mahlaba, Dr Shell-May Liao and Dr Sara Padidar, in collaboration with Ministry of Health and St Louis College of Pharmacy (USA) are also researching the attitudes and experiences of residents of Eswatini with the guidance on prevention measures aimed at curbing the spread of COVID-19. The study, which has ethical clearance from

Tell us your thoughts and experiences with COVID-19 prevention measures by taking our short anonymous survey [here!](#)

the Ministry of Health, is an anonymous online survey. The public can access the survey through links that are available on social media, as well as UNESWA COVID-19 [website](#) and [Eswatini COVID19 dashboard](#). The survey went live on 14 May 2020, and is available in both English and siSwati.

Prof. Mahlaba, Dr Liao, Dr Malinzi and Dr Padidar are currently working on more factsheets and materials to assist the general public to understand COVID-19, which will be published [here](#).



Final word from Prof. Sandile Motsa, the Dean of the Faculty of Science and Engineering, *"I'm proud of our Faculty for coming together during these difficult times. There is an urgent need for us to improve our understanding of COVID-19, its evolution, as well as contain its spread. Through collaborative research, we are able to provide data to support our country's leaders make informed decisions so they can best manage the path ahead in the Kingdom of Eswatini."*