

Editorial

Dear Readers,

Through different communication channels like this newsletter, our website emails, social media,

workshops, and progress review sessions, THRiVE has repeatedly notified her stakeholders regarding the imminent end of our DELTAS - 1 grant funding in July 2022. At all levels, we must avoid late and incomplete submissions of required documents from both the prime grantee and subcontracted partner institution. These may include property reports, patent reports, and others. To achieve all this, THRiVE management requests all fellows/trainees and staff to anticipate the coming workload between now and July. In addition, all of us should adopt a “do it right the first time” philosophy so that we do not have to go through the same work that is essential to closeout many times to get it right.

Close-out requires a final reconciliation of the budget and expenses. Each institution should liquidate all outstanding financial obligations within 90 days after the end of the project

After submission, the final reports and supporting documents should be safely stored for not less than the minimum period stipulated by the funder. Audits will be carried out starting with an entrance and completing with an exit interview at the prime institution and the partner institutions. When notified of an audit it is

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Top Wins for research scientists on the THRiVE-2 Grant



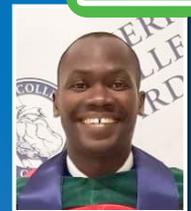
Assoc. Prof. David Meya



Assoc. Prof. Angelina Kakooza



Dr. Joel Bargul



Dr. Emmy Okello



Dr. Edward Wampande



Dr. Gerald Mboowa



Dr. Arthur Kwizera



For the past five years, THRiVE has empowered African institutions to develop their infrastructure and scientific research staff capacity to lead world-class research programmes; offered young researchers (post-graduate and post-doctoral fellows) the opportunity to be mentored by committed teams of scientific advisers and enhanced research governance and management by strengthening institutional systems like ethical review boards. In June this year, the program which started in 2009 will come to an end. Along the way, it (THRiVE) has grown and evolved, reaching several milestones and creating several networks. In this issue of the newsletter, we bring you our fellows and mentors

that have been honored with grants and awards during the THRiVE-2 grant period (2016-2022).

Dr. Arthur Kwizera – Spearheading respiratory failure research in Uganda

The advent of COVID-19 in Uganda cast the urgency to prioritize prevention and treatment of acute and chronic respiratory diseases into the spotlight. Recently, Dr. Kwizera, who has been leading research efforts to find innovative solutions to tackle acute respiratory failure, was awarded a £533,825 grant from Wellcome Trust. This is to support a clinical trial meant to assess

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MUST READ

My THRiVE-2 Career Development Award Story – benefits to career and professional growth thus far!



In July 2018, I received a THRiVE-2 Career Development Award...

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My experience towards becoming an independent researcher



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Learning about TB through community and public engagement: A case of Iganga Girls SS



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Dr. Arthur Kwizera wins grant for respiratory failure research

Dr. Arthur Kwizera has won a £533,825 grant from Wellcome Trust or a clinical trial...

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necessary to carefully prepare specifically for the information that is requested at each of these institutions. More is not better as that may unnecessarily prolong the audit. Audits can be relatively easy to complete if the institutions have good systems in place and everyone follows the project,

institutional, and funders guidelines. Please be truthful and check that everyone followed close finance monitoring throughout the project including during the final stages of the project and the post-COVID-19 pandemic.

... from Pg. 1 whether low cost, high-flow oxygen therapies reduce need for intensive care admission and death in patients with acute hypoxemic respiratory failure (AHRF) in Uganda.

Additionally, he is in the process of reviewing Uganda's National Oxygen Scale Up Plan. This involves reviewing the country's oxygen capacity and establishing plans to improve it with latest evidence. Furthermore, Dr. Kwizera is collaborating with other researchers to develop and validate a high flow oxygen generator which produces 30ltrs of oxygen per minute as compared to standard oxygen concentrators which produce 10ltrs per minute.



Dr. Arthur Kwizera

David Meya named world expert in Cryptococcosis



Assoc. Prof David Meya is a world expert in Cryptococcosis

Assoc. Prof David Meya, a THRiVE-2 post-doctoral fellow, was in September 2020 recognized as a world expert in Cryptococcosis by Expertscape, a website that identifies and objectively ranks medical expertise. He was placed in the top 0.1% of scholars writing about Cryptococcosis over the past 10 years by Expertscape's PubMed-based algorithms, a level they label as "World Expert." Additionally, Meya was selected as a fellow for the prestigious Africa Science Leadership Program (ASLP). The programme grows mid-career African academics in areas of thought leadership, team management and research development.

Dr Gerald Mboowa wins the 2020 Anglophone Young Investigators Award



Dr. Gerald Mboowa

Dr Mboowa, an Implementation Science Expert for Bioinformatics at the Africa Centers for Disease Control and Prevention (Africa CDC) was awarded the 2020 Anglophone Young Investigators Prize. He received €10,000 (approximately UGX 44.5M) by the Mali based African Association for research and control of Anti-Microbial Resistance (AAAMR) in recognition of his innovation, the Rapid Microbial Analysis Pipeline (rMAP). rMAP is an automated bioinformatics tool for analyzing, interpreting and tracking antimicrobial resistance (AMR). It is able to exhaustively decode bacterial resistance with minimal hands involvement.

rMAP is available on GitHub, an online hosting platform for bioinformatics software development. It is envisioned that the application of this tool for real-time detection of drug resistant pathogens is essential to combat their (resistant pathogens) increasing threat.

Dr Emmy Okello honored with Cardiology award



Dr. Emmy Okello is a consultant cardiologist and senior researcher at Uganda Heart Institute.

This year, Dr. Emmy Okello, an Interventional Cardiologist at the Uganda Heart Institute together with the THRiVE Director and Prof. Andrea Z. Beaton have

been awarded an NIH grant on "Reducing the impact of Rheumatic heart disease across the lifespan: The impact program."

In March 2018, Dr. Okello was also honored with a Fellowship of the American College of Cardiology (FACC) during a convocation at the 68th annual convention of the American College of Cardiology in New Orleans, USA. The FACC is the highest level of recognition in the field of cardiovascular medicine and recognizes years of training and dedicated service and research in cardiovascular medicine. Dr. Okello, a THRiVE-2 postdoctoral fellow has spearheaded interventional cardiology practice in Uganda and uniquely led the introduction of balloon mitral valvoplasty, a minimally invasive procedure that allows treatment of rheumatic heart disease patients with narrowed heart valves without having to undergo open heart surgery.

Assoc. Prof. Kakooza fellow wins NIH grant for epilepsy research



Before the end of 2021, the National Institutes of Health (NIH) awarded a \$2.5 million grant to Assoc. Prof. Angelina Kakooza-Mwesige to clinically characterize a Ugandan national sample of patients with epilepsy, investigate the magnitude and drivers of epilepsy stigma among adolescents and evaluate the effects of a community-based engagement program on reducing this stigma in the community (AWE Change project). This five-year project will be done in collaboration with colleagues from Duke University's Division of Global Neurosurgery and Neurology, Durham, USA.

Dr. Joel Bargul's Community Engagement Project lands him on school management board

Throughout his postdoctoral research, Dr. Bargul and his colleagues at *icipe* have profiled camel diseases circulating in northern Kenya as a basis to guide design of appropriate disease control measures to

be adapted by farmers in Laisamis, Marsabit. During the course of his studies, he involved students of Laisamis Secondary School (LSS) in research in order to spur them to develop scientific innovations. As a result of his work, Dr Bargul was selected as a member of the School Board of Management and will hold this position for three years. In an earlier interview with THRiVE, Dr. Bargul said that this position will provide him with a unique chance to offer leadership support to advance the school's goals, especially encouraging careers in the sciences.

Dr. Wampande secures grant to establish specialized laboratory for zoonotic diseases

Dr. Edward Wampande, a THRiVE-2 postdoctoral fellow, won a UGX 1B grant from Uganda's government in 2020 to establish the Centre for Bio security and Global Health (CEBIGHE) laboratory that will facilitate research of zoonotic diseases. The grant which spans two years. Currently, researchers are using the lab to manipulate zoonotic pathogens and perform experiments on small lab animals such as mice, rats, rabbits and non-human primates for validation/testing of potential vaccine, therapeutics and diagnostics candidates.



Dr. Edward Wampande outside the new Centre for Bio security and Global Health (CEBIGHE) laboratory

Assoc. Prof. Meya shines light on new single dose treatment for Cryptococcal Meningitis

Racheal Ninsiima - THRiVE Communications Officer

Assoc. Prof. David Meya in collaboration with researchers from the UK, Malawi, South Africa, France, Zimbabwe, Botswana and Uganda have discovered that a liposomal formulation of amphotericin B called AmBisome may be well-suited to treat cryptococcal meningitis. In their latest publication released by the New England Journal of Medicine on March 23 2022, the researchers found that a single, high-dose of AmBisome was effective at clearing *Cryptococcus* from around the brain. AmBisome, delivered in tiny lipid-based packages (liposomes), can be given in large doses that remain in the brain for some time and is less toxic compared to standard therapy.

The current treatments for cryptococcal meningitis in sub-Saharan Africa are either a seven to 14-day course of amphotericin-B

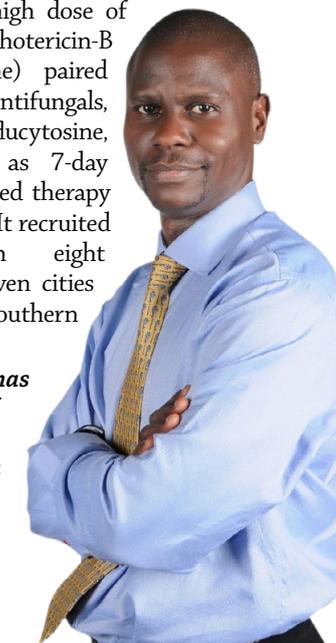
combined with oral antifungal tablets or oral fluconazole. Ten week mortality with fluconazole treatment remains at approximately 60% and standard treatment with amphotericin-B is not widely available across Africa.

"We found that a single, high-dose of liposomal amphotericin B was much easier to give, requiring just one intravenous infusion compared to seven days with standard therapy. The liposomal amphotericin B regimen was also associated with significantly fewer drug-related effects such as anemia, electrolyte abnormalities and intravenous line site infections," partly reads a press release on the London School of Hygiene and Tropical Medicine (LSHTM) website.

The findings are a result of the largest HIV- associated Cryptococcal Meningitis treatment trial ever undertaken named AMBITION-cm. The trial investigated

whether a single high dose of liposomal amphotericin-B (L-AmB, AmBisome) paired with two oral antifungals, fluconazole and flucytosine, was as effective as 7-day amphotericin-B based therapy in reducing deaths. It recruited individuals from eight hospitals across seven cities in five countries in southern and eastern Africa.

Assoc. Prof. Meya has led the inclusion of this new first line treatment regimen for cryptococcal meningitis in the Ugandan guidelines, which are currently undergoing review.



Assoc. Prof David Meya

My THRiVE-2 Career Development Award Story – benefits to career and professional growth thus far!

Robert Opiro, Gulu University



In July 2018, I received a THRiVE-2 Career Development Award (CDA) for a research project entitled "Trypanosome infection prevalence in

the tsetse fly *Glossina fuscipes fuscipes* and livestock reservoirs in a vector genetic transition zone in northern Uganda."

This idea emanated directly from work I did as part of my PhD thesis entitled "Genetic structure of the tsetse fly *Glossina fuscipes fuscipes* in northern Uganda." One striking output from my thesis was the identification of a vector genetic transition zone where tsetse vectors, of different genetic lineages, mix and interbreed freely. Given that this zone appears to coincide with an area that currently buffers the two forms of sleeping

sickness diseases in northern Uganda, we thought it would be interesting to unravel the epidemiology of the diseases in this area. This was the genesis of my CDA project, a project that originates from my own work.

One striking output from my thesis was the identification of a vector genetic transition zone where tsetse vectors, of different genetic lineages, mix and interbreed freely.



Dr. Opiro (L) tagging an animal from which blood sample has already been drawn

The benefits of this award have been enormous at both personal and professional level. This was literally my first independent research grant won, apart from the few study scholarships and conference travel grants that I received. For the first time, I had the enviable task of leading a research team. I was mandated with making strategic and other decisions for the success of the project, something that had until now, been an exclusive preserve of my supervisors! From the field technicians to research assistants, casual workers and communities we worked in, everybody was looking up to me for guidance. This was truly a humbling experience and I thank THRiVE-2 for this priceless opportunity.

Another salient benefit of this award has been my renewed drive and zeal to actively apply for grant opportunities. I have applied for the Royal Society of Tropical Medicine and Hygiene (RSTMH) Small Grants Programme; the Innovations in Eliminating Neglected Tropical Diseases under the Global Grand Challenges of the Bill and Melinda Gates Foundation; the MRC/DFID African Research Leader Scheme and most recently, the Small Grants Program of the African research Network for Neglected Tropical Diseases (ARNTD). Although I have had limited success with all these applications, some of the reviews from unsuccessful proposals have been helpful in shaping my ideas for future grant opportunities.



Dr. Opiro carrying out laboratory analyses of samples

In February 2021, I became a recipient of the 2021 African Researchers' Small Grants Program of the Coalition for Operational Research on Neglected Tropical Disease (COR-NTD) and the African Research Network for Neglected Tropical Diseases (ARNTD) Cohort V. In winning this award, the experience from the THRiVE-2 CDA award was invaluable because it added a grant portfolio to my name. The THRiVE-2 CDA award has emboldened me to actively look for and apply for grants. I have used feedback from unsuccessful grant

applications to attempt new submissions.

On the professional front, I have had a number of achievements for which this award has played a significant part. In May 2021, I was promoted to the position of Senior Lecturer at the Department of Biology in Gulu University. Before a promotion, one has to demonstrate meritorious achievement relative to their academic level and other opportunities. One such achievement, depending on the level of promotion one seeks, is evidence of independent research through winning grants. This award therefore helped me move to the next level in rank. Though not directly related to the grant, I was also appointed as the Acting Head of Department of Biology in November 2019 to date. However, I am now awaiting appointment as substantive Head of the Department because I am now a Senior Lecturer, a promotion for which the THRiVE-2 CDA played a significant role.

Elsewhere, during this grant period, I got placement as Postdoctoral Research Fellow on the NIH funded project on Molecular Aspects of Tsetse and Trypanosome Transmission project, a collaboration between Gulu University and Yale University researchers. Through this grant too, I was able to mentor the research of one MSc student from our Master of Science in Applied Tropical Entomology and Parasitology programme. Mr. Alele Moses was able to collect data, write and submit his dissertation using resources from the project. This to me, was so satisfying and a matter of great pride!

Lastly, this award opened for me doors to various research collaborations I need to develop my career. For example, I am collaborating with researchers from the University of Salford in the United Kingdom and the International Centre for Insect Physiology and Ecology (*icipe*), Nairobi Kenya. As an academician, career development chiefly depends on research and publication performance. Normally, things are tough for us at the beginning of this rather arduous journey, with collaborations (both national and international) being key for young academics to break new grounds and develop high impact outcomes. To this end, THRiVE-2 is performing admirably in developing collaborative activities among academics – an increasingly important component of research and professional growth.

In summary, I can undoubtedly say that I have made a lot of strides in my career journey, thanks to the THRiVE-2 CDA and my mentors, Prof. Elizabeth Opiyo and Assoc. Prof. Richard Echodu of Gulu University. May this grant scheme continue so as to help build and uplift research capacity on the African continent.

My experience towards becoming an independent researcher

Dr. Joel L. Bargul, THRiVE-2 Postdoc fellow

About me

I am a senior lecturer at the Department of Biochemistry of Jomo Kenyatta University of Agriculture and Technology (JKUAT) and senior research fellow of Molecular Biology, Bioinformatics and Biostatistics at the Nairobi-based International Centre of Insect Physiology and Ecology (*icipe*). I wield a Bachelors and Master of Science in Biochemistry from JKUAT and a doctorate of Science (*Magna cum laude*) in Molecular Parasitology and Infection Biology from the University of Wuerzburg, Germany.

My work mainly employs approaches in molecular biology, bioinformatics, and microscopy to understand arthropod disease vectors and pathogen transmission mechanisms to guide disease control.



Dr. Joel Bargul carrying out tests in the lab at *icipe*

A rewarding postdoc fellowship

After obtaining my doctorate in 2015, I applied and won a highly competitive THRiVE-2 postdoctoral fellowship in 2016 to study camel trypanosomiasis and the role of keds in disease transmission. For the first time, I got a chance to formulate an original hypothesis, develop and refine the research idea into a full research proposal or protocol, and hypothesis testing through experimental studies. My work was hosted and mainly based at *icipe* in Nairobi.

Under the fellowship, I was privileged to be mentored by two highly experienced research scientists- Prof. Mark Carrington from the Department of Biochemistry at University of Cambridge, UK, and Dr. Daniel Masiga, head of Animal Health Theme at *icipe*. Both wield over 20 years of research experience in the field of African trypanosomiasis and have contributed immensely to success in my postdoc studies. Additionally, THRiVE organized regular capacity building workshops for its fellows and in these I acquired skills in research leadership, grants-writing, supervisor/supervisee relationships, among others.

As a mechanism to closely monitor fellows' research progress, THRiVE required six monthly progress reports and organized Annual General Meetings (AGMs) where fellows presented their research. The secretariat also pushed for more Community and Public Engagement (CPE) activities to be done by the fellows which I was hesitant to adopt at the beginning of my study. By then, I had limited understanding on the role of CPE, how to design CPE activities and how to mentor high school students. In fact, the latter wasn't part of my original proposal – or so I thought.

Summary of research project

Under my postdoctoral fellowship, I set out to understand the role of livestock keds in transmission of veterinary and zoonotic diseases in arid regions of northern Kenya. Livestock is a key resource that supports rural livelihoods by providing food security. In Kenya, there are over three million camels and most are found in the vast arid and semi-arid eco-zones.

Dromedary camels (one-humped camels) are kept for milk, meat, hides, transport, and income. Additionally, they are a highly treasured commodity that are central to the community's cultural life and are becoming the preferred livestock due to their resilience to survive in harsh climates such as prolonged droughts. However, their productivity is being hampered by pests and diseases, resulting in huge agricultural losses.



Dromedary camels drinking salty water from a water trough placed in front of a shallow well in Northern Kenya.

Animal trypanosomiasis, for example, is a major constraint on the productivity of pastoralists in Africa south of the Sahara. The definitive host is the tsetse fly, *Glossina*. However, despite tsetse flies being absent in the arid and semi-arid lands of northern Kenya, our preliminary work showed that trypanosomiasis was rampant in camels and in keds collected from them. Although mechanical transmission of animal trypanosomiasis is well studied in various biting flies, little is known about the role of camel biting keds (also known as camel flies/ louse flies/ genus *Hippobosca*) in transmission of pathogens during blood-feeding process. Other than ticks, camel keds are the predominant blood-feeding ectoparasitic pests that infest all camel herds all year round.

This proposal aimed at determining the contribution of camel keds in transmission of camel trypanosomiasis and other pathogens. The key findings of this study will provide information on the circulating zoonotic disease pathogens and thus contribute to disease surveillance and control of these diseases. Additionally, the findings will determine whether there should be a large-scale control programme for keds in northern Kenya.



Camel keds on the underbelly of a camel

Field studies & key findings

My study site was in Laisamis, Marsabit County, a region in northern Kenya where all camel herds are infested by keds throughout the year. Keds and blood were collected from tagged animals. The trypanosomes and other selected hemopathogens present on/in the keds and in the blood were identified using species-diagnostic PCR reactions followed by amplicon sequencing for molecular identification. Laboratory colony of keds established at *icipe* and the freshly collected live flies were used in animal feeding experiments, i.e. mice and rabbits, to study their ability to transmit pathogens.

I found pathogens, namely *Anaplasma* and *Ehrlichia* spp., and trypanosomes, *T. vivax* and *T. evansi* (occurring outside the range of tsetse flies), present in camels and keds collected from them. Therefore, I propose the potential use of keds in xeno-surveillance of camel diseases to substitute the invasive and painful approach of

bleeding camels to obtain blood samples for pathogen screening.

Furthermore, the study demonstrated vector competence of camel keds in transmitting the camel pathogen, '*Candidatus Anaplasma camelii*', from naturally infected camels to laboratory mice and rabbits. Other than the camel-specific keds, *Hippobosca camelina*, we identified two other species of livestock keds in northern Kenya. These are: *Hippobosca longipennis* found only on dogs and *Hippobosca variegata* which infests dogs, cattle, goats, sheep, and donkeys but not co-herded camels.

Our preliminary studies detecting selected pathogens in these different species of livestock keds by pathogen-specific gene amplification and sequencing shows that they carry wide range of microbes including trypanosomes, *Ehrlichia*, *Anaplasma*, *Bartonella schoenbuchensis* (zoonotic), *Clostridium perfringens* (zoonotic), *Brucella*

(zoonotic), and *Theileria* species.

Since keds occasionally feed on humans, they may transmit zoonotic pathogens.

Community and Public Engagement (CPE):

During the field visits in Laisamis, the research team observed that most households retained one or two children of school-going age at home to help in livestock care at the expense of their education. Thus, we aimed to determine the influence of socio-cultural factors on access to education by children. Focus group discussions with the students of Laisamis Secondary School (LSS) were conducted to determine the influence of socio-cultural factors on education, class performance, and progression to higher levels of education. We also engaged high school students of LSS in camel health research to gain practical exposure on the application of various technologies and to motivate them to improve on their class performance.



Laisamis Secondary School students after engaging with Dr. Joel Bargul in focused group discussions on gender equity in formal education and gender roles in leadership.

Focus group discussions with students of LSS resulted in identification of nine socio-cultural factors that contribute to school dropouts among girls. These are: early marriage; early pregnancies; lack of school fees; poor performance in exams; lack of interest in education; unsupportive parents who do not value the education of the girl child; cultural pressure to be circumcised before joining school; negative influence from friends who do not go to school and the lack of basic needs (clothes and food). On the other hand, seven socio-cultural factors that cause school dropouts among boys in LSS were identified as follows; drugs and substance abuse; lack of school fees; poor performance in exams; lack of interest in education; attending to livestock herding duties at home; expulsion due to disciplinary cases and negative influence from friends who do not go to school. The students also identified six socio-cultural factors that

limit the access to education. They are: early marriage; large family size with many children; the need to attend to livestock at home; low education levels of parents; gender preference between girls and boys and unplanned pregnancies.

Key achievements:

Over the last four years (2016-2020), I have demonstrated research leadership first, by developing an original idea or hypothesis that camel keds could transmit diseases followed by rigorous experimental studies to test this. This generated new knowledge on vector competence of keds to transmit anaplasmosis, which forms basis for establishment of ked control

programmes for improved health. This study continues to generate new discoveries that motivate further studies.

Additionally, during my postdoctoral research fellowship, I attracted eight additional research grants, either as a PI or Co-I, amounting to USD 303,039 to study camel health and engage stakeholders and high school students in our research. I have established at least five research collaborations both nationally and internationally, and co-supervised MSc and PhD students. My project has trained two MSc students (as primary supervisor) and four undergraduate research interns. I have

...during my postdoctoral research fellowship, I attracted eight additional research grants, either as a PI or Co-I, amounting to USD 303,039 to study camel health and engage stakeholders and high school students in our research.

acquired skills in CPE and since 2017, I have published 25 journal articles. I wrote two blog articles on camel health and keds, both were published by Cambridge-Africa and also authored three THRiVE newsletter articles.

During the study, we trained six field assistants and engaged with more than 600 livestock farmers. We organized and implemented three scientific data dissemination and training workshops in Marsabit, northern Kenya (October 2020–March 2021). Together with *icipe* colleagues, we trained 60 stakeholders and delivered oral presentations followed by field sampling exposure to over 200 students of Laisamis Secondary School. I wrote manuals and translated key study findings into local languages. Our findings, on socio-cultural factors impacting negatively on school enrollment rates and

progression to higher levels of education, were presented to the Ministry of Education, Marsabit County, to guide policy change. I was appointed by this Ministry as member of the Board of Management of LSS to offer leadership and guidance so as to advance the school's goals.

Additionally, I was voted first place winner by the International Livestock Research Institute CapDev Grand Challenge 2020 following the 3-minutes research-pitching contest. I was also recognized by *icipe* for being among top five postdoctoral fellows for publishing 17 peer-reviewed journal articles during 2020 – 2021. I attended over 20 international scientific conferences and in 2019, I was invited by the African Association of Insect Scientists (AAIS) to deliver a keynote speech on my work during a conference in Abidjan, Cote

d'Ivoire.

Impact of the study and way forward

The key obstacle facing public health in northern Kenya is lack of reliable data on circulating zoonotic diseases in co-herded livestock (i.e. camels, sheep, goats, donkeys, cattle, and dogs) occupying various ecologies and, importantly, how these diseases are spread, for instance by insect vectors.

Detection of trypanosomes, *Anaplasma* spp, and *Bartonella* spp in camel keds and camels is of great public health and veterinary concern. Information from my study can guide formulation of disease control programs by animal and public health stakeholders. Additionally, it can lead to less invasive xenodiagnostic approaches to identify pathogens circulating in camel

herds.

Further research is crucial to provide a detailed understanding on the contribution of livestock keds in disease transmission, particularly zoonotic. However, one of the key challenges that I face is adequate funding to enable continuity of the studies.

Acknowledgements:

I acknowledge the financial support primarily received from THRiVE-2 and additional funding from other donors. Additionally, I am grateful to *icipe* and JKUAT for research and institutional support offered; livestock farmers; field assistants; enumerators, and all the community members who supported this study; Laisamis secondary school (students and teachers, schools principal), mentors and supervisors and all interns and postgraduate students who participated in this successful study.

NIMR introduces new masters in Biostatistics

Prof. Jim Todd & Jacqueline Materu

As an update on the impact THRiVE has had on the wider research and teaching community in East Africa, we are happy to report that NIMR Mwanza Centre (a THRiVE partner institution) has seven statisticians working on campus (combining the NIMR projects with the MITU centre), including two LSHTM statisticians and three graduates of the Kilimanjaro Christian Medical University College (KCMUCo) Epi and Applied Biostatistics course. This critical mass has generated some useful extensions to their work, which is still mostly focused on research projects. Two of the statisticians are enrolled on the PhD programme in Catholic University of Health and Allied Sciences (CUHAS) which is the teaching university associated with Bugando Medical Centre in Mwanza.

In collaboration with CUHAS, four of the NIMR statisticians – Jim Todd, Neema Masha, Sophia Kagoye and Jacqueline Materu – have delivered the Foundation course for statistics for MMED and Masters level students in Bugando. Around 90 students were on the course, and an inverted classroom was used for the course. In these, brief lectures were given, with some video recordings allowing students to access materials at a later date. The majority of the two hour session was devoted to hands on

analysis of data using Epi-Info, Stata, and SPSS. The students have developed their skills in traditional statistical methods before moving on to regression methods for continuous outcomes (linear regression) and binary outcomes (logistic regression). This is the second year we have delivered this foundation course and we already seeing more understanding of statistics, and respect for getting the right analysis technique for the data.

NIMR statisticians including Philip Ayeiko, have been involved in the development of new Masters programs in CUHAS. The MSc in Epidemiology and Applied Biostatistics will start in September 2022, with applications expected later this year. Several research staff in Mwanza have shown interest in applying for the course, which is expected to have a full student compliment of 10 students in its first year (even without studentships). The course is modelled on the highly successful MSc in Epi and Applied Biostatistics in KCMUCo (a THRiVE partner institution).

The vibrant Tanzania chapter of the International Biometrics Society (IBS) is also evident in Mwanza. The Mwanza statisticians along with Innocent Mboya (IBS Tanzania president), recent PhD graduate from UKZN and lecturer in KCMUCo, who also received funding for his MSc project

at KCMUCo and graduated in 2015) and Wende Safari (recent PhD graduate from University of La Corruña, Spain) successfully obtained funding for a short course from the IBS Education Committee. This “Statistical Learning Course using R with application to routine data from Low- and Middle-Income Countries” will be run in Mwanza in the first week of August 2022 (1-5 Aug). The course will be led by Dr Leacky Kamau and will focus on building skills in the R software among statisticians using Stata, SPSS, or SAS. The course will cover traditional regression techniques along with multi-level models, competing risks and machine learning using R. It will also highlight the importance of R Studio, Tidyverse and Shiny apps. **Anyone who wants to participate please contact Jim Todd, Innocent Mboya or Wende Safari. Watch out for the website associated with this course, we will circulate soon.**

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Living the PhD journey: A Personal reflection

Dr Trizah Koyi Milugo – THRiVE-2 PhD Fellow

My doctoral journey started in 2017, when I received an email from THRiVE confirming acceptance into the PhD program. However, the actual journey started in 2016 when I first approached my mentor Prof. Baldwyn Torto to support my application for the PhD fellowship. Whatever the starting point was, I was returning into education after being in a full-time job for four years.

PhD registration: After receiving the fellowship award, my first step was to take a leave of absence from work. Next I started the process of securing registration at Makerere University. But this turned out not

to be as straight forward as I had envisioned and after six months of trying, I opted for KCMC. By this time I was behind the THRiVE required deadline of six months for preliminary registration. I met my university supervisor, Prof. Reginald Kavishe in early 2018 and through his assistance, I was able to get registration within three months.

The Research trajectory: My PhD aimed to identify compounds derived from natural plants with activity against the transmissible stages of the malaria parasites. My expectation at the beginning was to do specific experiments, write three papers, submit thesis and graduate. This sounded straight forward, easy and doable. But to my surprise, I ended up doing quite a number

of experiments, some of which did not end up in my final thesis. This is when it dawned on me that PhD research was way different from what I had encountered at Masters. My objectives kept changing and the thesis flow only became clearer towards the end. Also, the amount of reading and writing was above normal. In fact, midway through, I started wearing prescription glasses due to too much screen time and there were days I had to work overnight just to catch up. Many of my weekends were far from free. Actually, I do not remember ever going for a holiday.

...my PhD aimed to identify compounds derived from natural plants with activity against the transmissible stages of the malaria parasites. My expectation at the beginning was to do specific experiments, write three papers, submit thesis and graduate. This sounded straight forward, easy and doable. But to my surprise, I ended up doing quite a number of experiments, some of which did not end up in my final thesis. This is when it dawned on me that PhD research was way different from what I had encountered at Masters.



Dr. Trizah Koyi conducting lab experiments for her PhD research

During my doctoral studies, I also had the opportunity to participate in community and public engagement (CPE) activities. At the beginning, I had a feeling that CPE was going to be a great distraction but to my surprise it did not derail me from completing the thesis. Instead, it gave me a sense of fulfillment and motivation. I even did a documentary and posted it on you tube. Also, I was a finalist in the 2020 Falling Walls remote in the category of Science Engagement.



Trizah Koyi (in black) demonstrates the mixing of different herbal leaves used in malaria treatment to students of Hilario Secondary School in Western Kenya



Dr. Trizah Koyi hands over a certificate of participation to a student involved in her community and public engagement project

The things I could change: The first year of my PhD involved writing a review paper as I waited for university admission and funding from THRiVE. At the start, I had no idea what writing a

review entails but I delved in it anyway. After working on it for a year and accumulating several versions, I realized that writing a review is much more difficult than a research paper. It took me three years to publish the review paper. Also, during my first year, I kept myself busy by attending induction seminars and workshops.

If given another chance, I would strategize differently. First, I would only focus on research papers. And secondly, I would only attend a few courses that are essential for my PhD. My doctoral project was interdisciplinary requiring skills in chemical synthesis, machine learning, insect biology and disease vector ecology. For most of the objectives, I had to learn new skills. Chemical synthesis was really hard and my experiments failed several times making

me to feel stuck and stressed. In fact, I contemplated leaving although I could not gather enough courage to walk away from it all.

Completing PhD; I spent three years pursuing my doctorate. One thing that kept me going was the fact that I wanted to have a PhD. I am not sure if this is a valid reason but somehow it worked for me. So I pushed on until I was able to submit my thesis. When I received the examiner's report about two months later, all I needed to do was minor revision and I graduated a week later. However, I was not able to attend the graduation ceremony because of COVID-19 pandemic.

My wins: In 2020, I was selected as a fellow of the Mawazo Learning Exchange (MLEx) and last year (2021), I was one of the

recipients of the *icipe* Governing Council, best published science paper. But, perhaps the glorious moment in my PhD life is when my story featured on the Frontiers in Tropical Diseases web page on world malaria day.

Important lessons: This PhD experience taught me many things: first, you need a strong motivation to engage in PhD research because you will always find a legitimate reason to opt out. Second, it is important to have regular meetings with supervisors and being based in an institution where you have access to all you need for your doctoral research helps a lot. Finally, never compare yourself with others. There were moments I felt everyone else was publishing and graduating apart from me and this made me to panic but still I graduated in time.

Learning about TB through community and public engagement: A case of Iganga Girls SS

'TB Girls', Iganga Secondary School

As Iganga Girls Secondary School, we were happy and excited when we were chosen out of many to participate in the Tuberculosis community and public engagement (CPE)

project. Great thanks to Dr. Edward Wampande and Mr. Jimmy Isooba for the golden opportunity. Our journey so far has been worth it.

The project began in the second lockdown with the use of Zoom as a way to coordinate

and discuss activities. The hilarious part of it all is that we all hardly knew about TB and were surprised when Dr. Wampande gave us a detailed introduction about the disease. We were elated that we got a chance to know more about

TB. After discussing TB at great length, we decided that the public needed to know about the dreaded monster killing masses. To achieve our goal, we agreed to use skits, poems, shirts, plays, animations and songs as a way of spreading awareness.



Some of the 'TB girls' make a poster presentation during a CPE session at their school

When we resumed physical school in January 2022, we embarked on working on a few of the suggested items. We composed a song, poem and skit. Dr. Wampande always came to the school over the weekends to review our progress. Through our journey, our knowledge of Tuberculosis has increased exponentially. Among the things we have learnt is the symptoms of TB such as dry

cough, fatigue, and chest pain, among others. We also learnt that there are different types of TB such as Multi Drug Resistant TB and Pulmonary TB.

"This project has not only helped me to make new friends but has also been a massive learning experience and a fountain of wisdom from which we have drunk free career guidance and motivation

in our academics. I am proud to have taken part in this project," says Amma Cynthia Nalumansi, a senior six student who is part of the project.

Another, Tracy Luwedde, an arts student, attests to the fact that participating in the project has made her open minded to acquire knowledge in different disciplines and not only the humanities.



Vivian Nansereko, the health prefect of Iganga Girls SS makes a presentation during a community and public engagement session

Owing to our consistent engagement with TB information, our school mates nicknamed us the 'TB Girls' and we find great prestige in it. As a way to continuously sensitize our colleagues, we resolved to form a health club and we are already underway in creating it.

We are grateful to THRiVE and Dr. Wampande for the opportunity afforded to us. We also thank Mr. Isooba and Mr. Peter Sangayi for their effort to have this project implemented in the school. This community and engagement project is something we shall carry on for a lifetime.



Dr. Edward Wampande (in colored shirt) poses for a picture with the 'TB Girls' of Iganga Girls SS

Tying up loose ends, ensuring continuity

Dickson Muyomba, IT officer-THRiVE

As we wind down the THRiVE-2 program, this marks the beginning of a long-standing legacy of THRiVE's impact on our African Partner Institutions (API) in the region. We want to ensure that the research culture, environment and partnerships developed in the past decade are carried forward within the institutions. One of the strategies adopted by THRiVE to ensure continuity is to modify the site visit plan to all partner institutions focusing on sustainability while ensuring compliance for a smooth closeout and continuity of activities.

At the beginning of the six month no cost extension in January 2022, a team of three THRiVE officers (finance, grants and ICT) conducted 'close-out' site visits to various partner institutions to prepare them for proper project closeout; get them to document project achievements and have them identify good practices that can bolster their research environment. These practices cut across four areas (finance, ICT, research management and governance) and are considered to be trusted global standards for research management environment within

research and academic institutions.

The Good Financial Grant Practice (GFGP) is one of the global standards that partner institutions have been asked to complete the assessment and thereafter given a certification depending on the score. Institutions with certified GFGP status have trust from the global funding community. The ICT benchmark standards clearly define processes to ensure information security for the institution. The Risk management

matrix adopted by THRiVE at all APIs has been rolled out to other institution projects to identify and mitigate risks as well as optimizing performance. The risk log tracker, a mechanism used to assign a responsible party who tracks risk status until it's closed off. The supervision portal has been adopted and modified based on the individual institution requirements.

The above-mentioned processes/practices have been followed up during the close-out



The THRiVE site visit team at partner institutions

visits at APIs and engagement of the relevant department heads in these institutions has taken place. A case-in-point is at Gulu university where Mr. John Nyeko, the university bursar, has been engaged to set up a university finance management system and institutional wide finance staff trainings have been initiated on using a finance management system. Through its visits, THRiVE has been instrumental in advocating for an electronic finance system for easy finance management.

Dr. Arthur Kwizera wins grant for respiratory failure research

Racheal Ninsiima - THRiVE Communications Officer

Dr. Arthur Kwizera has won a £533,825 grant from Wellcome Trust for a clinical trial to assess whether low cost, high-flow oxygen therapies reduce need for intensive care admission and death in patients with acute hypoxemic respiratory failure (AHRF) in Uganda. The award falls within the Wellcome Innovation for Impact in Lower- and Middle-Income Countries Flagship which aims to support innovations and new technologies to prevent and treat disease.

Kwizera, a senior lecturer in Makerere University's Department of Anaesthesia and PhD student with Training of Health Workers into Vocational Excellence in East Africa (THRiVE), will assess the efficacy of high-flow oxygen through a nasal cannula or continuous positive

airway pressure (CPAP) system in improving survival of AHRF patients. This is in comparison with the commonly used mechanical ventilator. AHRF, a condition characterized by inadequate oxygen in one's blood, is the commonest reason for intensive care unit (ICU) admission and death globally.

"The first step in improving critical care in Africa is to tackle the burden of mortality

from AHRF. I believe that death can be reduced by use of cost-effective innovations in diagnosis and oxygen delivery such as CPAP and high flow nasal cannulas. This multicenter prospective trial will determine whether these low-cost interventions can reduce death among patients," Dr Kwizera said in an interview.

A high-flow nasal cannula works by delivering heated and humidified oxygen, as much as 60 litres per minute, through nasal cannulas whereas CPAP therapy works by a machine pumping a gentle and steady pressure of air through a mask fitted over one's nose and mouth into the lungs' airways. Both these techniques are affordable and non-invasive (do not require introduction of instruments into the body) unlike the mechanical ventilator. In patients with AHRF, the need for invasive mechanical ventilation is associated with high mortality, especially in low-income countries like Uganda.

Moreover, owing to the inadequate ICU equipment and personnel to care for the critically ill in Uganda, he says there is need for affordable strategies to optimize patient oxygenation therapy and survival outcomes.

"Doing this will create a cascade of quality improvement in African acute care units to manage other conditions such as septic shock where fluid resuscitation management equally depends on management of AHRF," Kwizera

explained.

The clinical trial, Adult Respiratory InterventionS Evaluation in Africa (ARISE), will be conducted at six Ugandan hospitals and evaluate 470 patients for 16 months. Participating hospitals are: Mulago National Referral Hospital; St. Mary's Hospital Lacor in Gulu district; Mbarara; Jinja; Masaka and Mbale Regional Referral Hospitals. These were selected based on oxygen availability. For the trial, Dr. Kwizera has secured 25 cost-effective High Flow Nasal Cannulas and 250 CPAP masks from New Zealand based manufacturer - Fisher and Paykel.

"ARISE is the first step of an ambitious program to tackle AHRF in Africa. Lessons

learned will help streamline efforts in future large scale multi-national studies in Africa," Dr Kwizera remarked.

The trial builds on his PhD research focused on determining the prevalence of acute respiratory failure in Uganda and effect of respiratory interventions to improve outcomes.

The clinical trial, Adult Respiratory InterventionS Evaluation in Africa (ARISE), will be conducted at six Ugandan hospitals and evaluate 470 patients for 16 months



Dr. Kwizera secured 25 High Flow Nasal Cannulas to manage patients with acute respiratory distress.



Dr. Arthur Kwizera demonstrates how a CPAP mask works

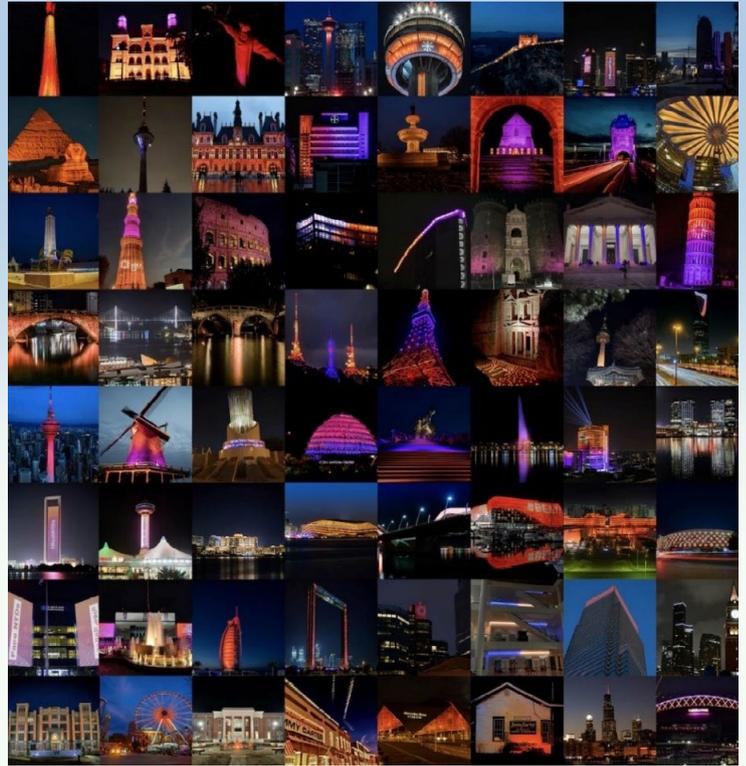
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100 Landmarks Across the World Light Up to Raise Awareness on World NTD Day 2022

100 landmarks in 34 countries lit up in unity to mark the third annual World Neglected Tropical Diseases (NTD) Day on Monday 30th January 2022. These include: The Bell Tower in Perth, Tokyo Tower, Great Wall of China, Kuala Lumpur Tower, Sheikh Zayed Bridge in Abu Dhabi, Expo 2020 Dubai, The Rome Colosseum, Jet d' Eau, Niagara Falls, CN Tower, Carter Presidential Library and Christ the Redeemer.

A special focus was placed on notable landmarks in endemic countries including Bangladesh, Brazil, Burundi, the Democratic Republic of the Congo, Ethiopia, Ghana, India, Kenya, Liberia, Niger, Nigeria, Philippines, Rwanda, South Sudan, Sudan, and Togo. The 100 "light-ups" aim to shine a light on NTD, as World NTD Day supports the goal of the WHO to eliminate at least one NTD from 100 endemic countries by 2030.

World NTD Day is a global movement that aims to galvanize the global health community and engage the public in the urgent effort to end NTDs. This year Uniting to Combat NTDs used World NTD Day to launch the 100% Committed movement, which exists to begin securing political and financial commitments in support of the Kigali Declaration on NTDs. The Kigali Declaration, a high-level political declaration, provides the opportunity to mobilize the political will, community commitment, resources and action needed to end unnecessary suffering from NTDs.



A photo showing landmark buildings that were lit up to mark the third annual World NTD day on January 30th 2022.

Prof. Sewankambo charms online listeners with moving talk

Racheal Ninsiima - THRiVE Communications Officer

It was a virtual audience of over 600 people. The occasion – seventh series of the Association of Surgeons of Uganda mentorship talk. The speaker - Prof. Emeritus Nelson Sewankambo. The topic – 'Living a life of significance and building a lasting legacy.' At 3:30PM, the prayer drum rolled and the show started. This happened on Friday 25th February 2022.

"I take it as a great honor to be given this opportunity to speak to you all. I spent a lot of time trying to understand how do we live and achieve a life of significance and realized that this varies from one person to another," Prof Sewankambo started his talk.

As if performing an open surgery, he first wheeled the listeners into deep contemplation of what significance and legacy mean. To him, significance always outlasts people and keeps on giving. He cautioned listeners to shun worrying about the next get-rich scheme but rather, spend their time and energy improving the lives

of people around them. In striving to live a life of significance, Prof. Sewankambo told listeners that failure is assured and is an opportunity to do better and succeed. To evade failure is to do nothing

With the wisdom knife, he cut through examples of famous people that persevered through failure and rose to live lasting legacies. One was Abraham Lincoln, the 16th president of the United States. Lincoln failed in business; overcame the death of his fiancée; suffered a nervous breakdown; lost two congressional and senatorial races and failed to become vice-president at 47 years. Nevertheless, he was elected president of the US at age 52.

Others include: Steve Jobs, Walt Disney, J.K Rowling and Bulaimu Muwanga Kibirige (BMK), who was a Ugandan businessman, entrepreneur and hotel owner.

"Before you begin, it's crucial to understand why you're leaving a legacy behind and what it personally means to you. Do you

want to impact your community? Your country? The world? Decide what kind of legacy you want to leave and you'll have a map to follow," Prof. Sewankambo advised.

Furthermore, he told listeners to hold onto their life's values and always utilize opportunities that accost them to leave footprints in people's lives. After one and half hours, the talk laden with real life examples, came to an end.

The ASOU Mentorship Series
Association of Surgeons of Uganda (ASOU)
Thank you
for attending and participating in the session.
We would love to hear from you
Living a life of significance:
Achieving personal success and building a lasting legacy.
With Prof. Nelson K. Sewankambo
Professor Emeritus of Makerere University,
and Immediate Past President, Uganda
National Academy of Sciences.
Friday 25 Feb 2022



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