

**WE ARE PLEASED TO ANNOUNCE A HALF-DAY "MICROBIOL SEMINAR", FEATURING LOCAL EXPERTS AND A VISITING SCIENTIST FROM OKAYAMA UNIVERSITY, JAPAN. YOU ARE ALL WELCOME ESPECIALLY STAFF AND GRADUATE STUDENTS**

**DATE & TIME :** FRIDAY, 30<sup>TH</sup> AUGUST 2019, 09:00AM – 01:00PM

**PLACE/VENUE :** BOT-ZOO LECTURE THEATRE, CONAS, MAKERERE UNIVERSITY

**HOSTED BY :** ASSOC. PROF. ARTHUR K. TUGUME, [AKTUGUME@CNS.MAK.AC.UG](mailto:AKTUGUME@CNS.MAK.AC.UG) TEL. +256 772 514841  
DEPT. OF PLANT SCIENCES, MICROBIOLOGY AND BIOTECHNOLOGY, CONAS, MAK

**MODERATOR :** ASSOC. PROF. FREDRICK MUYODI, DEPUTY PRINCIPAL, CONAS, MAK

Lanthanides (also known as rare-earth elements, REEs; although the term REEs is misleading) have been used by humans for biomedical and technology applications for years due to their special properties, including superiority in enzymatic catalysis. However, it turns out that bacteria employed lanthanides well before humans did, and the range of species reliant on lanthanide catalysis keeps expanding. The discovery of lanthanide (Ln<sup>3+</sup>) dependence for catalytic activity of methanol dehydrogenases few years ago has not only overturned a long-standing dogma of the biological inertia of the so-called REEs but also created numerous conundrums and hard questions on the evolution of alternative enzymes and their potentially different redox properties. The surprise discovery of the biological activity of REEs was mostly a reflection of our ignorance. Assoc. Prof. Akio Tani addresses this topic as "Lanthanide as a new life metal in microbiology".

In the meantime, insufficient food availability in sub-Saharan Africa continues to be a major hindrance to the well-being of the people there with the main constraint being numerous kinds of infectious diseases of livestock and crops. This seminar addresses this constraint using three (3) case studies by leading scientists at Makerere University. These include studies on (a) Whole genome sequencing to determine the molecular genetics and evolution of African swine fever virus at the livestock-wildlife interface in an endemic setting; (b) How virus-infected sweetpotato plants can naturally revert to virus-free status using own natural system, named 'reversion', and (c) How lateral banana shoots may escape Xanthomonas wilt-causing bacteria, even though the mother plants have died of the same bacterial infection, a scenario that is resonant of prevention of mother-to-child transmission of certain viral infections in humans. These scientists believe in the premise of investing in scientific research and innovation in overcoming long-standing problems of some infectious diseases plaguing our agriculture and indeed livelihood and prosperity.

**09:00AM – 09:10AM: Brief self-introductions**

**09:10AM – 09:20AM: Moderator's introduction of the four Presenters**

**09:20AM – 10:00AM: Lanthanide as a new life metal in microbiology.**  
**Assoc. Prof. Akio Tani, Institute of Plant Sciences and Resources (IPSR), Okayama University.**



Dr. Akio Tani holds a BSc, MSc and PhD from Kyoto University, Japan. Previously, he was a guest researcher at the Institute of Microbiology ETH, Zurich, Switzerland. Currently, he is an Associate Professor of Microbiology at the Institute of Plant Sciences and Resources, Okayama University, Japan. Akio Tani leads a research group on Plant and Environmental Microbiology. He does research in Genetics, Microbiology and Molecular Biology with keen emphasis on the "Taxonomy of rare earth metals-dependent methylotrophs". Methylotroph species that can utilize methanol emitted from plants are mutualistic symbiont that not only utilize methanol but also produce plant hormones. His team conducting functional analysis on their methylotrophy and plant-growth promoting ability, especially their lanthanide-dependent methylotrophy. In addition, Dr. Akio's group also studies about interaction between aquatic microbes and bloom-forming phytoplankton. Study to date demonstrated that marine viruses are known to terminate bloom by infecting phytoplankton, and marine bacteria may be involved in bloom formation by facilitating growth of phytoplankton. Together with the then president of Okayama University, and Dr. Arthur K. Tugume, Dr. Akio was part of the Japanese delegation that initiated the signing of a 5-year MoU (2016-2021) between Makerere University and Okayama University (Institute of Plant Sciences and Resources). At Makerere University, this MoU was championed and coordinated by Dr. Arthur K. Tugume, with benefiting colleges at Makerere University (College of Natural Sciences, and College of Agricultural and Environmental Sciences). The ceremony was hosted by the Embassy of Japan in Kampala.

**10:10AM – 10:50AM: Transmission dynamics of African swine fever in an endemic setting at the livestock-wildlife interface.**  
**Assoc. Prof. Charles Masembe, Dept. of Zoology, Entomology and Fisheries Sciences, CoNAS, Makerere University.**



Dr. Charles Masembe is a veterinarian, molecular geneticist and is an Associate Professor at the Department of Zoology, Entomology and Fisheries Sciences in CoNAS, Mak. He has teaching and research experience in molecular population genetics, diagnostics, evolution and epidemiology of important diseases of domestic animals, mainly Foot-and-Mouth Disease and African swine fever (ASF). Dr. Masembe holds a PhD in Molecular Population Genetics from University of Copenhagen (Denmark). He is a member at the Uganda Virus Research Institute Infection and Immunity Centre of Excellence; and external faculty at the Biosciences eastern and central Africa ILRI Hub. He is an Intermediate Wellcome Trust fellow using NGS full genome sequencing technologies with emphasis on Transmission dynamics of African swine fever virus (<http://asf.mak.ac.ug>). Dr. Masembe is an affiliate scientist at the MRC Centre for Virus Research, the University of Glasgow. His team is undertaking comprehensive molecular epidemiological analysis and diagnostics to investigate the distribution, pattern of spread, and full genomic features of ASF virus in Uganda and Africa in general. This research is aimed at unraveling pathogen evolution and interactions to design efficient disease control strategies for improved livelihoods and generation of knowledge.

**11:00AM-11:20AM: WORKING COFFEE/TEA BREAK**

**11:20AM – 12:00PM: Sustaining sweetpotato productivity through exploiting reversion from sweetpotato virus infections.**  
**Dr. Peter Wasswa, Dept. Agricultural Production, CAES, Makerere University.**



Dr. Peter Wasswa is a lecturer/researcher at the Department of Agricultural Production, Makerere University. He holds a BSc and MSc from Makerere University, and a PhD in Plant virology from the University of Greenwich, UK. Peter is passionate at exploiting tools and products in agriculture that can contribute to solutions for threats to food security and social economic transformation among resource poor farmers. He has 6 years of teaching and research experience with a range of multidisciplinary skills in plant viruses (Geminiviruses, Potyviruses and Ipomoviruses infecting cassava and sweet potato). His specific skills are in; serology, PCR, real time PCR, DNA cloning, sequencing, deep sequencing, tissue culture, thermotherapy, surveys and field trials. Peter has just finalized a research in July 2019 on "Sustaining sweetpotato productivity through exploiting reversion from sweetpotato virus infections". This 5-year Project was supported by the Bill & Melinda Gates Foundation, PEARL Phase 1 and was aimed at understanding the mechanism and heritability by which sweetpotato plants become infected by viruses but subsequently become virus-free once more.

**12:10PM – 12:50PM: Overcoming Xanthomonas wilt and rehabilitation of banana plantations in East and Central Africa.**  
**Assoc. Prof. Arthur K. Tugume, Dept. of Plant Sciences, Microbiology and Biotechnology, CoNAS, Makerere University.**



Dr. Arthur K. Tugume holds a BSc and MSc from Makerere University, and a PhD in Plant Pathology from the University of Helsinki, Finland. He has a teaching/research experience of 20 years, with expertise in plant disease diagnostics, plant virus transmission, virus ecology and evolution majoring on diseases of vegetatively propagated crops (banana, cassava, and sweetpotatoes) and cucurbits (pumpkins and watermelons). He has been a head of Department. Besides being a mentor and a prolific author, he also serves as a peer reviewer and/or an editor of international scientific journals in the subject areas of molecular plant pathology, virology, tropical plant disease management, genetics and plant breeding. Currently, he is an Associate Professor of Plant Pathology at the Department of Plant Sciences, Microbiology and Biotechnology, in CoNAS, Mak. With financial support from the PEARL granting platform of the Bill & Melinda Gates Foundation, Dr. Tugume's current research team is part of a consortium of 6 international partners including 2 CGIAR centers (International Institute of Tropical Agriculture and Bioversity International), NARO and two agricultural research institutes in Tanzania. His research aims at unravelling natural mechanisms by which banana plants may escape infection from Xanthomonas wilt bacteria as a template for rehabilitating banana plantations previously infested with the deadly banana xanthomonas wilt disease in East and Central Africa.