



From the Chair, icipe Governing Council



Dr Lukas Bertschinger,
Chair, *icipe* Governing
Council

Dear Friends and Colleagues of *icipe*,

We are pleased to present the Centre's accomplishments between October and December 2016.

Between 23 and 27 October, the *icipe* Governing Council (GC), held its annual general meeting. Among the outcomes, was the appointment of two new members to the Executive Board (ExBo), which is composed of five GC members with

specific mandate in guiding the coordination and monitoring of the management and financial affairs, as well as the execution of scientific programmes.

As the newly elected GC and ExBo Chair, I am honoured to serve *icipe* alongside the other eminent members of these two organs, to support the Centre in its mission of contributing towards food and health security in Africa, for the next three years.

The construction of solar photovoltaic (PV) power plants at *icipe*'s two campuses, which started in March 2016, is now complete. Funded by the Swiss Agency for Development and Cooperation (SDC), the US\$ 2.5 million project significantly advances the Greening of *icipe* initiative, which, in addition to renewable energy, also includes energy saving and water conservation measures with the aim of reducing the Centre's carbon footprint and making its environment more eco-friendly.

Over the past several months there has been significant developments regarding the Centre's core funding. The UK's Department for International Development (DFID), committed funding to *icipe* totalling GBP 1.2 million for the period September 2016 – August 2017, and an additional GBP 5.4 million extending to March 2020. *icipe* received the Swiss Agency for Development and Cooperation (SDC) 2016 core contribution of CHF 1.8 million and Greening *icipe* project funds amounting to CHF 500,000. In addition, SDC's 2017 – 2020 phase funding at CHF 6.4 million has been approved and an agreement signed. Further, between September and October

Continued next page

IN THIS ISSUE



Solar plants completed – Page 5

THOUGHT LEADERSHIP COLUMN BY DIRECTOR GENERAL ... 3

Microbiome research at *icipe* 3

INSTITUTIONAL NEWS 5

Solar plants completed 5

icipe Executive Board 6

New book on fruit flies in Africa 7

NEW PROJECT FUNDING..... 8

BioInnovate Africa Phase II 8

Potato cyst nematodes research 8

CAPACITY BUILDING 9

2016 graduates 9

RECOGNITIONS..... 12

icipe Governing Council students awards..... 12

icipe annual awards 2016..... 14

STAFF NEWS..... 17

icipe IN THE MEDIA..... 18



From previous page

2016, *icipe* and the Swedish International Development Cooperation Agency (Sida), signed a contract for programme core support amounting to SEK 90 million for 2016 – 2020. *icipe* also received Euro 219,000 from the Government of Germany through the Federal Ministry for Economic Cooperation and Development (BMZ) and the Gesellschaft für Internationale Zusammenarbeit (GIZ) for policy research.

In November 2016, *icipe* and Sida entered into an agreement for the Centre to host the Bio-resources Innovations Network for Eastern Africa Development (BioInnovate) programme, phase II, an initiative established in 2010 with support from Sida. The Programme (2016 – 2021), is funded at SEK 100.7 million.

News highlights in this newsletter include the graduation or thesis defence by 12 scholars undertaking their studies within *icipe*'s postgraduate programmes. Through their research, the young scientists made commendable contribution across the Centre's programmes and projects. We are pleased that most of them have found exciting opportunities to build their careers and to contribute to the research and development capacities of their countries.

Also worth noting is the publication by Springer International Publishing, Switzerland, in November, 2016, of a book co-edited by *icipe* researchers Dr Sunday Ekesi and Dr Samira Mohamed, in collaboration with Dr Marc de Meyer, Royal Museum of Central Africa (link: <http://link.springer.com/book/10.1007/978-3-319-43226-7>), which presents one of the most comprehensive appraisals of fruit fly problems and solutions in Africa.

Finally, I draw your attention to the Thought Leadership column by the *icipe* Director General, Dr Segenet Kelemu, which focuses on microbiome research at *icipe*, noting progress made by the Centre so far, and its importance in the long term vision of using endosymbiotic microbes to prevent insect-vectorated pathogens.

As 2016 draws to a close, we thank each and every one of you for your partnership. We wish you a truly great festive season, and a most prosperous 2017.

Dr Lukas Bertschinger,
Chair, *icipe* Governing Council

icipe by numbers

(October – December 2016)

Published journal articles



30

New push-pull farmers



10000

Ongoing postgraduate scholars



167

Media mentions



1000



THOUGHT LEADERSHIP COLUMN BY DIRECTOR GENERAL

Microbiome research at *icipe*

The bodies of all animals are inhabited by various microbes including bacteria, fungi and viruses, which are either detrimental (pathogens), or beneficial (symbionts), for the host.

Symbionts play an important, yet poorly understood role in sustaining the health and fitness of their animal hosts. Still, while it is difficult to fully understand the diversity and usefulness of symbionts, fascinating discoveries are increasingly being made. In particular, advances in molecular techniques have enabled a notable surge in researchers' ability to study these organisms in depth.

Most commonly, insects harbour two kinds of symbionts: endosymbiotic, which are found inside the cells or body of insects, and exosymbiotic, which exist on the outer cuticle or inside the intestines. Endosymbiotic microbes have a significant impact on the interactions between their host insects and pathogens (that is, disease causing agents). This is because to promote their own survival, the microbes often assist their host insects in the defence against pathogens.

In 2014, *icipe* started studies to explore the potential of endosymbionts in making insects more resistant to pathogens and to prevent the transmission of diseases. The Centre's primary focus is the development of insect endosymbiont-based strategies for the control of vector-borne diseases, which exert their greatest impact in developing regions, including Africa. Globally, insect endosymbionts are emerging as a promising alternative in vector-borne diseases management. However, there has been minimal progress in the development of endosymbiont-based strategies to control vector-borne diseases of great importance in Africa. In contrast to the explosion of research on endosymbiont strategies to manage arboviral diseases, there has been much less focus on similar



Dr Segenet Kelemu
Director General, *icipe*

strategies for vector-borne diseases that are caused by eukaryotic parasites. This distinction is significant because most of the important vector-borne diseases in Africa are indeed caused by eukaryotic parasites (e.g. *Plasmodium*, the malaria parasite; *Leishmania*, which is responsible for leishmaniasis, and *Trypanosoma*, which causes African trypanosomiasis).

icipe's research, which is being conducted through the Spirovector project, supported by the R. Geigy Foundation, the Swiss National Science Foundation (Switzerland), and the Wellcome Trust (UK), has two key objectives: to obtain a better understanding of diverse insect endosymbioses and to explore their potential use to control insect vector-borne diseases. The Centre's researchers have screened populations of numerous vectors throughout Kenya and they have identified several strains of *Spiroplasma*, insect-endosymbiotic bacteria that are known for their ability to protect insects against eukaryotic parasites. Notably, *Spiroplasma* strains have been discovered in *Anopheles arabiensis* (major vector of *Plasmodium*), *Glossina fuscipes* (major vector of *Trypanosoma*) and *Culex quinquefasciatus* (major vector of filarial nematodes). Currently, the scientists are investigating the *Spiroplasma* strains for their potential as a tool for blocking parasite transmission.

With support from the European Union, *icipe* is also conducting studies to understand the

basis of interactions between endosymbionts (specifically *Spiroplasma*), and *Bactrocera* and *Ceratitidis* fruit fly species. In Africa, fruit flies are one of the major constraints to realising the huge potential of fruit production for income generation, food and nutritional security. Over the years, *icipe* in collaboration with partners from Africa, Asia, Europe and USA, has developed integrated pest management (IPM) packages for exotic and native fruit flies, which are aimed at reducing yield losses and the enormous expenditure incurred by farmers to purchase pesticides, and to mitigate the health and environmental risks associated with the use (and misuse) of such chemicals. The IPM packages include fungi-derived biopesticides, baiting and male annihilation techniques, biological control with parasitoids, cultural control through field sanitation, minimal use of pesticide in localised bait stations of spot spray, and proper post-harvest treatment to provide and assure quarantine security.

icipe is now studying the interactions between endosymbionts and a number of the components of the Centre's fruit fly IPM package, specifically parasitoid wasps, biopesticides and host marking pheromone production. As a result, our researchers have developed novel tools to identify endosymbionts in African fruit flies, leading to the discovery of *Spiroplasma* species that are entirely new to science in the invasive fruit fly species *Bactrocera dorsalis*. Our scientists are now investigating how this strain of *Spiroplasma* affects the biology of the pest.

The Centre's most recent initiative in microbiome research is a project launched in September 2016, with support from the Swiss National Science Foundation, to assess the connection between honeybee gut microbiota and the overall health of the insect. *icipe* recognises the rising threats to bees in Africa and globally, in part due to unresolved issues surrounding bee health.

Continued next page



THOUGHT LEADERSHIP COLUMN: DIRECTOR GENERAL

From previous page

Therefore, the Centre has in recent years made bee health a primary research focus, as part of the process towards securing the bee industry in Africa, while contributing to global sustainability of bees.

Bee gut microbiota abundance and diversity have been shown to be good indicators of hive health and stress. By studying the honeybee gut microbiota, *icipe* aims to establish microbe-based diagnosis technique to improve bee health management. This study will also provide a better understanding of the distribution of bee diseases and improve risk mapping. Finally it will guide the development of probiotics to increase hive resistance to a broad range of pathogens.

The advances made by *icipe* so far are an important step in the long term vision of using endosymbiotic microbes to prevent insect vectored pathogens. The progress also demonstrates and reinforces *icipe*'s centre of excellence status.

Most of the microbiome research is being undertaken within the *icipe* Martin Lüscher Emerging Infectious Laboratory (ML-EID), which includes biosafety level 2 and 3 facilities for pathogen culture and high-throughput molecular surveillance, as well as insectaries for controlled experimental studies.

In addition, through the Spirovector project, the Centre has obtained a Leica SP5 confocal microscope, donated to the Centre by Cellular Imaging Facility, Lausanne University Hospital, Switzerland, through the mediation of TRoND Africa which is now installed in the ML-EID. The equipment, the first operational confocal in the East African region, will enable the Centre's researchers to acquire optical sections of specimens without background noise and image degradation.

icipe's microbiome research is also being conducted within the Centre's African Reference Laboratory for Bee Health, which is equipped with cutting edge instrumentation for molecular procedures and microbiology practices.

Most importantly, the microbiome research is contributing to *icipe*'s vision of scientific leadership by amalgamating regional and global



The Spirovector project intends to advance Africa's capacity in developing insect endosymbiont-based strategies for the control of vector-borne diseases. Here, Sharon Towett, an MSc student in the project is screening *Spiroplasma endosymbionts*.

talent. The research team is currently led by two scientists whose previous research has had global impact on the understanding of insect-endosymbionts: Dr Jeremy Herren (Switzerland), a Sir Henry Wellcome Postdoctoral Research Fellow, and Dr Juan Paredes (Colombia).

Six scholars are currently conducting microbiome research at the Centre. They include two PhD students: Hellen Butungi (Uganda) and Joseph Gichuhi (Kenya); and three MSc students: Lillian Mbaisi (Kenya), Enock Mararo (Kenya) and Sharon Towett (Kenya).

In advancing its microbiome research, *icipe* is grateful to partner with the Swiss Federal Institute of Technology (EPFL), Lausanne, University of Lausanne, Switzerland, and the universities of Lancaster, Glasgow and Liverpool, in the UK.



INSTITUTIONAL NEWS

Solar plants completed

The construction of solar photovoltaic (PV) power plants at *icipe*'s Duduville Campus, Nairobi, and at the Centre's Thomas Odhiambo Campus on the shores of Lake Victoria, which started in March 2016, is now complete.

The systems are currently being tested, with an official launch scheduled for February 2017.

The US\$ 2.5 million project, funded by the Swiss Agency for Development and Cooperation (SDC), is driven by *icipe*'s goal to create a sustainable energy supply and to reduce diesel fuel dependency.

The solar PV plants are part of the Greening of *icipe* initiative, which, in addition to renewable energy, also includes energy saving and water conservation measures,

with the aim of reducing the Centre's carbon footprint and making its environment more eco-friendly.

The *icipe* solar PV plants will have a combined generating capacity of 1016 kiloWatt peak (kWp). The design and construction was undertaken by Solar Century, which was awarded the contract through a rigorous, international selection process.



A total of 136 solar photovoltaic (PV) modules have been fixed on carports in both *icipe* campuses.



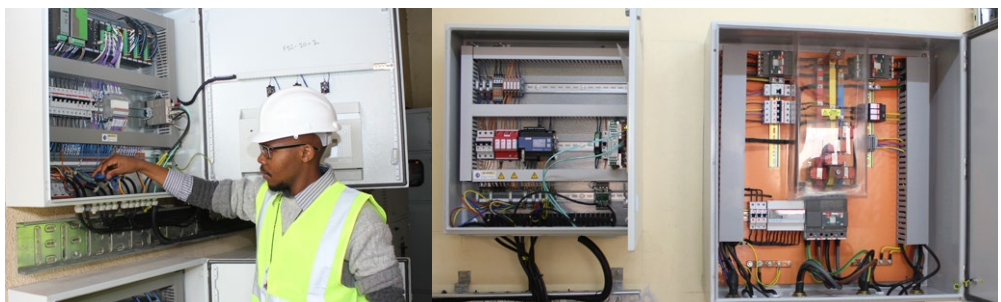
A semi-aerial view of the *icipe* Duduville Campus headquarters. A total of 3658 PV modules have been installed on rooftops on both *icipe* campuses. Photovoltaic modules placed on roofs have various advantages, for instance, better use of available space and natural cooling of the spaces underneath.



Technicians from Solar Century installing solar inverters, one of the components of the solar PV plants.



The solar battery backup system at the *icipe* Thomas Odhiambo Campus, Mbita, on the shores of Lake Victoria, which will supply power during the night for about five hours.



To ensure that the solar energy is generated and used in the most optimum manner, an 'intelligent system', which will enable energy interchange between the solar systems and the national electricity grid, has been installed, with the grid serving as a virtual battery storage.



INSTITUTIONAL NEWS

icipe Executive Board

The policy-level governance of *icipe* is overseen by a Governing Council (GC) that consists of 15 eminent individuals drawn from Kenya (host country), the Sponsoring Group of *icipe*, science and academia, and other relevant sectors. An Executive Board (ExBo) composed of five members of the *icipe* GC has specific mandate in guiding various issues, ranging from coordination and monitoring of the Centre's management and financial affairs to the execution of the scientific programmes. As of October 2016, the *icipe* ExBo has the following members:

Dr Lukas Bertschinger, Chair, Executive Board and Governing Council

Dr Bertschinger is Agroscope's Delegate for national and international research cooperations, Agroscope being the Swiss national public agri-food sector research. He is a phytopathologist and crop production scientist, integrating breeding, crop physiology, integrated pest management and food technology, with 25 years of research abroad and in Switzerland. As a research director, program manager and science quality manager (ISO), his leadership values are sustainability, science-based problem solutions, and a systems view with functional interdisciplinarity from omics to consumer research. Read Dr Bertschinger's complete profile [here](#).

Mr Nicolas P. Retsinas, Chair, Audit and Finance Committee

Mr Retsinas is the Director Emeritus of Harvard University's Joint Center for Housing Studies, a collaborative venture of the Graduate School of Design and the Harvard Kennedy School. The Center conducts research to examine and address the most critical housing and community development issues in America. Mr Retsinas is a Lecturer in Housing Studies at the Graduate School of Design and the Harvard Kennedy School, and is also a Lecturer in Real Estate at the Harvard Business School. Read Mr Retsinas complete profile [here](#).

Dr Bernard Vaissière, Chair, Programme Committee

Dr Vaissière is the Research Leader, National Institute for Agricultural Research (INRA), UR406 Abeilles & Environnement (Research Unit 406 Bees and the Environment),



Participants of the *icipe* Governing Council (GC) annual meeting held in Nairobi, Kenya in October 2016. Standing from left to right: Prof. Anthony Youdeowei (outgoing GC Member), Mr Andreas Schriber (representative of the Sponsoring Group of *icipe*), Dr Ylva Hilbur (GC Member), Dr Florence Chenoweth (GC Member), Dr Bernard E. Vaissière (Member, ExBo, Chair, Programme Committee), Prof. James P. H. Kahindi (GC Member), Prof. Noboru Minakawa (outgoing GC Member). Seated from left to right: Dr Carlos Lascano (GC Member), Prof. Bill Hansson (immediate past Chair and new Vice Chair of *icipe* GC), Mr Donald Kaniaru (ExBo member and Host Country Representative), Mr Nicholas Retsinas (ExBo Member, Chair, Audit and Finance Committee), Dr Segenet Kelemu (Ex-Officio and Director General, *icipe*), Dr Lukas Bertschinger (Chair *icipe* GC and ExBo), Prof. Elske van de Fliert (ExBo Member, Chair Nominating Committee).

Laboratoire de Pollinisation & Ecologie des Abeilles (laboratory of Pollination and Bee Ecology). Dr Vaissière is a pollination agronomist, and since September 1989, he has been a scientist at INRA, becoming, in 2000, the research leader of the Pollination and Bee Ecology team, which is composed of 2 scientists, 3 technicians, 3 postdoctorate researchers and 2 PhD students, conducting research under the programme, Agroecology of Pollination in Entomophilous Crops. Read Dr Vaissière's complete profile [here](#).

Prof Elske van de Fliert, Chair Nominating Committee

Prof. van de Fliert is Associate Professor and Director of the Centre for Communication and Social Change, University of Queensland, Australia. She coordinates and teaches in the Master of Communication for Social Change and is currently involved in several research projects in Indonesia, Timor Leste and Mongolia. She has a PhD in Communication and Innovation Studies from Wageningen University, the Netherlands, and an MSc and BSc (Ecology) from Utrecht University, The Netherlands. Read Prof. van de Fliert's complete profile [here](#).

Mr Donald W. Kaniaru, Host Country Representative

Mr Kaniaru is the Managing Partner, Kaniaru

& Kaniaru Advocates. An environmental lawyer by profession, he has wide experience and expertise in environmental law and diplomacy, having worked with Kenya's Ministry of Foreign Affairs from 1969 and with the United Nations Development Programme (UNEP) from 1975 to 2003. He is currently Regional Governor, International Council of Environmental Law, and the Council's representative to the United Nations in Nairobi. Read Mr Kaniaru's complete profile [here](#).

Dr Segenet Kelemu, Ex-Officio Member and Director General, *icipe*

Dr Kelemu is *icipe*'s fourth Director General, and the first woman to lead the Centre. Dr Kelemu (a native of Ethiopia), is a molecular plant pathologist with emphasis on elucidation of molecular determinants of host-pathogen interactions, development of novel plant disease control strategies including genetic engineering, biopesticides, pathogen population genetics and dynamics, endophytic microbes and their role in plant development. She has experienced the challenges and successes associated with African agriculture first-hand, from tending the field to directing world-class laboratories. Read Dr Kelemu's full profile [here](#).



INSTITUTIONAL NEWS

New book on fruit flies in Africa

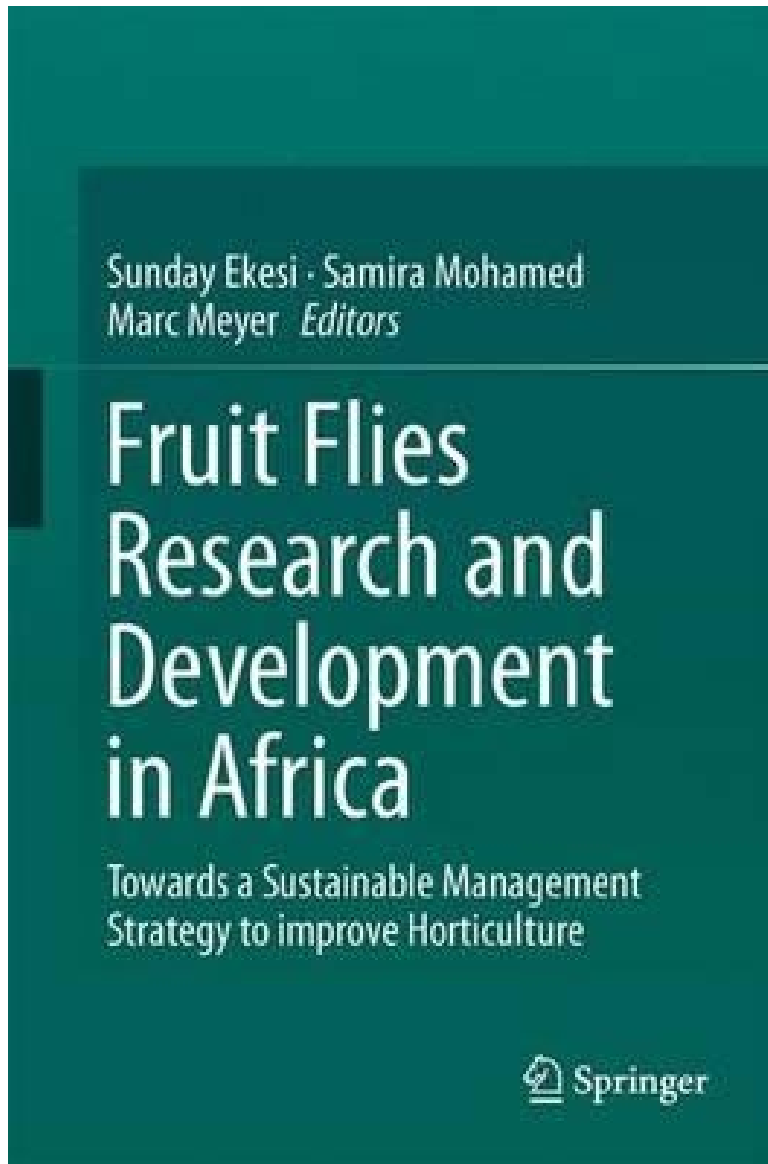
icipe researchers Dr Sunday Ekesi and Dr Samira Mohamed, in collaboration with Dr Marc de Meyer, Royal Museum of Central Africa, have co-edited a new book titled *Fruit Flies Research and Development in Africa: Towards a Sustainable Management Strategy to improve Horticulture*, published by Springer International Publishing, Switzerland, in November, 2016 (link: <http://link.springer.com/book/10.1007/978-3-319-43226-7>).

In addition to Dr Ekesi and Dr Mohamed, several icipe scientists are among 60 researchers from across the globe, who have authored chapters in the book which has been made possible by the support of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and Federal Ministry for Economic Cooperation and Development (BMZ), Germany.

The publication presents one of the most comprehensive appraisals of fruit fly problems and solutions in Africa, from taxonomy, to bioecology, management and socio-economic impact assessment.

The book also presents a perspective on desirable future control strategies and necessary research, and comes complete with images of native and invasive species of fruit flies.

Globally, Tephritid fruit flies are one of the major constraints to fruit production. They cause enormous losses through direct feeding and damage of fruit, as well as loss of market opportunities, as many fruit fly species are the subject of quarantine restrictions in export countries.



In Africa, a variety of fruit fly species, including the native *Ceratitis* and *Dacus* spp, and the exotic *Bactrocera* and *Zeugodacus* spp., lead to yield losses ranging from 30 – 90%.

While several specific reviews have addressed various aspects of the biology, ecology and management of economically important tephritid fruit flies, assessment of African native species has been limited to *Bactrocera oleae* and *Ceratitis capitata* – which are not economically important species in the continent. Indeed, there is currently no other book that explicitly addresses economically important African fruit flies.

There are also no prior reviews that have specifically focused on the status of the bioecology, economic impact and management of exotic and native fruit flies – including several potentially invasive *Dacus* species attacking vegetables – in Africa.

Therefore, *Fruit Flies Research and Development in Africa: Towards a Sustainable Management Strategy to*

improve Horticulture is important, as it fills critical knowledge gaps.

The book is also especially pertinent at a time when the fruit fly landscape is changing rapidly in Africa, due to the arrival of highly destructive alien invasives (*Bactrocera dorsalis*, *B. zonata*, and *B. latifrons*). The publication is therefore an important reference material for researchers, academics and students keen to improve horticulture and enhancing food and nutrition security in Africa and beyond.

To purchase a copy of the book, please visit: <http://www.springer.com/gp/book/9783319432243>



NEW PROJECT FUNDING

BioInnovate Africa Phase II

Through an agreement signed in November 2016 between the Swedish International Development Cooperation (Sida) and *icipe*, the Centre will host the Bio-resources Innovations Network for Eastern Africa Development (BioInnovate) programme, Phase II. BioInnovate is an initiative established in 2010 with support from Sida, to strengthen bioscience research and innovation activities in eastern Africa. The Programme addresses regional priorities in science, technology and innovation aligned to the AU-NEPAD's Science Technology and Innovation Strategy for Africa (STISA), the science agenda for Africa (S3A) and the Comprehensive Africa Agriculture Development Program (CAADP). BioInnovate's goal is to improve productivity and profitability of smallholder farmers and agro-processors in the region, while ensuring environmental sustainability. The initiative also seeks to promote inclusive growth by linking smallholder farmers to new



BioInnovate aims to improve sustainable production of agricultural produce while also addressing the range of value chain factors. — Photo: www.bioinnovate-africa.org

market niches, through the development of sustainable and resource efficient value chains. BioInnovate brings together critical players from the public and private sector

together to promote bioscience innovation and build a sustainable bioeconomy in six eastern African countries: Burundi, Ethiopia, Kenya, Rwanda, Tanzania and Uganda.

Potato cyst nematodes research

The potato cyst nematodes (PCN), is a serious pest of potatoes worldwide. These microscopic, soil dwelling roundworms are highly destructive; they feed on the roots of plants, leading to poor root development, stunted plant growth and reduced tuber yield.

The pests are extremely difficult to control due to the longevity of their cysts in the soil and their ability to spread easily in the soil and in the tubers.

Two years ago, PCN was reported in eastern Africa for the first time, signalling potential adverse impacts on food security and livelihoods in a region where potatoes are a highly important crop for many households.

Since then, *icipe* has been involved in an initiative funded by the Food and Agricultural Organization of the United Nations (FAO), aimed at surveying countrywide spread of PCN in Kenya, while training government



A technician sampling for nematodes.

technicians and staff of research institutions to deal with the pest. Preliminary findings by *icipe* indicate that certain crops act as dead-end PCN traps; while the PCN nematodes are attracted to the roots of such plants, they are unable to survive on them. This discovery provides promising leads for PCN management approaches.

In November 2016, the Centre received support from the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) / Federal Ministry for Economic Cooperation and Development (BMZ) Small Grants Program, to conduct studies on the possibility of using African nightshade in a dead end trap crop strategy for PCN in eastern Africa.



CAPACITY BUILDING

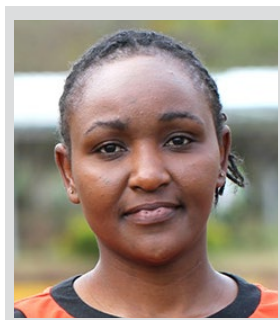
2016 graduates

In the course of 2016, the 12 scholars below conducting their research within *icipe*'s African Regional Postgraduate Programme in Insect Science (ARPPIS) and the Dissertation Research Internship Programme (DRIP), graduated or defended their thesis.



David Kupesa Mfuti, (PhD, ARPPIS, Democratic Republic of Congo), undertook research on the use of entomopathogenic fungus and kairomonal attractants for managing thrips on grain legumes. His research provided a more comprehensive explanation on the effect of a commercial kairomone and provided new information on the potential spatial separation between fungus and the

attractant (Lurem-TR). He also identified an alternative thrips attractant that is compatible with *Metarhizium anisopliae* isolate and demonstrated its effectiveness under field conditions. The study also demonstrated for the first time that mycoinsecticides can be applied in spot spray in combination with kairomones, leading to higher cost benefits than cover sprayed. David published two peer reviewed papers with a third currently under review. He is now a Researcher, and Interim of Chief, of the cassava programme at INERA, the National Agricultural Research Institute of the Democratic Republic of Congo. David was registered at North West University, South Africa, and his research was funded by The German Academic Exchange Service (DAAD).



Rosaline Wanjiru Macharia (PhD, ARPPIS, Kenya) undertook research to characterize the chemosensory genes in selected tsetse fly species. She published four papers in highly rated journals. In particular, Rosaline contributed to the successful completion, in April 2014, of the mapping of the genome of *Glossina morsitans morsitans* tsetse species.

This milestone was achieved through a 10-year project led by the International Glossina Genome Initiative (IGGI), which brought together more than 150 researchers from nearly 100 institutions across the world. As part of this consortium, *icipe* researchers, including Rosaline, were instrumental in the description of the sensory genes, which, in this and other tsetse species, are responsible for guiding interactions between the flies and their environment. Key global recognitions of this research include its publication in the prestigious *Science* journal (prominently featured on the cover page of the 25 April 2014 issue), and in several satellite papers in the *PLoS* family of journals. Rosaline also won the 2016 *icipe* Governing Council award for best published paper (see separate story). Registered at the University of Western Cape, South Africa, Rosaline's research was funded by DAAD and the United States National Institutes of Health.



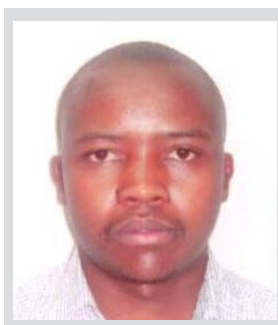
Evelyn Adhiambo Olang (PhD, ARPPIS, Kenya), assessed different malaria transmission metrics and human behaviour, to understand malaria risk among fishermen in Rusinga Island, Lake Victoria, western Kenya. The study demonstrated that, since their activities requires them to be out at night during peak mosquito biting times, fishermen are at a high risk of contracting malaria.

Therefore, the study recommended that, in addition to indoor strategies to control mosquitoes, there is need for approaches to protect individuals engaged in nocturnal outdoor livelihood activities. Evelyn published one paper out of her research. She is currently exploring opportunities in evidence-based operational research to control infectious and tropical diseases. Evelyn was registered at the University of Nairobi, Kenya, and her research was partly funded through a grant from the Kenya National Commission for Science, Technology and Innovation (NACOSTI).



Donatien Ntawurungu (MSc, DRIP, Rwanda), conducted studies on knowledge, attitude and practice towards African indigenous vegetables among selected Kenyan farmers. His results showed that farmers have significant knowledge and positive attitude regarding AIVs, but there is insignificant use of improved farming practices and inadequate cultivation of

the crops. Addressing these two challenges will help to improve AIVs production and yield. Donatien has a forthcoming journal article, and hopes to embark on a PhD soon. Donatien's research was funded by the Federal Ministry for Economic Cooperation and Development, Germany (BMZ), through the German Federal Enterprise for International Cooperation (GIZ). He was registered at Jomo Kenyatta University of Agriculture and Technology, Kenya.



Josphat Korir (MSc, DRIP, Kenya), studied the factors influencing intensity of adoption of *icipe*'s integrated pest management (IPM) package and pesticide misuse in the control of the mango fruit fly. The research established several positive influences on the adoption of the fruit fly IPM package. They include: number of mature mango trees owned, participation in fruit fly IPM



CAPACITY BUILDING

training and demonstration activities, education of household head and distance to the nearest mango input market. Josphat, who was registered at the University of Nairobi, Kenya, published a paper out of his research in the *International Journal of Tropical Insect Science*. studied. He is now a DRIP PhD student at *icipe*, still registered at the University of Nairobi.



Simon Ngao Mule (MSc, DRIP, Kenya), researched the diagnosis of Human African trypanosomiasis (HAT, or sleeping sickness). Using molecular biology tools, he developed an insect expression system that will enable the generation of recombinant antigens in future studies. He plans to commence PhD studies soon to further his research on host-pathogen interactions towards

improved or novel drug targets, vaccines and or diagnostic tools for infectious diseases. Simon's research was funded by NACOSTI, Kenya.



Stephen Omburo (MSc, DRIP, Kenya), conducted research on the seasonality of Amaranth leaf miners and the role of Phenylacetaldehyde and indigenous parasitoids in their control. His findings showed that different amaranth lines have varying levels of resistance to the pests. This study provides leads towards identifying and breeding amaranth accessions that are resistant to the

pests. Stephen also found the parasitoid *Apanteles hemara* to have high parasitism on the two major leaf-webbers of amaranth *Spoladea recurvalis* and *Udea ferrugalis* and can therefore be included in IPM strategies to control the pests. Stephen was registered at Kenyatta University, Kenya, and his research was funded by BMZ. He has now commenced PhD studies at the same university.



Mary Kanyiri (MSc, DRIP, Kenya), conducted research to understand the genes involved in detection of chemicals in the environment by *Glossina brevipalpis*, one of the forest-dwelling tsetse species. Tsetse flies are vectors of trypanosomiasis, and are adapted to different environments, with approximately 30 species occupying savannah, riverine or forest habitats.

The ability to sense chemicals enables mating, host detection and development of tsetse flies, and is important for the survival of the vectors. This study focused on a group of genes that contain the

information for odorant binding proteins (OBPs), which pick up odours from the environment, and depending on the nature of the chemical, they influence tsetse fly behaviour. The study showed that some of OBPs are associated with activity in juveniles (larva and pupae), while others are activated upon emergence of the adult flies. This study adds to emerging knowledge that some OBPs are important to juveniles, and not responsible for smelling external stimuli, while others are significant in the ability of adults to navigate the environment, for instance by finding bloodmeal hosts, mates, resting places and locations to lay their young larvae. Mary was registered at Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya, and her research was funded by the World Federation of Sciences (WFS) and *icipe*. She is currently a biochemistry tutor at JKUAT, as she makes plans to enrol for a PhD.



Peter Njenga (MSc, DRIP, Kenya) conducted genetic analysis and computer modeling of protein toxins produced by species of insect-killing bacteria, *Xenorhabdus*, and a study on how effective these bacteria are at killing the maize weevil and the larger grain borer, insect pests that cause huge post-harvest losses of maize. His research established that the larger grain borer

(*Prostephanus truncatus*) and the maize weevil (*Sitophilus zeamais*) are susceptible to toxins from *Xenorhabdus* spp. Peter developed a prototype for a biological pest control product to be used against the storage pests of maize, and has applied for its patent in Kenya. He also contributed towards a patent on antimicrobial products of *Xenorhabdus* spp. that can be used against drug-resistant bacteria. Peter was registered at the University of Nairobi, and his research was funded by NACOSTI, Kenya and *icipe*. He has now received a DAAD scholarship to undertake PhD studies at the University of Freiburg, Germany, where is in his first year of study.



James Maina Gichuhi (MSc, Kenya) studied rearing methods and life history of laboratory bred African coffee white stem borer, *Monochamus leuconotus* (Pascoe). He developed a new innovative rearing method for the African coffee white stem borer, which had, for long, remained a big challenge for researchers working on this pest. In addition, the research contributed towards comprehensive and updated life

history literature which was also lacking. James was registered at the University of Nairobi, and his research was conducted through the Climate Change Impacts on Ecosystem Services and Food Security in Eastern Africa (CHIESA), funded by the Ministry of Foreign Affairs,



Finland. He is currently a biology and agriculture teacher, while seeking PhD training opportunities.



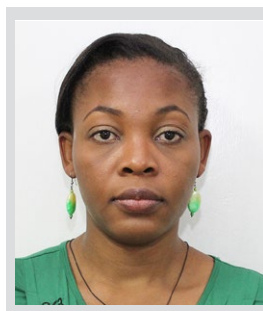
Pedro A. Sansao (PhD, ARPPIS, Mozambique) researched the epidemic and inter-epidemic activities in the modelling of vector-borne diseases. His studies yielded four publications in high impact factor peer-reviewed journals. Pedro is now a lecturer at the Universidade Eduardo Mondlane, Mozambique. His goal is to contribute to the establishment of a mathematical sciences postgraduate programme at the University, and a centre dedicated to research in mathematical epidemiology and ecology for tackling health problems facing the country. Pedro was registered at the University of the Witwatersrand, Johannesburg, South Africa.



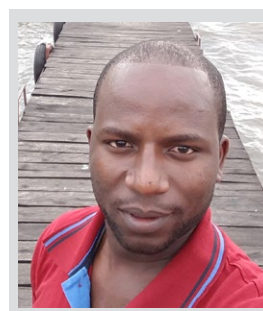
Sydney Mwamba (MSc, Zambia) focused on research methods. He is currently the Head of the Variety Evaluation Unit at the Ministry of Agriculture, Seed Control and Certification Institute, Zambia, where he aims to contribute towards strengthening research design and data analysis. He also intends to pursue a PhD, either in insect science or statistical modeling. His PhD studies were funded by Africa Share Capacity –Intra-ACP for graduate training in Africa.



David Omondi (PhD, ARPPIS, Kenya) conducted research around Lake Victoria and Lake Baringo, Kenya, to establish arbovirus diversity in people experiencing fevers, and in bloodfed mosquitoes. He published a paper on the host diversity of mosquito blood-meals, identified using a new high-resolution melting (HRM) analysis technique developed by icipe, which also found Sindbis and Bunyamwera viruses in circulation. David also contributed to a publication on low-parasitaemia malaria as well as mosquito larval microhabitat characteristics and mosquito composition in the region. Further, his thesis research involved a survey of ticks and tick-borne diseases associated with livestock and wildlife in his study areas. His studies contributed significantly to understanding the potential burden and diversity of vectors and vertebrate hosts involved in the transmission of arboviral and tick-borne diseases endemic to the two lake regions. David was registered at the University of Western Cape, South Africa, and his research was funded by Sida and icipe core funds. He is now a Lecturer at Egerton University, Kenya.



Yvonne Ukamaka Ajamma (PhD, ARPPIS, Nigeria), conducted research on the diversity of mosquitoes in the Lake Victoria and Lake Baringo regions of Kenya. She identified about 63 species, many of which had not previously been identified in Kenya, although they have been implicated in arbovirus transmission elsewhere. By developing high-resolution melting (HRM) analysis to differentiate mosquito species that cannot be morphologically differentiated before sequence analysis, Yvonne was able to identify likely new mosquito subspecies, with yet unknown roles in the transmission of vectored diseases. Additionally, she developed 16 microsatellite markers as a tool to study the population genetics of *Mansonia* mosquitoes, an important group in the transmission of arboviruses. She also contributed to publications on mosquito blood-meal analysis and mosquito larval microhabitat characteristics. Her findings significantly improved African research capacity to investigate the population genetics and diversity of mosquito vectors associated with disease transmission. Yvonne was registered at JKUAT, Kenya, and her research was funded by Sida and icipe core funds.



Martin Koome Mbaya (MSc, DRIP, Kenya), helped to develop an economical, highthroughput, nearly pan-arbovirus, low-cost detection assay, for the rapid surveillance, discovery and identification of arthropod borne viruses (arboviruses) (see story on page 15). This assay was used to identify diverse arboviruses circulating in Kenyan mosquitoes, and led to the first isolation in Kenya of Wesselsbron virus, which has been implicated with human disease in South Africa. The assay was also used to discover diverse novel clades of mosquito-specific flaviviruses that have the potential to be exploited to block arbovirus transmission. Martin was registered at Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya, and his research was funded by Google.org, through the Arbovirus Incidence and Diversity (AVID) project and icipe core funds. Martin is currently a Regional Technical Representative at Alliance Global, Nairobi, Kenya.



RECOGNITIONS

icipe Governing Council students awards

During its annual general meeting held in Nairobi, Kenya, at the end of October 2016, the *icipe* Governing Council honoured six outstanding postgraduate scholars currently undertaking their research at the Centre. The awards were presented in two categories: best published paper, and best poster.

Best published paper category



Rosaline Wanjiru Macharia (PhD scholar)
WINNER



Matilda Wangeci Gikonyo (MSc scholar)
FIRST RUNNER UP



Mercy Mumbi Murigu (MSc scholar)
SECOND RUNNER UP

In the best published paper category, the top award went to **Rosaline Wanjiru Macharia**, for her publication in the journal *PLoS Neglected Tropical Diseases*, based on her discovery that different species of tsetse flies use the same set of genes to find their hosts. Tsetse flies search for their food by detecting chemicals produced by their hosts (such as carbon dioxide). Rosaline's finding is surprising and of great scientific interest, considering that tsetse fly species differ in their responses to animal odours. The results also present leads for efficient, environmentally friendly ways to control tsetse and trypanosomiasis. This research was conducted with funding from the German Academic Exchange Service (DAAD), through *icipe's* African Regional Postgraduate Programme in Insect Science (ARPPIS). Further support was received from the National Human Genome Research Institute of the United States National Institutes of Health (NIH), awarded to the University of Cape Town, South Africa, H3ABionet Africa Project, of which *icipe* is a sub-grantee. The paper is available at: <http://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0004421>

The second prize went to **Matilda Wangeci Gikonyo**, for a paper on the common blossom thrips, *Frankliniella schultzei* Trybom, a pest that affects a huge variety of crops in many African countries. The pest occurs in dark and pale colour forms, which, though morphologically similar, differ in vector competency and geographic spread. Matilda's research aimed at ascertaining the taxonomic status of the two colour forms by characterising them using morphological, molecular, biological and ecological approaches. The results of these studies, which were published in the *International Journal of Tropical Insect Science*, indicate that the two colour forms of *F. schultzei* could be different species. The findings also highlight the need for combining morphological, biological, molecular and ecological characteristics to resolve taxonomic status of closely related insects. The research was conducted within the framework of an *icipe* project grant financed by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the Government of the Federal Republic of Germany. Matilda is registered at Jomo Kenyatta University of Agriculture and Technology, Kenya. The paper is available [here](#).

Mercy Mumbi Murigu won the third prize for a paper on the effectiveness of fungal isolates developed by *icipe* against strains of *Rhipicephalus decoloratus* tick species, that are known to be resistant to amitraz, a widely used acaricide.

The findings, published in *Veterinary Parasitology* journal, showed *icipe's* *Metarhizium anisopliae* and *Beauveria bassiana* fungal isolates to be harmful to strains of the tick that are resistant to amitraz as well as those that are susceptible to the acaricide.

The research also revealed *M. anisopliae* ICiPE 7 to be compatible with amitraz, which makes this isolate a potentially strong candidate in tick control.

This research has been funded by UK Aid from the Government of the United Kingdom. Mercy is registered at the University of Nairobi, Kenya. Her paper is available at: <http://www.sciencedirect.com/science/article/pii/S0304401716301911>



RECOGNITIONS

icipe Governing Council students awards

Best poster category



Pamela Ochungo (PhD scholar)
WINNER



Beritah Mutune (MSc scholar)
FIRST RUNNER UP



Nelly Ndungu (PhD scholar)
SECOND RUNNER UP

Pamela Ochungo won the top prize for a poster titled: Landscape setup and honey bee colony integrity: a case study of mwingi, eastern kenya.

In Africa, with more land being allocated to agriculture, the health of bee colonies is being negatively affected, since the resource base is either removed or contaminated. At the same time, there is inadequate knowledge regarding how honey bee foraging, productivity and colony strength will be affected by changing land use and land cover. The poster describes a multidisciplinary approach that uses earth observation techniques to map landscape patterns up to vegetation community level, and also applies pollen characteristics and colony strength measurements and hive productivity analysis.

This research was conducted with funding from the German Academic Exchange Service (DAAD), through *icipe's* African Regional Postgraduate Programme in Insect Science (ARPPIS), the European Union (EU), and *icipe* core funding provided by: the Government of Kenya; UK Aid from the Government of the United Kingdom; Swedish International Development Cooperation Agency (Sida); the Swiss Agency for Development and Cooperation (SDC) and the Federal Ministry for Economic Cooperation and Development (BMZ), Germany.

Beritah Mutune won the second prize for a poster titled: Fungal endophytes as promising tools for the management of bean stem maggot *Ophiomyia phaseoli* on beans *Phaseolus vulgaris*.

The poster highlights the use of fungal entomopathogens to control BSM and illustrates, in particular, the effectiveness of *Metarhizium anisopliae* isolate, ICIPE 20.

The poster demonstrates that fungal endophytes are a promising tool that can be used as an alternative to chemical control, in the management of BSM. This strategy could improve bean production, leading to increased food and nutritional security and improved livelihoods.

The research was funded by the World Federation of Scientists, *icipe* Innovative Seed Grant, and *icipe* core funding provided by: the Government of Kenya; UK Aid from the Government of the United Kingdom; Swedish International Development Cooperation Agency (Sida); the Swiss Agency for Development and Cooperation (SDC) and the Federal Ministry for Economic Cooperation and Development (BMZ), Germany.

Nelly Ndungu took the third prize for a poster titled: Transcriptome comparison between newly emerged queen and worker bees of stingless bee *Hypotrigona gribodoi*.

Stingless bees are important ecologically and in improving livelihood sustainability through hive products. Stingless bees are considered an alternative pollinator to honey bees due to similarity in foraging traits. Contrary to the honeybee, the main challenge in stingless bee domestication is the mass production of queens. One way to achieve this is by studying caste differentiation to understand the basis for caste differentiation. This is the first study to report queen-worker gene differentiation in an African stingless bee species.

The research was conducted with funding from the German Academic Exchange Service (DAAD) through *icipe's* African Regional Postgraduate Programme in Insect Science (ARPPIS), European Union (EU), and *icipe* core funding provided by: the Government of Kenya; UK Aid from the Government of the United Kingdom; Swedish International Development Cooperation Agency (Sida); the Swiss Agency for Development and Cooperation (SDC) and the Federal Ministry for Economic Cooperation and Development (BMZ), Germany.



RECOGNITIONS

icipe annual awards 2016

The annual *icipe* Awards honour distinction in contribution to the Centre's mission and vision under the following categories: outstanding employee of the year, outstanding support staff contribution, outstanding professional staff of the year, outstanding research publication of the year and outstanding partner of the year. Below are the winners for 2016.

Outstanding employee of the year



Elijah Asami
Mail Clerk

Elijah Asami Mail Clerk

Elijah, who oversees *icipe*'s mail room, was recognised for his distinction in ensuring efficient and effective management and movement of all the Centre's documentation and mail to local and international destinations.

Often working under tight deadlines, Elijah always conducts his duties to the highest levels of professionalism. Having joined *icipe* 38 years ago, Elijah was previously assigned to the janitorial section before joining the mail section in 1992, supporting different departments and ultimately taking charge of the mail room in 2000.

Seth Kamidi Mulusa Senior Accountant – Projects

Seth was awarded for his commitment to delivering high quality financial reports that meet internal and external requirements as pertains to *icipe* staff, donors, collaborators and other relevant stakeholders. His duties

Outstanding support staff of the year



Seth Kamidi Mulusa
Senior Accountant - Projects

include preparation of restricted projects financial reports, providing assistance in the preparation of budgets during proposal writing, making budget amendments for ongoing projects and involvement in the external audit of projects.

Seth joined *icipe* in June 2007. He holds an MBA in Finance from the United States International University – Africa, and a Bachelor of Commerce (Accounting option) from the University of Nairobi, Kenya. He is also a Certified Public Accountant of Kenya (CPA-K).

Sunday Ekese Theme Leader, Plant Health, and Leader, Fruit fly IPM programme

Sunday was recognised for his exemplary scientific output, technology development, resource mobilisation, capacity building and leadership. A former Africa Regional Postgraduate Programme in Insect Science (ARPPIS) PhD scholar (class of 1995), Sunday exemplifies *icipe*'s home grown

Outstanding professional staff of the year 2016



Sunday Ekese
Theme Leader, Plant Health, and Leader, Fruit fly IPM programme

scientific leadership talent. He has been instrumental in the development of a fungal-based biopesticide that has been proven effective in the control of thrips, fruit flies and mealybug, which now bears the trade names Campaign® or Met 69® and is commercially registered in Ethiopia, Kenya, South Africa, Tanzania and Mozambique.

As Leader of the Plant Health Theme, Sunday oversees *icipe*'s goal of contributing to enhanced agricultural production in Africa. He has also helped to nurture to success, the *icipe* fruit fly IPM programme, and also provides leadership to the Centre's emerging insects for food and feed research. He has made 35 successful grant proposals, amounting to over US\$ 42 million, and is one of *icipe*'s top publishers. Sunday has mentored many young scientists and technicians, and he and his teams have demonstrated great success in building the capacity of various stakeholders to use knowledge and technologies developed by the Centre.



RECOGNITIONS

Outstanding publication of the year 2016

Arbovirus and insect-specific virus discovery in Kenya by novel six genera multiplex high resolution melting analysis.
Molecular Ecology Resources; doi: 10.1111/1755-0998.12584

Villinger J, Mbaya M. K., Ouso D. O., Kipanga P. N., Lutomiah J. and Masiga D. K (2016)

This paper, which was authored by researchers working in the *icipe* Martin Lüscher Emerging Infectious Diseases (ML-EID) Laboratory and collaborators, reported the development of an economical, high-throughput, nearly pan-arbovirus, low-cost detection assay, for the rapid surveillance, discovery and identification of arthropod borne viruses (arboviruses).

Arboviruses represent a broad category of emerging and re-emerging infectious diseases that threaten public health worldwide. In recent decades, climatic change, tropical urbanisation and increased trade have facilitated dramatic geographical expansions of arboviruses, leading to global epidemics of diseases such as those caused by Zika, chikungunya and West Nile viruses that were previously thought of as relatively harmless and restricted to Africa.

Currently, there is a clear lack of accurate tools to discover and analyse arboviruses from large sample sizes, and studies show that only a fraction of such organisms have been identified. Identification of arboviruses mostly relies on techniques that examine blood and other fluids. However, these diagnostic approaches are costly and time-consuming, and only enable the screening of a few select viruses. Moreover, due to limited diagnostic capacity in health facilities in most rural areas of sub-Saharan Africa (SSA) where arboviral infections are likely to occur, most such illnesses are either diagnosed as undefined fever or misdiagnosed as malaria or bacterial infections, affecting not only treatment, but clarity on arboviral infection rates and disease burden. As such, there is need for screening approaches that can facilitate rapid identification and discovery of arboviruses.

The detection assay developed by the *icipe* researchers uses high-resolution melting (HRM) analysis of highly multiplexed Polymerase chain reaction (PCR) assays to identify broad diversities of arboviruses within *Flavivirus*, *Alphavirus*, *Nairovirus*, *Phlebovirus*, *Orthobunyavirus* and



Jandouwe Villinger, lead author of the outstanding publication of the year pictured with Daniel Ousa, a technician in the *icipe* Martin Lüscher Emerging Infectious Diseases (ML-EID) Laboratory, and one of the co-authors of the paper.

Thogotovirus genera. The researchers differentiated around 22 medically important viruses such as those responsible for dengue, Zika, chikungunya, Rift Valley, West Nile and yellow fevers, by comparing the melting characteristics of their genetic sequences. They then applied the assay to arbovirus surveillance of mosquito samples collected in Kenya and identified diverse insect-specific viruses, including a new clade in anopheline mosquito, vectors of malaria. They also detected, for the first time in Kenya, Wesselsbron virus, an arbovirus that can cause viral haemorrhagic fever in humans, in *Culex* spp. and *Anopheles coustani* mosquitoes.

The *icipe* innovation can be used to identify novel viral diversities and potential disease threats that may not be included in pathogen detection panels of routine surveillance efforts. This will enhance understanding of arboviruses, and contribute to improved healthcare and appropriate treatment. While it remains difficult to predict arboviral pandemics, the assay provides a valuable tool for their early identification. The approach can also be adapted to other pathogens to

enhance disease surveillance and pathogen discovery, as well as the study of pathogen diversity and viral evolutionary ecology.

Collaborators of this research include: Kenya Medical Research Institute (KEMRI); Jomo Kenyatta University of Agriculture and Technology, Kenya; and Zoological Institute, Katholieke Universiteit, Belgium.

This research was funded by: Google.org, the philanthropic arm of Google; the Consortium for National Health Research (CNHR, Kenya), through the Community of Excellence for Research in Neglected Vector Borne & Zoonotic Diseases (CERNVec) project based at *icipe*. The researchers also acknowledge *icipe*'s core funders: the Government of Kenya, the UK's Department for International Development (DFID); the Swedish International Development Cooperation Agency (SIDA); and the Swiss Agency for Development and Cooperation (SDC).

The publication is available here: <https://www.ncbi.nlm.nih.gov/pubmed/27482633>



RECOGNITIONS

Outstanding partner of the year 2016

Rothamsted Research was recognised for its longstanding partnership with *icipe*, which, among other outcomes, has led to the development of the highly innovative and successful push-pull technology, currently being used by over 130,000 farmers in Africa. Developed over the past 20 years, this simple cropping strategy simultaneously addresses the five key constraints of cereal-livestock mixed production systems in Africa – insect pests (stemborers), the parasitic weed *Striga* (and other weeds), poor soil fertility, soil moisture management, while also fulfilling the need for high quality animal feed.

Rothamsted's main role has been to work on the science of the push-pull, a technology that is based on the intercropping of cereals with a pest repellent plant, such as *Desmodium*, which drives away or deters stemborers from the target food crop. An attractant trap plant, for instance Napier grass (*Pennisetum purpureum*), is planted around the border of this intercrop, to attract and trap the pests. As a result, the food crop is left protected from the pests. In addition, *Desmodium* stimulates suicidal germination of *Striga* and inhibits its growth. Push-pull also has significant benefits for dairy farming, since silverleaf *Desmodium* (*Desmodium uncinatum*) and Napier grass are both high quality animal fodder plants. Additionally, *Desmodium* is an efficient nitrogen fixing legume, which improves soil fertility. Moreover, because both plants are perennial, push-pull conserves soil moisture and continually improves soil health. Over the past four years *icipe*, Rothamsted Research and partners have developed a climate-smart



Rothamsted Research, United Kingdom, was recognised as the *icipe* partner of year 2016. —Photo: www.rothamsted.ac.uk

push-pull version, which uses drought tolerant repellent and trap crops, greenleaf *Desmodium* (*Desmodium intortum*) and *Brachiaria cv Mulato*, as intercrop and border crops respectively.

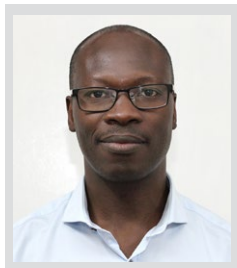
In addition, many *icipe* researchers have benefitted from the Rothamsted International Fellowship Scheme, which supports scientists from developing countries to train at Rothamsted Research for 6 – 12 months on a research project developed jointly with a Project Leader at Rothamsted.



A thriving push-pull field.



STAFF NEWS

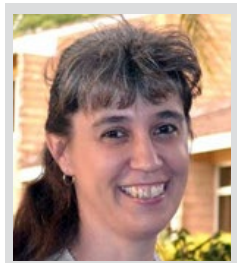


Dr Julius Ecuru, Programme Manager, BioInnovate Africa Programme

Dr Ecuru has joined *icipe* as Programme Manager, BioInnovate Africa Programme, based at the *icipe* Duduville Campus.

He holds a PhD in Technology and Technoscience studies from Makerere University, Uganda, and Blekinge Institute of Technology, Sweden. He also has an MSc in Environmental Science from Makerere University, Licentiate of Technology from Blekinge Institute of Technology, Sweden and a Postgraduate Diploma in International Research Ethics, from the University of Cape Town, South Africa, and a BSc in Chemistry from Makerere University.

Julius has more than 18 years of work experience in research and technology development. His immediate appointment prior to joining *icipe* was at the Uganda National Council for Science and Technology, Kampala, Uganda. He also worked for the Biosciences eastern and central Africa-International Livestock Research Institute (BecA-ILRI) Hub as Program Manager, where he developed the Hub's 2015 – 2018 strategy and facilitated partnerships development with regional actors, universities and national agricultural research systems.



Dr Ulrike Fillinger, Senior Scientist

Dr Ulrike Fillinger, previously a Visiting Scientist at *icipe*, has been appointed a Senior Scientist. Dr Fillinger is a disease ecologist and public health entomologist with more than 20 years of experience in basic, applied and operational research. Her work is aimed at improving existing strategies and developing new ones, to control mosquito and other insect-borne diseases in Africa.

Her major focus over the past 15 years has been on malaria control, studying the ecology and behaviour of mosquitoes to develop tools that complement current frontline mosquito control interventions. She is leading research on basic vector ecology, evaluation of a broad range of insecticides from chemicals, microbials to insect growth regulators, and operational research on vector control and its impact on entomological, epidemiological and sociological outcomes.

Recently, Dr Fillinger expanded her research portfolio to include basic and applied studies to understand the disease ecology of tungiasis (sand flea disease, jiggers) in Africa and to investigate how freshwater pollution impacts on the spread of schistosomiasis.

Ulrike is keen on trans-disciplinary, in close collaboration with ecologists, geographers, epidemiologists, statisticians, parasitologists, medical practitioners, veterinarians, microbiologists, social scientists and health economists which is well reflected in her diverse publication record. She has a wealth of experience in working with community-based organizations, public health staff and representatives of the private sector. She is also passionate about research capacity building and has a track record of mentoring BSc, MSc and PhD students.



Dr Juan Paredes, Visiting Scientist

Dr Juan Paredes joined *icipe* in September 2016 as a Visiting Scientist, where he is currently conducting research on gut symbionts and their potential use as probiotics to increase insect pollinators fitness. Juan Paredes is an entomologist specialised in molecular biology, microbiology and genetics. He received his undergraduate and masters degrees from École Normale Supérieure de Lyon in France. He studied for a PhD research at the Swiss Institute of Technology (EPFL), and his research has had a major impact on insect-endosymbiont (the “friendly bacteria” living inside a host) interactions. He was the first to sequence the genome of a fastidious bacteria living in *Drosophila* (fruit flies) circulation. He also studied the molecular mechanisms by which a bacterial endosymbiont protects its insect host against macroparasites.



Dr Chris Prideaux, Director of Research and Partnerships

Dr Prideaux left *icipe* at the end of November 2016, having served as the Centre's Director of Research and Partnerships (DRP) since September 2014. The *icipe* DRP is one of three senior managers who provide leadership, guidance, co-ordination as well as the development of new partnership paradigms to the Centre's research divisions and departments. In this capacity, Dr Prideaux contributed intellectual and strategic scientific leadership, and in partnership with the Director General and other team members, he worked to facilitate research excellence while enabling management processes and systems best suited for a vibrant and effective research environment. Dr Chris Prideaux joined *icipe* from CSIRO, Australia's national science agency, where he was Deputy Chief of their Division of Animal, Food and Health Sciences.



icipe IN THE MEDIA [\(More info: http://www.icipe.org/media-coverage/media-clippings\)](http://www.icipe.org/media-coverage/media-clippings)

Organic farming in sub-Saharan Africa is productive, economically viable and resource-conserving

(LifePR) (Frick, 24.11.2016) A long-term study in Kenya shows that maize yields and nutrient uptake in the organic farming systems are quite similar to conventional systems. Due to premium prices, organic systems are more profitable for farmers than conventional ones. The study was carried out by the Research Institute of Organic Agriculture (FiBL) in close cooperation with partners in Kenya.

A recent publication in the journal "Agriculture Ecosystems and Environment" shows the results of maize-based conventional and organic farming systems over the first six years of two long-term field trials in Chuka and Thika in the central highlands of Kenya. Both farming systems were compared at input levels of commercial, export-oriented production (high) and at those of

Organic farming in sub-Saharan Africa is productive, economically viable and resource-conserving

<http://www.lifepr.de/pressemitteilung/fibl-forschungsinstitut-fuer-biologischen-landbau/Organic-farming-in-sub-Saharan-Africa-is-productive-economically-viable-and-resource-conserving/boxid/625362>

Improved surveillance systems and coherent policies needed to combat Rift Valley fever

Published on November 22, 2016 at 5:51 PM

Research on the mosquito-borne Rift Valley fever in east Africa and the Arabian Peninsula shows that current surveillance systems are unable to detect the virus in livestock before it spreads to humans. A coherent policy is needed to combat the viral disease, which has the potential to spread to previously unaffected areas, according to studies at Umeå University in Sweden.

Researchers found that knowledge, attitudes and practices around Rift Valley fever (RVF) varied in local communities in affected countries. There were also no existing connections between many affected areas and authorities that could have limited the impact of RVF outbreaks.

"To confront Rift Valley fever outbreaks we need a policy that better incorporates the local communities, ecological factors and human interactions with livestock and the environment," says Osama Ahmed Hassan, doctoral student at the Umeå University Department of Clinical Microbiology, Unit of Virology and the Department of Public Health and Clinical Medicine, Unit of Epidemiology and Global Health.

Improved surveillance systems and coherent policies needed to combat Rift Valley fever

<http://www.news-medical.net/news/20161122/Improved-surveillance-systems-and-coherent-policies-needed-to-combat-Rift-Valley-fever.aspx>

ECO-FRIENDLY NETS

A Physical Control Solution for Vegetable Production

Vegetable production is a common practice in a home garden and is a source of fresh produce and income. However, the use of pesticides and fungicides is often necessary to control pests and diseases. The use of agro-ecological practices, such as crop rotation, intercropping, and the use of natural enemies, can reduce the need for pesticides. A bank of diesel generators at ICIPE's Homa Bay center, on the shore of Lake Victoria in south-west Kenya, cost about \$4,000 a year to fuel and maintain – and they contribute to climate change.

Now the campus is set to bid farewell to two of its five generators by the end of the year as a solar battery system comes into operation to provide electric power to the center at night.

ECO-FRIENDLY NETS - A Physical Control Solution for Vegetable Production

http://www.icipe.org/sites/default/files/Taha_Mag_2016_3rd_Eco-Friendly_Nets.pdf

Kenyan develops a drug for superbugs

WEDNESDAY NOVEMBER 9 2016

SUPERBUG MDRA SUPERBUG DRNG

FALLING WALLS LAB

Kenyan develops a drug for superbugs

<http://www.nation.co.ke/news/Kenyan-develops-a-drug-for-superbugs/1056-3446068-5497c0/index.html>

Solar battery power takes up the charge in Kenya

WORLD NEWS | Wed Oct 26, 2016 | 6:38am EDT

By Anthony Langat

NAIROBI (Thomson Reuters Foundation) - Staff of the International Center of Insect Physiology and Ecology (ICIPE) don't worry too much about the frequent power outages at their campuses. A bank of diesel generators ensure that when power from the national grid goes off, the center's research into insects, food and health is not disrupted.

But the five generators at ICIPE's Homa Bay center, on the shore of Lake Victoria in south-west Kenya, cost about \$4,000 a year to fuel and maintain – and they contribute to climate change.

Now the campus is set to bid farewell to two of its five generators by the end of the year as a solar battery system comes into operation to provide electric power to the center at night.

Solar battery power takes up the charge in Kenya

<http://www.reuters.com/article/us-kenya-solar-batteries-idUSKCN12Q18K>

Organic farming beats conventional method, new finding shows

Organic farming beats conventional method, new finding shows

<http://www.nation.co.ke/business/seedsforgold/Organic-farming-better-conventional-farming-/2301238-3295826-15d60c/index.html>

改變世界的評審名單

今年勞力士主辦的「勞力士羅比偉略大獎」系列邁進40週年。此項國際慈善計劃，今年將由著名科學家、環保人士、創新者和探險家組成大獎評審團，他們將為意義非凡的本屆大獎選出十名得主。

List of judging lists that change the world

<http://lj.hkej.com/artculture/article/id/1429970/>

Better surveillance and more cohesive policies needed against Rift Valley fever outbreaks

Research on the mosquito-borne Rift Valley fever in east Africa and the Arabian Peninsula shows that current surveillance systems are unable to detect the virus in livestock before it spreads to humans. A coherent policy is needed to combat the viral disease, which has the potential to spread to previously unaffected areas, according to studies at Umeå University in Sweden.

Researchers found that knowledge, attitudes and practices around Rift Valley fever (RVF) varied in local communities in affected countries. There were also no existing connections between many affected areas and authorities that could have limited the impact of RVF outbreaks.

"To confront Rift Valley fever outbreaks we need a policy that better incorporates the local communities, ecological factors and human interactions with livestock and the environment," says Osama Ahmed Hassan, doctoral student at the Umeå University Department of Clinical Microbiology, Unit of Virology and the Department of Public Health and Clinical Medicine, Unit of Epidemiology and Global Health.

Better surveillance and more cohesive policies needed against Rift Valley fever outbreaks

<http://healthmedicinet.com/i/better-surveillance-and-more-cohesive-policies-needed-against-rift-valley-fever-outbreaks/>

Biologische Landwirtschaft in Afrika ist produktiv, wirtschaftlich und ressourcenschonend

(LifePR) - Eine Langzeitstudie des Forschungsinstituts für biologischen Landbau (FiBL) und lokalen Partnern in Kenia zeigt, dass die Maiserträge in biologischen Anbausystemen den konventionellen Erntemengen ähnlich sind. Aufgrund der höheren Preise ist Bio gar rentabler als konventionell. Die kürzlich in der Zeitschrift "Agriculture, Ecosystems & Environment" publizierte Studie zeigt die Ergebnisse der ersten sechs Jahre eines Langzeitvergleichs von biologischem und konventionellem Landbau in Kenia. Forscher des FiBL führen den Versuch gemeinsam mit kenianischen Forschungspartnern durch. An zwei Standorten, Chuka und Thika, wurden Parzellen angelegt, die nach biologischen und konventionellen Methoden bewirtschaftet werden. Die beiden Anbausysteme werden in zwei Varianten geführt: Als kommerzielle, exportorientierte Systeme (hoher Einsatz an Betriebsmitteln wie Dünger etc.) und als kleinbäuerliche Variante (niedrige Bewirtschaftungsintensität). Konventionell wird mit Herdüngern und Mineraldüngern, in der Biovariante mit Kompost, Asche und Gesteinsphosphat gedüngt. Bereits nach drei Jahren erreichen die Erntemengen in den Versuchspartellen beim Biolandbau mit hoher Bewirtschaftungsintensität ein ähnliches Niveau wie beim konventionellen Landbau mit hoher Bewirtschaftungsintensität. Trotz höherer Produktionskosten lag die Rentabilität des biologischen Landbaus dank höheren Preisen beim 1,3- bis 4,1-fachen der Rentabilität konventioneller Systeme. Dies jedoch erst nach dem fünften Jahr der Umstellung auf Bio. In Parzellen mit niedriger Bewirtschaftungsintensität produzierte Mais in Monokultur unter konventionellem Anbau zwar einen dreimal höheren Maisertrag als Bio, in der Fruchtfolge mit Bohnen waren die Maiserträge jedoch auch bei niedriger Bewirtschaftungsintensität ähnlich.

Organic agriculture in Africa is productive, economical and resource-conserving

<http://www.industrietreff.de/herstellernews1428824.html>

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