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In 2020, *icipe* will celebrate its Golden Jubilee, a major milestone for an institution that was founded on audacious hope: “Get the very best people and then if you have more money, put buildings and equipment around them.” As we launch the countdown to our 50th anniversary, we are conscious of the numerous elements that have enabled *icipe* to flourish; to become a source of pride for Africa – a regionally and globally acclaimed centre of scientific excellence. We are also cognizant of the fact that our remarkable history mandates us towards an even more determined future.

icipe BY NUMBERS

12,500 number of direct beneficiaries of the Young Entrepreneurs in Silk and Honey (YESH) project (2016-2019).	113 number of peer reviewed journal articles published by <i>icipe</i> from January – October 2019.	20 number of projects currently being supported by grants through BiInnovate Africa Programme.	11 number of the Regional Scholarship Innovation Fund (RSIF) African Host Universities.	107M potential reach of <i>icipe</i> media publicity from July to September 2019.
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Dr Lukas Bertschinger,
Chair, *icipe* Governing Council

Dear Colleagues and Friends,

This *icipe* e-bulletin, which consolidates the Centre's activities for July – October 2019, opens with the exciting countdown to our upcoming jubilee celebrations. This significant milestone is embodied in the slogan 'Insects for Life' – a dual expression of the interlinkage between Human, Animal, Plant and Environment Health, and the unwavering commitment to our vision and mission.

We are aware that *icipe*'s accomplishments over the past 50 years have derived significantly from the incredible support of partners, especially donors. We are equally conscious that constant retrospection is important for effective collaboration between donors, research organisations, and other stakeholders, to translate research into impact. In her [Thought Leadership Column](#) titled: 'Re-thinking donor funding strategies', the Director General, Dr Segenet Kelemu, provides some points for reflection.

Further intuition on impactful donor partnerships is provided by Dr Marlis Lindecke, GIZ Programme Manager of the German Advisory Service on Agricultural Research for Development (BEAF), who is mandated by the Federal Ministry of Economic Cooperation and Development (BMZ), to manage the financial support and serve as a partner to the Agricultural Research Centers. GIZ, on behalf of BEAF and BMZ, has been *icipe*'s worthwhile partner for 20 years. As Dr Lindecke recounts in the [From Our Partners](#) section, the result has been the development of innovative solutions for a broad range of challenges, thus helping to improve livelihoods in Africa.

Overall, we hope this publication will give you a sense of the vibrancy that has marked our Centre over the past four months. *icipe* continues to be a thriving hub – basic and applied research advance in tandem; and alongside, dissemination and uptake of technologies is progressing steadily. The Centre's funding is on the rise, and our outputs and outcomes are augmenting global knowledge while contributing to social economic transformation in Africa. Meanwhile, *icipe* maintains global visibility through a variety of recognitions to various teams, media coverage and interactions with partners and organisations from all regions of the world.

As we further report in the *e-bulletin*, BioInnovate Africa, one of the continent's largest regional innovation-driven science initiative, has found a true home at *icipe*. Managed by *icipe* since 2016, the Programme is now supporting 20 bioscience enterprises across eastern Africa. Meanwhile, as the Regional Coordinating Unit (RCU) of the Regional Scholarship and Innovation Fund (RSIF), *icipe* has had an extremely busy programme; from strengthening the participation of women in STEM; mentorship of our scholars to be thought leaders, to interacting with partners across the world.

We wish you a happy reading, and hope that you will join us as we take determined steps towards the next chapter in *icipe*'s history in 2020.

Dr Lukas Bertschinger,
Chair, *icipe* Governing Council

“*icipe* continues to be a thriving hub – basic and applied research advance in tandem; and alongside, dissemination and uptake of technologies is progressing steadily.



Dr Segenet Kelemu
Director General, *icipe*

Re-thinking donor funding strategies

“Some donor specifications lead to flawed priority setting, as well as unequitable visibility and acknowledgement of contributions.”

Research for development is a complicated business that requires diligence, commitment, compassion and passion, supported by continuous learning, evaluation and evolution. Arguably, donors and development partners are united by their commitment to impact: the demonstrable contribution that research makes to the economy, society, environment, culture and knowledge. While noble, this intention is often difficult to achieve. Therefore, we propose constant reflection and re-strategising of donor funding along the points below.

Agenda setting: The success of any R&D project significantly depends on how visionary and strategic the initiative is, in regard to the aspirations of target communities and the local context. While donor-driven



research agendas are prevalent, a more participatory approach that incorporates perspectives from research institutions, policymakers, national development strategies and end-users among others, is more desirable and impactful. Such a strategy should ensure coherence of donor priorities, visions of research institutions, and emerging developmental challenges. At *icipe*, in recent years we have been able to link our mandate of insect science with ideals of various donors, and national and continental strategies to implement initiatives that address increasing need for holistic and inclusive development in Africa. Examples include the Mastercard funded Young Entrepreneurs in Silk and Honey (YESH), and a range of activities supported by a variety of donors around the exciting new area of insects for food and feed and integrated pest and vector management among others. As a result, we are enabling the creation of meaningful enterprises by marginalised sections in Africa, like women and youth.

Research leadership: Increasingly, various funding opportunities from the North assign direction of research projects to organisations in the donor country or region.



In effect, researchers in such institutions assume the role of principal investigators (PIs), with authority over most aspects of the project. This is the case even when research projects are conceived to target global, or Africa specific issues. Such stipulations may have several adverse impacts. First, the role of researchers in developing countries – co-investigators – is depreciated, and in some cases, power asymmetries arise. Second, inadequate awareness of local contexts by the PIs may obstruct project administration and implementation. Third, this approach diminishes local ownership of projects among development country partners. Fourth, unequities emerge in resource allocation due to lack of enough understanding or empathy of the specific requirements of individual institutions to meet their objectives. Fifth, visibility and acknowledgement of the role of co-investigators and their institutions is reduced. Therefore, research projects should be grounded in arrangements that create equitable and respectful partnerships.

Funding models: The research and development processes are often extremely convoluted, moving in an iterative manner from basic science, technology



development and dissemination, to commercialisation and scaling up. In reality, it could take decades to transform a research idea to impact. This has been the case with *icipe*'s most effective technologies, like the tsetse repellent collar and Push-Pull technology. Absence of sustained funding leads to abandonment of potentially important initiatives. Therefore, we need foresighted funding models that are capable of envisioning long-term project goals aiming

“Equality is treating everyone the same. Equity is giving everyone what they need to be successful.”

to support various phases with specific, feasible milestones, while aspiring to continue funding, or to attract interest of other donors.

Institution strengths: Beyond geographic location, research institutions are distinguished by: capacities and capabilities in terms of financial, human and infrastructural resources; accomplishments and impact; and local, national and international clout. Against these variables, strong institutions are progressively emerging in Africa. This is illustrated at *icipe*, a Centre that has a staff of more than 600 consisting of over 40 nationalities, collaborations with more than 300 national systems, universities and international research institutes and partners. While our research continues to have impact on communities, we maintain global prominence in generation of world class science, contributing to basic science fields like chemical ecology and molecular biology. We have an extremely diverse research portfolio encompassing insects and other arthropods, and microbial organisms. We target communities across demographics and in most geographical zones in Africa; animals including livestock and wildlife; staples, horticultural, indigenous and commercial crops. The strength of *icipe*'s human resources, financial, research and institutional infrastructure, research translation and innovation capabilities is reflected in the recent mandate of the Centre to manage the Regional Innovation Scholarship Fund (RSIF), a flagship programme of Africa's Partnership for Skills in Applied Sciences, Engineering and Technology initiative (PASET) (<https://www.rsif-paset.org/>) and BioInnovate Africa programme, Africa's largest innovation platform (<https://bioinnovate-africa.org/>). This kind of robustness is a definite asset for effective impact and transformation of R & D in the continent.

Capacity building: To ensure proper budgetary allocation, it is important to break down this rather amorphous term into several components. The first set includes research specific requirements, like adequate teams in regard to numbers and skills, discipline experts, technical and administrative support

staff. Sufficient infrastructure consisting of laboratories that meet required standards and equipment, as well as availability of energy and water, is also essential. Indeed, it is important to review overhead costs allocations to developing countries researchers, which are often pegged much lower than is the case in the North. The second set comprises prerequisites for effective technology uptake. Researchers need resources to create innovative research dissemination pathways; collaborators and other intermediaries require support to contribute to this process; end-users must have skills to adapt knowledge intensive technologies. All stakeholders should be able to contribute to the development and institutionalisation of relevant frameworks and policies for the technology. The third set of capacity building tasks aims towards accruing institution-wide value from research projects. This objective could be achieved by investing in researchers to enable them advance their careers and reputations, while also mentoring new generations. It would also be strategic to identify and remedy gaps in organisational capacities, for example in project management, research communication, financial management among others and overall leadership in R & D arena.

Interdisciplinary competencies:



In recent years, concern has been raised in regard to the decline in certain fields of science, like entomology, taxonomy and agronomy, just to mention a few (<https://time.com/5144257/fewer-scientists-studying-insects-entomology/>) *icipe* and other similar organisations stand as testaments of the importance of insect science as a basis for improved food security, better health and overall improved livelihoods across Africa. Moreover, our interdisciplinary approach to research makes the case for diverse competencies. For example, using taxonomic knowledge in combination with chemical ecology and molecular sciences, we have been able to accurately identify and understand the behaviour of a range of crop pests and disease vectors species, facilitating the development of relevant surveillance and control systems. Conscious funding for such underrated fields and skills will greatly enhance research projects and eventual impact for humanity.

NEWSMAKERS



icipe Director General (DG) & CEO, Dr Segenet Kelemu, has been recognised as the 2019 Science Honoree of the Donald Danforth Plant Science Center, an institution that aims to improve human condition through plant science (<https://www.danforthcenter.org/>). Dr Kelemu was honoured for her distinguished career in advancing international agricultural research to deliver impact for African farmers. She is the first African to receive the Danforth Center Science Honoree recognition. Read more: <http://www.icipe.org/news/icipe-director-general-honoured-research-impact-african-farmers>



Beatrice Nganso (Cameroon), former PhD student, is one of two winners of the Early Career Researcher Award by the *Parasitology* journal. Currently a Postdoctoral Research Fellow at the Agricultural Research Organization, Volcani Center, Israel, Beatrice completed her PhD in the *icipe* Behavioural and Chemical and Ecology Unit registered at the University of Pretoria, South Africa. Her research interest is on the interactions between *Varroa* mites and honey bees.



Yosef Hamba Tola (Ethiopia) PhD student in Bee Research, has been awarded a Global Mendeleev Advisor recognition certificate and badge. Mendeleev is a desktop and web programme produced by Elsevier for managing and sharing research papers, discovering research data and collaborating online. Yosef will run introduction to sessions, facilitating one-on-one outreach and other activities to introduce Mendeleev.



Joel Bargul (Kenya), a Postdoctoral Research Fellow supported by the Training Health Researchers into Vocational Excellence in East Africa (THRiVE) consortium, in the *icipe* Animal Health Theme, won the best presenter award at the Deltas Africa conference, held recently in Dakar, Senegal. Joel presented his research findings on the presence of epizootic and zoonotic pathogens in camels in northern Kenya.



Naomi Riithi (Kenya), an MSc student in the Animal Health Theme (IBCARP Tsetse component), was awarded the best oral presenter prize during the East Africa Research in Progress (EARIP) conference organised by the Royal Society of Tropical Medicine and Hygiene (RSTMH) for her presentation on the prospects of fabric panels for applying *Metarhizium anisopliae* against vectors of sleeping sickness.



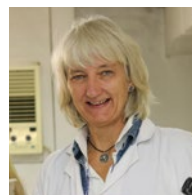
Joshua Njelemba (Zambia), a former PhD student at *icipe*, received an Excellence Award: Promising Young Scientist, at the 70th anniversary of the International Scientific Council for Trypanosomiasis Research and Control (ISCTRC) held in Abuja, Nigeria in September 2019. Joshua is currently a Principal Tsetse Biologist, Tsetse and Trypanosomiasis Control Unit (TTCU), Department of Veterinary Services, Ministry of fisheries and livestock, Zambia, where he is also overseeing a new partnership between the Unit and the *icipe* Animal Health Theme.



Jeremy Herren (Switzerland/USA), an *icipe* Visiting Scientist focusing on interactions between endosymbiotic bacteria and their insect hosts, has recently been appointed an Editorial Board Member of the *Frontiers in Microbiology* journal.



Jean Nepomuscene Hakizimana (Rwanda), a PhD student registered at Sokoine University, Tanzania, under the *icipe*-managed Regional Innovation Scholarship Fund (RSIF), has been awarded an International Foundation for Science (IFS) grant to advance his research on the epidemiology of African swine fever.



icipe Nematology Laboratory has been chosen by the The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH communication team as an example and success story for Centre for International Migration (CIM) cooperation with AR4D partners. The laboratory is headed by Solveig Haukeland (Norway), a CIM Expert at *icipe*.



Dr Segenet Kelemu will be speaking at the [Falling Walls Conference](#) on 9 November in Berlin, Germany. The Falling Walls is a unique international platform for leaders from the worlds of science, business, politics, the arts and society.

The **Young Entrepreneurs in Silk and Honey (YESH) project**, funded by Mastercard Foundation has been awarded a Special Mention by the Selection Committee of the International Innovation Award for Sustainable Food and Agriculture (in the category for innovations that empower youth in agriculture and food systems). The Award is funded by FAO and the Federal Government of Switzerland.

RECENTLY FUNDED

Donor: THRiVE-2 Career Development Award

Project title: Identification of Sex pheromone in selected Afrotropical sand flies for improved leishmaniasis surveillance and control.

icipe researchers: Xavier Cheseto, David Tchouassi, Dan Masiga.

Collaborators: Jonathan Kayondo, Ugandan Virus Research Institute, Uganda

Donor: National High Magnetic Field Laboratory user proposal, University of Florida, USA

Project title: Isolation, synthesis and anti-plasmodium studies of parthenin derivatives.

icipe researcher: Baldwyn Torto

Collaborators: Rhoel Dinglasan, Emerging Pathogens Institute, University of Florida.

Donor: Global Challenges Research Fund seed grant/ University of Aberystwyth, UK

Project title: Physiologically inspired optimisation of control devices for biting fly pests of livestock

icipe researcher: Mike Okal

Collaborators: Roger Santer, Aberystwyth University, UK.

Donor: Wellcome Trust - International Master's Fellowship

Project title: A real-time genome sequencing approach to the role of wildlife in transmission of animal trypanosomiasis - 218351/Z/19/Z

icipe researchers: Kawira Mathenge and Daniel Masiga.

Donor: Expanding Excellence in England (E3) Fund/ Natural Resources Institute, University of Greenwich, UK

Food and Nutrition Security Initiative (FaNSI)

icipe researchers: Baldwyn Torto
Some ARPPIS or DAAD scholars can gain some experience working with scientists at the University of Greenwich.

Donor: Mozilla Foundation

Project title: Research FAIR Genomic Data in Africa: Storage Infrastructure, Reuse and Policy.

icipe researcher: Caleb Kibet.

Donor: THRiVE Research Enrichment for Community and Public Engagement (RECPE) Award

Project title: Awareness on tickborne zoonotic disease transmission and preventive methods among nomadic pastoral systems.

icipe researchers: Joel Odera.

Donor: Lundin Foundation and Africa Oil Ethiopia

Project title: Establishing four model youth beekeeping demonstration sites and strengthening two public apiculture training centres in sericulture development sites of the YESH project in the Gamo and Wolayita zones of the SNNP region.

icipe researchers: Workneh Ayalew, Meron Belay, Shifa Ballo, Lulseged Belayhun and Desalegne Tadesse.

Collaborators: Africa Oil Ethiopia B.V. and the Southern Nations, Nationalities, and Peoples' Region Bureau of Livestock and Fisheries Development.

Donor: African Academy of Sciences in partnership with Wellcome and Department for International Development (DFID)

Project title: DELTAS Africa CPE Seed

Fund: Science-based conversation, knowledge and skill transfer to students in selected secondary schools in Western Kenya.

icipe researchers: Trizah Milugo, Baldwyn Torto, David P. Tchouassi

Collaborators: Patrick Okanya and Claudia Onsare, Technical University of Kenya.

Donor: THRiVE Research Enrichment for Community and Public Engagement (RECPE) Award

Project title: Using a participatory approach to identify novel approaches to control malaria

icipe researchers: Trizah Milugo, Baldwyn Torto, David P. Tchouassi

Collaborators: Claudia Onsare, Technical University of Kenya.

Donor: Food and Agriculture Organization of the United Nations (FAO)

Project title: Elucidation of the science and effectiveness of Local Innovations for Managing Fall armyworm in Africa (LIMFA).

icipe researchers: Charles Midega.

Collaborators: International Institute of Tropical Agriculture (IITA), Cameroon and Northwest University, South Africa.

Donor: USDA-Agricultural Research Service

Project title: Identification of semiochemicals for regulation of potentially invasive pests or beneficial organisms for the control of invasive pests to the U.S.

icipe researchers: Baldwyn Torto

Collaborators: John Beck, USDA/ARS-Center for Medical, Agricultural and Veterinary Entomology, Gainesville (CMAVE), Florida, USA.

Donor: European Commission through Kenya Agricultural and Livestock Research Organization (KALRO)

Project title: Development of technologies for improving productivity of apiculture in ASALS of Kenya

icipe researchers: Baldwyn Torto, Michael Lattorff

Collaborators: South East Kenya University, Kamaki Farmers Cooperative Society, Ikutha, Kitui County, Eastern Kenya; Kenya Agricultural & Livestock Research Organisation, KALRO; Apicultural Research Institute, Marigat, Baringo County; County Government of Kitui County; National Museums of Kenya.

Donor: National Institute for Health Research (NIHR)/Royal Society of Tropical Medicine and Hygiene (RSTMH's) 2019 small grants programme

Project title: Evaluating attractive fabric panels impregnated with *Metarhizium anisopliae* against vectors of sleeping sickness.

icipe researchers: Naomi Riithi

Collaborators: Elizabeth Kokwaro, Kenyatta University, Kenya.

Donor: DFG - German Research Foundation through the Free University of Berlin

Project title: Tungiasis in East Africa - an interdisciplinary approach to understand the interaction between parasite and hosts

icipe researchers: Ulrike Fillinger and Patrick Sawa.

Collaborators: Jürgen Krücken, Institute of Parasitology and Tropical Veterinary Medicine, Freie Universität Berlin, Germany; Hermann Feldmeier, Charité University Medicine Berlin, Germany; Amina Abubakar and Lynne Elson, Kenya Medical Research Institute Wellcome Trust Centre, Kenya; Charles Waiswa, School of Veterinary Medicine and Animal Resources, College of Veterinary Animal Resources and Biosecurity, Makerere University, Uganda; and Francis Mutebi, School of Veterinary Medicine and Animal Resources, College of Veterinary Animal Resources and Biosecurity, Makerere University, Uganda.

Donor: Innovate UK/Agri-tech Catalyst round 8: agriculture and food systems innovation Competition for Funding/Crop Health and Protection Limited

Project title: Diagnostic tool for the identification and quantification of Potato Cyst Nematode (PCN).

icipe researcher: Solveig Haukeland.

Collaborators: Lead partner: CHAP, Crop Health and Protection UK; PES Technologies, UK.



Malaria Cell Atlas

Collaborative research led by the Wellcome Sanger Institute, UK, has led to the creation of a Malaria Cell Atlas, which provides a comprehensive view of gene usage in an eukaryotic parasite, as well as an open-access reference dataset for the study of malaria parasites. *icipe* was one of the organisations that contributed to this research, through the team working on mosquito endosymbiotic bacteria. <https://science.sciencemag.org/content/365/6455/eaaw2619>



Fall armyworm: encouraging findings

A survey conducted in Ethiopia, Kenya and Tanzania has confirmed wide distribution of the pest. The pest's damage has been found to be severe ranging from 33% to 100% across the countries. Five different species of natural enemies were found, the main one being *Cotesia icipe* (Hymenoptera: Braconidae), an indigenous parasitoid that has the potential to parasitise, thereby killing, over 60% of fall armyworms. In Kenya, *Telenomus remus* (Hymenoptera: Scelionidae) was the dominant egg parasitoid. While the spread and damage of fall armyworm remains a point of concern, it is encouraging to see a reasonable level of biological control in place.



Symbiotic control of Rift Valley fever virus

icipe researchers have provided the first comprehensive report of the microbial communities of field-caught populations of the primary vectors of Rift Valley fever virus in Kenya. The report shows two mosquito species to have distinct microbial communities whose diversity and richness is heavily influenced by the site of collection. Because vector susceptibility to pathogens may be influenced by certain bacterial species, further studies are needed to investigate the functional role of identified microbiota on the biology of the mosquito species including influence on susceptibility to Rift Valley fever virus. These studies may be harnessed for symbiotic control of the virus. Paper link: <https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0007361>



Stemborer reservoirs

Several wild plants, grasses mostly, have been identified as hosts of stemborers and their parasitoids during maize off-seasons. However, the abundance of stemborers is much lower in wild plants compared to cultivated fields. Thus, the role of wild plants as a reservoir for cereal stemborers and their parasitoids is still controversial. Recent *icipe* studies indicate that maize residues constitute a better refugia reservoir of maize stemborers and their natural enemies during non-cropping seasons as compared to wild plants. Thus, systematic destruction of maize residues would compromise biological control of stemborers, especially in areas with reduced wild habitat. Paper link: <https://www.ncbi.nlm.nih.gov/pubmed/31261763>

UK aid



The UK Government has pledged £61 million to develop crops that are better adapted to higher temperatures, can withstand droughts or floods, and have natural resistance to pests and diseases. These crops are developed specifically for the most vulnerable countries in Asia and Africa. *icipe* is one of the organisations, specifically receiving support for pest control work. Read more: <https://www.gov.uk/government/news/uk-aid-to-help-protect-one-billion-people-from-impact-of-extreme-weather>

Enhanced Fruit Production in Southern Africa



A new project that will upscale highly successful fruit fly management technologies developed by *icipe*, to Southern Africa, has been launched. Funded by the International Development Research Centre (IDRC), and the Australian Centre for International Agricultural Research (ACIAR), through Cultivate Africa's Future Fund (CultiAF), the project will be implemented in Malawi, Mozambique, Zambia and Zimbabwe. The project titled: "Enhanced Fruit Production in Southern Africa (EFPSA) for gender equality and social inclusion", will be led by *icipe*. Partners include: Zambia Agriculture Research Institute, ZARI; Department of Agricultural Research Services, Bvumbwe Research Station, Malawi; Eduardo Mondlane University, Mozambique and the Ministry of Agriculture, Plant Quarantine Services Institute, Zimbabwe.

YESH eco-honey and beeswax marketplaces



Four marketplaces for eco-honey and beeswax established in Ethiopia through the Young Entrepreneurs in Silk and Honey (YESH) project are now fully operational. The YESH project is an *icipe*-led initiative funded by the Mastercard Foundation, implemented jointly with the Ministry of Agriculture, Ethiopia, and various other partners. The marketplaces will process, conduct training and demonstrate honey and beeswax production. Already, the products are attracting high premium buyers. The sites pave way for a new business model for the transformation of beekeeping businesses, across the value chain.

Alternative livelihoods



icipe with the support of the International Fund for Agricultural Development (IFAD) has launched the second phase of the Alternative Livelihoods for Food and Income Security in Four Indian Ocean Island Nations, and in Zanzibar, Tanzania. The project will achieve its goals through improved beekeeping technologies and pollination services.

More and better insect delicacies



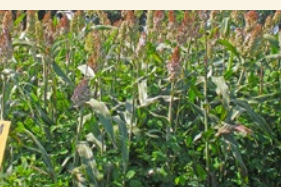
icipe has made progress towards increasing harvests and quality of *nsebene*, the longhorned grasshopper, *Ruspolia differens*, and a much loved snack in Uganda. The Centre has introduced improved trapping drums that will increase catches of the insect and prevent potentially harmful bycatches. *icipe* has also initiated laboratory rearing of palm weevils for their edible larvae. Wild harvests of these larvae are a delicacy, and a good source of nutrients, in many parts of Africa. Moreover, palm weevils provide a potential source of income, with just a handful fetching approximately US\$2 in Cameroon and Uganda.

Black soldier fly microenterprise



A new insects for feed enterprise supported by *icipe* has emerged in the heart of Kiambu County, Central Kenya. InsectiPro is an initiative led by 24-year-old Talash Huijbers, who is rearing black soldier flies primarily for the fish industry. She notes: "Initially I wanted to start fish farming but I found the input costs too high. I discovered that in many instances, fish farmers make little profit, and at times incur losses. I investigated further and found feed to be an industry-wide problem, with the protein component making up more than 80% of the cost."

Fall armyworm and sorghum



A study by *icipe* to evaluate the effect of fall armyworm invasion on stemborers on maize and sorghum in eastern Uganda has shown high infestation of the pest on sorghum. A climate smart crop grown widely across Africa, sorghum is the continent's second most important cereal. It is the only viable food grain for many people, especially in drier regions. Therefore, more attention is needed to sorghum to effectively manage fall armyworm alongside other pests of the crop.

Supporting Women in STEM

icipe in its role as the Regional Coordination Unit (RCU) of the PASET Regional Scholarship Innovation Fund (<https://www.rsif-paset.org/>), co-organized the Global Forum on Women in Scientific Research (GoFoWiSeR) convening, held in Dakar, Senegal, on 18 & 19 July 2019. Other organizers included the African Women in Agricultural Research and Development (AWARD), the African Academy of Sciences, the United Kingdom Research and Innovation (UKRI), South African National Research Foundation, IDRC and other partners.



Dare to be a thinker: Blogs by RSIF scholars



During the fifth forum of the Partnership for skills in Applied Sciences, Engineering and Technology (PASET) held in Kigali, Rwanda, on 20 – 22 May 2019, *icipe* organised a series of training sessions for scholars of the Regional Scholarship and Innovation Fund (RSIF). The activity was conducted as part of *icipe*'s role as the Regional Coordination Unit (RCU) of RSIF.

One of the sessions, titled Dare to be a Thinker, focussed on incalculating of thought leadership among the scholars, against the background of a continent where the youth form majority of the population, and one that must embrace the Fourth Industrial

Revolution (4IR). A key outcome of this session was a variety of blogs by the RSIF scholars available here: <http://www.icipe.org/news/blog/dare-be-thinker-blogs-rsif-scholars>

Korea-Africa partnership

Four young African scientists will over the next two years undertake part of their doctoral studies in one of Korea's most vibrant research and development districts. As a result, the emerging researchers will benefit from cutting-edge infrastructure and a global network, in their path towards developing solutions for selected food security and agribusiness challenges in Africa.

RSIF network expands

Over the past several months, the Regional Scholarship Innovation Fund (RSIF) has expanded its network with the addition of seven universities to its list of African Host Universities (AHUs), making a total of 10 such institutions. The AHUs are competitively and rigorously selected universities, research institutes or centres

based in Africa that offer a PhD programme in any one of the RSIF priority thematic areas. The institutions host RSIF PhD scholars; they are also partners in capacity building; and receive grants for research and innovation from RSIF. The AHUs are partnered with stringently chosen international institutions in their areas of expertise. RSIF scholars

have the opportunity to conduct part of their research in the international institutions, leading to a network system that ensures collaborative and innovative research, and the highest level of mentorship for the emerging researchers by leading local and global experts. The current list of AHUs is as below.



ICTs including big data and artificial intelligence

University of Gaston Berger, Senegal (Africa Center of Excellence for Mathematics, Informatics, and ICT); University of Rwanda (Africa Center of Excellence in Internet of Things – ACEIoT).



Food security and agribusiness

University of Ghana (Department of Agricultural Economics and Agribusiness); Sokoine University of Agriculture, Tanzania (Africa Center of Excellence for Infectious Diseases of Humans & Animals in Southern & Eastern Africa -SACIDS).



Minerals, mining and materials engineering

Kenyatta University, Kenya (Department of Physics); Nelson Mandela African Institution of Science and Technology, Tanzania (Africa Centre of Excellence in Water Infrastructure and Sustainable Energy Futures – WISE-Futures).



Energy including renewables

University of Port Harcourt, Nigeria (Africa Center of Excellence in Oilfield Chemicals Research – ACE-CEFOR); University of Nairobi, Kenya (Department of Physics).



Climate change

University Félix Houphouët-Boigny, Côte D'ivoire (Africa Center of Excellence for Climate Change Biodiversity and Sustainable Agriculture); Bayero University, Nigeria (Africa Centre of Excellence in Dryland Agriculture).



BiInnovate Africa progress

Since finding a new home at *icipe* two years ago, BiInnovate, one of Africa’s largest regional innovation-driven science initiative, which is supported by the Swedish International Development Cooperation Agency (Sida) to enable scientists, researchers, innovators and entrepreneurs in eastern Africa work together to turn innovative ideas and technologies based on biological sciences into viable businesses.

For example, a project on piloting use of novel enzymes from local bacterial isolates for eco-friendly processing of hides and skins, led by the University of Nairobi, Kenya, the technology is using enzymes to replace the chemical process used in tanneries. Potentially, the technology will contribute to eliminating air pollution and harsh chemicals associated with tanneries, while also making it possible to produce leather on smaller yet economically viable scales.

“ The technology is using enzymes to replace the chemical process used in tanneries. ”

Regional and Global presence

On a wider scale, BiInnovate is contributing to regional and global discussions in the development of a bioeconomy in Africa. BiInnovate Africa programme manager, Julius Ecuru, was a participant at a Bioeconomy Public Seminar held in Stockholm, Sweden, organised by the Stockholm Environment Institute, where he made a presentation on the benefits of bioeconomy in developing countries, using examples from BiInnovate Africa.

Strengthening capacities

BiInnovate continues to employ innovative strategies to strengthen capacities of implementing partners. An example is a Bio Business Acceleration Boot Camp held recently in Nairobi to foster interactions between science and business leaders, and improve firm ownership of promoted technological solutions.

ICE 2019



icipe recently hosted the Insect Chemical Ecology workshop (ICE 2019), a two-week PhD level course led by world leading scientists. ICE 2019 was organised by *icipe* and Max Planck Institute for Chemical Ecology, in collaboration with the Swedish University of Agricultural Sciences (SLU) and Penn State University, USA. The course covered the impact of semiochemicals on insect behaviour,

from neuronal input, behavioural output to novel applications. Specifically, the training focussed on: plant-plant, plant-insect, plant-insect-microbe, and insect-animal interactions, pheromones, olfactory receptors, odour processing, evolution, physiological and chemical methods, insects and diseases, new and upcoming applications. Partnering institutes included: United States Department of Agriculture

(USDA), Gainesville, Florida, USA; University of Neuchâtel, Switzerland; Lund University, Sweden; National Centre for Biological Sciences, Tata Institute of Fundamental Research, India; Francis Crick Institute, UK; University of Pretoria, South Africa; and Jomo Kenyatta University of Agriculture and Technology and Kenya Technical University, both in Kenya.

Recent graduates



Selpha Opisa Miller (PhD, Kenya)
 Research Topic: Management of *Spoladea recurvalis* (Lepidoptera: Crambidae) on amaranths using biopesticides.
 Registered at: North-West University, South Africa
 Mentors: Dr Sunday Ekesi and Dr Komivi Akutse (*icipe*); Prof. Magdalena Johanna Du Plessis (North-West University).
 Project: African Indigenous Vegetable-IPM
 Funding: DAAD, BMZ.



Gamal Eldean Aboubaker Idriss (PhD Sudan)
 Research Topic: *Tuta absoluta*: Bio-ecological factors governing its invasion and spread in north and sub-Saharan Africa
 Registered at: North-West University, South Africa.
 Mentors: Dr Samira Mohamed Faris, Sunday Ekesi and Fathiya Khamis (*icipe*), Prof. Hannalene Du Plessis (North-West University)
 Project: *Tuta absoluta*
 Funding: DAAD, BMZ



Bernard Steve Soh Baleba (PhD, Cameroon)
 Research topic: Olfactory preferences of gravid female stable flies, *Stomoxys calcitrans* (Diptera: Muscidae) and their fitness consequences.
 Registered at: University of Pretoria, South Africa.
 Mentors: Dr. Merid Getahun, Prof. Baldwyn Torto and Dr Dan Masiga (*icipe*); and Dr Christopher William Weldon (University of Pretoria, South Africa).
 Funding: DAAD; Integrated Biological Control Applied Research Program (IBCARP), Camel Component, funded by the European Union.



Martha Wangu Musyoka (PhD, Kenya)

Research topic: Nitrogen dynamics in organic and conventional farming systems in the sub-humid highlands of central Kenya

Registered at: University of Hohenheim, Germany

Mentors: Dr Noah Adamtey (FIBL), Dr Anne W. Muriuki (KALRO) and Prof. Dr Georg Cadisch (University of Hohenheim)

Project: FIBL - Long-term Farming System Comparisons in the Tropics

Funding: Swiss Development Cooperation, LED, CCOOP Sustainability Fund and Biovision Foundation funding for the project "Long-term Farming System Comparisons in the Tropics for which *icipe* is the implementing agency.



Komi Mawufe Agbodzavu (PhD, Togo)

Research topic: Bioecology studies and development of IPM technologies against amaranth Coreid bugs and Lepidopteran defoliators

Registered at: Jomo Kenyatta University of Agriculture and Technology (JKUAT), Nairobi, Kenya.

Mentors: Dr. Komi Fiaboe (*icipe*) and Dr. Sunday Ekesi (*icipe*); and Prof. Mary Gikungu and Prof. Zipporah Lagat (JKUAT).

Project: African Indigenous Vegetable-IPM

Funding: DAAD, and German Federal Ministry for Economic Cooperation and Development (BMZ).



Teresiah Nyambura Njihia (PhD, Kenya)

Research Topic: Development of a trapping system for management of Antesia bugs (Heperoptera: Pentatomidae) in coffee using semiochemicals.

Registered at: JKUAT

Mentors: Prof. Baldwyn Torto and Dr Janet Irungu (*icipe*); Dr Regis Babin (*icipe*/ Centre de Coopération Internationale en Recherche Agronomique pour le Développement, CIRAD); Dr Lucy Murungi (JKUAT).

Project: Climate Change Impacts on Ecosystem Services and Food Security in Eastern Africa (CHIESA) project. Funding: DAAD, CIRAD, Ministry of Foreign Affairs, Finland and Mawazo Institute.



Carolyn Anaye Omukoko (PhD, Kenya)

Research Topic: Endophytic activity of *Beauveria bassiana* in tomato and its efficacy against red spider mites (*Tetranychus evansi*).

Registered at: JKUAT

Mentors: Dr Nguya Maniania (*icipe*); Prof. Losenge Turoop (JKUAT), and Dr Vitalis Wafula Wekesa (Flamingo Horticulture Kenya Ltd).

Funding: National Commission for Science, Technology and Innovation (NACOSTI).



Richard Kyalo, Kenya

Registered at:

Research Topic: Habitat suitability modeling for African citrus psyllids (*Trioza erytreae*) vector using remotely sensed and climatic variables

Mentors: Dr Tobias Landmann

Nematology graduates

Two young scholars mentored at *icipe* were among the recent batch of 14 students who graduated from the International Master of Science in Agro- and Environmental Nematology, at Ghent University, Belgium. Grace Mwangi and Kevin Gitau were previously attached to the *icipe* Nematology Laboratory (2015-2016), an opportunity that contributed to their acceptance at Ghent University together with a scholarship from VLIR-UOS to fund their studies. Moreover, the 2019 graduating class included a total of nine students who participated in the 'Kenya track', a collaborative training initiative conducted by *icipe*, Ghent University and the International Institute of Tropical Agriculture (IITA). MSc nematology students opting to take the Kenya track module receive professional internships in Kenya and obtain practical training on tropical crop pests and diseases, integrated pest management and agricultural extension services. They also assist in teaching the annual [Basic Crash Course in Nematology](#).





Dr. Marlis Lindecke

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

As *icipe*'s celebrates its 50th anniversary in 2020, GIZ will be marking a more low-key milestone: 20 years of partnership with the Centre. On behalf of the Federal Ministry of Economic Cooperation and Development (BMZ), and the Advisory Service on Agricultural Research for Development (BEAF), GIZ has over the years supported *icipe* in developing innovative solutions that address a broad range of challenges, thus helping to improve livelihoods in Africa.

Saving the cabbage (and other vegetables)



The partnership between BMZ and *icipe* goes back to 2000, marked by efforts to control the diamondback moth (known in short as DBM), one of the most devastating pests of brassica (cabbage and crucifers). This pest, which is extremely difficult to control due to its notorious pesticide resistance, had caused untold distress to farmers while also threatening household nutrition and incomes, based on the importance of these vegetables in eastern and southern Africa. Between 2001 and 2008, *icipe*, with BMZ support, implemented a highly successful project using parasitic wasps to manage DBM in all key brassica growing areas in Kenya, Tanzania, Uganda, Ethiopia and Cameroon.

Between 2014 – 2016, alongside *icipe*, we were spurred on by the increasing importance of African indigenous vegetables (AIVs), and the need to address challenges that have kept yield and quality of these crops way below potential and demand. Therefore, we joined forces in an initiative to develop and implement eco-friendly management strategies against pests of three AIVs – amaranth, leafy cowpea and African nightshades.

Further, BMZ has backed *icipe*-led research that has led to the management of thrips – minute insects that suck plants dry thus destroying them, and in some cases transmitting diseases. These strategies will benefit smallholder farmers cultivating key vegetables like onion, tomato and French beans for domestic and export markets.

In 2015, Africa was taken by surprise by the invasion of the tomato

leafminer, *Tuta absoluta*; its threatening and devastating presence immediately noticeable on solanaceous vegetables, especially tomato, in the continent. As tomato production is one of the most important income generating activities for small and medium scale tomato growers, the presence of this pest was a source of great concern. *icipe* sprung right into action, and BMZ was at hand to support the Centre in developing basic knowledge on this invader: its bioecology, host range and distribution, as well as association with indigenous natural enemies. These factors are critical for the development of an integrated pest management strategy for the pest. Based on studies conducted in Kenya, Sudan, Republic of South Sudan, Tunisia and Uganda, a package has been developed and preliminary trials conducted towards management of *T. absoluta* in Africa.

Partnership for a fruitful Africa

The production of fruit offers one of the most important opportunities for income generation, employment creation and food and nutritional security in Africa. However, fruit production is significantly constrained by a variety of factors including insect pests through direct damage to produce, and lead to loss of market opportunities, as the presence of these pests leads to the rejection of horticultural products from Africa in export markets. In particular, fruit flies lead to losses amounting to an estimated USD 2 million. Over several decades, *icipe* and partners have developed an array of environmentally friendly approaches to manage fruit flies, which have proven to be extremely effective. BMZ and GIZ is proud to have been a worthwhile partner to the Centre in this endeavour.

Pollinators and IPM

Recently, *icipe* and BMZ have commenced a partnership in a project built on the premise that environmental services such as pollination and integrated pest management (IPM) are key drivers, and two components that can interact in a variety of ways, resulting in healthier agricultural landscapes and improved food security. This initiative enhance productivity of avocado and cucurbits (cucumber, butternut and pumpkin). These crops are economically important for smallholder farmers in East Africa, are highly dependent on pollination services and are severely affected by insect pests.





Dr Kelemu being interviewed by media during the International Green Week 2019

New research directions

Over the past several years, *icipe* has pioneered research in the exciting area of insects as alternative sources of food for people and feed for livestock. Insects are ubiquitous: they reproduce quickly, have high growth and feed conversion rates and low environmental impact. Insects are also valuable sources of minerals and vitamins essential for human development. BMZ is contributing to the Centre's front-running research, specifically studies to improve farming of edible insects that are popular in Africa, like saturniid caterpillars, and the long-horned grasshopper, commonly known as *Nsenene*, and crickets.

Based on the exciting nature of programme, and due to our overall strong and trusted collaboration, in 2018 and 2019, BMZ selected *icipe's* research on insects for food and feed to be featured during the International Green Week. The largest global exhibition on food and agriculture, this annual 10-day event takes place in January in Berlin, Germany, and is attended by 400,000 people. BMZ features selected highlights of its work in one hall to the broad German public, where, on both occasions of *icipe* has been allocated a section to demonstrate edible insects as an example of sustainable alternative food production. On both occasions, the *icipe* team has been led by the Director General, Dr Segenet Kelemu. Through interactive displays, live cooking shows by a popular chef and tastings at an African food stand, immense awareness has been created around the topic. Moreover, BMZ Minister Dr. Gerd Müller, has used the opportunity to emphasize *icipe's* insects for food and feed nutritional and ecological benefits of insects to meet the global demand on food supply to the media.

CIM experts

Through a joint venture with the. (CIM), GIZ facilitates the placement of integrated experts from the European Union, as well as returning experts, at *icipe*. This collaboration has been mutually fruitful. At *icipe*, the CIM experts have over the past several years be vital in the establishment of a Geo-Information Unit, enabling the use of remote sensing and geographical information system (GIS) to provide geo-spatial analysis and mapping support to *icipe's* research themes; and the establishment of a dedicated laboratory to conduct nematology research. The experts have also bolstered research on animal health, and on gender integration across the Centre's research and operational activities.

Outstanding partnership

Germany has a long history of supporting international agricultural research. And we consider BMZ / GIZ's two decades of partnership with *icipe* to be a key component of this vision. We are pleased that our collaboration has led to the production of quality science to improve food and nutritional security and the livelihood of the people of Africa. In addition, we are aware that all the projects support capacity building of young researchers, agricultural extension officers and farmers, among others.

We are also extremely delighted of the value *icipe* attaches to BMZ and GIZ, including recognising the Ministry and us as the Outstanding Partner of the Year Award 2017. We look forward to continuing our strong ties with *icipe*, towards innovative and applied research for development in Africa.

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH or GIZ

in short is a German development agency that provides services in international development cooperation. GIZ mainly implements technical cooperation projects of the Federal Ministry for Economic Cooperation and Development (BMZ), its main commissioning party, although it also works with the private sector and other national and supranational government organizations on a public benefit basis. In its activities GIZ seeks to follow the paradigm of sustainable development, which aims at economic development through social inclusion and environmental protection. GIZ offers consulting and capacity building services in a wide range of areas, including management consulting, rural development, sustainable infrastructure, security and peace-building, social development, governance and democracy, environment and climate change, and economic development and employment.

Marlis Lindecke is GIZ programme manager of the Advisory Service on Agricultural Research for Development (BEAF), who is mandated by BMZ to manage the financial support and serve as a partner to the Agricultural Research Centers.

Jena, Germany and Nairobi, Kenya

Launch of MPI-*icipe* Partner group: (l-r): Mrs Ursula Koos, Head of Department for Culture and Education (representing H.E Ambassador Annett Günther, German Embassy, Nairobi); Ms. Margaret Kirai, Deputy Director, Regional Office for Africa German Academic Exchange Service (DAAD); H.E Ambassador Meles Alem, Ethiopian Ambassador to Kenya; *icipe* Director General, Dr Segenet Kelemu; *icipe* Partner Group Leader, Dr Merid Getahun; Max Planck Institute (MPI) Partner Group Philosophy, Prof Dr. Bill S. Hansson, Vice President of Max Planck society and Director of Department of Evolutionary neuroethology, Max Planck Institute for Chemical ecology, Jena Germany.



Berlin, Germany

Delegation of the Committee on Education, Research and Technology Assessment of the German Bundestag (Federal Parliament), during a visit to *icipe*, captivated by the research on insects for food and feed programme.

Nairobi, Kenya

Codou Diaw, Senior Programme Manager, Scholars Programme, Mastercard Foundation, visited *icipe* for discussions regarding the Regional Scholarship and Innovation Fund (RSIF).



Tel-Aviv, Israel

Itai Sened, Founding Head of the School of Social and Policy Studies, Head of the Boris Mints Institute for Strategic Policy Solutions to Global Challenges, Tel-Aviv University, held discussions on ongoing collaborations and gave a campus wide seminar titled: "Outdated Institutions, New Wealth, and Old Poverty and why does it all matter?"

Côte D'ivoire, Ghana, Kenya, Nigeria, Rwanda, Senegal, Tanzania

icipe, in its capacity as the Coordination Unit of the Regional Scholarship and Innovation Fund (RSIF), has signed Partnership Agreements with the Fund's African Host Universities (AHUs).



Nairobi, Kenya

Dr Claes Kjellstrom, after a successful 2019 annual review meeting for the BioInnovate Africa Programme Management Office (PMO) with *icipe* senior management and SIDA representative, Dr. Claes Kjellstrom, after a successful 2019 annual review meeting for the programme



Nairobi, Kenya

Mr Stephen Wathome, Programme Manager, Agriculture, Job creation and Resilience Delegation of the European Union to Kenya, during a visit to evaluate progress within the Integrated Biological Control Applied Research Programme (IBCARP) Push-Pull IPM component.

East Africa and Germany

Participants of the annual project meeting of the “Integrated pest and pollinators management (IPPM) to enhance productivity of avocado and cucurbits among smallholder growers in East Africa project”, funded by BMZ.



Munich, Germany

Tobias Landmann (Adjunct Scientist, Geo-Information Unit), from Remote Sensing Solutions GmbH, presented a seminar titled: ‘Making sense of ‘big data’ for localized development priorities in Africa: A case study for the Mono Delta in West Africa’.

Pennsylvania, USA

David Roos, University of Pennsylvania, USA, led a database workshop alongside *icipe* MMBU team, and Jean-Baka Domelevo Entfellner, Scientist, Bioinformatics, Biosciences eastern and central Africa-International Livestock Research Institute (Beca-ILRI Hub), and Eukaryotic Pathogen Genomics Database Resource (EU Path DB) team.



Annecy, France

The Director General, Dr Segenet Kelemu visited the Institut de recherche pour le developement (IRD) as a keynote speaker to open a seminar titled “Act for climate and biodiversity.”



Nairobi, Kenya

BiInnovate Africa Bio Business Acceleration Boot Camp, aimed at strengthening the capacities of partners funded by the Programme towards commercialising innovative biobased technologies, foster interactions between science and business leaders, and improve firm ownership of promoted technological solutions.

Aspen, Colorado, USA

Sunday Ekesi, Director of Research and Partnerships, participated in a workshop on Food System Impacts of Pests & Pathogens in a Changing Climate, at the Aspen Global Change Institute (AGCI).



Benin Guerir, Morocco

icipe in its role as Manager of RSIF, and University Mohammed VI Polytechnic held a three-day workshop, building on the signing of a memorandum of understanding (MoU) between PASET and the University. The event explored potential research projects in RSIF priority thematic areas. The RSIF team also met with OCP (previously Office Chérifien des Phosphates), to explore potential partnerships.

South Korea

RSIF scholars (l-r): Humphrey Mabwi, Maxwell Waema, Sylvia Maina and Emmanuel Kifaro on arrival at the Incheon International Airport, South Korea to commence their two-year placement at the Korea Institute of Science and Technology.



St Louis, Missouri, USA

icipe Director General (DG) & CEO, Segenet Kelemu, has been recognised as the 2019 Science Honoree of the Donald Danforth Plant Science Center, an institution that aims to improve human condition through plant science (<https://www.danforthcenter.org/>)



Geneva, Switzerland

icipe's role as a Stockholm Convention Regional Centre (SCRC) for Africa was formally endorsed for a further four years (2020 – 2023). This decision was communicated during the annual joint meeting to enhance cooperation and coordination between the regional centres under the Basel and Stockholm conventions held from 24 to 25 September 2019, in Geneva, Switzerland. *icipe* was represented at the event by Annah Njui, Grants, Partnerships and Projects Manager. For further information: <http://www.icipe.org/research/environmental-health/icipe-stockholm-convention-regional-centre>

Chilanga, Zambia

Samira Abuelgasim Mohamed (extreme left), *icipe* Scientist and Project Leader, and Edidah Amapire (extreme right), Senior Programme Officer, IDRC, join dancers during the launch of a fruit fly IPM in Southern Africa project.



Gamo Zone, Southern Nations, Nationalities, and Peoples' Region, Ethiopia

Young women attending a sericulture training session under the Young Entrepreneurs in Silk and Honey project.

New appointments



Juan Paredes, previously an Adjunct Scientist at *icipe*, re-joined the Centre as a Research Scientist in Arthropod Microbiome after a stint as a Principal Investigator at the Universidad Nacional de Colombia (UNAL). Previously, Juan was Research Scientist at the Swiss Federal Institute of Technology (EPFL) Switzerland. He holds a PhD in Molecular Biology, Microbiology and Genetics using *Drosophila melanogaster* as a research animal model from the Swiss Federal Institute of Technology (EPFL) Switzerland, an MSc in Immunology, Virology and Cell Biology and a BSc in Molecular Biology from the Lyon Higher Normal School (ENS), France. His research aims to develop microbe-based strategies for improved bee health management.



Karl Thunes has joined *icipe* as a Visiting Scientist under a Protocol Agreement between the *icipe* and Norwegian Institute of Bioeconomy Research (NIBIO) to implement the 'Combating Arthropod Pests for Better Health Food and Climate Resilience' project supported by the Norwegian Agency for Development Cooperation (NORAD). Karl holds a PhD and an MSc in Zoology from the university of Bergen, Norway. Prior to joining *icipe*, Karl worked at NIBIO in various capacities. He has also been a lecturer at the University of Bergen, Norway, and he has undertaken several assignments across Africa and Centra America. He is a Member of the Technical Working Group on Biological Control in the FAO-led Framework for Partnership against Fall Armyworm.



Stephen Biko Oluoch Mboya has joined *icipe* as a Senior Human Resources Officer. He holds a BA in Human Resources Management from Kenyatta University, Kenya, and a Higher National Diploma from the College of Human Resources Management (IHRM). He is also a member of the Institute of Human Resources Management (IHRM). Prior to joining *icipe*, Stephen was a Senior Human Resources Officer at the Kenya Medical Research Institute (KEMRI) |Wellcome Trust Research Programme. He has also worked with CARE International-Kenya, as a Human Resources Officer; Stealth Communications as a Human Resources Advisor and at the Norwegian Refugee Council where he was a Human Resources Officer.

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Core donors

- Swiss Agency for Development and Cooperation (SDC), Switzerland
- Swedish International Development Cooperation Agency (Sida), Sweden
- UK Aid, Government of the United Kingdom
- Ministry of Higher Education, Science and Technology, Kenya
- Government of the Federal Democratic Republic of Ethiopia

Restricted project donors

- African Academy of Sciences
- African Union
- African Women in Agricultural Research and Development (AWARD)
- AIRD (French Inter-institution Agency for Research and Development)
- Bertha Foundation
- Bill & Melinda Gates Foundation
- Bioinnovate Africa Programme
- Biotechnology and Biological Sciences Research Council, UK, through Rothamsted Research, UK
- Bayer: Science For A Better Life
- Biovision Africa Trust
- Biovision Foundation for Ecological Development, Switzerland
- Canadian Government through International Development Research Centre (IDRC)
- Centre for International Migration and Development (CIM)
- CIRAD – Agricultural Research for Development, France
- Cultivate Africa's Future (CultiAF) through International Development Research Centre (IDRC)/Australian Centre for International Agricultural Research (ACIAR)
- Ethiopian Catholic Church Social Development Commission (ECC-SDCBOM)
- European Union
- Federal Ministry for Economic Cooperation and Development (BMZ), Germany
- Food and Agriculture Organization of the United Nations (FAO)
- Future Leaders – African Independent Research (FLAIR)
- German Academic Exchange Service (DAAD)
- Deutsche Forschungsgemeinschaft (DFG)
- Global Challenges Research Fund (GCRF)
- Global Environment Facility (GEF)/United Nations Environment Programme (UNEP)
- Government of Côte d'Ivoire
- Government of Rwanda
- Government of South Korea
- Grand Challenges Canada (GCC)
- Innovative Vector Control Consortium (IVCC), through Wageningen University
- International Atomic Energy Agency (IAEA)
- International Centre for Genetic Engineering and Biotechnology (ICGEB)
- International Fund for Agricultural Development (IFAD)
- IRD, Institut de Recherche pour le Développement, France
- JRS Biodiversity Foundation, directly and through Royal Museum for Central Africa (RMCA)
- LEAP -Agri (A Long term EU-Africa research and Innovation Partnership on food and nutrition security and sustainable Agriculture)
- Liechtenstein Development Service (LED), Principality of Liechtenstein
- Mastercard Foundation, Canada
- Max Planck Institute
- Medical Research Council, UK
- Ministry for Foreign Affairs of Finland
- Mozilla Foundation
- National Geographic Society
- National Research Fund, Kenya
- Netherlands Organisation for Scientific Research (NWO)
- Newton Fund
- Norwegian Agency for Development Cooperation (NORAD)
- R. Geigy Foundation, Switzerland
- Research Institute of Organic Agriculture (FiBL), Switzerland
- Rockefeller Foundation
- Russell IPM Ltd, UK
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- Swedish Research Council through the Kungliga Tekniska Högskolan (KTH)
- Swedish University of Agricultural Sciences (SLU)
- Swiss National Science Foundation (SNSF)
- SWITCH Africa Green
- United Nations Environmental Programme (UNEP)
- USAID—United States Agency for International Development's IPM Innovation Lab (Feed The Future Innovation Lab for Integrated Pest Management) of Virginia Tech, USA
- United States Agency for International Development Partnerships for Enhanced Engagement in Research (USAID-PEER) Science program with funding from National Academy of Sciences (NAS)
- United States Department of Agriculture (USDA)
- United States National Institutes of Health (NIH)
- United States National Science Foundation (NSF)
- Volkswagen Foundation, Germany
- Wellcome
- World Academy of Sciences (TWAS)
- World Bank
- World Federation of Scientists through the ICSC-World Laboratory
- World Health Organization
- World Trade Organization (WTO) – Enhanced Integrated Framework (EIF)

In realising its mission, *icipe* also benefits from extensive partnerships with research partners (including universities and research institutes in Africa and beyond), private sector partners, and communities across Africa.

For more information on these and other topics, please visit our

Website: <http://www.icipe.org> or contact us through our

Email address: icipe@icipe.org

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