



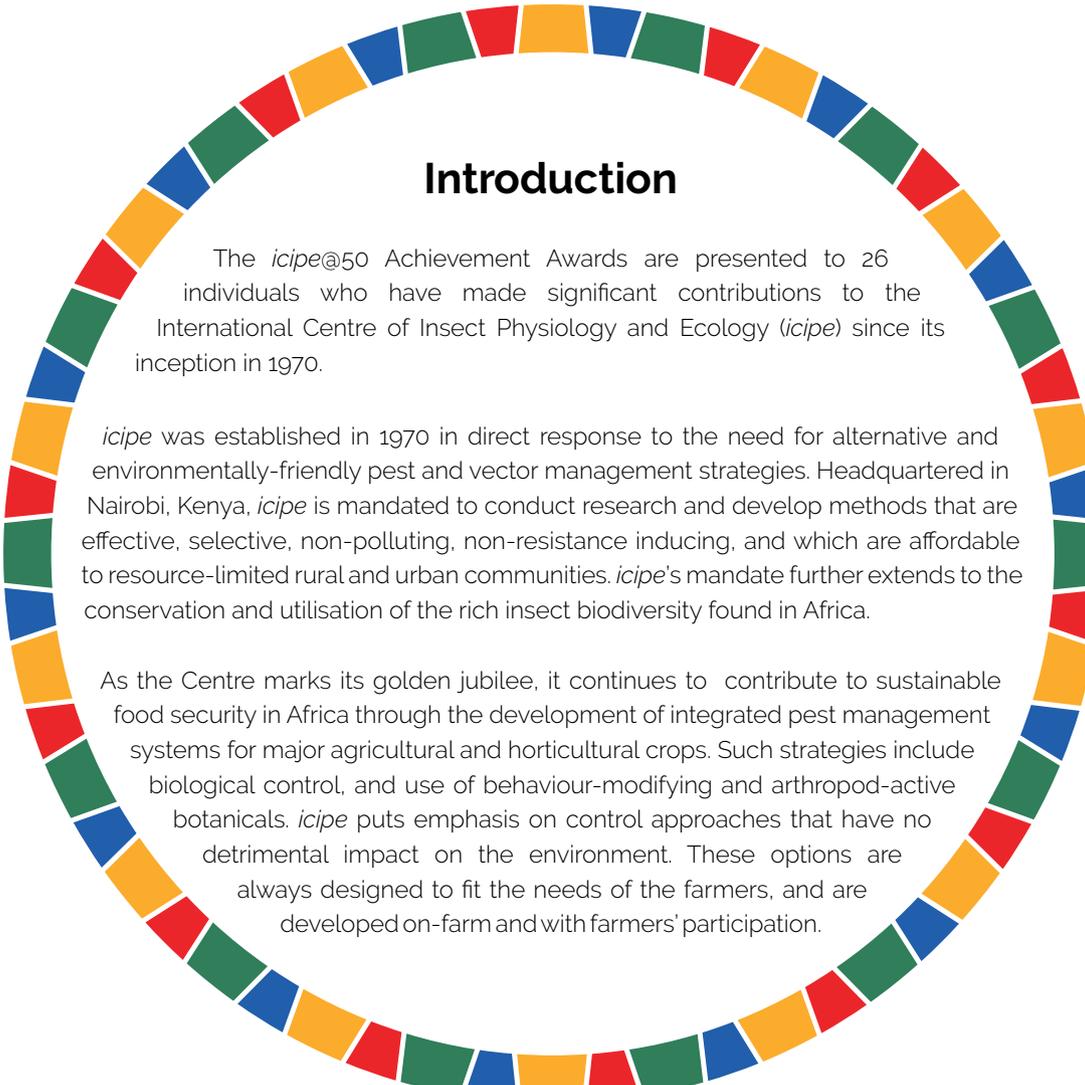
icipe@



*Achievement
Award*



Schwarzia sp. (Hymenoptera: Apidae) to be named *icipensis* (in litt.) is a cleptoparasitic bee that invades the nests of pollen-collecting bees, deposits its egg(s), and the larvae that hatch from the eggs feed on the pollen of the unsuspecting host. It is a previously undescribed species named after *icipe* to commemorate its 50th Anniversary.



Introduction

The *icipe*@50 Achievement Awards are presented to 26 individuals who have made significant contributions to the International Centre of Insect Physiology and Ecology (*icipe*) since its inception in 1970.

icipe was established in 1970 in direct response to the need for alternative and environmentally-friendly pest and vector management strategies. Headquartered in Nairobi, Kenya, *icipe* is mandated to conduct research and develop methods that are effective, selective, non-polluting, non-resistance inducing, and which are affordable to resource-limited rural and urban communities. *icipe*'s mandate further extends to the conservation and utilisation of the rich insect biodiversity found in Africa.

As the Centre marks its golden jubilee, it continues to contribute to sustainable food security in Africa through the development of integrated pest management systems for major agricultural and horticultural crops. Such strategies include biological control, and use of behaviour-modifying and arthropod-active botanicals. *icipe* puts emphasis on control approaches that have no detrimental impact on the environment. These options are always designed to fit the needs of the farmers, and are developed on-farm and with farmers' participation.



Ahmed Hassanali

Dr. Ahmed Hassanali obtained a BSc and MSc from the University of Adelaide, Australia, and a PhD from the University of Nottingham, UK. From 1966 to 1980, he worked in the Chemistry Department of the University of Dar es Salaam. In 1981, he joined *icipe* and took over the leadership of the Chemistry & Biochemistry Unit in 1984, which he transformed into the Behavioural and Chemical Ecology Unit. Between 1994 and 1996, he also served as Director of Research under Dr. Hans Herren, the second Director General of *icipe*.

During his time at *icipe*, Dr. Hassanali oversaw many research breakthroughs in the field of chemical ecology. He led research on the identification of pheromones associated with the gregarious phase of the desert locust, unearthed cross-stage pheromonal effects and their potential for control of hopper bands and proposed a conceptual kinetic model underlying phase dynamics. He spearheaded research into chemical ecology of oviposition, vector-plant relationships and blood-seeking behaviour of *Anopheles gambiae*, and bio-prospected natural plant products as mosquito repellents and growth-disrupting larvicides. He laid the semio-chemical basis of host preferences of savannah and riverine tsetse flies, and identified attractant blends from preferred hosts (buffalo and cattle) and repellents from wildlife (waterbuck) as well as their potential deployment in 'pull', 'push' and 'push-pull' tactics. He conducted numerous studies on ticks, including exploitation of a pheromone in attracting and controlling *Amblyomma variegatum*, a vector of heartwater, and elucidation of the different odour profiles of *Rhipicephalus appendiculatus*, the vector of East Coast Fever, in locating its preferred feeding site on livestock, leading to potential development of a push-pull system for their control. He also participated in the push-pull technology of stemborers, specifically in elucidating the allelopathic basis of control of *Striga* spp. by *Desmodium* spp.

Dr. Hassanali has supervised over 50 PhD students at *icipe* and mentored 10 Postdoctoral Fellows. He is an elected Fellow of the African Academy of Sciences and was awarded Doctor of Science (Honoris Causa) at Kenyatta University, Kenya, in 2004.



Baldwyn Torto

Prof. Baldwin Torto is a Principal Scientist and Head of the Behavioural and Chemical Ecology Unit at *icipe*, as well as Extraordinary Professor, Department of Zoology and Entomology, University of Pretoria, South Africa. He was the first PhD student to be trained in Chemical Ecology (1985-1988) by Prof. Ahmed Hassanali under the African Regional Postgraduate Programme in Insect Science (ARPPIS). He had his postdoctoral training at the University of Maine, USA, and was a Rothamsted International Fellow at Rothamsted Research, UK. He spent six years as a researcher at the United States Department of Agriculture-Agricultural Research Service (USDA-ARS), Center for Medical, Agricultural and Veterinary Entomology.

Prof. Torto's achievements in over 30 years span the application of chemical ecology research to agriculture, veterinary and public health, and the environment, and nurturing of the next generation of scientists in these fields.

He is the recipient of several prestigious awards, including the 2020 Entomological Society of America Nan-Yao Su Award for Innovation and Creativity in Entomology, the 2019 Agropolis Foundation Louis Malassis International Prize for Food and Agriculture for Outstanding Career in Agricultural Development (France), and the 2018 Journal Article of the Year and Lecture Award of the Journal of Agricultural and Food Chemistry (AGRO-division, American Chemical Society). In 2017, the South African Department of Science and Technology named him one of the top 50 scientists in Africa.

Prof. Torto is a Fellow of the Entomological Society of America and the African Academy of Sciences, and serves on the editorial boards of *Current Opinion in Insect Science*, *Journal of Chemical Ecology*, *Journal of Agricultural and Food Chemistry*, *Proceedings of the Royal Society B: Biological Sciences*, *Pest Management Science*, and *International Journal of Tropical Insect Science*.

He has published more than 150 peer-reviewed papers, and several book chapters and patents. He has mentored over 70 PhD and MSc students and more than 50 undergraduate interns.



Bill S. Hansson

Prof. Dr. Bill Hansson has had a strong connection to *icipe* since the early 1990s, when he worked at the Centre on locust and stemborer chemical communication. He has been a member of *icipe*'s Governing Council (GC) since 2006 and chaired the GC from 2014 to 2017 and from 2020. During his term, as Chair, he has worked intensively together with the Director General and Management, to strengthen research and to continuously modernize administration and leadership at *icipe*.

Prof. Bill S. Hansson has since 2006 been a Director at the Max Planck Institute for Chemical Ecology in Jena, Germany. During his six-year term as Vice President of the Max Planck Society (2014-2020), Prof. Hansson was responsible for the 27 Max Planck Institutes that focus on biology and medicine in Germany and the USA. He also coordinated the international work of the Max Planck Institutes with partner organisations in Shanghai, China, and Buenos Aires, Argentina, as well as 19 Max Planck centres all over the world. After ending his term as Vice President, Prof. Hansson remains responsible for Max Planck collaborations with Africa. Prof. Hansson's research centres on the neural basis of insect behaviour, and the interactions between insects and their host plants. He is particularly interested in how scents affect the behaviour of insects and other arthropods, and in the evolution of olfactory function from a behavioural and ecological perspective. From 2006 to 2016, Prof. Hansson was part of the leadership of the Swedish Linnaeus Project In Insect Chemical Ecology, Ethology and Evolution and in 2020 he started the Max Planck Center 'Next Generation Insect Chemical Ecology (nGICE)' as a collaboration between Max Planck, the Swedish University for Agricultural Sciences and Lund University, Sweden. During his career, he has worked at universities and research institutions in Germany, Japan, Kenya, Sweden, the UK and the USA.

Prof. Hansson is a Fellow of the African Academy of Sciences and an Honorary Fellow of the Royal Entomological Society. He is also a member of the Royal Swedish Academy of Sciences, the Royal Swedish Academy of Agriculture and Forestry, The German National Academy of Sciences Leopoldina, The Finnish Society of Sciences and Letters, and the Saxonian Academy.



Daniels Obeng-Ofori

Prof. Daniels Obeng-Ofori is a Professor of Applied Biology and Agricultural Entomology and distinguished university administrator. His research interests are mostly centered on chemical ecology for management of agricultural pests for sustainable crop production, postharvest technology and public health.

After his MPhil and PhD degrees in Applied Biology and Agricultural Entomology, respectively, at the University of Cambridge, UK, he joined *icipe* as a Postdoctoral Research Fellow, working on the chemical ecology of the desert locust from 1991 to 1994. Apart from scholarly publications, *icipe* was awarded the patent 'Gregarisation-disrupting factors in a novel approach of controlling locusts and grasshoppers' in 2000 through the pioneering work of his research team.

In 1994, Prof. Obeng-Ofori won the prestigious Alexander von Humboldt Research Fellowship at the Federal Biological Research Centre for Agriculture and Forestry, and Humboldt University in Berlin, Germany. He returned to Ghana in 1996 and joined the Department of Crop Science, University of Ghana as a Lecturer. During his career at the University of Ghana from 1996 to 2012, he held several administrative positions, including Head of Department of Crop Science, Vice-Dean of the School of Agriculture, Acting Dean, Deputy Provost of the College of Agriculture and Consumer Sciences, and Coordinator of *icipe*'s African Regional Postgraduate Programme in Insect Science (ARPPIS), West Africa Sub-Regional Centre. He subsequently became the Foundation Pro Vice-Chancellor of the University of Energy and Natural Resources, Ghana, from 2012 to 2016, and has been the Vice-Chancellor of the Catholic University College of Ghana since 2016.

As an astute academic, Prof. Obeng-Ofori has published widely and successfully supervised numerous undergraduate, MSc and PhD students. Prof. Obeng-Ofori is the first African Council Member of the International Congress of Entomology (ICE) and member of the Permanent Committee of the Working Conference of Stored Product Protection. He served as the Humboldt Ambassador Scientist for Ghana from 2016 to 2019 and has been the Chair of the Council of Independent Universities in Ghana since 2019.



David L. Denlinger

Prof. David L. Denlinger counts the years spent at *icipe* as a Postdoctoral Fellow among the best of his life. As one of the first scientists to participate in *icipe*'s birth, he realized a childhood dream to work in Africa. In those days, all postdoctoral researchers were on short-term appointments, working under the direct supervision of Prof. Thomas Odhiambo and members of the *icipe* Governing Council, whose guidance helped nurture the young scientists' careers.

Prof. Denlinger's first assignment at *icipe* was to help oversee construction of the Dudu Lab, a new research laboratory at the University of Nairobi. With a modern but modest laboratory in place, the young postdocs could seek answers to questions they found compelling. His first question was to see if diapause exists in the tropics, and if so, how it is regulated. From his doctoral work, he had a good overview of pupal diapause in flesh flies from northern latitudes, and he was curious to know if tropical flesh flies also have a diapause. He found out that they do, but rather than relying on photoperiod as a seasonal cue, Kenyan flies use low daytime temperatures during July and August to programme their developmental arrest. This first report of diapause potential in tropical flies was helpful in establishing the fact that diapause is a common feature of tropical insects throughout the world.

Though his assignment focused on diapause, Prof. Denlinger could not help but also be fascinated by the remarkable reproductive life of tsetse flies. With the help of *icipe* colleagues, he documented dynamics of the female's reproductive cycle, probed the structure of the milk gland, discovered bacteria inhabiting the lumen of the milk gland, and found that juvenile hormone can act as a potent abortifacient to disrupt the pregnancy cycle. The result was the great accomplishment having three papers published in *Nature* within one year.

In the mid-1970s, he assumed a professorship at Ohio State University but returned periodically to *icipe* to work on a National Institute of Health (NIH)-sponsored project on tsetse fly physiology.



Dickens Obondo Nyagol

Mr. Dickens Obondo Nyagol has worked at *icipe* for 38 years, rising through the ranks to a Technician. Most of Mr. Nyagol's work has centered around stemborers, starting from when he joined *icipe* in 1982 to rear the pests for scientific research. From 1995 to 1999, Mr. Nyagol assisted in conducting research on the abundance and spatial distribution of *Chilo partellus* on vegetables pests. He also worked on the development of technologies for controlling the banana weevil and plant-parasitic nematodes in East Africa. Mr. Nyagol has worked in *icipe*'s push-pull flagship since 1999. Push-pull technology is a habitat management technology that simultaneously combats stemborers and *Striga* spp. while improving soil fertility in cereal-livestock farming systems. The technology deploys a stimulo-deterrent tactic in which a legume (*Desmodium* spp.) intercrop acts as a 'push' factor, repelling pests from the cereal crop, and in which the pests are simultaneously 'pulled' to a trap plant, which is planted as a border crop, such as Napier grass or *Brachiaria* spp.

He started by conducting screenhouse experiments and field trials to understand the mechanism of *Striga* suppression by *Desmodium* spp. in maize. From 2000 to 2003, he worked in the 'Systemwide Programme-Integrated Pest Management (SP-IPM)', testing different technologies for the management of *Striga* spp. weed, stemborers and soil fertility in Kenya, Mali, Morocco and Nigeria. Mr. Nyagol was trained on the laboratory methods for volatiles' collection at Rothamsted Research, UK in September 2003. For the next two years, he worked in a multi-partner project on integrated pest and soil management to combat *Striga* spp., stemborers and declining soil fertility in the Lake Victoria basin.

He is currently involved in testing the drought-resilient push-pull companion plants *Desmodium incanum* and *Brachiaria cv. xaraés* in different agro-ecologies, as well as intensifying push-pull systems by integrating vegetables. Since joining the push-pull team, he has become an essential staff in *icipe*'s quest for climate-smart push-pull systems, conducting numerous demonstrations and trainings for farmers in Ethiopia, Kenya, Malawi, Nigeria, Uganda, Rwanda and Tanzania.



Donald Kaniaru

Mr. Donald Kaniaru served as a Governing Council (GC) member between 2004 and 2018. His achievements as a member of the *icipe* GC reflect his diverse and unique background and experience. Mr. Kaniaru played a vital role in supporting the GC and stewarded the Centre's growth and development between 2004 and 2018. He helped develop and improve operational management procedures, policies and institutional mechanisms in his role on the GC and its Executive Board, and as Vice Chair of the Audit and Finance Committee. He also advised and supported *icipe* in strengthening its stakeholder partnerships and relations with the host and government authorities in several African countries, and dealt with issues affecting internal stakeholders, including the Staff Association and the African Regional Postgraduate Programme in Insect Science (ARPPIS).

Mr. Kaniaru is the Managing Partner at Kaniaru & Kaniaru Advocates. He worked with the United Nations Environment Programme (UNEP) for over 28 years in diverse roles, including as Director of the Division of Environmental Policy Implementation and of the Division on Environmental Conventions. He also served as Special Senior Legal Adviser to the Executive Director of UNEP. Mr. Kaniaru is a member of several professional and environmental bodies, including the International Union for Conservation of Nature (IUCN), the Commission on Environmental Law and the International Council of Environmental Law (ICEL), for which he serves as representative to the UN in Kenya. He served as Chairman of the Kenya National Environmental Tribunal from 2005 to 2013 and made substantial contributions to the development of environmental law in Kenya during this period. He also served as a Trustee of the Centre for International Environmental Law (CIEL) since 2004 and is a Trustee of the Institute for Governance and Sustainable Development.

Mr. Kaniaru has received various awards and recognitions for his contributions to the development and advancement in the field of international environmental law, including the Elizabeth Haub Prize for International Law (2009) and the CIEL International Environmental Law Award (2010). He has authored several articles and book chapters, co-edited the two-volume seminal book *Making Law Work - Environmental Compliance and Sustainable Development* (2005), and edited *The Montreal Protocol: Celebrating 20 Years of Environmental Progress: Ozone Layer and Climate Protection* (2007).



Elijah Asami

Mr. Elijah Asami joined *icipe* in 1978, and has supported work at the Centre through provision of janitorial services and postal and courier services. Starting off when the Centre was housed at Chiromo Campus, University of Nairobi, and moving to Duduville Campus in Kasarani, Mr. Asami has provided these critical services efficiently and diligently for over 30 years. This has allowed many staff to increase their efficiency and results while decreasing the Centre's expenses.

Mr. Asami has seamlessly ensured that all the outgoing and incoming mail has been recorded, franked, and posted in time. In addition, he efficiently picks up incoming mail from the post office and distributes them to various units and staff members. He delivers documents to *icipe* collaborators, acts as a bank agent for *icipe's* various bank accounts, and ensures that the Centre's statutory deductions and utility bills cheques are submitted on time. He also supports colleagues in their visa applications and collection.

Mr. Asami is one of *icipe's* longest-serving employees and his unwavering committed service has ensured the stress-free smooth running of the Centre over many decades. Mr. Asami has seen the Centre grow from its humble beginnings to one of the leading institutes of research in Africa. His effort and dedication have contributed to *icipe's* success.



Everlyn Nguku

Dr. Everlyn Nguku is a textile scientist and a catalyst for rural development through research. Her interests revolve around new technologies related to animal fibre, specifically silk, innovative textiles and material science. In 2000, she started working at *icipe* and researched on textile fibres as part of her graduate studies at the Beneficial and Commercial Insects Programme of the Environmental Health Theme. Upon graduating, she was engaged in research activities and project implementation within the Programme, where she contributed to rearing of the domesticated *Bombyx mori* silkworm and indigenous wild silkmoths, as well as silk postharvest technologies. Afterwards, she joined *icipe*'s Dissertation Research Internship Programme (DRIP), which supported her PhD studies. Her research led to the establishment of a silk fibre quality control laboratory, the first of its kind that ensured improved production of quality raw silk.

On completion of her PhD studies, Dr. Nguku stayed at *icipe* as a Scientist, Leader of the Beneficial and Commercial Insects Programme and eventually led the Environmental Health Theme. She optimized silkworm rearing techniques and cocoon production, with a key focus on fibre quality and value addition. She successfully mobilised funds from development partners and coordinated their implementation across various African countries. Some of the notable projects she coordinated and guided successfully include a project to upscale smallholder livelihoods using beekeeping and sericulture in the Near East, North Africa and Eastern Africa, which resulted in better income. She also guided the development component of a project for honeybee pests and diseases in Africa. The project established the African Reference Laboratory for Bee Health, which is accredited by the World Organisation for Animal Health (OIE) as a Collaborating Centre for Bee Health.

Dr. Nguku continues her research activities in Japan, focusing on the use of biological resources from various silkworm species for the creation of innovative technologies in medicine and industries. She has published more than 20 papers in refereed journals and authored and co-authored several books, including *African Ways of Silk: Ancient Threads – New Possibilities, 2nd Edition* (2017).



Francis Omeno Onyango

Mr. Francis Omeno Onyango worked at *icipe* between June 1979 and December 2016 in various capacities, initially at the Animal Rearing and Containment Unit (ARCU) as Senior Research Assistant for 28 years and later as Station Manager at the Thomas Odhiambo Campus (ITOC), Mbita. As Coordinator of ARCU, he managed the development of cost-effective laboratory mass-rearing techniques for new insect species needed for research as well as continuously improved on existing techniques. He facilitated their distribution in the most efficient and timely manner to *icipe* research programmes as well as to collaborating national agricultural research organisations and universities, both locally and abroad.

His research at *icipe* focused on developing artificial diets for rearing different stemborer and podborer species. For instance, in 1992 Mr. Onyango was able to develop, for the first time, a novel semi-synthetic diet for continuous rearing of the maize stalk borer *Busseola fusca*, thereby preventing the onset of the six-month-long diapause characteristic of *B. fusca* in nature that had hampered research on this insect species off-season. His research on insect rearing resulted in 12 scientific publications in peer-refereed journals, international conference proceedings and book chapters.

Mr. Onyango also developed procedures for good laboratory practices as a pre-requisite to successful rearing of insects and animals of good quality for research purposes, and developed and implemented standard operating procedures for specific insects and animal species. He equally contributed to the training of resident graduate scholars within *icipe*'s African Regional Postgraduate Programme in Insect Science (ARPPIS) and visiting students from other institutions in the science of insect and animal rearing and handling. He used his vast experience to help set up insect rearing facilities for national agricultural research institutes, such as the Kenya Agricultural and Livestock Research Organisation (KALRO), the Mount Makulu Research Station in Zambia, and the Baidoa and Afgoi Research Stations in Somalia. As ITOC Station Manager, Mr. Onyango maintained regular, open and clear linkages with *icipe*'s headquarters, and oversaw tremendous infrastructural and scientific growth.



Jack H. Pen-Mogi Nyeko

Prof. Jack H. Pen-Mogi Nyeko first developed a relationship with *icipe* when he used the Centre's facilities to investigate the chemotherapy of vectors of trypanosomes for his MSc thesis in Entomology at the University of Nairobi in 1978. Five years later, he got a PhD fellowship under *icipe*'s African Regional Postgraduate Programme in Insect Science (ARPPIS) Programme and studied the effects of trypanocidal drugs on the vector forms of *Trypanosoma brucei* in tsetse flies.

After graduating with a PhD from Makerere University, Prof. Nyeko joined the International Livestock Research Institute (ILRI) as a Senior Research Fellow. The multifunctional research setups at *icipe* and ILRI, where scientists in biological sciences conducted research using the same facilities, was a learning which led him to the development of research laboratories. When he became founding Vice-Chancellor of Gulu University in 2002, a post he held until 2017, he built a Biosciences Research Laboratory. The idea was initially resisted by scientists from various biological faculties but is now a centre of excellence in infectious disease research, including testing for COVID-19 in Gulu.

Prof. Nyeko blends academics with politics, believing that 'one needs to have a political mind in order to successfully manage public institutions'. He was first elected Member of Parliament in 1996, before which he had been nominated to the Constituent Assembly that drafted the 1995 Constitution of Uganda. His other public appointments include Chair of Uganda's National Council for Higher Education in 2012 and Chair of the National Environment Management Authority in 2013. Currently, he is a member of the Uganda Land Commission.

He has received many awards through his career. In 2008, he was one of the winners of the ARPPIS Silver Jubilee Alumni Award for Best Achiever in Science Administration and Policy. In 2012, he was recognised for Outstanding Contribution to Education at the Africa Education Leadership Awards.



Jean Nguya Kalemba Maniania

Dr. Jean Nguya Kalemba Maniania is an insect pathologist. He began his career as a Fellow Researcher with the French National Agricultural Research Institute (INRA), then joined the European Parasite Laboratory, a United States Department of Agriculture (USDA) overseas laboratory in France. He carried out extensive surveys in France and Spain to isolate entomopathogens from insects that had become major pests in the USA and to develop them as biological control agents.

He joined *icipe* as an Insect Pathologist in 1989. From that time until his retirement in 2015, he conducted research on the development of entomopathogenic fungi (EPF) as microbial control agents of arthropod crop pests (stemborers, termites, thrips, spider mites, leafminer flies and locusts) and disease vectors (tsetse flies, sandflies and ticks). His research interests included developing delivery systems to auto-disseminate EPF amongst insect pests and disease vectors in the field; the use of EPF as endophytes; as well as understanding tri-trophic interactions between host plants, insects and pathogens.

Dr. Maniania provided the first attempt to control tsetse flies with EPF using an auto-dissemination device in the field, and was also the first to demonstrate that infection by EPF can reduce *Trypanosoma* reproduction in tsetse fly as well as the fly's ability to acquire or transmit the parasite. He successfully led studies for the control of the Malagasy migratory locust in Madagascar, resulting in the introduction and registration of the biopesticide *Green Muscle* in the country in 2009.

During his tenure at *icipe*, Dr. Maniania also established *icipe*'s Arthropod Pathology Unit as a leading entity in research-for-development for microbial control of insect and vector pests, paving the way for commercialisation of several biopesticides through joint public private sector partnerships.

During his 33-year career as an insect pathologist, he has supervised 22 PhD students and 17 MSc students. He has written and co-authored over 120 articles in refereed journals, 96 conference abstracts and 10 book chapters, co-edited one book, and holds a patent on formulation.



John Anthony Pickett

Prof. John Anthony Pickett was a member of the Governing Council of *icipe* from 2006 to 2014 and its Chairman from 2008 to 2013. He worked closely with the then Director General (DG), Prof. Christian Borgemeister, in securing international funding, particularly in re-establishing support from the Foreign, Commonwealth and Development Office (then DFID). During his tenure as Chair, he was pivotal in ensuring an adaptive GC that oversaw leadership transition at the Centre.

Prof. Pickett started working with *icipe* colleagues in the 1980s, including Prof. Ahmed Hassanali, under the founding DG, Prof. Thomas Odhiambo, and developed several research thrusts, including the first field use of a mosquito pheromone. The team particularly benefitted from the rapidly growing field station at Mbita Point on the shores of Lake Victoria, now *icipe*'s Thomas Odhiambo Campus.

With well over 40 years' experience, Prof. Pickett continues to lead the chemical characterisation and practical exploitation of chemical signals, including pheromones. Major developments in chemical signaling, for which he was jointly awarded the international Wolf Prize for Agriculture in 2008. His work includes sustainable pest control tools for sub-Saharan Africa under the effects of climate change and the first genetically modified broad-acre crop engineered to release a pheromone of a pathogen vector in the UK. He was elected Fellow of the Royal Society in 1996, Commander of the Most Excellent Order of the British Empire in 2004 for services to biological chemistry, and International Member of the US National Academy of Sciences in 2014, as an international driving force in the science and application of chemical ecology.

Prof. Pickett works on managing pesticide resistance and in overcoming resistance to the use of biological chemical signals. His ideas for advancing chemical signaling by synthetic biology have developed rapidly since moving to Cardiff University in 2017. He was the first to characterise, as novel chemical structures, the sex-related pheromones of insect vectors of major pathogens, including mosquitoes, sand flies and aphids. He has authored over 570 peer-reviewed research papers and patents.



John Oliver Davies-Cole

Dr. John Oliver Davies-Cole is a fellow of *icipe's* African Regional Postgraduate Programme in Insect Science (ARPPIS), graduating from the University of Sierra Leone in 1992. His medical entomology research work focused on trypanosomiasis, and specifically the mating behavior of *Glossina morsitans* and *Glossina pallidipes*. He became a Postdoctoral Fellow at *icipe* and continued his research on the reproductive physiology of tsetse flies, with the goal of understanding their mating behaviour as well as chemical cues that could lead to improved trapping technology. With a Deutscher Akademischer Austauschdienst (DAAD) Scholarship at the University of Oldenburg in Germany, he embarked on research involving vitellogenesis and the evaluation of the yolk protein in *Glossina* sp., with the goal of developing appropriate methods to disrupt its reproductive processes. He has published extensively in peer-reviewed journals and book chapters in the field of medical entomology and public health.

Dr. Davies-Cole is Chief Epidemiologist at the Department of Health in Washington DC, USA. He leads the COVID-19 surveillance and response activities in the District and serves as a public health advisor on the Mayor of Washington DC's COVID-19 ReOpen DC Advisory Group. Previously, he served in various positions at the Department of Health, including Interim Senior Deputy Director, responsible for the Centre for Policy, Planning and Epidemiology, and Chief, Bureau of Epidemiology and Health Risk Assessment. He also served on the Mayor of Washington DC's Task Force on Surveillance for West Nile Virus; as Chair of the West Nile Virus and Malaria Committee of the Metropolitan Washington Council of Governments; and as Chair of the Bioterrorism Surveillance Committee set up after the 11 September 2001 terrorist attacks.

Since 2000, he has continued to supervise MSc and PhD students, including fellows from the Centres for Disease Control and Prevention, the Epidemic Intelligence Service and the Council for State and Territorial Epidemiologists in the US. He is also an Adjunct Professor of Global Health at the Milken Institute School of Public Health of George Washington University.



Lucy W. Irungu

Prof. Lucy W. Irungu graduated from the University of Nairobi, Kenya with a BSc First Class in Entomology. She joined *icipe* in 1978 as a graduate research scholar, during which time she pursued her MSc in Entomology and Applied Parasitology, and her PhD in Entomology at the Liverpool School of Tropical Medicine, University of Liverpool, UK. During her postgraduate training, she carried out research on vectors of leishmaniasis and filariasis. At *icipe*, she laid the groundwork for a vibrant research career in vector biology and host-vector-parasite relationships, with specific interest in malaria vectors and parasites of neglected diseases.

Prof. Irungu joined the Department of Zoology at the University of Nairobi as a Lecturer in 1988. She served as Chair of the Department of Zoology from 1999 to 2004 and was appointed Principal for the College of Biological and Physical Sciences in 2004, a position she held until March 2011, when she was appointed the First Deputy Vice Chancellor, Research Production and Extension. In 2018, she assumed the post of first Vice Chancellor of Machakos University.

In 2011, Prof. Irungu was a member of the Higher Education Task Force and chaired the Science, Technology and Innovation Committee, which developed the Science Technology and Innovation Bill, later enacted as the STI Act 2013. She belongs to several professional organizations, has served as a member in several boards, and is currently Chair of the Board of the Kenya Wildlife Service Training Institute, Board Member of the JRS Biodiversity Foundation and President of the Eastern Africa Research and Innovation Management Association. She is a Fellow of the Royal Society of Tropical Medicine and Hygiene, and a Fellow of the Kenya National Academy of Sciences.

Prof. Irungu has published extensively in refereed journals and has mentored and supervised numerous postgraduate research students.



Lukas Bertschinger

Dr. Lukas Bertschinger was a member of the *icipe* Governing Council (GC) from 2009 to 2019. Rapidly discovering the important mission of the Centre, its huge impact and the excellence of its novel research, he became, and continues to be, a strong advocate of *icipe*. During his membership, he served on *icipe*'s Executive Board and was engaged as a member of the Nominating Committee (NC), which he chaired from 2012 to 2016. As Chair of the NC, he played a critical role in ensuring an expedient, clear and transparent recruitment of GC members, with the right mix of competencies to best support *icipe* and in pursuit of the joint efforts of the GC and the Executive Board to improve the GC's gender balance, and compliance with the composition criteria for the GC established by *icipe*'s Charter.

In 2017, Dr. Bertschinger was elected Chair of the GC. As the Chair and link between the GC and Management, he worked closely with the Centre through a time of change and was supportive in the implementation of professional, effective and up-to-date management procedures. He worked to strengthen ties with core donor agencies, particularly liaising with the long-term donor Swiss Development Cooperation, and put particular emphasis on fostering the GC's governance skills and capacity as well as broadening African representation in the GC. It was during his tenure as Chair that the Centre's 2018 Periodic External Review was successfully completed and *icipe*'s Vision and Strategy 2020-2025 launched.

Dr. Bertschinger is an applied crop scientist with vast experience in Swiss and global applied crop-based agrifood value chain research as well as research management and leadership. In his role as GC member, he continuously had an eye for research relevance and impact underpinned by scientific excellence. With regard to *icipe*'s research-for-development, Dr. Bertschinger, in his capacity as a member of the Programme Committee, fully supported the Centre's holistic and transformative impact-oriented approach that ensure tangible outcomes. A strengthened and effective social science component in *icipe*'s research programmes, through which the Centre more effectively contributes to food security and rural livelihoods in Africa, is representative of this.



Lynn M. Riddiford

Prof. Lynn M. Riddiford became the first female Assistant Professor in Harvard University's Department of Biology, where she began exploring many aspects of the endocrine control of insect development and reproductive behaviour in 1966. She moved with her husband, Prof. James Truman, to the Department of Zoology, University of Washington, in 1973. After retiring as Professor of Biology Emerita in 2007, she became a Senior Fellow at the Janelia Research Campus, Howard Hughes Medical Institute in Virginia, for nine years. She and Prof. Truman are now back at the University of Washington at its Friday Harbor Laboratories, working on the role of juvenile hormones in both insect and crustacean development.

When *icipe* was being founded in the late 1960s, Prof. Riddiford often discussed its development with Prof. Carroll Williams, who was deeply involved in its establishment, and in whose laboratory she had worked. She and her husband first visited *icipe* and met Prof. Thomas Odhiambo in 1974 on their way to the International Congress of Comparative Endocrinology in Tsavo National Park. Her next visit to the Centre was in 1985 as a member of the Governing Council (GC). Over the next six years, she helped shape *icipe*'s mission and gave direction to its science.

During her last three years as member of the GC, she was Chair of the Programme Committee. In that time, significant progress made in reducing tsetse fly populations in the Maasai communities. She and her husband spent five months of their sabbatical in 1987 at *icipe*, working on tsetse fly behaviour and development. She also supervised two postdoctoral researchers from *icipe*. In her established career, Prof. Riddiford received numerous awards, including election to the National Academy of Sciences (USA); Fellow of the American Academy of Arts and Sciences, Entomological Society of America (ESA), and Royal Entomological Society; Recognition Award in Insect Physiology, Biochemistry, and Toxicology (ESA); the G. J. Mendel Honorary Medal for Merit in the Biological Sciences (Czech Academy of Sciences); and the Vollum Award for Distinguished Accomplishment in Science and Technology (Reed College).



Mabel Opanda Imbuga

Prof. Mabel Opanda Imbuga is the immediate former Vice Chancellor (VC) of Jomo Kenyatta University of Agriculture and Technology (JKUAT), a public university in Kenya. She was the university's first female VC and held this position for a period of 10 years. As a Professor of Biochemistry, she has over 35 years' experience in teaching, science and leadership, and has had the opportunity to mentor many students, some of whom joined *icipe* and have since risen through the ranks to become Scientists and Principal Scientists. Prof. Imbuga was a Postdoctoral Fellow at *icipe* from 1990 to 1992 under the supervision of Dr. Ellie Osir before being promoted to Scientist, a position she held for three years.

While serving as the VC of JKUAT, Prof. Imbuga steered successful collaboration between her university and *icipe*, opening up opportunities for postgraduate students in the cutting-edge research facilities at the Centre, as well as joint student supervision and research programmes by staff from both institutions.

She has driven the change agenda for scientific education across Africa and beyond, as demonstrated by the range and number of significant board memberships she has held locally, regionally and internationally. She was the Chair of the Regional University Forum for Capacity Building in Agriculture (RUFORUM), a consortium of 126 African universities operating in 38 countries, as well as member of the Pan African University Council, which has five nodes in the different regions of Africa and which strives to find homegrown solutions to the different challenges facing the continent. In May 2020, His Excellency the President of the Republic of Kenya appointed Prof. Imbuga the Chair of the Board of the National Authority for the Campaign Against Alcohol and Drug Abuse (NACADA). She is a member of the Jury for the L'Oréal-UNESCO for Women in Science Awards Programme for Sub-Saharan Africa, and a member of the Jury of the 2019 African Union's Kwame Nkrumah Awards for Scientific Excellence.

Prof. Imbuga is the recipient of numerous awards, among them the Elder of the Order of the Burning Spear, and an Honorary Doctorate from Cardiff Metropolitan University, UK, for transforming JKUAT into the most entrepreneurial university in Kenya.



Milcah Wanjiru Gitau

Ms. Milcah Wanjiru Gitau has loved insects since her childhood. Through a chance encounter with Dr. Johanna Darlington, then the Head of the Termite Programme, she was enrolled in a three-year research course at the Centre and was among the first research technicians to be trained at *icipe*.

After completing her training in 1978, she worked under Dr. Darlington from 1979 to 1982, before being transferred to *icipe*'s headquarters at the University of Nairobi. When the head office moved to Duvuvile in 1987, Ms. Gitau was instrumental in establishing insect colonies for research work. She has remained at the Centre since then, except for a five-year break between 1994 and 1999. In the course of her work, she has gained broad knowledge for the benefit of *icipe*, acquiring skills in laboratory technology, microbiology, molecular biology, parasitology and chemistry.

For the past 13 years, Ms. Gitau has been the Team Leader in the Animal Rearing and Containment Unit (ARCU), an essential research support unit supplying *icipe* researchers with almost 5 million insects and small mammals a year from its insectaries, animal breeding and bio-containment facility. In addition, Ms. Gitau is also in charge of mosquito rearing under the Human Health Theme. She has initiated colonies of mosquitoes such as *Anopheles gambiae*, *Anopheles arabiensis*, *Culex quinquefasciatus* and *Aedes aegypti* for research into the control of vector-borne infectious diseases. She carefully monitors for optimal performance of laboratory-reared species and ensures that only insects of high-quality are used in research, including parasitoids for classical biological control programmes from the bio-containment facility. Her work recently contributed to the discovery and identification of *Microsporidia MB*, a microsporidian symbiont that blocks transmission of the malaria parasite in *Anopheles arabiensis* mosquitoes.

During her long career at *icipe*, she has also contributed to the training of resident scholars and interns from tertiary institutions in laboratory-rearing of insects.



Nicolas P. Retsinas

Mr. Nicolas Retsinas served on *icipe's* Governing Council (GC) from 2005 to 2019 and was Chairman of the Audit and Finance Committee throughout that period. During his tenure at the GC, he championed transparency and accountability that continue to be a critical pillar of the Centre. He also advocated and guided the Centre in the development of a balanced budget and moved *icipe* from a position of negative reserves in 2005 to a reserve level of over four months of overall spending in 2019. In spite of his busy schedule, Mr. Retsinas was always available at all times to support Management in administrative matters, and provided invaluable guidance in the development of policies and in keeping focus on the big picture.

Mr. Retsinas has lectured, written and testified on housing, real estate and banking issues. He is currently Director Emeritus of Harvard University's Joint Centre for Housing Studies, a collaborative venture of the Graduate School of Design (GSD) and the Harvard Kennedy School (HKS). He recently retired as Senior Lecturer in Real Estate at the Harvard Business School (HBS), where he taught courses in housing finance and real estate in frontier markets but continues to teach in the Executive Education Programmes of HBS, HKS and GSD. Prior to his Harvard appointment, Mr. Retsinas served as Assistant Secretary for Housing-Federal Housing Commissioner at the US Department of Housing and Urban Development, and as Director of the Office of Thrift Supervision. He also served on the Board of the Federal Deposit Insurance Corporation, and chaired the Federal Housing Finance Board and the Federal Financial Institutions Examination Council.

He received a Meritorious Service Medal from the US Treasury Department, and is in the National Housing Hall of Fame and the Affordable Housing Hall of Fame. *Bloomberg Business Week* named him one of the 50 most influential people in real estate, and he is on the list of the top innovators in the home building industry in the past 30 years compiled by *Builder Magazine*.

Mr. Retsinas served on the housing and urban transition team for President-elect Barack Obama in 2008, as well as on the Board of Freddie Mac (Federal Home Loan Mortgage Corporation). He serves on the Board of Directors of the Centre for Responsible Lending.



Onesmas Kaye Wanyama

Mr. Onesmas Kaye Wanyama is a Senior Research Officer responsible for instrumentation in the Behaviour and Chemical Ecology Unit at *icipe*. Mr. Wanyama joined *icipe* in October 1990 as Associate Scientific Officer in the then Chemistry and Biochemistry Research Unit, working on a wide range of laboratory instruments. Before he started at *icipe*, he worked as a Physicist in the Ministry of Energy of Kenya, responsible for evaluating geothermal energy potential within the central and northern Rift Valley.

For the 30 years he has worked at *icipe*, Mr. Wanyama has kept critical laboratory analytical and process equipment in perfect working condition, maximizing their utilization until replacement with next-generation equipment technology. As a skillful technical resource person who is equipped with a fundamental understanding in the field of chemical ecology, he has elegantly linked basic research questions to appropriate technologies. His knowledge and dedication have helped solve countless complex problems for different projects, and this has translated into the delivery of top-notch scientific outputs for countless students, technicians and scientists at *icipe* as well as to *icipe*'s partners and collaborators.



Rosemary Sang

With a background in Medical Entomology (PhD) and Medical Virology (MSc), Dr. Rosemary Sang is among the few world-class experts in the field of arbovirology. She has over 30 years' experience working in arbovirus ecology, epidemiology, surveillance, virus discovery, outbreak investigation and response. As the world continues to face a global resurgence and emergence of arbovirus infections threatening global health security, Dr. Sang has broadened her research focus from Africa to beyond.

The 2006–2007 outbreak of Rift Valley fever in eastern Africa inspired the establishment of the Emerging Arbovirus Disease Programme and the development of the Martin Lüscher Emerging Infectious Diseases Laboratory at *icipe*. Using this platform, Dr. Sang has contributed to research and capacity building in arbovirology at the Centre since 2009.

Dr. Sang has undertaken research that has generated much-needed data to inform and guide the health sector and fellow health researchers on arbovirus geographic distribution, identifying factors that drive risk of transmission of diseases, with pointers to opportunities for outbreak prevention and control focusing on key hemorrhagic fever viruses such as Rift Valley fever, dengue fever, yellow fever, Crimean-Congo haemorrhagic fever and chikungunya. She has also contributed to the detection of novel virus agents that have potential to cause disease in humans, setting the stage for improvement of early warning systems and preparedness for better prevention and control.

Training and mentoring of graduate students and postdoctoral fellows have been an integral part of her research at *icipe*. Using the African Regional Postgraduate Programme in Insect Science (ARPPIS) and the Dissertation Research Internship Programme (DRIP) at the Centre, she has improved capacity in arbovirus research for the African continent by supervising and mentoring more than 17 MSc and PhD scholars. She has published widely in her field, with more than 90 papers in peer-reviewed journals. Dr. Sang has and continues to serve in various national, regional and global expert committees in an advisory role.



Sunday Ekese

Dr. Sunday Ekese joined *icipe* in 1995 to pursue his PhD programme while registered at Ahmadu Bello University, Nigeria. The outcome of his PhD research was a biopesticide product based on *Metarhizium anisopliae* (ICIPE 69), which is currently widely used across Africa as an alternative to toxic synthetic pesticides in horticulture against thrips, fruit flies and mealybugs. Upon completion of his PhD in 1999, he was immediately offered a postdoctoral research position at *icipe*, which he held from 1999 to 2003, discovering new isolates of entomopathogenic fungi that have since been developed as biopesticides for management of different arthropod pests, including *M. anisopliae* (ICIPE 78) for red spider mite control and *M. anisopliae* (ICIPE 62) for aphid control. In 2003, Dr Ekese was offered a Rothamsted International Fellowship in the UK, where he studied interactions between the aphid pathogen *Pandora neoaphidis*, pest and non-pest aphids, and predatory coccinellid beetles. He returned to *icipe* in 2004 and joined the African Fruit Fly Initiative (AFFI) as a Research Scientist. He took over leadership of AFFI in 2005, attracting various sources of funding from diverse donors in what is now recognized as one of *icipe*'s most successful flagship programmes. In addition, he coordinates and continues to be actively involved in several other projects, including: IPM of *Tuta absoluta*, the fall armyworm, citrus pests, African indigenous vegetable pests and locusts; and the effect of climate change on ecosystem services. In 2012, he initiated research on insects for food and feed, which has since become a major flagship programme of *icipe*.

Dr. Ekese became a Senior Scientist in 2006 and was promoted to the rank of Principal Scientist 2010. He became Director of Research and Partnerships at *icipe* in 2016. Globally, he is recognised as a leading expert in the field of arthropod pathology with an exceptional breadth of knowledge in the development and commercialisation of biopesticides. He has trained 27 MSc and PhD students, and advised national programmes in 21 African countries on the development and implementation of IPM for horticulture and staple crops. His list of publications includes more than 210 papers in refereed journals and has made over 140 oral presentations at major scientific gatherings.



Susan Kariuki

Ms. Susan Kariuki joined *icipe* in August 1998 as Executive Assistant to the Deputy Director General. In that role, she helped to strengthen the Directorate and successfully supported key research conferences and accorded administrative support to the Sponsoring Group of *icipe*.

From 2000, she assumed the position of Executive Officer to the DG and ensured continuity on two occasions during the transition in the leadership of the Centre. Her contribution to the induction of the two Director Generals, including meeting staff and familiarization with the Centre's systems, donors and collaborators, was very impactful.

She took on a new role when the position of Fundraising Coordinator was created in 2005 to coordinate donor scoping initiatives and identify funding opportunities of relevance to *icipe* research. During her tenure, the Centre's finances tripled from an annual income US\$ 9.5 million in 2005 to US\$ 30 million at the end of 2013. This contributed to the growth of *icipe's* research-for-development portfolio and capacity building activities across Africa.

In 2014, Ms. Kariuki was deployed to head the supplies and logistics functions of the Centre as the Procurement Manager. A major assignment has been updating the Centre's procurement policies and building a team that ensures value for money in all purchases.

She continues to play a critical role in ensuring full compliance with donor conditionality and delivery of transparency and accountability, contributing to increased stakeholder confidence and brand equity of the Centre.



Zeena Adams

Ms. Zeena Adams, who is a Certified Public Accountant and a member of the Institute of Certified Public Accountants of Kenya joined *icipe* in 2004 and has been a key member of the Finance Unit. Before joining *icipe*, Ms. Adams worked in supervisory capacity in industry, where she was exposed to all aspects of commercial accounting.

Her work at *icipe* has included working with projects as a Project Accountant and in the management of the Centre's key resources as a Treasury Manager. Within projects, she was charged with monitoring project costs and budgets, partner reimbursements, project financial reports, and preparation of proposal budgets in accordance with donor requirements. She was a member of the then Projects Management Committee, which oversaw the operations of the Centre's project operations. Following her redeployment and promotion in 2010, she assumed the position of Treasury Manager. In this role, Ms. Adams has been overseeing the custody of the Centre's largest resources of cash and bank balances, ensuring adequate working capital for daily operations, and optimising use of funds, while balancing the cocktail of foreign currency held to optimal levels and ensuring payments are done accurately and in a timely manner. She has managed the secretariat of the Investment Committee and is also a member of the Enterprise Resource Planning (ERP) Technical Committee overseeing the implementation of a new Microsoft Navision system for the Centre.

Ms. Adams has fully utilised her postgraduate qualification in Finance, Strategic Management and Human Resources and her certification in 'Global financial Governance' from the United Nations Institute for Training and Research (UNITAR) for the benefit of the Centre.



Zeyaur R. Khan

Prof. Zeyaur R. Khan is a Principal Scientist and leader of the push-pull flagship programme at *icipe*. He is internationally acclaimed for developing the 'push-pull' farming system, an ecological agricultural innovation with adaptations for climate change to ensure long-term sustainability. He has led a research-based extension system to disseminate push-pull technology, with scientists working closely with farmers and extension agents to ensure the technology serves and reaches farmers across Africa. Push-pull technology has impacted global thinking and policy on sustainable agriculture. The 2015 Report of the United Nations Secretary-General to the 70th Session of the General Assembly singled out push-pull technology as an integrated pest management innovation that benefits marginalised populations.

Prof. Khan attended the Indian Agricultural Research Institute, New Delhi, receiving his MSc (1977) and PhD (1980) in insect taxonomy and insect physiology, respectively. He joined *icipe* in 1986 as head of a collaborative programme between the Centre and the International Rice Research Institute (IRRI) on insect pests of rice. He moved to *icipe*'s Thomas Odhiambo Campus as Senior Scientist in 1993 and was promoted to Principal Scientist in 1998. Prof. Khan has also been an Adjunct Professor of Entomology at Cornell University since 2009, and Council Member of the International Congress of Entomology since 2010. He served as President of the International Branch of the Entomological Society of America (ESA) in 2019.

Prof. Khan is an Honorary Fellow of the Royal Entomological Society, and a Fellow of the African Academy of Sciences, ESA, and The World Academy of Sciences (TWAS). His awards include the International IPM Excellence Award (2009), ESA's Distinguished Scientist Award (2010), ESA's Nan-Yao Su Award for Innovation and Creativity in Entomology (2010), TWAS Prize in Agricultural Sciences (2011), *icipe*'s Thomas Risley Odhiambo Distinguished Fellow Award (2012), and Louis Malassis International Scientific Prize for Outstanding Career in Agriculture (2015) from the Agropolis Foundation. He has mentored over 50 graduate students from 16 countries, and authored or co-authored over 150 scientific papers, 10 book chapters and five books.

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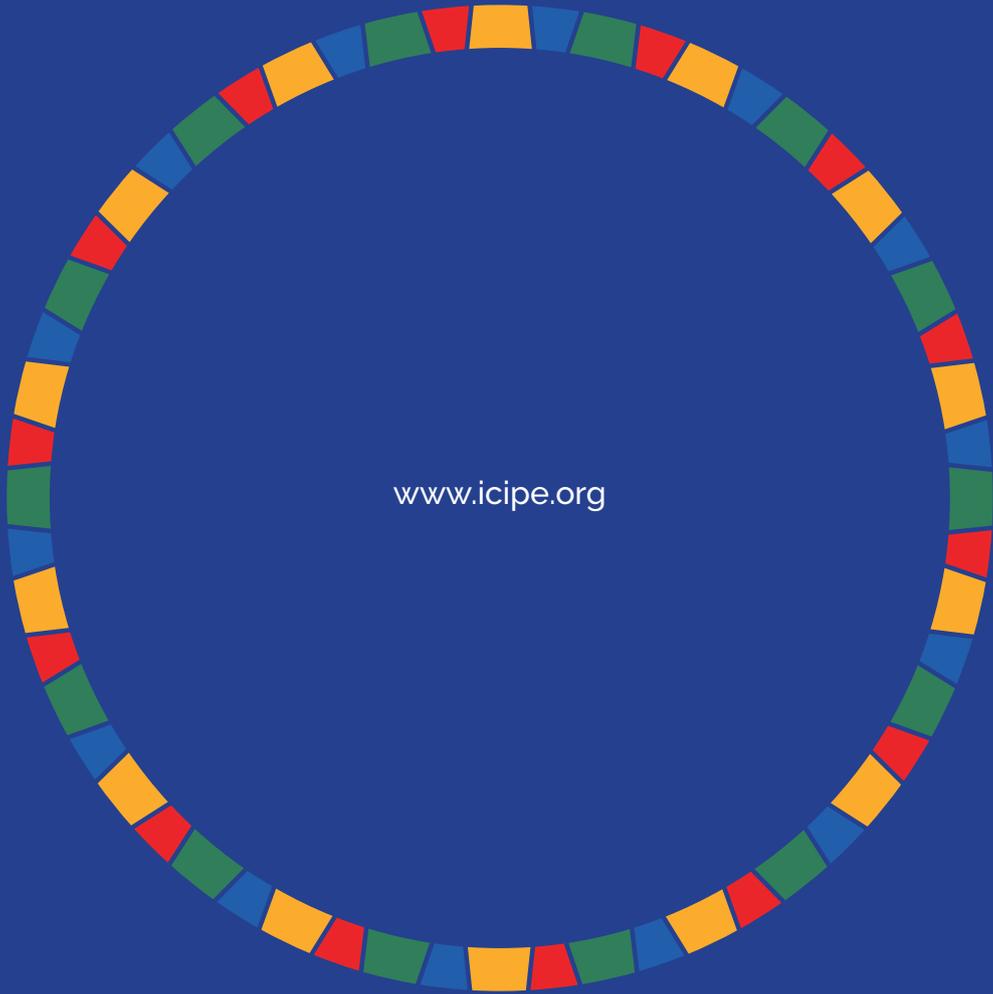
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Cotesia icipe (Braconidae: Hymenoptera), an indigenous solitary parasitoid of major armyworm larvae such as cotton leafworm, *Spodoptera littoralis*; Beet armyworm, *Spodoptera exigua* and fall armyworm, *Spodoptera frugiperda*. Field assessments in Kenya, Ethiopia and Tanzania by *icipe* has revealed up to 45% field level parasitism of fall armyworm in Ethiopia, showing its high potential in the biological control of the invasive pest.



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