Top: Rosaline Macharia (class of 2012; Kenya) is characterising olfactory responsive genes in the tsetse fly to help understand their responses to odours. Rosaline is seen here with a biconical trap used to collect tsetse flies.

Bottom: David Cham (class of 2012; Cameroon) is studying pests of the honey bee (*Apis mellifera*) and bee diversity in Cameroon.

project that took into consideration my background in virology, and this gave me a rare opportunity to study viruses, a unique practical experience that I have treasured very much in my profession as an arbovirologist," Rosemary adds.

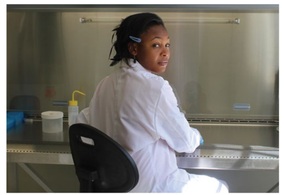
A vision ahead of its time

When Rosemary joined KEMRI to work at the Centre for Virus Research on arbovirus diseases, these viruses were not considered to be of significant public health importance. However, things took a different turn when a yellow fever outbreak occurred in Kenya for the first time in 1992/93, with additional haemorrhagic fever virus diseases causing outbreaks in much of East Africa. "This necessitated research programmes to understand the insect vectors of these viruses and to control them, programmes that have taken up much of my attention," explains Rosemary.

Since completing her PhD studies in ARPPIS, Rosemary has been engaged in medical research in the field of arbovirology and other aspects of tropical infectious diseases. As Head of the Arbovirology/Viral Haemorrhagic Fevers (VHFs) Laboratory at KEMRI, Rosemary spends most of her time in the laboratory, which is now a member of the

Top: Yvonne Ajamma (class of 2011; Nigeria) is studying the ecology and population genetics of arbovirus mosquito vectors in Suba and Baringo Districts, Kenya.

Bottom: Daniel Munyao Mutyambai (class of 2011; Kenya) is exploiting early herbivory-induced defence traits in maize species for the management of stemborer pests.



Emerging and Dangerous Pathogens Laboratory Network (EDPLN) of WHO AFRO, and which serves as the national and regional reference laboratory for Arbovirus/VHFs for Kenya and the eastern African region in outbreak investigations, response and surveillance. Rosemary also serves in various WHO expert committees as an expert in arbovirology to advise on arbovirus/haemorrhagic fevers research priority setting and outbreak response activities. She also supports capacity building activities through teaching and supervising graduate students, including ARPPIS PhD students, and postdoctoral fellows in the field of medical virology.

Dr Sang is also implementing a number of projects at the Martin Lüscher Emerging Infectious Diseases Laboratory at *icipe*, in Nairobi. Her research has been published widely with over 60 papers in peer-reviewed scientific journals, and a contribution to a book on emerging infections.

Building Capacity Through Research and Strategic Partnerships

***icipe* – Working in Africa for Africa…**

The International Centre of Insect Physiology and Ecology (*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. *icipe*'s Capacity Building Programme aims to promote the development and utilisation of sustainable arthropod management technologies by enhancing the research and training capabilities of countries in Africa. The Centre's major areas of capacity building activity are: (i) Capacity building and professional development of university lecturers, researchers, and professionals in insect and related sciences; (ii) institutional development by nurturing and strengthening higher education, research and extension institutions; (iii) promoting innovations on insect science, in collaboration with regional and national agricultural research and advisory services, and the private sector. These objectives are realised through postgraduate training at PhD and MSc levels, professional development schemes for scientists, and non-degree training for technicians, scientists, community members and extension workers.

COVER PHOTOS
ARPPIS PhD researchers: ARPPIS has contributed to building the capacity of African scientists in insect science.

DONORS: Main financial support to *icipe*'s postgraduate training was provided by a consortium of development partners, who have included over time, the German Academic Exchange Service (DAAD), UK Aid (the UK Government), the Swedish International Development Cooperation Agency (Sida), the Dutch Programme for Cooperation with International Institutions (Netherlands-SII), the German Federal Ministry for Economic Cooperation and Development (BMZ), the Dutch Directorate-General for International Cooperation (DGIS), the Organization for Women in Science for the Developing World (OWSD), the International Centre for Scientific Culture (ICSC-World Laboratory), the African Development Bank (ADB), the International Fund for Agricultural Development (IFAD), and the Swiss Agency for Development and Cooperation (SDC).

COLLABORATORS: World Academy of Sciences (TWAS), Organization for Women in Science for the Developing World (OWSD), African Academy of Sciences (AAS), African Association of Insect Scientists (AAIS), University of Nairobi, Jomo Kenyatta University of Agriculture and Technology, Kenyatta University, Egerton University, University of Pretoria, University of the Western Cape, University of Cape Coast, University of the Witwatersrand, North-West University, University of Yaoundé I, University of Gezira, University of Dar es Salaam, and University of Ghana.

Photos: icipe

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Building Capacity Through Research and Strategic Partnerships

The African Regional Postgraduate Programme in Insect Science (ARPPIS)

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Top: Edith Chepkorir (class of 2014; Kenya) is studying the risk of transmission of yellow fever and dengue by *Aedes (Stegomyia)* mosquitoes.

Bottom: David Kupesa Mfuti (class of 2012; Democratic Republic of Congo) is working on an autodissemination device using entomopathogenic fungi and kairomonal attractants for the management of legume flower thrips, *Megalurothrips sjostedti*.

Postgraduate training for African students hosted at *icipe*: African Regional Postgraduate Programme in Insect Science (ARPPIS)

icipe established ARPPIS in 1983 as a postgraduate training programme in partnership with African universities. The programme is central to *icipe*'s mission of building Africa's indigenous capacity and leadership in insect and related sciences. ARPPIS provides young African scientists with the opportunity to conduct PhD research in Africa for Africa, focusing on beneficial insects, and also on insect pests and vectors that threaten health and food security.

A major strength of ARPPIS is that it draws upon the expertise of *icipe* and African universities, bringing a collective interest in advancing tropical insect science and high-level staff development. Since inception, 29 universities from 16 African countries have partnered with *icipe* in the ARPPIS PhD programme.

ARPPIS is a three-year training programme that includes research, training, and professional development opportunities, as well as participation in professional scientific meetings and international conferences. At *icipe*, PhD students have access to excellent

Top: Nelly Ndungu (class of 2013; Kenya) is studying the phenotypic plasticity and molecular mechanisms underlying development and differentiation in *Hypotrigona* species of honey bee in Kenya.

Bottom: Shepard Ndlela (class of 2012; Zimbabwe) is working on the development and implementation of pre- and post-harvest management measures to control the fruit fly *Bactrocera invadens* on mango.

research facilities in an interdisciplinary environment, and field sites located in various agroecological zones. By giving a broad-based education both in theory and practice, the ARPPIS PhD programme prepares young scientists to compete in an internationally competitive research environment within national, regional and international research and development programmes. ARPPIS reflects a priority of *icipe* and AU's CAADP to build the science capability of national and sub-regional R&D systems to create knowledge and tools for impact in Africa.

ARPPIS has earned a well-deserved reputation as an incubator of some of Africa's finest young scientists. To date, more than 210 PhD-level scientists from 29 African countries have been trained through ARPPIS. The programme is also committed to building the capacity of women scientists. Overall, 29% of all ARPPIS PhD students have been women, and since 2010 44% of students in the programme have been women.

Building Capacity Through Research and Strategic Partnerships

Top: Tigist Assefa Tolosa (class of 2012; Ethiopia) is studying the chemical ecology of plant-to-plant signalling, and its potential to manage the cereal stemborer pest in Africa.

Bottom: Mawufe Komi Agbodzavu (class of 2014; Togo) is developing integrated pest management technologies for coreid bugs and lepidopteran defoliators of amaranth.

ARPPIS PhD research projects span a continuum from strategic basic research, technology development and validation, through to community-based field adoption of new technologies. Students make outstanding discoveries and contribute to knowledge creation and sustainable development, and enhance the research capacity and status of *icipe* as a world-class centre for insect R&D. For example, postgraduate students are primary authors on approximately 40% of all scientific papers that *icipe* generates.

Most ARPPIS PhD alumni are active in research and development in Africa, making important contributions to insect and related sciences. More than 80% are in Africa conducting research at universities or national and international research centres, or teaching at university level. Several alumni have continuing research careers at *icipe* as junior scientists, heads of projects or research themes. Some have risen to senior positions in universities, or in policy-influencing positions within their governments.

Building Capacity Through Research and Strategic Partnerships

Dr Rosemary Sang (ARPPIS Scholar 1992–1995)

Making the right choices for Africa: Dr Rosemary Sang (ARPPIS Scholar 1992–1995)

After a bachelor of science at the University of Nairobi, Rosemary went back to the same university to pursue an MSc on the effects of arbovirus infections on the behaviour of the mosquito *Aedes aegypti*. Later, through one of the scientists at the Kenya Medical Research Institute (KEMRI), she learned about the ARPPIS programme, which she applied for to pursue a PhD.

Rosemary explains: "ARPPIS provided a great opportunity for me to interact with scientists of diverse nationalities and pursuits, which was enriching to me as a person and as a scientist". In turn, this taught her to have a wider perspective, and to appreciate other people's diversity of views and practices. "The setting of the ARPPIS training programme at *icipe* provided an academic environment that was conducive for great scientific pursuit and achievement," she says.

"ARPPIS opened the door to a whole new experience on a personal and professional level. I felt that the programme was tailored in an enriching and unique way. I selected a

Building Capacity Through Research and Strategic Partnerships