The Regional Initiative in Science and Education (RISE) is a project of the Science Initiative Group (SIG), an organization dedicated to fostering science in developing countries and based at the Institute for Advanced Study in Princeton, NJ, USA. RISE was established in 2008 with the goal of strengthening science research and education in sub-Saharan Africa by increasing the population of qualified academic staff in the region’s universities. RISE’s broader goal is to build capacity in science, technology and innovation as a key to economic development in sub-Saharan Africa.

RISE is currently made up of five university-based networks spread throughout sub-Saharan Africa, each focused on a particular research area. The networks were selected by an international panel of distinguished scientists following a 2008 competition that attracted 48 proposals from 29 African countries. RISE supports scientists pursuing PhDs and master’s degrees on the continent through these research and training networks.

While each RISE student receives his or her degree from one university, all students have access to the complementary instruction, research opportunities, and laboratory facilities available at each institution within their network. RISE scientists have reaped the benefits of participating in information and material exchange, scientific consultation, and collaborative research.

RISE was designed with African needs and challenges in mind. The five networks’ current areas of scientific training—materials science and engineering, natural products research, biochemistry and bioinformatics, water resources, and marine science—target some of Africa’s most pressing ecological problems and technological deficits.

In 2014 the African Mathematics Millennium Science Initiative was designated a RISE Affiliate Network. Established in 2004 by the Science Initiative Group in partnership with The World Academy of Sciences (TWAS) and the African Academy of Sciences, AMMSI is a distributed network of mathematics research, training and promotion throughout Africa, with six regional offices from Rabat in the north to Gaborone in the south. As an affiliate of RISE, AMMSI adds a mathematics component to the project, enhancing the research taking place within the five core networks and broadening RISE’s geographic reach.

Since RISE was launched in 2008, 26 women and 62 men have earned one or more degrees through the networks, and the majority of the graduates are employed in academic positions at African universities or in scientific industries, working on projects relevant to Africa’s development. There are currently 37 women and 66 men pursuing degrees through RISE.

To date, RISE has been supported by grants from Carnegie Corporation of New York totaling over $15.4 million and in-kind support from the Institute for Advanced Study, in addition to funds leveraged by the individual networks. RISE is seeking to establish partnerships that will sustain and grow it after Carnegie grant funding comes to an end in 2016. Of prime importance is SIG’s new partnership with the African Development Bank, which was formalized at the 2nd Ministerial Forum on Science, Technology and Innovation, held in Rabat, Morocco on 14 October 2014. Through this partnership, RISE will become firmly rooted on the African continent and more fully Africa-owned.
AMSEN: African Materials Science and Engineering Network
AMSEN is based on the premise that increased skills in materials science and engineering are needed in southern Africa to develop and add value to the extensive mineral deposits of the region. AMSEN benefits from existing collaborations, including the DST/NRF Centre of Excellence in Strong Materials established at Wits in 2004 and the Wits-Namibia Engineering Curriculum Development Program in nanotechnology, sponsored by Norway’s SANTED Programme. To reduce the brain drain in this field from academia to industry, AMSEN uses a retention strategy that includes supplementation from industry, allowing staff to consult for and be seconded to industry, and providing incentives for publishing in academic journals. The AMSEN nodes and their coordinators are:

- University of the Witwatersrand, South Africa (Prof. L.A. Cornish, AMSEN Director)
- Federal University of Technology, Akure, Nigeria (Prof. J.O. Borode)
- University of Botswana (Prof. P.K. Jain)
- University of Ghana (Dr. David Doodoo-Arhin)
- University of Nairobi, Kenya (Prof. George Rading)
- University of Namibia (Prof. F.P.L. Kavishe)

RISE-AFNNET: African Natural Products Network
In the face of rapid population growth, loss of agricultural lands, and insufficient human capacity, RISE-AFNNET works to develop Africa’s rich biodiversity into a natural products industry of social and economic significance. Building on an already active research network of 10 member countries called NAPRECA, RISE-AFNNET expands existing research programs and formalizes educational activities in such natural products (NP) fields as engineering, biochemistry, environmental science, pharmacology, economic development and nutrition. Students work on natural products research projects in the context of poverty alleviation, gender equity, and the Millennium Development Goals. The RISE-AFNNET nodes and their coordinators are:

- Makerere University, Uganda (Prof. John David Kabasa, RISE-AFNNET Director)
- Sokoine University of Agriculture, Tanzania (Prof. Robinson Mdegela)
- University of Nairobi, Kenya (Dr. Kiama Gitahi)
SABINA: Southern African Biochemistry and Informatics for Natural Products Network

Due to the great biodiversity of southern Africa, increased capacity in natural products research has the potential to strengthen food security, public health, and value-added exports. The SABINA network trains both PhD and MSc scientists through research on the biochemistry and chemistry of natural products, including bioinformatics as an essential tool for data management and the elucidation of structure and function. Research focuses on increasing the understanding of useful plants and fungi (such as mushrooms, seaweeds, and tea crops) through the study of screening assays, biosynthetic pathways, gene expression, modes of action, synthetic production and genetic diversity. The SABINA nodes and their coordinators are:

- Council for Scientific and Industrial Research (CSIR), South Africa (Dr. John Becker, SABINA Director)
- Tea Research Foundation of Central Africa, Malawi (Prof. Albert G. Changaya)
- University of Dar es Salaam, Tanzania (Dr. Quintino Mgani)
- University of Malawi, Chancellor College (Dr. Mourice Monjerezi)
- University of Namibia (Prof. Martha Kandawa-Schulz)
- University of Pretoria, South Africa (Prof. Zeno Apostolides)
- University of the Witwatersrand, South Africa (Prof. Charles De Koning)

SSAWRN: Sub-Saharan Africa Water Resources Network

SSAWRN builds on two existing networks—one that emphasizes research and another that promotes postgraduate education. It addresses sub-Saharan Africa’s most pressing water issues, including rising use, declining quality, insufficient research and teaching capacity, inadequate weather stations and the likelihood of increased variability of water supplies associated with future climates. The network assigns first priority to research projects that address practical issues and contribute to problem solving. Students are encouraged to share research experience with others and to participate in consultancy work. SSAWRN is working to develop a culture of multidisciplinary problem solving. The SSAWRN nodes and their coordinators are:

- Rhodes University, South Africa (Prof. Denis Hughes, SSAWRN Director)
- Eduardo Mondlane University, Mozambique (Prof. Eloniu Muiuane)
- Makerere University, Uganda (Prof. Michael Ocaido)
- University of Botswana (Prof. Wellington Masamba)

WIO-RISE: Western Indian Ocean Regional Initiative

WIO-RISE provides research and training in skills associated with the utilization of coastal and marine resources and the protection of the coastal and marine environment. The network avails itself of the substantial experience of IMS/UDSM, which has roots in the former East African Marine Fisheries Research Organization and the affiliated Western Indian Ocean Marine Science Association based in Zanzibar. The School of Marine and Coastal Studies at Eduardo Mondlane University is strategically located near the Sofala Bank, a major fishery and aquaculture resource, and the University of Cape Town has the only department in southern Africa offering graduate training in physical oceanography, climate science, and atmospheric science. The WIO-RISE nodes and their coordinators are:

- University of Dar es Salaam, Tanzania (Prof. Desiderius Masalu, WIO-RISE Director)
- Eduardo Mondlane University, Mozambique (Prof. Antonio Hougane)
- Nelson Mandela African Institute of Science and Technology (NM-AIST), Tanzania (Dr. Musa Chacha)
- University of Cape Town, South Africa (Prof. Chris Reason)

AMMSI: African Mathematics Millennium Science Initiative (AMMSI) [Affiliate Network]

AMMSI is a network of mathematics research and training, with emphases on graduate education and applied mathematics. AMMSI’s goals are to support research in mathematics and its applications; to strengthen teaching and learning; to enhance capacity in mathematics through networks; to raise general awareness of mathematics; and to enhance the use of ICT in the teaching and learning of mathematics. The five AMMSI regional offices serve the entire continent.

- Programme Director: Prof. Wandera Ogana, University of Nairobi
- Central Africa Regional Office (Prof. Basile G. R. Bosso, Marien Ngouabi University, Brazzaville, Congo)
- Eastern Africa Regional Office (Dr. Eunice W. Mureithi, University of Dar es Salaam)
- Northern Africa Regional Office (Prof. Nouzha El Yacoubi, University Mohammed V-Agdal, Rabat, Morocco)
- Southern Africa Regional Office (Prof. Edward Lungu, University of Botswana)
- Western Africa Regional Office, Zone 1 (Prof. Samuel Ilori, University of Ibadan)
- Western Africa Regional Office, Zone 2 (Prof. Hamidou Toure, University of Ouagadougou)
RISE was founded on the premise that it is possible to attain high-quality, comprehensive graduate training in Africa by pooling the resources and talents available at multiple institutions, and given the successes of our graduates to date, this has proven to be true.

Professor Joseph Borode of the Federal University of Technology, Akure (Nigeria) node of AMSEN, based at the Department of Metallurgical and Materials Engineering, emphasizes the positive effect of RISE on department morale: “Prior to the advent of RISE-AMSEN, the department lacked adequate teaching and research facilities. The morale of the few staff in the department was at low ebb. Staff retention after postgraduate training was difficult due to lack of suitable working conditions. ... At present, there has been a change of fortune for both the staff and the department. The international outlook of the department has been greatly enhanced. In the same vein, the staff’s mobility in the global arena has been given a boost through attendance at international conferences, seminars, and workshops. ... Members of the staff have been able to establish new partnerships through which they can advance their academic careers.”

Professor John David Kabasa of AFNNET applauds the network approach as being “a driver of many changes in university education processes, information sharing, and capacity sharing, as well as [having opened] scientific boundaries which had previously clogged the traditional university systems. ... [AFNNET students have] learned to coordinate multi-cultural and multi-national research networks ... and to mentor local young scientists on how to report their results at workshops and conferences. Students have been exposed to various opportunities, [discovered] and recommended by SIG, and they have traveled widely as they disseminate their research work.”

Professor Denis Hughes of SSAWRN has observed a trend whereby student and staff activities bring benefits to projects outside of academia: “Most of the student projects supported by SSAWRN are aligned to applied research and address solutions to identified socio-economic problems affecting various countries, thus creating a bridge between academia and society.”
Opportunities for Collaboration

As science becomes an ever more international enterprise, RISE students and graduates will gain a richer educational experience by pursuing opportunities for research collaboration beyond Africa. RISE is seeking to build its international network of collaborators and is currently pursuing the development of new partnerships with universities in the United States, Canada, and Europe. Collaborations could involve research visits by RISE PhD and MSc students and graduates for periods ranging from a month to an academic year; or short courses lasting one to four weeks given at RISE universities by visiting professors from institutions outside of Africa, in subjects relevant to the networks but in which they lack expertise.

To date, some RISE students and graduates have participated in South-South fellowship programs through our partner organization The World Academy of Sciences (TWAS). In addition, a few students and graduates have had successful research visits lasting two to five months at Princeton, Duke, and Mississippi State Universities. The arrangements to date have been ad hoc, based on informal partnerships with these universities; typically SIG covers travel and visa costs and the host university covers local costs, but the specifics vary. SIG is eager to expand academic opportunities for RISE scientists. Universities interested in scientific collaboration with RISE students and graduates are encouraged to contact us.

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