



## INTERNATIONAL

## Seeking Growth, East Africa Expands Science, Education Ties

**KIGALI**—High-ranking government leaders from six African nations have pledged to expand their collaboration in science and science education to further economic and human development in their resource-rich but long-impooverished region.

At a landmark meeting organized by the Rwandan Ministry of Education and AAAS, leaders from the East African nations of Burundi, Kenya, Rwanda, Tanzania, and Uganda, along with the Democratic Republic of Congo, agreed to establish a forum for their science ministers. By working together on a range of issues—from education and health to energy and the environment—they hope to support sustainable economic growth while advancing East Africa's emerging commitment to regional integration.

"The integration spirit in the region is very high," said Charles Murigande, Rwanda's minister of education. "The objective of this conference was to bring us together. We did not want to come together once and end it there, and so I expected ... that we should continue to meet and exchange ideas on how we can promote science and technology."

That could be a crucial opportunity for harmonizing science and education goals and procedures in the region, said AAAS Chief Executive Officer Alan I. Leshner, who led a delegation to the conference. "This is a very important and promising development," said Leshner, the executive publisher of *Science*. "If we're going to be able to work for the betterment of humankind on a global scale, the scientific community has to be able to function as a global community in and of itself."

Rwanda, devastated by genocide in 1994, has become an international model for building economic strength with education, science, and technology; Rwandan President Paul Kagame discussed that strategy and plans for the future in an hour-long meeting with Leshner and the AAAS delegation.

Rwanda's neighbors are embracing a similar approach to strong economic growth.

The conference, convened 8 to 9 December in Rwanda's capital, reflected the region's energy and optimism. It attracted about 60 influential science leaders—government science and education ministers, heads of national science organizations, and university rectors, along with top officials from the



**Regional partners.** (left to right): Alexis Kanyenye, deputy director of cabinet, Ministry of Scientific Research, Democratic Republic of the Congo; Romain Murenzi, director of the AAAS Center for Science, Technology and Sustainable Development; Julien Nimubona, minister of higher education and scientific research, Burundi; Ignace Gatara, minister in the office of the president for Information Communication Technologies, Rwanda; Nelson G. Gagawala, minister of state for trade, Uganda; Alan I. Leshner, CEO of AAAS; Charles Murigande, minister of education, Rwanda; Charles Kitwanga, deputy minister of communication, science, and technology, Tanzania; and Shaukat A. Abdulrazak, executive secretary, Kenya National Council for Science and Technology.

African Development Bank and UNESCO. W. Stuart Symington, the U.S. ambassador to Rwanda, also spoke at the event.

Discussions were collegial and candid, and they ranged broadly across issues—from Internet technology and data collection to food security and approaches to scientific collaboration. But participants returned repeatedly to the importance of education.

"Our continent has reached the milestone of 1 billion people," said Boukary Savadogo, division manager for education, science, and technology at the African Development Bank. "These 1 billion brains constitute a tremen-

dous resource that can be tapped for the purposes of development of our continent."

Science education and training are crucial to the region's ability to address its challenges, said Romain Murenzi, formerly a minister in the Kagame administration overseeing education, science, and communication, and now director of the AAAS Center for Science, Technology and Sustainable Development. But with less than 1% of East Africa's 200 million people holding college degrees, he said, "regional integration is critical to efficiently use this scarce resource."

Before the conference, Jo Ellen Roseman, director of AAAS's Project 2061 science literacy initiative, gave a 2-hour briefing on the program's extensive science learning resources to about 40 administrators and staff at Rwanda's National Curriculum Development Centre.

At the conference, some 40 undergraduate and graduate students won praise for their research posters, many focused on agriculture, hydrology, and health, and most with direct practical applications.

Speakers from both Africa and the United States put particular focus on the need to recruit more women into science and engineering studies. Mabel Imbuga, vice chancellor of the Jomo Kenyatta University of Agriculture and Technology, described Kenya's incentives to bring women into the sciences. Uganda and Tanzania are making similar efforts, speakers said. Advocates need to demonstrate more forcefully that bringing more women into science has a positive economic impact, said Shirley Malcom, head of Education and Human Resources at AAAS.

Vaughan Turekian, AAAS's chief international officer, was among many speakers who urged science leaders to build on momentum created by the conference. "Cooperating across borders to improve the lives of people and drive prosperity represents one of the greatest goals of our scientific and education enterprise," he said. "We have to seize on this opportunity through sustained action."

The science ministers forum can help lead that effort, said Ugandan Trade Minister Nelson G. Gagawala. "We need action," he said. "We need action in real time."

## Science, Law Enforcement Build Biotech Bridges

With scientists working to create new life forms and amateur biology clubs springing up nationwide, it stands to reason that the U.S. security community would be concerned that one rogue researcher or one innocent error might create a grave problem.

But before uneasiness could turn to conflict, the FBI, working closely with AAAS, embraced a new strategy. The Bureau held conferences with university and private sector researchers, attended synthetic biology science fairs, and spent time with do-it-yourself (DIY) biologists. The message, though tailored for each audience, was consistent.

“We want science and security communities to come to an understanding to promote a culture of responsibility,” says Edward H. You, an experienced researcher and now the FBI supervisory special agent guiding the outreach effort. By bringing those communities together, “we can... identify what some of the risks and gaps might be, and then come up with strategies that make sense to both communities to mitigate those risks and gaps.”

A certain amount of uneasiness was inevitable after the deadly blitz of anthrax letters that followed the 9/11 terror attacks and, more recently, the stunning advances and increasing accessibility of biotech research. In research published last May in *Science*, genomics

pioneer J. Craig Venter announced development of the first cell controlled by a synthetic genome. That breakthrough underscored that biotech will likely create unpredictable implications for science and society.

In a recent appearance at AAAS, bioethicist Thomas H. Murray said synthetic biology—fundamentally altering life or creating new life forms—offers “mind-boggling” possible benefits, from production of new pharmaceuticals to cleaning up oil spills. But, he added, the benefits must be weighed against bioterrorism and other hard-to-define risks.

“If I didn’t think the potential benefits... were massive, there would be no point in having this conversation,” said Murray, president and chief executive officer of the Hastings Center, in the annual AAAS-Hitachi Lecture on Science & Society on 28 October.

Finding the best balance of benefits and risks is the rationale for the collaboration between the FBI and AAAS, said AAAS biosecurity expert Kavita Berger, an associate program director in the Center for Science, Technology and Security Policy.

Just a few years ago, Berger contributed to a survey of researchers that found only a third were comfortable sharing their research with agents, and a mere 14% felt comfortable with the FBI having a role in monitoring research.



Genspace President Ellen Jorgensen (left) and FBI Supervisory Special Agent Edward H. You (right).

But if science and security couldn’t build a working relationship, she thought, then policy-makers, acting out of mistrust or fear, might impose rules that impede research without affecting real security concerns.

Collaboration, she said, is “ultimately going to be a lot more productive and a lot more useful in reaching the end goals of security and science.”

In professional conferences organized by the FBI and AAAS, You and Berger have had agents and researchers work through simulated problems related to biotech and biosecurity. In the process, they learned about each other’s values, perspectives, and practices.

Now the uneasiness is giving way to closer interaction between researchers and law enforcement, with major universities offering to host the conferences. “We’re seeing a paradigm shift,” said You, who had worked in gene therapy and cancer research before joining the FBI.

AAAS is helping forge a similar relationship with amateur biologists, who number an estimated 4000 or more nationwide. An informal meeting this fall brought three of them together with You and others from the FBI, along with government and AAAS officials. The DIY speakers described how a love of science and commitment to public engagement has led them to hold exhibits at street fairs and form community labs.

Ellen Jorgensen, an assistant professor in pathology at New York Medical College and president of the Genspace community lab in New York City, acknowledged that cooperation with agents does not come easily for many in the DIY movement.

But, she said, “I think that the meetings we have had were very useful in terms of fostering some trust between the FBI and the DIY biocommunity... To kill a movement that embodies a reawakened public enthusiasm about science due to concerns about biosecurity would be a terrible shame.”

—Brian Vastag contributed to this report.

### ANNUAL MEETING

## In Washington, Researchers Seek Science Without “Silos”

Some of the most compelling scientific work of the 21st century depends on researchers who seek inspiration and partnerships across disciplines and national borders. It’s an approach that Frances H. Arnold, a plenary speaker at the 2011 AAAS Annual Meeting, uses when she combines mechanical engineering, chemistry, and evolutionary biology to design new enzymes for medical and energy research. It’s also the driving force behind the work of Colin Phillips, one of the meeting’s topical speakers, who employs computer science, anthropology, and neuroscience in his studies of human grammar.

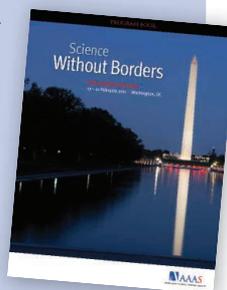
Under the banner “Science Without Borders,” Arnold, Phillips, and scientists and engineers from more than 50 countries will convene from 17 to 21 February at the 177th Annual Meeting in Washington, D.C. Their innovative projects “cross conventional borders or break out from silos, especially in groundbreaking areas of research,” said AAAS President Alice S. Huang. The program will also highlight the international nature of scientific collaborations, said Huang,

who has consulted on science policy for government agencies in China, Taiwan, and Singapore.

The 2011 meeting will continue AAAS’s tradition of boundary-crossing science, featuring multi-disciplinary research on oceans, human health, sustainability, and next-generation engineering. Special events include seminars on neuroscience and robotics, molecular machines, the search for Earth-like planets, and a plenary panel on emerging issues in biosecurity.

For registration and other information about the 2011 Annual Meeting, see [www.aaas.org/meetings](http://www.aaas.org/meetings). Information from the D.C. gathering will also be posted at the Annual Meeting News site at <http://news.aaas.org>, at the 2011 AAAS Annual Meeting and *ScienceNOW* pages on Facebook, and on Twitter at #AAASmtg.

—Becky Ham



# Science

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