

An African Showcase for Math Studies

MUIZENBERG, SOUTH AFRICA—An exotic mixture of languages—Swahili, Amharic, Malagasy—echoes through the lobby of this former beach hotel that has been transformed into a hothouse for cultivating bright young African minds. But it is the universal language of mathematics that unites the diverse and ambitious group of students making a second home here.

The 53 students at the African Institute for Mathematical Sciences (AIMS)—whether they come from the deserts of northern Africa, such as Esra Khaleel of the conflict-torn Darfur region, or from the lush southern island of Madagascar, like Mika Sidonie Ranaivomanana—share a passion for numerical concepts and a determination to make a difference in their home countries. “While I am at AIMS, my goal is to understand the difficult concepts,” says Proscovia Namayanja of Uganda. “I want to return to Uganda to teach those concepts.” AIMS’s director, theoretical physicist Fritz Hahne, former dean of science at the University of Stellenbosch in South Africa, describes his charges as “creative and committed students” who “are here because they want to give something to Africa and to their home countries.”

AIMS alumni surveys indicate that the vast majority of graduates go on to study for advanced degrees, mostly at South African universities but also in Europe and North America. It is unclear exactly how many return to their native lands, although every one of the dozen current students interviewed by *Science* said that they eventually would. Walter Mudzimbabwe of Zimbabwe, for example, plans to become an expert in a field that might benefit his hyperinflation-plagued homeland: financial mathematics. On the steps outside the AIMS building, Lydia Flore Mamoade—the first woman to attain a mathematics degree in her country—discusses her plans to earn a higher degree and then return home to the isolated Central African Republic.

AIMS accepts only about one in five applicants. Students, who are given free room and board, take a series of intensive 3-week courses from visiting lecturers, who live in the building and make themselves available day and night. Although some courses focus on “pure” math or physics, most are in the problem-solving realm of what Hahne calls “relevant” mathematics—for example, related to bioinformatics, finance, or astronomy. When physicist Robert de Mello Koch of the University of the Witwatersrand in Johannesburg teaches electromagnetism, he avoids textbook tutorials, instead assigning challenging problems and projects such as building electroscopes out of soda cans. Understanding “the magic of AIMS” is only possible if you spend time with students, he says, “to see how hard they engage with the material, how far they manage to go, and how much it changes them.”

Students appreciate their constant access to lecturers, a far cry from most of their university experiences. “The openness of lecturers, the nature of the material, the language—AIMS is completely different,” says Khaleel.

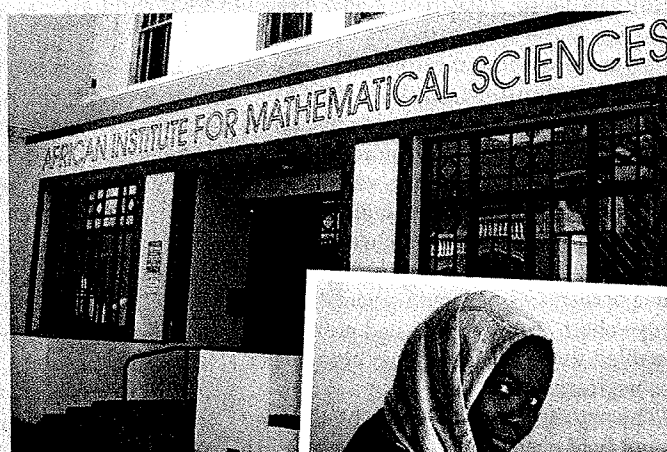
This April, having completed their classes, the students were all working on final essays: Audry Ayivor of Ghana tackled topology in the library while Namayanja sipped tea as she explored a bioinformatics problem.

Even though AIMS is at a beach resort near Cape Town, this year’s class has no South African students—and previous classes had only a handful of them—in part because the nation’s talented math graduates are quickly hired by industries to fulfill diversity goals. In an effort to attract more South Africans, AIMS plans to start a separate Honors program in biological mathematics next year.

This month, Hahne says, AIMS is addressing another shortcoming by opening a new Research Center in two renovated buildings across the street. Visiting scientists, with joint appointments at AIMS and other universities, will try to create a synergy with the institute by enlisting students to help with research projects.

Although the goal of developing an Albert Einstein in Africa may not happen in their lifetimes (see main text), AIMS students don’t discount the possibility. “There is a mountain of talent on this continent, but young people need opportunities to excel,” says David Unuigbo of Nigeria, who wants to pursue solid-state physics at the University of Cape Town. And Ethiopian student Amasalework Ayele Ejigu believes AIMS will help students find such chances, ultimately benefiting the whole continent: “We are finding an African unity through mathematics.”

—ROBERT KOENIG



AIMing high. Once a rundown hotel, a new math institute (*above*) now attracts top African students such as Esra Khaleel (*right*) of Sudan, who studies nuclear physics.

