

a serious bid to host another international collaboration, a radio astronomy project called the Square Kilometre Array (SKA), and participates in a third, the High Energy Stereoscopic System (HESS), a gamma ray telescope soon to be commissioned in neighboring Namibia. Gambling that such investments will keep South Africa a leader in the high-profile world of astronomy, the government also hopes that they will spark interest in science among young people (see sidebar at right), create opportunities for industry, and lure scientific resources to southern Africa.

"There's no way we can pay for our astronomy program on our own," says Rob Adam, director general of the Department of Science and Technology. "That would be mad. So we say to the rest of the world, 'Look, we have wonderful viewing conditions here, we have industry that can build much cheaper than anywhere else, plus we can maintain facilities.'" Out of that deal, Adam says, "we get high-cost infrastructure on our table."

South Africa is hoping to get back to where it once was: at the forefront of astronomy in the Southern Hemisphere. For example, a 1.9-meter optical telescope, predating World War II and standing a few hundred meters from SALT, was once the largest of its kind in the Southern Hemisphere. By the 1970s, however, 4-meter telescopes were cropping up in Chile, Australia, and other locales, rendering South Africa's scope nearly "obsolete and irrelevant," says SALT project scientist David Buckley.

The dismantling of apartheid opened the door to international funding and collaboration. In 1996, scientists at the McDonald Observatory near Fort Davis, Texas, paid a visit to the Cape Town headquarters of the South African Astronomical Observatory. They wanted to drum up interest in building a Southern Hemisphere equivalent of the Hobby-Eberly Telescope (HET), then under construction at the McDonald Observatory.

The timing was right. Astronomers were hungry for a new telescope, and crucially, the new government was eager to support a flagship project that would buoy one of its top scientific communities. Plus, HET's revolutionary design—a spherical mirror tilted at a fixed angle, optics to correct for the mirror's poor focusing ability, and a device to track star movement so that the mirror could remain stationary—meant that a world-class 10-meter telescope could be built for \$20 million, roughly the cost of a conventional 3-meter instrument. (Inflation has since increased the cost to \$30 million.)

Scheduled for completion early next year, SALT improves on the HET design. Its main mirror, like its cousin's, consists of an array of 91 hexagonal segments, but in SALT each is equipped with a dozen edge sensors as

South Africa's Own Shooting Star

CAPE TOWN, SOUTH AFRICA—Thebe Medupe takes a stroll under the brilliant southern sky, a protective hand on the shoulders of two of his astrophysics graduate students. Although Medupe turned 30 years old this year, his smooth, round face and unconstrained grin make him look more like a classmate of the two youngsters than their supervisor. It wasn't long ago that he was in their position, but they will not face the kind of obstacles that stood in his way.

In 1986, Medupe was 13 years old and living in a village with no running water outside Mafikeng in northern South Africa. This was the year that Halley's Comet came whipping through the solar system, firing Medupe with a passion for astronomy. Straightaway he built his own telescope—using a metal pipe that he cut and fitted with a pair of lenses borrowed from his school—and meticulously mapped the surface of the moon. "I was determined to become an astronomer," recalls Medupe.

Apartheid began to crumble just as Medupe was applying to universities, enabling him to become the first black astronomy student at the prestigious University of Cape Town (UCT). He stayed on to earn a cum laude distinction for his master's thesis and complete a Ph.D. on the interior structure of stars, and now he works at the South African Astronomical Observatory in Sutherland, where he continues to study stellar interiors.

Medupe has also taken on a mission: to attract black students into his field. Astronomy is one of the research communities in South Africa in which black scientists are most underrepresented, with only three among the country's 50 astronomers. Medupe sees two major barriers to transforming these demographics. There is little public outreach to attract black students into astronomy, he says, and those who do take it up "have no black role models to encourage them to go further." Medupe is tackling both these problems at once. "Thebe is an inspiration," beams Brian Warner, head of UCT's astronomy department.

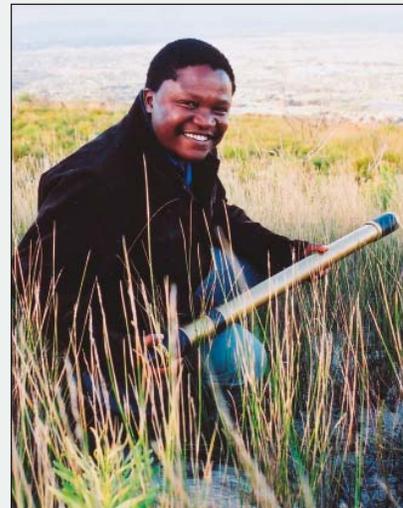
"During apartheid," Medupe says, "we were told that Africans have never been interested in science, and certainly not astronomy." To put the lie to this misrepresentation, Medupe teamed up with a pair of filmmakers and in 2002 traveled across Africa, visiting remote villages and collecting cosmological mythologies. The making of the film, called *Cosmic Africa*, transformed Medupe. "I know so much about the stars, yet I know so little about my own continent and how my own people are connected to the sky," he explains. The film has won praise at festivals in South Africa and later this month will be aired at the Hayden Planetarium in New York City.

Meanwhile, Medupe is guiding as many black astronomy students into postgraduate research as he can. In 2000, he set up a theoretical astrophysics research program back home at North West University in Mafikeng. When it started, the program didn't even have a room allocated to it—it "really was theoretical," quips Medupe. Four years later the program has plenty of room, including a new computer lab, and Medupe oversees a budding group of two master's and two Ph.D. students. And this year, Medupe is helping run a national program to pluck out the brightest astronomy students—particularly black postgrads at disadvantaged universities—and give them year-round access to the best teaching and research resources.

Medupe has high hopes that his efforts will bear fruit. "My dream is to start seeing top-quality black astronomy graduates running the facilities here," he says, "and participating on an equal basis with astronomers from around the world." It's unclear when that vision will be realized, but Warner believes it is inevitable. "You want to keep your standards high and hire on the basis of skill. So we need to increase the number of qualified black students."

In spite of Medupe's unbridled optimism, one thing still frustrates him. "I go to international astronomy conferences, and I'm almost always the only black face in the crowd." If he gets his way, Medupe will change that.

—J. B.



Humble beginnings. Thebe Medupe holds his first, homemade telescope.