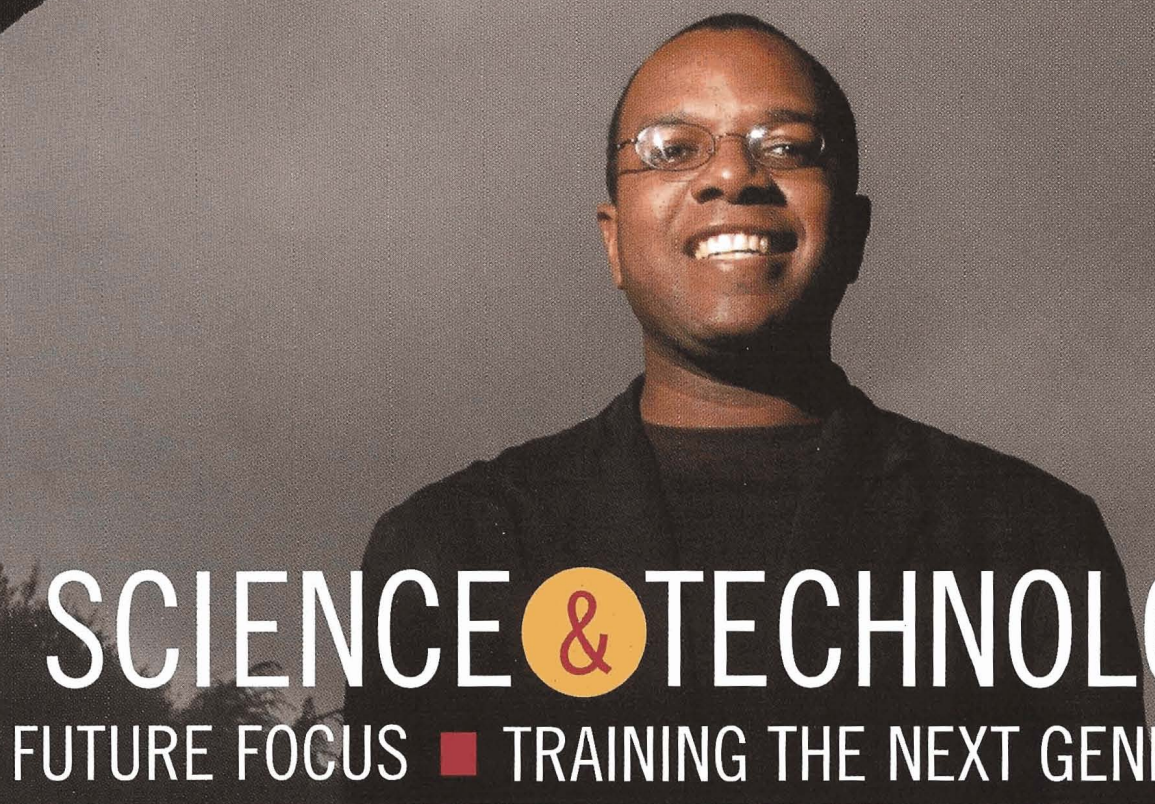


A CONVERSATION WITH LIBERIAN PRESIDENT ELLEN JOHNSON SIRLEAF

The CRISIS

thecrisismagazine.com



SCIENCE & TECHNOLOGY

FUTURE FOCUS ■ TRAINING THE NEXT GENERATION

+5

Visionaries in Math, Robotics,
Computer Technology,
Cancer and Stem Cell Research

Astrophysicist
Neil deGrasse Tyson

Science Fiction Writer
Octavia Butler

MAY/JUNE 2006

US \$3.00 CANADA \$4.00

06 >



74470 57686 0

Stanford University
Mathematician Jonathan
Farley uses lattice theories
to help address homeland
security and border issues

career turn into academia by joining the Systems and Control Group at the Georgia Institute of Technology in Atlanta. She now teaches classes and serves as the director for the Human-Automation Systems Laboratory, which she founded and where she and her students build and test robots.

Her stature in the technology community is not one that Howard takes lightly. "I want to make a big, big impact," she says. "I want to be remembered for changing the world."

Along those lines, one of Howard's major goals is to consciously work to increase the number of minorities and women in the engineering ranks. One of her key reasons for leaving JPL was to have more access to students, particularly African Americans and Latinos.

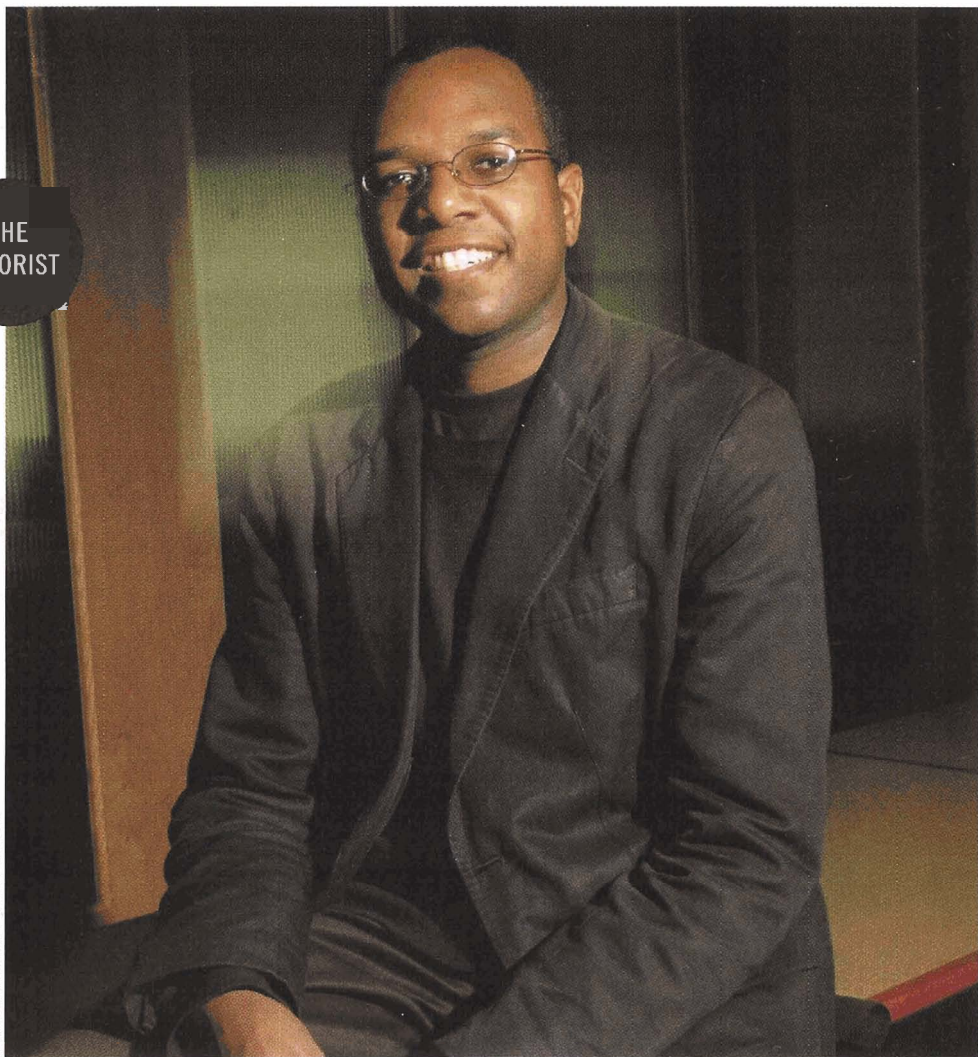
"I want to bring people in," Howard says. "I think there's a disconnect for underrepresented students because typically engineering is shown as a sterile environment, and culturally, this group of students wants interaction. They want an environment that they can touch and feel."

Howard wants to show students both the wealth of opportunity for human interaction and fulfilling work that engineering offers. For instance, her interests lie in creating robots that interact in the same environment with people. These could be household service robots, robots in hospitals, robots assisting with office security or robots interacting with astronauts. And, while Howard concedes this type of work is challenging, she says that people don't appreciate how "cool" it is. Besides that, she stresses that it has to be done — for our community's sake.

"Our students, our kids need to see us on TV getting the Nobel Prize or becoming [an academic] fellow," says Howard. "Only then will they know that those are goals that are attainable."

P. White is a freelance writer based in Atlanta

THE THEORIST



SEAN CONNELLEY FOR THE CRISIS

JONATHAN FARLEY MATHEMATICIAN

Thirty-six-year-old mathematician Jonathan Farley's efforts at solving decades-old math problems, applying lattice theory to U.S. homeland security efforts and constructing the perfect terrorist cell have put him, and the ventures he helped found, among the go-to sources for both Hollywood screenwriters and defense contractors.

Farley, a science fellow at Stanford University's Center for International Security and Cooperation, in August will become chairman of the department of mathematics and com-

puter science at the University of the West Indies in Jamaica.

"I want to build up the math department to be a highly regarded department," says the Brockport, N.Y., native. "And an integral part of that is having the funds to do it." Toward this end, Farley plans to establish the Institute for Mathematical Methods in Counter-terrorism as a way to help draw funds to the university.

Farley's affair with math began long before he graduated summa cum laude from Harvard University in 1991 and earned a doctorate in mathe-

matics from Oxford University in 1995. The youngest of four sons, all Harvard graduates, says their father, an economics professor, taught him math. Their mother, a professor of African American history, also had a profound impact on him. By age 14 he knew math would be his life.

Today, he specializes in lattice theory — an outgrowth of the study of Boolean algebras which provides a framework for studying hierarchy and ordered sets in math.

What led to this concentration? Farley says the "field

picked me. I love lattices.”

In college he began by proving simple lattice theories, then studying their quantum aspects. He wrote his junior and senior theses on lattices, but knew by his junior year that he “was definitely hooked at that point.”

His undergraduate work proved outstanding, according to Farley’s favorite mentor, Harvard neuroscience professor and administrator Dr. S. Allen Counter.

“Jonathan stands out because he is brilliant,” Counter says. “He has a great depth of field in mathematics, won numerous awards and solved math equations that have never been solved.”

Those problems included one posed by MIT Professor Richard P. Stanley at a 1981 conference — solved in 2003 — and another presented in 1964 by George Grätzer; Farley solved that one in 1998.

Three years ago, Farley, along with Lennox Farrell and Stefan Schmidt, a fellow lattice theorist, formed Phoenix Mathematics Inc., which incorporates reflexive and lattice theories in homeland security research. Lockheed Martin just recruited the company to work on border security, and a military research entity recently contacted the firm about possible work.

“We will do the fundamental math research and provide tools for the main experts, who will fine-tune it for the people who actually make the decisions about border patrol,” Farley explains.

“One thing we are definitely not doing: We’re not coming up with anything that’s going to stop terrorists or catch Osama Bin Laden. We’re creating tools that enable decisionmakers to make more logical decisions rather than relying on intuition or guess work.”

Victoria L. Hudson is a freelance journalist in the San Francisco Bay area.

DR. OLUFUNMILAYO OLOPADE BREAST CANCER RESEARCHER

or Olufunmilayo “Funmi” Olopade, an internationally acclaimed researcher of the genetic and environmental factors that affect breast cancer in Black women, multitasking is a necessity, even when she’s on vacation.

In mid-April, Olopade found time to tour the Great Wall of China a few days before starting a two-week visiting professorship at China Medical University in Shenyang.

As her colleagues enjoyed the view, Olopade endured a scratchy cellphone connection so she could answer questions about her research from a writer from the United States. It would have been easy for Olopade to brush the caller off, but that’s not her style.

“She tries to do as much as is humanly possible and

then some,” says Dawn Elliott, a clinical research associate at the University of Chicago Hospitals Cancer Risk Clinic, where Olopade serves as the director and a professor of medicine. “She loves her work.”

Olopade’s passionate study of the molecular genetics of breast cancer in African and African American women caught the attention of the John D. and Catherine T. MacArthur Foundation, which last year awarded her one of its “genius” grants. The \$500,000 gift was an acknowledgement of how the 49-year-old physician-scientist uses her research to develop innovative clinical practices in the United States and in Africa.

“Our work on women of color and breast cancer has



COURTESY UNIVERSITY OF CHICAGO

THE
“GENIUS”