BLACKS IN COMPUTER SCIENCE

THE SECRETS OF THEIR SUCCESS

By Theresa Sullivan Barger and Eric Addison

On its face, the news is great: After years of being labeled an "underrepresented minority" in computer science, blacks in the U.S. are on the brink of leaving that category, with bachelor's degrees in hand.

Since 1996–97, according to the federal government's National Center for Education Statistics, the number of black students receiving baccalaureates in the field has more than doubled, from 2,463 to 5,875. Just as significant, the percentage of blacks among computer science bachelor's degree-holders has been rising since 1998, and in 2006, blacks made up 12.4 percent of the candidates receiving those degrees, a proportion almost equal to that of blacks in the U.S. population (12.8 percent).

To use the national lexicon of diversity, blacks have nearly achieved "parity" in computer science at the bachelor's degree level, a remarkable achievement, especially when one considers the continuing lack of diversity in engineering, where blacks are getting significantly fewer bachelor's degrees — 3,355 in 2006 — and make up a significantly smaller percentage of the graduates: only 5 percent of the bachelor's degree recipients that year.

But beneath the skin of blacks' success in comp sci, there are signs of deep trouble. The number of students receiving degrees in the field, including all races and ethnicities, has shrunk by more than 12,000 over the past two years for which the federal government has figures: from 59,488 in 2003–04 to 47,480 in 2005–06. The number for blacks also fell, from 6,945 to 5,875 over the period.

The bottom line under the big picture: As comp sci seems to be losing its attractiveness for U.S. students in general, the field is becoming more black. And the causes of these two trends are open to debate.

SLOWING GROWTH

"Blacks have been underrepresented in most (science, technology, engineering and math) fields, so the fact that they're up in computer science is good," says demographer B. Lindsay Lowell, Ph.D., director of policy studies for the Institute for the Study of International Migration at Georgetown University.

But in a May 2008 article titled "Making the Grade," published in the science journal *Nature,* Dr. Lowell and Hal Salzman, Ph.D., senior faculty Fellow at Rutgers University's Heldrich Center for Workforce Development, said students have been steering away from computer science for good reason.

"When the IT industry was growing, the number of graduates in computer science kept pace, doubling over six years," they wrote. "Following the collapse of the IT industry bubble, the number of graduates fell by 17 percent between 2003 and 2005. Employment in this field is just now reaching the levels of the boom years but, *with little prospect of rapid growth, students seem to be wise in choosing other fields."*

U.S. Computer and Information Sciences Bachelor's Degrees Conferred

	Total # of Degrees	Degrees to Blacks	% to Blacks
2005–2006	**47,480**	**5,875**	**12.37%**
2004–2005	54,111	6,438	11.90%
2003–2004	59,488	6,945	11.67%
2002–2003	57,439	6,540	11.39%
2001–2002	47,299	5,030	10.63%
2000–2001	41,954	4,384	10.45%
1999–2000	36,195	3,527	9.74%
1998–1999	29,345	2,827	9.63%
1997–1998	26,852	2,701	10.06%
1996–1997	24,768	2,463	9.94%

Source: National Center for Education Statistics, Digest of Education Statistics

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Many demographers, including Dr. Salzman and Dr. Lowell, predict that near-term growth in information technology will be slow. And the U.S. Bureau of Labor Statistics says salaries in IT, which are much lower than they were before the dot-com bubble burst in 2000, will not grow as quickly as those in medicine, law or business.

Computer science and engineering are not the high-paying professions they used to be, Dr. Salzman tells *Career Engineer.*

"People who are just looking for a high-paying occupation are less likely to go into science and engineering than they were in the past," he says. If students "want to go into an area that is secure and high-paying, it's probably medicine. I don't know many people who would say computer science and engineering are going to hold as many opportunities."

YOUTHFUL OPTIMISM

While these demographers looking at the big picture predict a somewhat bleak future for computer science degree-holders, the young graduates we spoke with expressed job satisfaction and optimism.

"I think computer science is an open area right now," says NSBE member Joshua Meduoye, a sophomore computer science major at Morgan State University in Baltimore, Md. "It's the bedrock to various technologies that are going to come out in the future.... Various electrical engineers have told me I should switch to electrical engineering, as more companies are looking for that degree."

Meduoye, who was born in Nigeria, had an internship this summer at Cummins Inc. in Columbus, Ind. He is one of 970 of NSBE's 15,499 collegiate members who have or are pursuing computer science degrees. He says he chose computer science over computer engineering.

"I know myself to be a good thinker, a good problem-solver. I believe there's good potential (in this field)," he says. "I see myself in 10 years' time being an employer, not an employee."

DeVaris Brown, 24, a lifetime member of NSBE, is also bullish on the future of computer scientists. The Detroit resident earned a bachelor of science degree in math and computer science from the University of Illinois at Urbana-Champaign in 2006 and is an academic relations manager for Microsoft Corporation. He loves his job.

"This job is an extension of what I've always wanted to do: educate the masses about technology," he says.

He has observed that the IT jobs being sent off shore tend to require "manual" work, while "the jobs that require critical thinking stayed." He believes computer scientists who can script, program and integrate what they do into the needs of the business have job security. While still in college, he did research and had multiple internships. And when he

graduated, he says, he received several offers.

"The sky is the limit for me," Brown says. "I'm one of those people who can determine what the business needs. I have insight as to how to make things work and how to better the company's bottom line.... As a black person, you are probably one of the most highly sought out people coming out of college."

MID-CAREER BLUES?

But what's down the road for these 20-something computer scientists? According to Dr. Salzman, the Rutgers University demographer, most mid-career engineers and computer scientists are pessimistic.

"There are very few who would recommend that their son or daughter go into engineering or computer science," he says. "Few of them see it as a high-growth field."

In addition, says Norman Matloff, Ph.D., professor of computer science at the University of California at Davis, the offshoring of jobs, and the H-1B visa program — which allows non-U.S. citizens in IT, engineering and certain other high-skill professions to live in the U.S. as temporary workers — are contributing to salary stagnation.

"My attitude (during the dot-com boom) was, if there is a profession where certain groups are underrepresented, it would be good to get them in there. But are we doing them a favor?" Dr. Matloff asks. Even in 1998 and 1999, he says, "people with Ph.D.s weren't getting jobs. The H-1B (visa) is about age: Older people cost more. And by older I mean 35 and up. The H-1B program gives employers an outlet, so they don't have to hire the older Americans.

"If you're a programmer…over the age of 35, you are really at risk of losing your job to an H-1B worker," Dr. Matloff continues. "Are we doing black people a favor by encouraging them to major in this field, when at age 35 they're going to suffer age discrimination along with anyone else, as well as racial discrimination?"

"Computers were very hot (in the late '90s)," says NSBE member Felix Njeh, 40, a computer sciences doctoral candidate and an adjunct professor in the Computer Science department at Bowie State University in Bowie, Md. "…Some parents thought computers were the way to go. When I advise students, I tell them the job market is not the same anymore.… I don't think the black parents know that."

'PLENTY OF JOBS'

Electrical engineer Mitch Duncan, 44, a senior technical writer for Microsoft Corporation, has a decidedly different take on aging in his field. He is happy with his job and optimistic about his future and that of others, as long as they take charge of their careers, constantly learn new skills and look for different and challenging opportunities.

There will always be work for those who are passionate and who keep abreast of changes in the industry,

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Employment Projections – Computer Occupations				
			Change 2006–2016	
	Employment, 2006	Projected Employment, 2016	Number of Jobs	Percent
Computer Programmers	435,000	417,000	-18,000	-4%
Computer Scientists and Database Administrators	542,000	742,000	+200,000	+37%
Computer Software Engineers	857,000	1,181,000	+324,000	+38%
Computer Systems Analysts	504,000	650,000	+146,000	+29%
Computer Hardware Engineers	79,000	82,000	+3,600	+5%
Electrical and Electronics Engineers	291,000	306,000	+15,000	+5%
Computer Support Specialists and Systems Administrators	862,000	1,016,000	+155,000	+18%
Source: U.S. Bureau of Labor Statistics, Occupational Outlook Handbook				

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says Duncan, a NSBE member who held a workshop at this year's NSBE Annual National Convention. He's done several different jobs in the 20 years he's been at Microsoft, working in the corporate headquarters, in the field and now as a technical writer. Along the way, he's read books, taught himself or been mentored to learn new skills. He is working on a master of computer science degree at Arizona State University.

Having the degree "gets you to the table," he says. But to get hired and succeed, "You have to show you're a geek. I'm a hobbyist. I live it. I breathe it."

Darlene Fox, who earned a degree in computer science, has 28 years with The Boeing Company, where she is now a manager of noise, weight and scientific computing. "I honestly feel there are going to be plenty of jobs in this field," she says. But you can't get stagnant, even if you are doing a good job, she says: "You really have to manage your career."

COMP SCI V. ENGINEERING

So why the difference in degree numbers for blacks in computer science and engineering? Some say the reason lies in black students' familiarity and level of comfort with the subject matter.

"In my generation, (working with) computers is something you just know how to do," says NSBE National Chair Stevenson A. Dunn Jr., 23, a junior majoring in civil engineering at Polytechnic Institute of New York University in Brooklyn, N.Y. "It becomes fundamental to a child's development, even in lower income households."

Black students, many argue, do not get such early exposure to engineering, especially not through black role models in the field.

When black, college-bound students consider careers, they draw from what they know and see, says Makola Abdullah, Ph.D., dean of the College of Engineering Sciences, Technology and Agriculture at historically black Florida A&M University. They choose majors in areas they think will help their community, he says, such as law, education, law enforcement, social work, media, psychology and entertainment. They don't pick engineering as much, he continues, because black engineers are not visible enough.

"We need to do a better a job of educating our community," says Dr. Abdullah, a former NSBE chapter advisor. "It's ultimately the responsibility of black engineers and computer scientists to make sure that we're relevant in the community."

NSBE Executive Director Carl B. Mack couldn't agree more. That's why NSBE had a summer camp program that reached 600 third, fourth and fifth graders in Washington, D.C., and Columbus, Ohio, this year, he says. Through the Summer Engineering Experience for Kids (SEEK) Camp, 70 black engineering students led the campers in hands-on engineering experiments. With corporate grants, he says, NSBE hopes to expand the free camp to tens of thousands of kids within three years.

"That's what we have to do to get to these kids," Mack says. "When they see hundreds of black engineers, they say, 'I'm going to be one, too.' "

But even among black students who know what engineers do, computer science has more appeal to some.

NSBE member Hortense Burt is an engineer and manager of Education Projects at Kennedy Space Center in Florida. But after years of saying he was going to major in engineering, her son, a recent high school graduate, decided to major in computer science.

"He thinks it's an easier major," she says.

Dr. Lowell of Georgetown University puts it another way: "(Computer science) is much more open. The requirements for getting into it are much broader. To get into engineering, students have to have calculus and trigonometry.... Programming doesn't require the math skills."

"Math is one area where black students are not as well-prepared when they come to the university," Felix Njeh of Bowie State says. "You have to have a very sound background in math to do well in engineering.... If you don't have a good background in math and physics, you will not survive. In computer science, you might get away with it."

But just as in engineering, succeeding in computer science requires a good long-term career plan, Dr. Matloff says. He cites a Nov. 1, 2004 article from *IEEE Spectrum* titled "Electrical Engineering's Identity Crisis." The article said roughly one-third of electrical engineering and computer science majors at MIT view their bachelor's degrees as "a sort of technical liberal arts degree that prepares them for a wide range of technical and nontechnical jobs. Indeed, after earning their undergraduate degrees, about a quarter of MIT students go directly into jobs in finance or management consulting."

"I think that's very shrewd of them," he says. ■

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