

NSBE bridge

THE NATIONAL SOCIETY OF BLACK ENGINEERS' PRE-COLLEGE MAGAZINE

WINTER 2017

Graduating
10,000
African-American
Engineers

*Dorothy
Vaughan*



*Mary
Jackson*

Hidden Figures BLACK STARS OF MATHEMATICS

SPECIAL MATH ISSUE



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ABOUT NSBE

The National Society of Black Engineers (NSBE), with nearly 16,000 active members, is one of the largest student-governed organizations based in the U.S. NSBE's mission is to increase the number of culturally responsible Black Engineers who excel academically, succeed professionally and positively impact the community. NSBE comprises more than 150 chapters on college and university campuses, nearly 60 NSBE Professionals chapters and interest groups and 77 NSBE Jr. chapters, in North America, Africa and the Caribbean. The U.S. chapters are divided geographically into six regions. NSBE had its genesis in April 1975. In 1976, NSBE was incorporated as a nonprofit organization in the State of Texas and also became recognized as a tax-exempt organization under Section 501 (c)(3) of the Internal Revenue Code.

The NSBE torch symbolizes our everlasting, burning desire to achieve success in this competitive society and to effect a positive change in the quality of life of all people. The lightning bolt represents the striking impact that will be felt by the Society and industry due to the contributions and accomplishments made by dedicated members of the National Society of Black Engineers.

For more information, visit www.nsbe.org.

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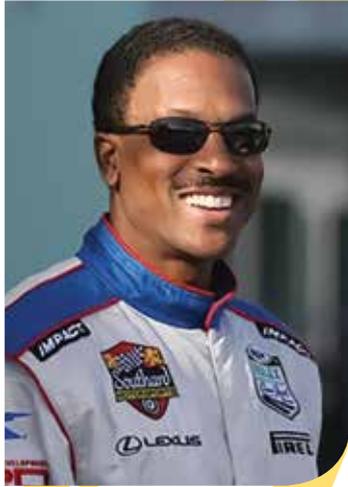
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An Engineer and NASCAR Pioneer Steers Youth to Knowledge of STEM

Driven



Bill Lester travels the country with a simple message for kids: exposure to STEM is a good thing.

As one of only three African Americans — and the last — to race in the top-level NASCAR Sprint Cup Series, Bill Lester was a trailblazer in a sport that is second only to the National Football League in fan base and television viewers. From his first professional race in 1989 to his last in a NASCAR-sanctioned sports car race in 2012, Lester, a trained engineer, had a long and fruitful career in an occupation not well-known for its diversity or reliance on engineering principles.

Now off of the racing circuit, Lester is using the exposure provided by his NASCAR fame to share his story with young black and brown kids and to promote science, technology, engineering and math (STEM) as a platform for career and life success.

“Blacks aren’t typically associated with NASCAR,” says Lester, 55. “But, having been on a Honey Nut Cheerios box for a couple of years, staring at kids across the breakfast table, (I know) it makes them sit up and notice.”

Eschewing a traditional business suit for a flame-retardant racing suit adorned with his numerous sponsors, Lester travels the country with a simple message: exposure to STEM is a good thing.

“What they see, they will be,” he says. “My dad exposed me to racing at an early age. I was always interested in cars, but I never thought of racing until I saw a race. The same with STEM: exposure is key. Am I trying to convince them to become race car drivers? No. I tell them to find their passion. A STEM platform is the great foundation. If it wasn’t for a STEM and science background, I never would’ve accomplished what I’ve done.”

“Am I trying to convince them to become race car drivers? No. I tell them to find their passion. A STEM platform is the great foundation.”

— Bill Lester

A TECHNOLOGY SPORT

Lester’s own STEM story includes graduating from the University of California, Berkeley with a Bachelor of Science degree in electrical engineering and computer science, in 1983. Upon graduation, he launched his professional career as a software development engineer at Hewlett-Packard Company (now HP Inc.), where he had interned for three previous summers as a student at Berkeley. Yet, even as he was writing diagnostic code to troubleshoot computer workstations and server systems, his desire to race cars was part of his DNA.

He began driving part time in regional races in the Sports Car Club of America, earning 1985 Rookie of the Year and 1986 Regional Class Champion honors. Even after he was promoted to research and development manager at HP, responsible for leading a team that produced diagnostic software tools, Lester continued in the sport, driving in his first professional sports car race in 1989.

Then the breakthrough moment arrived. In 1998, at 37 years old and 15 years into his career with HP, Lester was convinced by his wife, Cheryl, that the time had come for him to hit the racing circuit on a full-time basis. She was supportive of his dream and recognized that her husband was a race car driver as well as an engineer.

By Kevin M. Briscoe



to Drive

Lester is one of only three African Americans to race in the top-level NASCAR Sprint Cup Series.

“Going into the relationship, she knew my real passion was not in engineering,” Lester said. “I got into engineering because I wanted to be a race car driver. I wasn’t born with a silver spoon: I needed an occupation to support me.”

Once on the racing circuit, Lester found that his engineering background gave him a leg up on some of his competition.

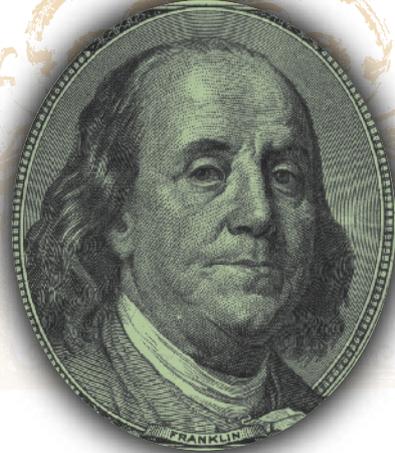
“NASCAR started as a grassroots organization, flying by the seat of their pants to get a feel for what worked and what didn’t,” he says. “But now, NASCAR is a technology sport. Computers and engineering have taken over the NASCAR landscape. Most guys struggled with that, but, for me, I was like a fish (in) water.” ■

Kevin M. Briscoe is a writer based in Atlanta, Ga., and a former editor of NSBE Bridge.



CASH FOR COLLEGE

CASH FOR COLLEGE



BLACKS AT MICROSOFT SCHOLARSHIPS

Deadline to Apply: March 1, 2017
Award Amount: \$5,000 (annual, renewable)
Number of Awards Available: 2
Provided By: Blacks at Microsoft (BAM)

Description: Blacks at Microsoft (BAM) is a company-sponsored employee network dedicated to supporting the continued growth and development of black employees at Microsoft Corporation. This year, BAM will award two scholarships to outstanding high school seniors who are interested in pursuing careers in technology. To be considered for a BAM Scholarship, applicants must be high school seniors of African descent; plan to attend a four-year college or university in the fall of the year after high-school graduation; plan to pursue a bachelor's degree in engineering, computer science, computer information systems or select business programs; demonstrate a passion for technology; demonstrate leadership at school or in the community; have a cumulative GPA of 3.3 or higher and require financial assistance to attend college.

How to Apply: Download the application at <https://www.microsoft.com/en-us/diversity/programs/blacks-scholarships.aspx>.

SUPERPOWER SCHOLARSHIP

Deadline to Apply: March 31, 2017
Award Amount: \$2,500 (annual, nonrenewable)
Number of Awards Available: 1
Provided By: Unigo (EducationDynamics)

Description: Have you ever wondered where you'd go if you could fly around downtown? Or maybe you daydream of secretly taking over the world. For all of you hero lovers and villain enthusiasts, this scholarship can give you the power to win free college money. Applicants must answer this question in

250 words or less: "Which superhero or villain would you want to change places with for a day and why?" The scholarship sponsor wants to know how you would use your super powers for good, or bad, even if it were just for the day. To be considered for this scholarship, you must be a legal resident of the 50 United States or the District of Columbia, aged

13 or older and enrolled or planning to enroll in an accredited postsecondary institution of higher education in the U.S. before Dec. 31, 2023.

How to Apply: Visit <https://www.unigo.com/match/scholarshipdetail/superpower-scholarship-2017/4825>, for the application, complete scholarship rules and more information.

ALL ABOUT EDUCATION SCHOLARSHIP

Deadline to Apply: April 30, 2017
Award Amount: \$3,000 (annual, nonrenewable)
Number of Awards Available: 1
Provided By: Unigo (Education Dynamics)

Description: It's often been said that "education is the key to success." But it's not cheap to get a college degree, and many college-bound students see a shut door for education. The sponsor of this scholarship wants to help open it again. Let the scholarship sponsor know, in 250 words or less, how winning a \$3,000 "All About Education Scholarship" could help make a difference in your life. Eligible applicants are students aged 13 or older who are legal U.S. residents of the 50 United States and are enrolled in or planning to attend an accredited postsecondary institutions of higher education in the U.S. on or before Dec. 31, 2023. Applications will be judged based on the applicants' writing ability, creativity, originality and overall excellence.

How to Apply: Visit <https://www.unigo.com/scholarships/our-scholarships/all-about-education-scholarship>, for the application, complete scholarship rules and more information.

Health and Wellness for All

By Kevin M. Briscoe

When Portia Singh was an undergraduate student at Grambling State University, she made a decision that changed the course of her career and placed health and wellness near the center of her life.

“My advisor encouraged me to apply to a program that was (designed to get) minority students interested in pursuing a Ph.D. in biological sciences,” she says. “I was a computer science major and hadn’t really thought I could apply computer science to biology.”

Later, while enrolled in the Ph.D. program in biomedical engineering at Carnegie Mellon University, she started doing research at the school’s Quality of Life Technology Center. The center focuses on developing “intelligent systems” that enable elderly adults and people with disabilities to live more independently. Intelligent systems are high-tech machines that perceive the world around them and respond to it.

“I fell in love with the field of research, as it allows me to combine many skills and interests together to provide solutions to help people,” says Dr. Singh, who is now a researcher and engineer at Philips Research North America, in Cambridge, Mass., and a member of NSBE’s Boston Professionals Chapter.

“When an elderly person, like your grandmother or grandfather, begins to age, many family members and friends work together to help that person keep a good quality of life. My current work looks at using mobile smartphone technology and mobile apps to provide tools for family and friends to organize the help they provide to the elderly person. Additionally, we provide technology, like tablets and easy-to-use apps, to the elderly, to assist them in taking care of their health at home.”

To accomplish her work, Dr. Singh uses science, technology, engineering and math (STEM) tools such as signal processing, statistical modeling, machine learning, wearable sensing technologies and mobile technology.

Dr. Singh is a fitness enthusiast as well as an engineer. In her off time, she leads a women-only dance fitness program called the “Boss Chick Dance Workout,” which is a “hip hop-inspired workout that hopes to give women a safe place

to have fun, work out and get support from other women to better their health.”

“This is a hobby of mine that is not directly related to my work at Philips,” Dr. Singh explains. “However, it does bring into focus...the importance of exercise to future health and well-being.”

She is also learning skills to be certified to provide exercise training to the elderly.

Besides her involvement with NSBE, Dr. Singh is a member of Alpha Kappa Alpha Sorority, Inc. and the Institute



Portia Singh, Ph.D.

“... We provide technology, like tablets and easy-to-use apps, to the elderly, to assist them in taking care of their health at home.”

– Dr. Portia Singh, Philips Research North America

of Electrical and Electronics Engineers (IEEE). She enjoys working with all of these organizations to participate in social activities as well as community service, including mentoring young men and women who are applying to graduate school and helping them secure graduate school funding and engage in STEM research. ■



BASED ON THE UNTOLD TRUE STORY

MEET THE WOMEN YOU DON'T KNOW,
BEHIND THE MISSION YOU DO.

HIDDEN FIGURES



FOX 2000 PICTURES PRESENTS A CHELSEA ENTERTAINMENT / LEVANTINE FILMS PRODUCTION "HIDDEN FIGURES"
TARA R. JENSON OCTAVIA SPENCER JANELLE MONAE KEVIN COSTNER KRISTEN DUNST JILL PASMORE PHOENIX ZIMMER PHOENIX WILLIAMS & BENJAMIN WALLERSCHE EGGS HENEE EBHOLUCH KALFOS PH PETER TESCHNER "GISH" WYNN THOMAS
MUSIC BY MANDY WALZER ASC ASC JAZZ JAMAL DANIEL RENEE WITT RYANA DONNERDIO IAN VALDES KEVIN HALLURAN ***DJONNA FIGUEROA PH PETER CHEBIB PH JENNIFER TIPPING PH PHOENIX WILLIAMS PH THEODORE MELTZ PH
CASTING BY MARGOT LEE SMETTERLY PH ALLISON SCHROEDER PH AND TREASURE MELTZ PH THE DOORE MELTZ PH (MUSIC BY JAZZ '14)
PG PARENTS STRONGLY CAUTIONED
EXCLUSIVE ENGAGEMENTS START DECEMBER 25TH. OPENS EVERYWHERE JANUARY 6TH.

NSBE Jr. Members Uncover 'Hidden Figures'

A group of NSBE Jr. members from Chamblee Charter High School in suburban Atlanta – Destinee Gant, 17, Joshua Ani, 16, and Ryan Cotton, 17 – were part of a select group last April to visit the set of “Hidden Figures,” an upcoming Hollywood film that chronicles the largely unknown contributions of black female mathematicians to the early U.S. space program.

The film stars Taraji P. Henson, an Academy Award nominee and star of Fox’s hit TV show “Empire,” as Katherine Johnson; Oscar winner Octavia Spencer (“The Help”) as Dorothy Vaughan; and six-time Grammy nominee Janelle Monae as Mary Jackson. Oscar winner Kevin Costner, CBS’ “The Big Bang Theory” star Jim Parsons and Kirsten Dunst co-star.

For the Chamblee NSBE Jr. students, the field trip was not only a learning experience and a chance to meet with Hollywood stars, it was also additional recognition of their own math prowess: they were part of the four-member team that took first place in the Upper Division of NSBE’s national Try-Math-A-Lon competition this past March. Seated with an international group of science journalists on the film set, the young technologists-in-training were treated to a firsthand look at the movie business at work – long hours, flurries of activity, endless wait times – while learning a story that goes beyond the familiar names of astronauts John Glenn, Neil Armstrong and Buzz Aldrin.

“I think about how hard these women worked and how they weren’t appreciated or celebrated until now,” said Gant, who was then a senior with plans to attend Tuskegee University in the fall. “For it to have taken so long for their story to be told or even given any recognition is crazy.”

“I had never heard about the ‘female computers’ before. I’m honestly surprised that I haven’t,” added Cotton, an aspiring civil engineer. “I think it’s sad they needed to struggle for recognition so much. I think it’s even sadder that we, as black people, aren’t being taught or teaching others about them.”

But, there is a lesson to be learned, said Ani: “We can learn



(left to right) NSBE Jr. members Destinee Gant, Ryan Cotton and Joshua Ani on the set of “Hidden Figures” in Atlanta, in April

that success is (not linked) to one’s appearance and that we shouldn’t let other people’s judgments define us.”

‘IN THE PRESENCE OF GREATNESS’

“Hidden Figures” is based on a book of the same name by Margo Lee Shetterly, founder of the Human Computer Project. On her website, Shetterly stated that, “ ‘Hidden Figures’ recovers the history of these pioneering women and situates it in the intersection of the defining movements of the American century: the Cold War, the Space Race, the Civil Rights movement, and the quest for gender equality.”

The racial and gender differences were obvious: the women

CONTINUED ON PAGE 8

By Kevin M. Briscoe

"I think about how hard these women worked and how they weren't appreciated or celebrated until now. For it to have taken so long for their story to be told or even given any recognition is crazy."
— Destinee Gant



CONTINUED FROM PAGE 7

mathematicians — or “computers,” as they were called then — were segregated from their male colleagues and even further separated by race. But Katherine Johnson rose above it.

“I was in the presence of greatness,” said the actor Henson to the NSBE Jr. group, when recalling her interactions with Johnson. “She was humble, never saying ‘I,’ always ‘we.’ She didn’t think about the problem. Was it hard? Yes. But, there was no time to complain. She had to rise above it. She had to (help) get a man to the moon.”

Considered a math prodigy, Johnson graduated summa cum laude from West Virginia State College in 1937 at age 18 with degrees in math and French. The next year, she was the first African-American woman to attend the graduate school at West Virginia University. Later, dissatisfied in her early career as a teacher, she joined the National Advisory Committee for Aeronautics (NACA), the predecessor to the modern-day NASA, as a “computer” in 1953, supervised by Vaughan.

Through her mastery of analytic geometry, she gained the respect of her male colleagues by calculating the trajectory for the 1959 space flight of astronaut Alan Shepard, the first American in space, and the launch window for his 1961 Mercury mission. She was even called upon to verify the calculations of the *electronic* computers used in John Glenn’s 1962 orbit around Earth, lending credibility to the use of the then-new technology. She went on to work on the Apollo program, the Space Shuttle program and plans for a mission to Mars, before retiring in 1986.

BELATED HONORS

“Locked out of the room, she actually saved lives,” said Costner, referencing Johnson’s work to get the ill-fated Apollo

13 crew back to Earth after an oxygen tank explosion aborted their mission. “I want to be (Katherine Johnson), because she didn’t want to get lost in history.”

CONTINUED ON PAGE 10



"I think it's sad they needed to struggle for recognition so much. I think it's even sadder that we, as black people, aren't being taught or teaching others about them."

— Ryan Cotton



“Locked out of the room, she actually saved lives... I want to be (Katherine Johnson), because she didn’t want to get lost in history.”

– Kevin Costner



MORE ABOUT GREAT BLACKS IN MATH

10 Famous Black Mathematicians and Their Contributions

<http://www.famous-mathematicians.com/10-famous-black-mathematicians-and-their-contributions>

Who Are the Greatest Black Mathematicians?

<http://www.math.buffalo.edu/mad/madgreatest.html>

9 Great African American Mathematicians

<http://www.dreambox.com/blog/in-honor-of-black-history-month-3-great-african-american-mathematicians>

Erica Walker: Beyond Baneker: Black Mathematicians and the Paths to Excellence

<https://www.youtube.com/watch?v=FpID36hRhWE>

National Association of Mathematicians

<http://www.nam-math.org>



The Chamblee High School NSBE Jr. Upper Division Try-Math-A-Lon team enjoys a moment in the lights, after taking first place honors at NSBE’s 2016 Annual Convention, in Boston. Team member Mohammed Bouh is at far right.

“We can learn that success is (not linked) to one’s appearance and that we shouldn’t let other people’s judgments define us.” – Joshua Ani



CONTINUED FROM PAGE 8

And, yet, only recently are Johnson’s contributions — and those of her colleagues — getting national attention. President Barack Obama awarded Johnson the nation’s highest civilian honor, the Presidential Medal of Freedom, in November 2015, citing her as a pioneering example of African-American women in STEM. This past May, the new Katherine G. Johnson Computational Research Facility was formally dedicated at NASA’s Langley Research Center in Hampton, Va. “Hidden Figures” also wrapped up shooting in Atlanta in May and is scheduled for release on Jan. 6.

At press time, the Johnson, now 97, continues to reside in Hampton, Va. ■

Kevin M. Briscoe is a writer based in Atlanta, Ga., and a former editor of NSBE Bridge.



Dr. Rudy Horne of Morehouse College with the late, great journalist Gwen Ifill in January 2013, at the U.S. presidential Inaugural Ball sponsored by *The Washington Post*, *TheRoot* and the Smithsonian National Museum of American History

Morehouse Professor Stars as a Movie Math Consultant

By Kevin M. Briscoe

Breaking into the movie business happened purely by chance for Morehouse College math professor Rudy Horne, Ph.D. Now, he is listed among the closing credits for the upcoming Fox 2000 Pictures release of “Hidden Figures,” which shines a long-overdue spotlight on the black female mathematicians who calculated the trajectories of launches in the early U.S. space program.

“Some folks involved in filming (the movie) were scouting locations and came across Morehouse College (an historically black institution), which became one of the locations used in the film,” says Dr. Horne. “The production designer, Wynn Thomas, called the chair of the mathematics department, Dr. Duane Cooper, and asked him if there was a mathematician who would have some knowledge of NASA and the mathematics involved in reentry mechanics. My chair recommended me for the job.”

As the math consultant for the film, Dr. Horne, who holds multiple degrees in physics and applied mathematics from the University of Oklahoma and the University of Colorado Boulder, provided relevant background information for a number of scenes by verifying calculations and training the cast to write equations while on camera. Working on the film gave Dr. Horne a front-row seat in the recreation of a history of which he was unaware.

“The most appealing thing about this movie is the story itself,” he says. “The fact that three African-American women were an integral part of a group of people at NASA working to get John Glenn into Earth’s orbit and return him safely is an amazing part of history.” ■

Students + Math + Music = Success?

By Frank McCoy

If Prince was right that the Broadway musical “Hamilton” is “the best history class ever,” then maybe music can also put young students on a path to high achievement through math.

Herbie Hancock (www.herbiehancock.com), the Grammy Award-winning jazz musician, is convinced that music will do just that. So he suggested that the U.S.

Department of Education work to combine (“integrate”) math and music courses to attract youth and encourage them to consider careers in science, technology, engineering or math (STEM).

As a boy, Hancock investigated mechanical devices with the inquisitive mind that led him to play piano and then study electrical engineering at Grinnell College, before he became a jazz professional.

“It was that same instinct that I have that made me learn jazz more quickly...” he told *The Washington Post* newspaper this past April. “It wasn’t a talent for music. It was a talent for being able to analyze things and figure out the details.”

Hancock is the chairman of the Thelonious Monk Institute of Jazz, which has worked with another organization named MusEDLab to create an online toolkit for teachers: MathScienceMusic.org. The toolkit combines math, science and music in 10 interactive apps for students in kindergarten through high school. At the website, children can use the “SCRATCH JAZZ: music + coding” app to create their own music using the basic coding platform “Scratch” (<https://scratch.mit.edu>). Another app, “GROOVE PIZZA: shapes + angles + grooves,” is a beat box generator. Users of the app draw lines and shapes on a circle that rotates, and then they add or subtract line and shape “toppings” to create individual sounds and grooves, which they can enhance using another program or export to their friends.

Hancock is one of many black musicians whose compositions



Jazz musician Herbie Hancock at the U.S. Department of Education, in Washington, D.C. (April 26, 2016)

use the link between math and music, by adding, subtracting, multiplying and dividing musical elements.

OTHER BLACK MUSIC MATHEMATICIANS

This past July, astrophysicist and Dartmouth College professor Stephon Alexander gave a TED Talk about the physics of jazz (<https://www.youtube.com/watch?v=90bjRafoPOQ>), based

on the work of the great jazz saxophonist John Coltrane. After seeing a drawing of Coltrane’s musical composition “Giant Steps,” Alexander wrote in *Business Insider* that, “I thought the diagram was related to another and seemingly unrelated field of study — quantum gravity... What I had

realized...was that the same geometric principle that motivated Einstein’s theory was reflected in Coltrane’s diagram.”

Thelonious Monk, a premier jazz pianist, said that, “All musicians are subconsciously mathematicians.”

Celebrated physicist S. James Gates, a professor at the University of Maryland, spoke in a video on the topic “Math Meets Music: The Surprising Symmetry of String Theory and Schoenberg.” (<https://www.youtube.com/watch?v=6CLpuPsarxo>)

MATH AND HIP HOP

Music and audio producers such as J Dilla, Dr. Dre, Timbaland and Kanye West may not use math symbols to create, bend and distort synthetic sounds and musical samples, but they follow the same principles. Plus check out how drummer Clayton Cameron’s TED video explains “A-rhythm-etic: The Math Behind the Beats” (<https://www.youtube.com/watch?v=bkY-o07h7T4>), and learn how geometry is a basis of math and hip hop dancing at <http://mathipop.weebly.com/math-in-hip-hop.html>. For more connections, search for “math and hip hop.” ■

“It wasn’t a talent for music. It was a talent for being able to analyze things and figure out the details.”

— Herbie Hancock

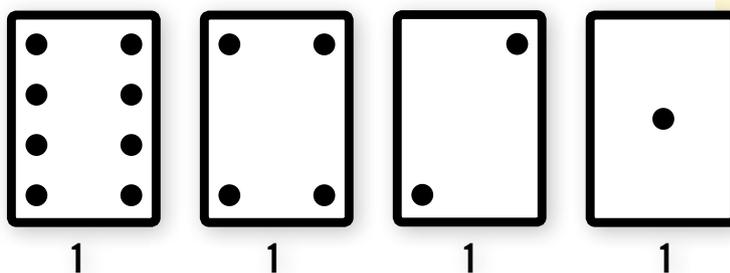
Learning the 'Hidden Figures' Inside of Computers

By Michael D. Alston, Ph.D.

In 1948, a researcher named Claude Shannon published a paper that explained how best to encode information – such as text, sound, photos and TV signals – to be sent from one location to another. His answer was *binary digits*, called “bits” for short, which can be sent from one place to another without mistakes if enough energy and time are provided to send them. This discovery started a new field called “Information Theory,” and it led to a new and popular way of sending and receiving information, called “digital communications.”

INTRODUCTION TO BINARY DIGITS

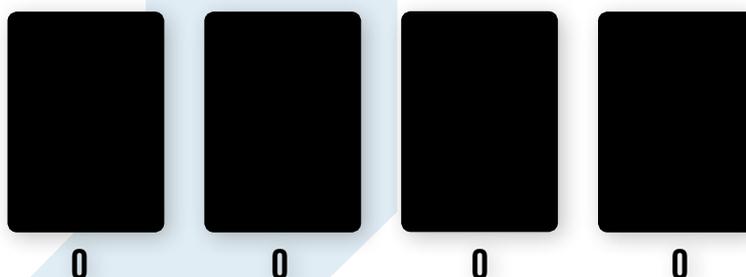
Let's explore together how binary digits work. Take four index cards, or tear a piece of paper into four parts, and mark large dots on each card like this:



Each card can be turned “on” or turned “off” by flipping it over. As shown above, all four cards are turned “on” (facing up).

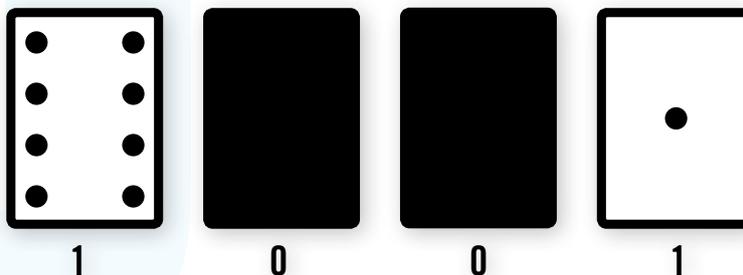
Q1) How many dots, total, are showing on the cards that are turned “on” (facing up)?

Now flip all four cards off (facing down), like this:



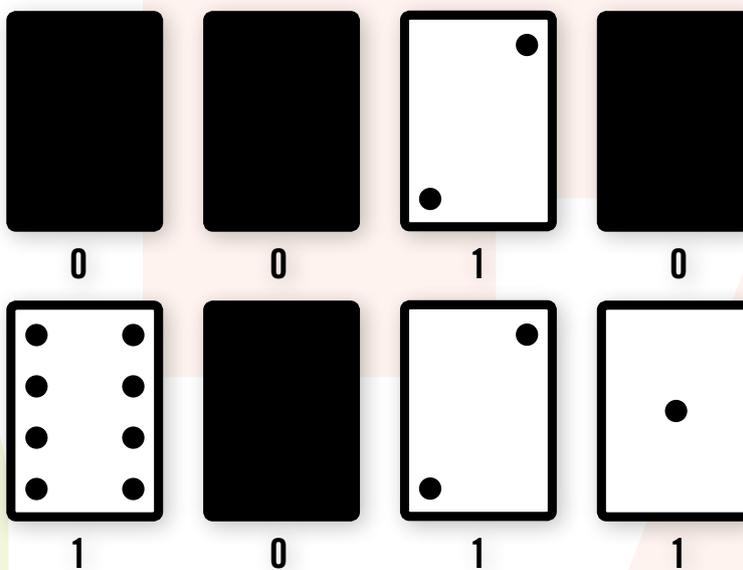
Q2) How many dots, total, are showing on the cards?

Now flip a couple of the cards to form this “on” and “off” pattern:



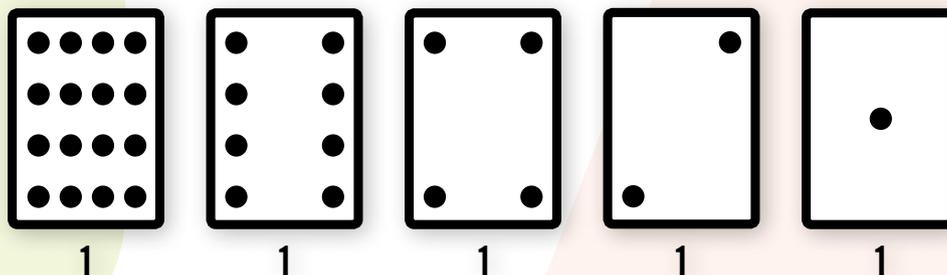
Q3) How many dots (total) are showing on the cards?

Notice the digits, 1 or 0, below each card: 1 if the card is “on,” 0 if the card is “off.” 1 and 0 are the digits of the binary number system. Here are two of the 16 different ways the four cards can be flipped.



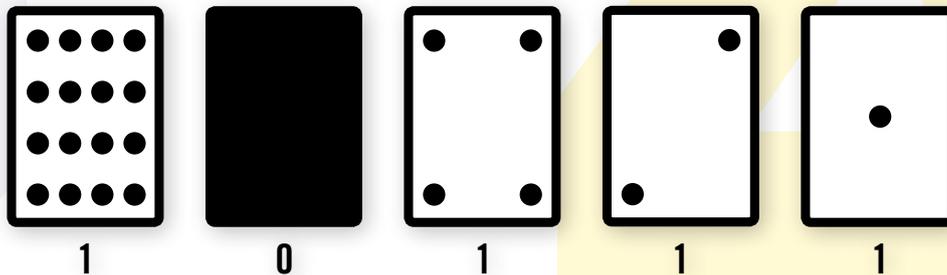
Q4) How many dots, total, are showing on the cards?

Let’s add one more card to the left, for a total of five cards.



Q5) How many dots, total, are showing on the cards?

Now flip your cards “on” or “off” to form this pattern:



Q6) How many dots (total) are showing on the cards?

1101
10010
11101

Q7) Now you are ready to interpret bit patterns WITHOUT relying on dotted cards. What do these bit patterns represent?

BINARY DIGITS: SUMMING IT UP

Using dotted cards, we have explored how the binary digits, 0 and 1, can be used to represent decimal numbers such as 7, 2, 31, 23, etc. Digital communications are implemented with billions of tiny transistors designed into circuits. Like the cards in our exercises above, the transistors switch on and off. They do that rapidly, millions of times per second on a microchip in your cellphone.

Here are links to two of the many free videos online that may teach you more:

Demonstration of a Mechanical Binary Counter

<http://www.youtube.com/watch?v=uotLQjvaG34> (1 minute)

How to Make a Microprocessor

<http://www.youtube.com/watch?v=RHAso1yM-D4> (3 minutes)

HOW TO LEARN MORE...ON YOUR OWN

As you learn more about binary, logic, communications, graphics or video, you'll be on your way to becoming a member of a team of engineers who do amazing things such as:

- Design cars that react to dangerous situations faster than their human driver, OR
- Bring virtual characters to life in the middle of your living room, OR
- Build robots with vision systems to inspect buildings damaged in an earthquake, OR
- Create cameras you can use in and around your home to alert you, by cellphone, to unusual activity.

Use Google, Bing or YouTube to find videos, articles or interviews that can help you learn more on your own. Look up some or all of these terms or phrases: counting in binary, binary logic tutorial, how transistors work, virtual reality, Claude Shannon, Boolean logic, ASCII Code. Here are a couple more links to videos to get you fired up and ready to learn!

What Most Schools Don't Teach

<https://www.youtube.com/watch?v=nKlu9yen5nc> (6 minutes)

Grit: The Power and Passion of Perseverance

http://www.ted.com/talks/angela_lee_duckworth_the_key_to_success_grit (6 minutes)

ANSWER KEY

Q1) 15; Q2) 0; Q3) 9; Q4) 2, 11; Q5) 31; Q6) 23; Q7) 13, 18, 29

Michael D. Alston, Ph.D. is a senior staff engineer at Qualcomm Technologies, Inc. He has a bachelor's degree in electrical engineering (EE) from Carnegie-Mellon University; a master's degree in EE from the University of California, Berkeley; and a doctorate in EE and a Master of Business Administration (M.B.A.) from the University of California, San Diego. Dr. Alston was born and raised in Baltimore, Md.

OLD SCHOOL CODING, BY HAND!

Many years ago, before computers were widely used, students studying business education were taught to write in a type of code called "shorthand." A person proficient in taking dictation by writing in shorthand could write down every word spoken without asking the speaker to slow down. Because it uses a special set of figures as symbols, rather than the English alphabet, writing in shorthand is a more *efficient* way to capture human speech than writing in cursive (longhand), which, by the way, is also a type of coding. To learn more about writing and reading shorthand, ask a relative or friend who is a senior citizen, or use Bing or Google to search "Gregg shorthand."

Here is a sample of the figures used to represent words in Gregg Shorthand:

arri(ve)		lou(d)		li(ght)	
deri(ve)		sou(th)		pri(vate)	
enga(ge)		poo(r)		glo(ry)	
stri(ke)		pu(re)		invi(te)	
gra(de)		cu(re)		provi(de)	
tra(de)		pecu(liar)		procee(d)	
dou(bt)		condu(se)		deci(de)	
crow(d)		excu(se)		preva(il)	
prou(d)		refu(se)		repe(at)	
stoo(d)		beca(me)		opera(te)	



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"Graduating as the valedictorian of my high school class, I was accepted to other top-tier colleges, and I had my choice of schools to attend, but I chose the Academy because I wanted to accomplish more than just earning a Bachelor's Degree.

"At West Point, I've developed physically, mentally, and academically, and I'm part of something bigger than myself. Every day is a new challenge, but I'm never alone. Every one of my classmates – the entire Corps of Cadets – is there for me, and they have my back, any place, every time.

"I came here as a city girl from Atlanta, but now I'm a leader, and when I graduate I'm going to be a warrior-scholar as a member of the Long Gray Line. I think that's pretty cool."

– CDT Isabella Minter





NSBE's '10K Campaign' Aims to Expand the Black Engineering Corps

By Kevin M. Briscoe

Grassroots activism is at the heart of executing the 10K Campaign.

Before its launch in October of last year, the National Society of Black Engineers' "Be 1 of 10,000" ("10K") Campaign was designed with NSBE's ambitious long-term goal in mind: increasing the number of African-American bachelor's degree recipients in engineering from a little more than 3,500 to 10,000 per year by 2025. The plan to move blacks in the U.S. from underrepresentation to overrepresentation in engineering, according to NSBE leaders, requires an outreach strategy targeting African-American students in middle school and elementary school.

With the 10K Campaign now in place, NSBE members are increasing their connections with pre-college students to generate more interest in science, technology, engineering and math. The campaign, and NSBE's 10K goal, came in response to data that showed declines in the already low proportion of African Americans becoming engineers. These poor numbers can be attributed largely to low math and science proficiency among black elementary school and middle school students.

WHAT'S CAUSING THE SLUMP?

"I believe the decline may be the result of

a society bloated with innovative technology lacking the urgency to attract future generations to continue the trends in innovation," says Jane Odero Greene, an information security specialist and a member of NSBE's Boston Professionals Chapter. "Industry must change its position in targeting middle school students (to increase their interest in STEM, and begin at the elementary level."

Darryl Johnson Jr., a senior majoring in mechanical engineering at North Carolina State University and NSBE's Region II Comfort Zone coordinator, adds that it is a problem of exposure.

"Engineering, specifically, is not a common 'dream job' of many children who do not already have an engineer in their family. There is a lack of overall representation and media coverage on the great things that engineers and other STEM professionals are achieving," Johnson says. "This has an even bigger impact on minority students, because they will not even have the privilege of having many 'identity affirmations' when trying to envision themselves as engineers."

GRASSROOTS ACTIVISM

The numbers are indeed dismal. Research by NSBE determined that a paltry 1.1 percent of

*“There is a lack of overall representation and media coverage on **the great things that engineers and other STEM professionals are achieving.**”*

— *Darryl Johnson Jr., NSBE’s Region II Comfort Zone Coordinator*



black college freshmen in the U.S. enrolled in engineering programs in 2010. And, according to the American Society for Engineering Education, the percentage of African Americans among U.S. engineering graduates was on a downward spiral for more than a decade, before a small uptick to 4.0 percent in 2014–15 – well below the 13.3 percent that represents parity for blacks. These statistics are rooted in another sad reality: only 19 percent of African-American 4th graders and 13 percent of African-American 8th grad-

number for newly minted Black Engineers.

NSBE’s Summer Engineering Experience for Kids, or SEEK, for example, is a national program in which NSBE collegiate members – “SEEK mentors” – work with youngsters who may have previously been overlooked in the teaching of STEM concepts and engineering principles. The mentors guide the younger students through SEEK’s interactive, team-based engineering design curricula. Another program, “A Walk for Education,” has NSBE members walk door-to-door to flood neigh-



*“(The goals of the **10K Campaign** are) important, because the number of African-American students exposed to the opportunity of going to college is still extremely low in comparison to their counterparts (of other ethnicities).”*

— *Simone May, NSBE Region IV Programs Chair*

ers were proficient in math in 2015, according to the National Assessment of Educational Progress (NAEP). Only 10 percent of African-American 8th graders were proficient in science in 2011, the last year for which NAEP results were reported.

“(The goals of the 10K Campaign are) important, because the number of African-American students going to college and graduating with an engineering degree is still extremely low in comparison to their counterparts (of other ethnicities),” says NSBE Region IV Programs Chair Simone May, a senior computer science major at Purdue University.

Grassroots activism is at the heart of executing the 10K Campaign, and that is why NSBE members are in the communities in which they live, work and study to raise awareness and put the U.S. on a trajectory to hit the annual 10,000

neighborhoods with college preparation materials and interact with students in grades K–12.

“Personally, I am an active community member, speaking at and supporting programs such as Girls Who Code, Black Girls Code and other nonprofit organizations,” says Jane Odero Greene. “Accountable to my mentees, I constantly continue my own technical growth and promote the interest I have in seeing more Black Engineers and, more specifically, black female engineers.” ■

Kevin M. Briscoe is a writer based in Atlanta, Ga., and a former editor of NSBE Bridge.

NSBE Jr. Launches 'Future City' Pilot Program

By Kevin M. Briscoe



Teaming with DiscoverE, NSBE Jr. kids will have an opportunity to participate in a Future City Competition pilot program.

Since NSBE's National Executive Board (NEB) approved the start of the Pre-College Initiative (PCI) program in 1988 and the formation of NSBE Jr. chapters in 1990, PCI has maintained a focus on stimulating interest in science, math, engineering and technology, or STEM, among young students. Through partnerships with many other STEM stakeholders, NSBE Jr. and PCI continue to this day to encourage black youth to attend college and pursue technical degrees.

At the helm of PCI this year are two women who are proof positive that the program works: National PCI Chair Maya Carrasquillo and National Professionals PCI Chair Catherine Boyd. Both are long-term NSBE members with extensive exposure to the program. Together, they are implementing new initiatives to benefit a wider population.

Membership that was once only offered to middle school and high school students is now also available to kids in grades three through five, after an affirmative vote by the NEB at the 42nd NSBE Annual Convention in Boston, last March.

"Expanding the demographic we serve will enable us to expose students to STEM opportunities at a younger age," says Brittany Boyd, NSBE's interim manager of Pre-College Programs. "This is crucial, as math proficiency in elementary school sets a foundation for students. The goal is that NSBE Jr. programming will increase their interest in STEM, which will hopefully carry over into their work in the classroom."

Since the expansion of NSBE Jr. membership eligibility at last year's Annual Convention, 27 new chapters have been chartered.

SOMETHING NEW

"NSBE has an ambitious goal of graduating 10,000 new African-American engineers annually by 2025," says Boyd. "In order to stimulate NSBE Jr. members' interest in STEM, we are improving current PCI programming and resources."

NSBE is also adding something new to the PCI roster of programs.

Teaming with DiscoverE (formerly the National Engineers Week Foundation), NSBE Jr. members will have an opportunity to participate in a Future City Competition pilot program. Students in grades six through eight will work in teams with an engineering mentor to “imagine, design and build cities of the future.” In the program, students will learn about engineering and city planning, develop writing and public speaking skills, and apply math and science to real-world issues.

During the competition, student teams will design a city using SimCity software, research and write a description of their city’s attributes and devise solutions to its challenges, complete a project plan to help them organize their project, build a physical model of their city using recycled materials and featuring a moving part, and present their city to a panel of judges from local STEM industries.

For the pilot, 10 NSBE Jr. chapters will be involved by competing locally. Teams will display their physical models at the Innovations Lab at NSBE’s 2017 Annual Convention and compete for a NSBE award.

“After the Future City showcase at the Annual Convention, chapter advisors will be surveyed to determine if the program will be implemented nationwide,” says Boyd. ■

Kevin M. Briscoe is a writer based in Atlanta, Ga., and a former editor of NSBE Bridge.



Students enjoy learning STEM skills at a Future City Competition in North Texas. Future City is a program of DiscoverE.



NSBE Teams Score a



The Calvert Cruisers of C.A.S.H. NSBE Jr. placed second with their Enterprise Presentation.



The San Antonio City Wide chapter's car was a unique combination of science and style.

By Cindy Atoji

Zoom! The Homestead-Miami Speedway is best known for its NASCAR and IndyCar races, not STEM championships. But behind the main grandstand is the Homestead RC Raceway, exclusively for radio-controlled cars. This is where 400 participants gathered this past May for a racing and robotics challenge: the Ten80 National STEM League Finals 2016. Middle school and high school students from around the country assembled to test their team's skills. Among them were four NSBE Jr. chapters: Chicago State University PCI; C.A.S.H. (Creative and Striving Hard), from Prince Frederick, Md.; San Antonio City Wide, from Texas and aSTEAM Village, from Kansas City, Mo.

These hard-working teams had been preparing since September with the goal of building an electric, radio-controlled race car to compete against the best in the country. This challenge would be tackled in the same way that a professional motorsports team would, with collaboration among engineers and technicians as well as marketing executives and other businesspeople.

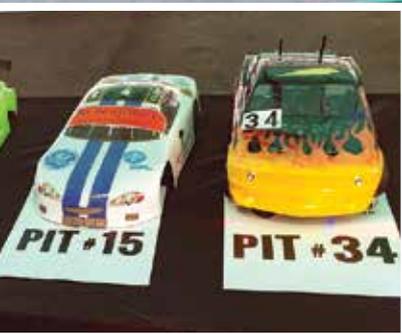
"I wanted to expand on engineering skills that could come in handy later on in life," says student Keith Baker, Ten80 team captain for the San Antonio City Wide NSBE Jr. Chapter. He raved about racing a remote-controlled vehicle.

"It's very fun: the adrenaline rushing through your body when the car is on the final laps is amazing," says Baker.

The base technology for Ten80 Student Racing Challenge teams is a 1:10-scale, electric, radio-controlled (RC) car that can be set up in more than four million ways before re-engineering a single part. The car can be modified using computer-aided design programs or other tools, to make the car more aerodynamic.

For aSTEAM Village (the "a" stands for all-inclusive, apolitical and awesome), a team of 11 students called their team the RoboRacerz. The car had a Lamborghini shell and operated and steered very smoothly, say team members Vincent Carter Jr. and Hunter Wilson. It competed against cars such as those engineered by the San Antonio City Wide team, an all-white car with blue racing stripes that was a replica of a 1965 Shelby GT350 Mustang. And the Chicago State University team, The Beast, built a RedCat RC car that received first place for its graphic art design. Carlos Farias, head coach for the San Antonio chapter, says that, as was true for many of the Ten80 teams, their final car was a unique combination of science and style.

t the Ten80 Nationals



“It had the speed and would take the corners smoothly and predictably without spinning out,” says Farias. “Fast and smooth makes for a great race car.”

‘THE MORE YOU KNOW, THE FASTER YOU GO’

The Ten80 motto is “The More You Know, The Faster You Go,” and for the C.A.S.H. NSBE Jr. Chapter, that was definitely true. It was the first year of competition for the Maryland team, and organizer Rhonda Thomas says seeing the other teams’ engineering designs and presentations was a STEM learning opportunity in itself.

“Our car was able to compete at the national level, because we practiced and made sure that it was in the best shape possible,” says C.A.S.H. member Jerrell Jones, who adds that the most important lessons he took away from the competition were to stay organized, be creative and think outside of the box. In addition to learning STEM, each team was required to present a business model, and the Calvert Cruisers C.A.S.H. NSBE Jr. team placed second with their eight-minute Enterprise Presentation.

To be sure, there were plenty of obstacles for all of the teams along the way. San Antonio City Wide member Kaden Jennings says much problem-solving was involved in the project: learning how to operate the radio-controlled car was a challenge at first but became easier with practice. The aSTEAM Village NSBE Jr. team’s car was totaled during the competition and also needed to go from all-wheel drive to rear-wheel drive. Still, despite needing to rebuild the car totally, the RoboRacerz not only got back into the race but finished it in the top 10.

“We did not quit in the heat of the battle,” says RoboRacerz’ Vincent Carter Jr.

In the end, what kid doesn’t love remote-controlled cars? Farias of San Antonio City Wide says the chapter needed to constantly perform experiments and record results as well as practice, practice, practice. He feared that racing the car over and over might get to be a bit boring.

“Of course, that never happened. They never stopped wanting to race the car,” he says. “They are kids, after all.” ■

The aSTEAM Village RoboRacerz rebuilt their car during the competition and finished in the top 10.



Chicago State PCI’s team, The Beast, won first place for graphic design of their RedCat RC car.

Cindy Atoji is a Boston-based blogger and editor who specializes in diversity issues and technology writing.

South Houston NSBE Jr. Thrives on Strong Support

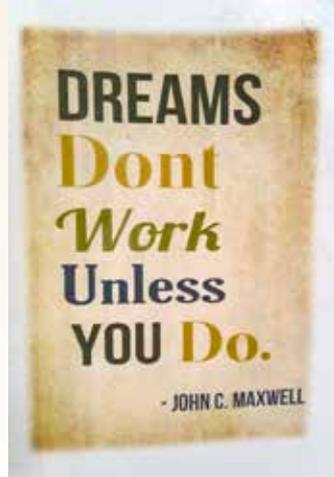
By Chrystal Tyler Lindsey

When NSBE member Chrystal Tyler Lindsey returned to Houston after college to work as a software engineer, she realized she had four nephews who could benefit from the programs of the National Society of Black Engineers. While a student at the University of Texas at Austin, she had chartered two NSBE Jr. chapters and knew the positive impact NSBE Jr. could make on its members. To support her nephews, she chartered the South Houston NSBE Jr. Chapter, in 2008. During the chapter's first year, its members attended NSBE conferences and any other NSBE activity Lindsey was allowed to take them to.

Lindsey opened the chapter's membership to students citywide in 2009. Despite its name, South Houston was based near the center of the city and had members from cities up to 60 miles away. The chapter started with high school students only then added middle school. For the past four years, its activities have engaged elementary school students as well.

South Houston receives much support from past members of NSBE, especially past chapter advisor Regina Ligons, who joined NSBE when she was a student at the University of Oklahoma, and current advisor Dora Jacobs, a former NSBE member at Rice University. Advisors Sumatra Harvey and Patricia McMorris became involved as parents of chapter members and have continued serving now that their children have graduated. Local universities are also strong supporters, specifically Texas Southern University, the University of Houston and Prairie View A&M University, and the NSBE Houston Professionals Chapter is always willing to help.

South Houston NSBE Jr. partners with a local middle school in a minority neighborhood where many of the chapter's events are hosted. To thank the school for its support, South Houston hosts a STEM Day there, each year. This past May, the STEM Day exposed more than 300 students to engineering and NSBE. It included four





South Houston NSBE Jr. has been the Region V NSBE Jr. Chapter of the Year twice and the NSBE Houston Professionals NSBE Jr. Chapter of the Year for the last two years.



engineering activities, sponsored by the chapter, in which the whole school participated. Fifth graders built roller coasters as Stephon McGowan, a former NSBE member and Texas Southern University civil engineering graduate explained the physics involved. Sixth graders built an egg catapult as former NSBE member Larry Holloway, P.E., a mechanical engineering graduate of Texas Tech University, explained the mechanical engineering aspects. Former NSBE member Myra Walthour, an electrical engineering graduate of Florida A&M University, explained currents, voltage and circuitry, as seventh graders built an electric circuit with a cardboard box to create a safe that sounded an alarm when opened. And Keisha Antoine, Ph.D., P.E., a chemical engineering graduate of Lehigh University and a former member of NSBE, explained mechanical engineering concepts to eighth graders building a model crane.

South Houston's annual events consist of college prep workshops, college visits, dissection labs, community service events, monthly engineering experiments, computer programming workshops, writing workshops and various technical and scientific competitions. The chapter also focuses on leadership activities, so many of its members are active as chapter officers or members of the Regional Junior Executive Board.

South Houston NSBE Jr. has been the Region V NSBE Jr. Chapter of the Year twice and the NSBE Houston Professionals NSBE Jr. Chapter of the Year for the last two years. South Houston has been a guest multiple times on a local radio show named "Black on Both Sides," on which they spoke about NSBE and how they address the issues that affect students in the local community. South Houston strives to support every part of NSBE's mission. ■

Crystal Tyler Lindsey is advisor of the South Houston NSBE Jr. Chapter and a member of NSBE Professionals.



SEEK 2016!

NSBE'S SUMMER ENGINEERING EXPERIENCE INSPIRES

By Donna M. Owens

Ballet camp, soccer camp, theatre camp: the options seem unlimited for many youngsters seeking good experiences during summer vacation. Yet for Morgan Jefferson, a fifth grader in Washington, D.C., only one activity would do: for the third year in a row, she opted to attend the **Summer Engineering Experience for Kids**, known as **SEEK**.

Launched by NSBE in 2007, the three-week program was created to increase the representation of African Americans in science, technology, engineering and math (STEM). The free day program is designed to expose elementary school and middle school students to STEM fields, with a curriculum centered on interactive, team-based engineering projects.

"When I tell my friends about SEEK, I tell them it's an incredible, attention-grabbing, super fun camp that puts you ahead of your class," says Morgan, aged 10. "My favorite curriculum this summer was the glider! The glider taught us about aeronautical engineering. We learned about forces like lift, thrust and gravity, and the

different parts of the plane... We also learned that the major difference between a glider and an airplane is that the glider has no engine: it's launched into the air."

Battelle Memorial Institute awarded NSBE a \$1-million grant that established SEEK, which began with one location in Washington, D.C. This year, the program had 14 locations in 12 cities across the U.S., including two sites with all-girls programs: Atlanta, Ga., and Jackson, Miss. To date, more than 15,000 students have participated, a fact that dovetails with NSBE's primary strategic goal, which is to lead the nation to produce 10,000 African-American bachelor's degree recipients in engineering annually, by 2025.

"2016 was an outstanding summer for NSBE and the SEEK program. Our incredibly talented team of site leaders and mentors ran 14 camps across the country, including a brand new site in Washington, D.C.," says Gregory J. Meeropol, NSBE's senior director, Programs, whose team noted that coding was among the new additions to the curriculum. "As part of our expansion and



*“When I tell my friends about **SEEK**, I tell them it’s an incredible, attention-grabbing, super fun camp that puts you ahead of your class.” — Morgan Jefferson*



innovation goals, NSBE plans to increase the number of programs offered across the country next year.”

NSBE collegiate members serve as the “SEEK mentors” and engineering role models who guide the pre-collegiate participants through the curriculum. NSBE’s national secretary, Racheida Lewis, a Ph.D. student in engineering education at Virginia Polytechnic Institute and State University, served as a mentor at one of the two SEEK sites in Washington, D.C.

“To be a lead mentor for SEEK for the first time was an amazing experience,” Lewis says. “Due to the small class size, my co-mentors and I were able to be very flexible in our curriculum, by facilitating conversations our students wanted to have with us regarding high school math and physics concepts, resume writing, college applications, financial aid and college life, (while) still ensuring that the students learned the necessary concepts and optimum time to complete their engineering design project for the week.”

She praised the students, describing them as

“very creative” girls and boys who designed interactive video games and more. “We have a great group of young people who were interested in learning and have bright futures ahead of them.”

The admiration was mutual.

“The mentors were very caring, and they helped the students understand the curriculum. They encouraged us to do our very best,” says Morgan Jefferson. “Having a community of kids that also liked STEM made it easy to make new friends.”

Morgan’s mother, Akilah Jefferson, has had two children participate in SEEK. This year, the proud parent also served as an assistant site director at the location in Southeast D.C.

“My daughter Morgan attended SEEK this summer, and she absolutely had a wonderful experience. She came home daily excited about the new topics she was being introduced to. It was a joy to watch her imagination and self-confidence grow week by week,” says Jefferson. “She was challenged by the curriculum, but I saw in her a new determination to explore and learn new topics.



CONTINUED ON PAGE 28

SEEK 2016!



“To see so many young children so engaged and presenting their knowledge so flawlessly after a single week’s instruction was inspiring.” — Akilah Jefferson



CONTINUED FROM PAGE 27

Over the course of the three-week camp, and even now, she is very thoughtful about the inner workings of mechanical processes, something I attribute to SEEK. She relates everyday occurrences with things she’s learned there.”

The weekly competitions between teams during SEEK, on Fridays, were a highlight of the program for the whole family.

“My favorite part of SEEK was competition Fridays, because we got to present our creations to the other classes, parents and judges, and collect ribbons,” says Morgan. “We were able to showcase our hard work, like figuring out the details of how to make a toy work best.”

Her mother adds: “To see so many young children so engaged and presenting their knowledge so flawlessly after a single week’s instruction was inspiring. ... SEEK has been a great experience for my family, and I share its value with every parent I meet. I just hope that this opportunity can be accessed by every child that seeks it.” ■

Donna M. Owens is a freelance writer based in Baltimore, Md.



2016 SEEK Locations

- Atlanta, Ga.
- Birmingham, Ala.
- Chicago, Ill.
- Denver, Colo. – Northeast
- Denver, Colo. – Southwest
- Detroit, Mich.
- Houston, Texas
- Jackson, Miss.
- Lancaster, Texas
- Los Angeles, Calif.
- New Orleans, La.
- Philadelphia, Pa.
- Washington, D.C. – Northeast
- Washington, D.C. – Southeast

STEM NOLA Polishes 'Diamonds in the Rough'

HANDS On!

| By Kevin M. Briscoe



Dr. Calvin Mackie guides young people through a learning activity in the STEM NOLA program, in New Orleans.



"The scale of the solution must equal the scale of the problem," said Calvin Mackie, Ph.D.

Internationally known for his work to increase the number of minorities in science, technology, engineering and math (STEM), Dr. Mackie, a former Tulane University engineering professor, has built a thriving program in his hometown of New Orleans to tackle this issue head-on.

STEM NOLA, founded in December 2010, provides New Orleans-area youth with STEM-based learning activities with the hopes of developing their skills and inspiring them on to STEM-based careers. The monthly program brings young people to four area locations on Saturdays and sticks to a rigid schedule of orientations, lessons, hands-on learning and project presentations. Since STEM NOLA opened its doors, more than 8,000 youngsters have participated in the program, and many have become engineering students in college.

"We've been doing the same things for too long (to try to increase minority representation in STEM), deciding and picking who's smart and who's not," said Dr. Mackie during a phone interview. "...The solution is to cast a wider net, to find the diamonds in the rough."

At the heart of STEM NOLA is what Dr. Mackie calls "vertical mentoring." Past program participants, who are enrolled in engineering programs at universities such as Howard, Louisiana State, Mississippi State, Southern, Tuskegee and the University of Michigan, often come out on Saturdays and return during the summer as paid interns to lead the curriculum, he reported. Their



efforts are supported by corporate volunteers from organizations such as The Boeing Company, Cox Communications, Entergy and Lockheed Martin Corporation, who serve as instructors and mentors.

"We've created a STEM ecosystem, an ecosystem of mentoring that happens naturally instead of being forced," Dr. Mackie said. "K-12 students get the chance to see themselves as STEM-based career participants, our college students get \$10 an hour and get offered jobs by our corporate partners while mentoring the kids, and the companies get access to our database."

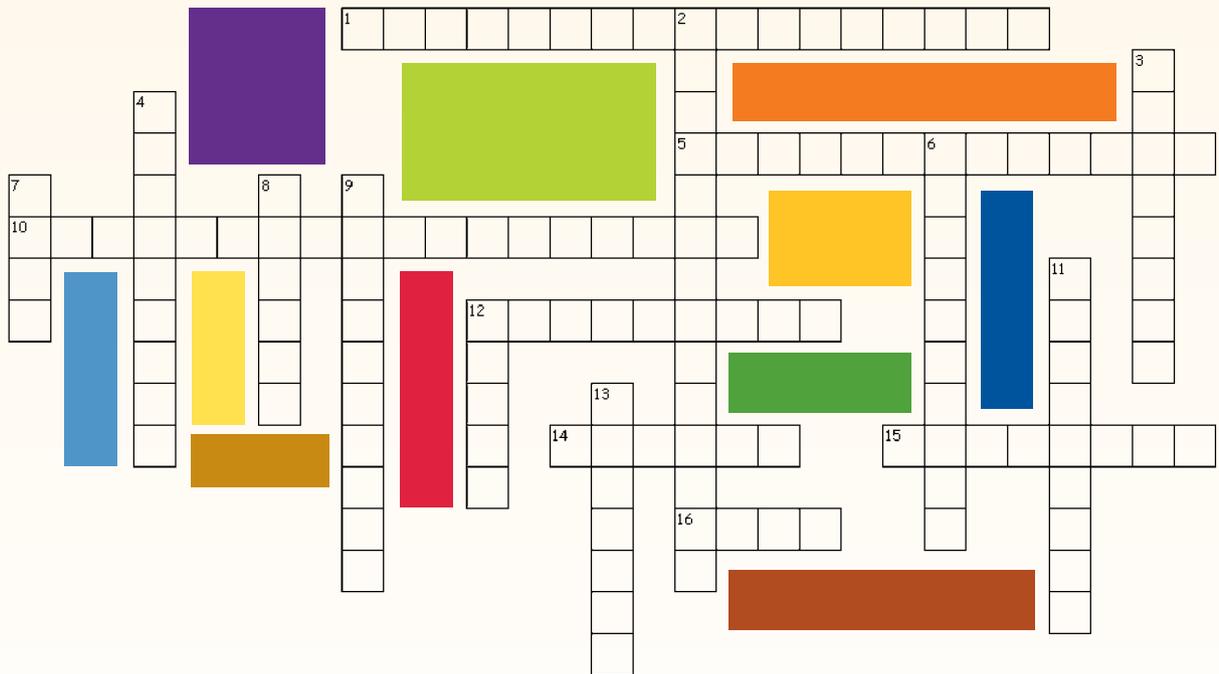
STEM NOLA operates on corporate donations, has a sliding-scale fee and is free for students who receive federal vouchers for free or reduced-price lunches in school. The program is only offered in New Orleans now, but Dr. Mackie said he believes the program is "scalable, transferable, reproducible and sustainable" and said that plans are under consideration to create STEM Atlanta, STEM New York and STEM Chicago.

"Somebody needs to adopt this program," he added. "The challenge is that we don't (often) know how to engage the community and STEM stakeholders in an accessible way. I'd like to attach it to an organization, like NSBE, that has the brand to do it."

STEM NOLA is "child-centered, adult-governed and elderly-ruled," Dr. Mackie said, a structure designed to increase representation for kids of color in the world of STEM.

For more information, visit the program's website at www.stemnola.com. ■

MATH, ENGINEERING AND THE ARTS



ACROSS

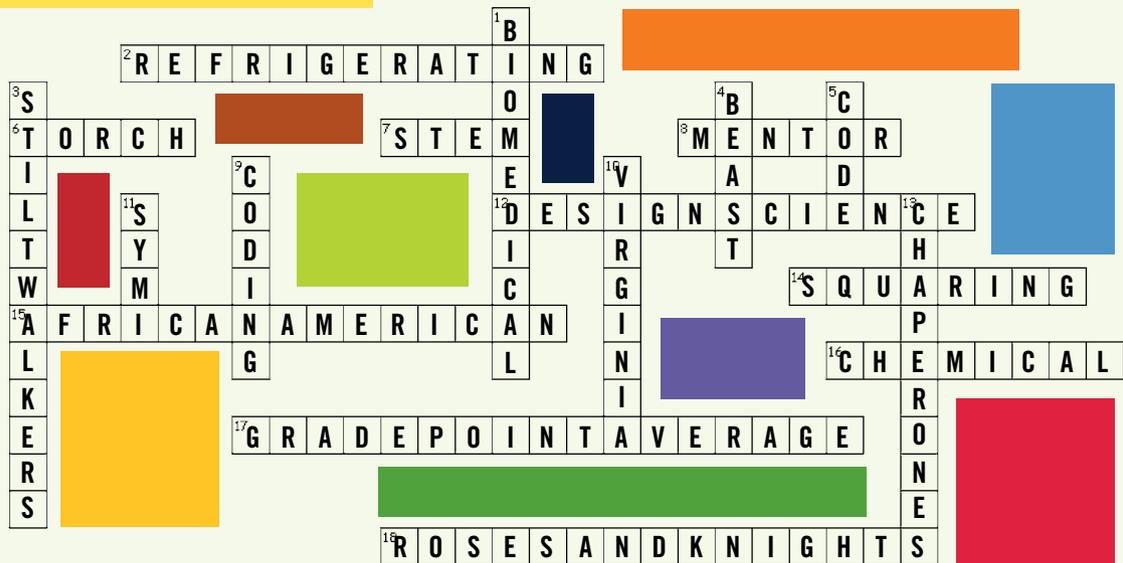
1. BAM!
5. A "must-see" movie this January!
10. Machines that perceive
12. What female mathematicians were called during NASA's early days
14. A new addition to the SEEK curriculum in 2016
15. A John Coltrane composition inspired thoughts about his theory
16. Predecessor to NASA

DOWN

2. One jazz great said all musicians are also these
3. They won first place for graphic art design at the Ten80 nationals
4. The "Hidden Figures" math consultant teaches at this college
6. NSBE's new pilot program for middle school students
7. 1001 in binary = _____ in decimal (Hint: spell out the number.)
8. Type of digits used in digital communications
9. One driver says NASCAR is this kind of sport
11. One type of "old school" coding
12. Ryan Cotton, aspiring _____ engineer
13. Katherine _____, recipient of the Presidential Medal of Freedom

Tip: You can find the answers by reading this issue! The answers will be published in the next issue of NSBE Bridge.

SUMMER PUZZLING ANSWERS



OUR SAY

OUR SAY



Break the Limits

By Maya Elizabeth Carrasquillo, *NSBE National Pre-College Initiative Chair*

No matter what field we are in, history provides greater understanding of where we are and where we have the capacity to go. For years, the National Society of Black Engineers has been seen by many as a bridge connecting black students to opportunities in the science, technology, engineering and mathematics (STEM) fields. Our organization has not only provided these opportunities but has given aspiring students examples of what they hope to one day become. Today, our work is creating a shift that will largely determine the future face of engineering disciplines.

Throughout our nation's history, African Americans have contributed greatly to the intellectual progress of society through STEM. Great names such as Lewis Latimer, Madame C.J. Walker, Garrett Morgan, Lonnie Johnson, Katherine Johnson, and many others, represent the black excellence our future engineers need to know, to understand why their own role today is so important. The book and movie "Hidden Figures" highlight the pioneering role of three black women in STEM and their courage to defy the limits placed on them in the not-so-distant past. Their demonstration of courage becomes more relevant when we examine where we are as a people, as slogans such as "Black Lives Matter" and "Black Girls Rock" bring awareness to some of

"My challenge to each NSBE member and chapter is this: have the courage to defy low expectations, especially with regard to your career as an engineer!"

the most pressing problems of the 21st century, particularly those issues faced by African-American communities.

My challenge to each NSBE member and chapter is this: have the courage to defy low expectations, especially with regard to your career as an engineer! Don't put the idea of STEM in a box, and don't let it box you in. STEM can be an art, if you make it one. Pursuing a STEM degree is all about building, creating and discovering. For NSBE to achieve our primary strategic goal for the U.S. — graduating 10K Black Engineers annually by 2025 — NSBE Jr. and our Pre-College Initiative must achieve new standards. Our students, your students, are the ones who will be graduating as engineers in 2025 and beyond. Our job

is not only to expose our young people to engineering but to be at the forefront of a movement that changes the face of the profession. Engineering needs students like you, with your thoughts, originality and wonderment, to challenge the current standards and continue breaking through glass ceilings. NSBE needs to continue to be a stepping-stone for students, as we increase the number and quality of Black Engineers who have the potential to change what engineering is all about! ■

NSBE Jr. Chapters



If your chapter is not listed, please contact the NSBE Membership Department at membership@nsbe.org to ensure your information is correct in our account management system, **NSBECONNECT**.

ALABAMA

C. F. VIGOR HIGH SCHOOL – MOBILE
CENTRAL ALABAMA – MONTGOMERY

CALIFORNIA

KORNBLUM SCHOOL – HAWTHORNE
SOUTHERN CALIFORNIA – INGLEWOOD
LEADERS INNOVATORS FORWARD THINKERS OF TOMORROW (LIFTT-NSBE JR.) – OAKLAND
EAST BAY – PITTSBURG

DISTRICT OF COLUMBIA

FRIENDSHIP COLLEGIATE ACADEMY
THURGOOD MARSHALL COLLEGE FUND VBM STEM

FLORIDA

MENTORING FAMILIES AND KIDS – JACKSONVILLE
FLORIDA EAST COAST – PALM BAY
FLORIDA EAST COAST – PALM BEACH GARDENS
MIDDLETON HIGH – TAMPA
STRIVE - POLK COUNTY FL – WESLEY CHAPEL
SUNCOAST COMMUNITY HIGH SCHOOL – WEST PALM BEACH

GEORGIA

CSRA AUGUSTA JR CHAPTER – AUGUSTA
CHAMBLEE HIGH SCHOOL – CHAMBLEE
TRI-CITIES HIGH SCHOOL – EAST POINT
ARABIA MOUNTAIN HIGH SCHOOL – LITHONIA
SANDY CREEK – TYRONE

ILLINOIS

CHICAGO – WEST SUBURBS – AURORA
CHICAGOLAND – CHICAGO
NSBE AT PIKE HIGH SCHOOL – INDIANAPOLIS
CENTRAL IL – PEORIA

LOUISIANA

YOUNG TECHNICAL PROFESSIONALS – SHREVEPORT

MARYLAND

BALTIMORE LINKS – BALTIMORE
VBM BALTIMORE – BALTIMORE
METRO WARRIORS STEM – FORT WASHINGTON

C.A.S.H. (CREATIVE AND STRIVING HARD) – PRINCE FREDERICK – PATRIOTS TECHNOLOGY CENTER – SEAT PLEASANT
C.H. FLOWERS HIGH SCHOOL JAGUARS – SPRINGDALE
TAKOMA ACADEMY TIGERS – TAKOMA PARK
CHARLES COUNTY – WALDORF
MILFORD MILL ACADEMY – WINDSOR MILL

MASSACHUSETTS

BROCKTON SCIENTIFIC – BROCKTON
JEREMIAH E. BURKE HIGH SCHOOL – DORCHESTER
MASSPEP OF BOSTON – WEST NEWTON

MICHIGAN

FIELD ZONE – SOUTHFIELD

MISSISSIPPI

DE&I (DELTA ENGINEERS & INNOVATORS) – HERNANDO

MISSOURI

ST. LOUIS METRO GATEWAY – HAZELWOOD

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STUYVESANT – NEW YORK
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CROWN JEWELS LINKS – PHILLIP O. BERRY ACADEMY OF TECHNOLOGY – CHARLOTTE
NINE DIME (910) ONSLOW COUNTY – JACKSONVILLE

OHIO

GREATER CLEVELAND – CLEVELAND
BEECHCROFT HIGH SCHOOL – COLUMBUS
COLUMBUS TECH CORPS – COLUMBUS

PENNSYLVANIA

HARRITON HIGH SCHOOL – BRYN MAWR

SOUTH CAROLINA

AMS KNIGHT RIDERZ – COLUMBIA
ORANGEBURG 5 TECHNOLOGY CENTER – ORANGEBURG

TENNESSEE

MEMPHIS ACADEMY PROGRAM – MEMPHIS

TEXAS

SCIENCE AND ENGINEERING MAGNET – DALLAS
HARMON RANCH COMMUNITY – FORT WORTH
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HOUSTON ENGINEERS AND LEADERS IN THE MAKING – HOUSTON
SOUTH HOUSTON – HOUSTON
LANCASTER JUNIOR ENGINEERING ALLIANCE – LANCASTER
KREATIVE MINDZ – RICHARDSON
PEARLAND – PEARLAND

VIRGINIA

AT LARGE PCI (REGIONS I-VI) – ALEXANDRIA
NUBIAN VILLAGE ACADEMY – CHESTER
DANVILLE/PITTSYLVANIA – RINGGOLD

BAHAMAS

NSBE JR. BAHAMAS (G.E.A.R.S) – FREEPORT

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NEXT UP KANSAS CITY, MISSOURI



NSBE



43rd Annual Convention

March 29–April 2, 2017

SAVE THE DATES





*(schools) + (parents) + (business) =
how we bridge the STEM skills gap.*

To fill the high-skill jobs that will power our economy in the future, we need more students to study science, technology, engineering and math (STEM). That's why BP is working with partners such as the National Action Council for Minorities in Engineering and the National Society of Black Engineers to understand the STEM skills gap and find ways to close it. Schools, parents and businesses must work together to ensure STEM plays an important role in young people's lives. BP remains committed to this goal every day. For more on BP's 60-year commitment to education, and to join us in developing tomorrow's leaders, go to bp.com/STEMed

