Shining Stars

Girls gain hands-on engineering experience through Detroit program

BY ROSE QUINN

At the helm of an all-girl engineering academy with all-women instructors serving metropolitan Detroit is Gerald O. Thompkins, Ph.D., a forward-thinking man with a plan and the backing of the Engineering Society of Detroit (ESD) to make it happen.

In its third year, ESD opened the Girls in Engineering Academy (GEA) to improve academic achievement and increase engineering pursuits among girls. It was a need Thompkins recognized early in his nearly 30-year career in engineering administration and education.

“The main goal of the GEA program is to prepare and encourage middle school girls, particularly students from the Detroit metropolitan area, to enter college and study engineering at a level competitive with other students,” says Thompkins, who currently serves as ESD’s program manager and director of GEA. “The overarching objective is to academically prepare middle school girls for high school and beyond.”

It was back in the fall of 2016 when Thompkins was approached by ESD Executive Director Robert Magee who asked him: We want a new paradigm. How can you help? Thompkins happily shared his ideas about offering a pre-engineering program for underrepresented girls that was taught by an all-female staff of college/university students who would also be role models — the very foundations that today make the GEA different from any other programs.

“It was my background and experience that allowed me to create this program,” says Thompkins, a former associate dean of engineering at Wayne State University in Detroit. He’s held positions in the engineering departments at IUPUI-Purdue University and Michigan State University and he was director of the STEM Research and Education Center at Kent State University.

Also, he is a retired U.S. Naval commander who was assigned to an anti-submarine warfare operations unit.

Closing Gender and Achievement Gaps

The academy is open primarily to fifth-grade female students who have an overall grade point average of 2.5 or better and a minimum B average in math and science. Currently, there are 56 girls enrolled in two groups of 28 each that began in the summers of 2017 and 2018. A third cohort starts in July.

“We are more impactful if we recruit middle school girls as opposed to high school,” says Thompkins, adding, “When we look at the data, boys and girls are on par from kindergarten through fourth grade. By the time girls reach fifth and sixth grades, their interest in math and science begins to diminish.”

It’s a disparity Thompkins blames in part on classroom expectations where boys conduct experiments while girls record them, as well as science textbooks that depict mostly males in white lab coats. The fallout can be far-reaching and disconcerting.

Nationally, of the estimated 100,000 students who receive engineering degrees each year, women account for about 24,000, Thompkins says, citing data from the National Science Foundation. Of those 24,000 women, about 1,100 are African-American, 2,765 are Hispanic and 4,352 are Asian.

“The Girls in Engineering Academy program is designed to ameliorate the gender and achievement gaps that currently exist in STEM and in engineering education, particularly with underrepresented minority females,” Thompkins says.

The GEA offers the students hands-on experience. “Ours is a progressive curriculum. We present content to build from year to year,” Thompkins says of the three-year program that includes weekly sessions over four weeks in the summer plus two Saturdays a month during the school year. “Does it look like school? No. This is a student-centered, project-based, hands-on program. We don’t want it to look like the typical school day. And we certainly don’t want it to look like summer school. We promote learning and foster interest in STEM,” he says. “The girls in the first year take computer science. In that class, they learn about coding. This is something that is not taught until late in high school and in some cases college.”

For all first-year students, summer and academic day sessions are held on the campus of Wayne State University. Classes include pre-algebra, mechanical engineering, physics, computer science and English/language arts. In their second year of the academy, summer sessions are held at Eastern Michigan University where girls reside in a dorm for four weeks. In addition to studying geometry, drone technology and biology, Thompkins says the girls add campus exposure to their experience.

This year, Oakland University has been added to the summer roster, and girls in the inaugural 2017 cohort will reside there in a dorm for four weeks as they study pre-calculus, chemistry and electrical engineering. “There are 15 engineering schools in
Michigan and the majority of them want GEA on their campus,” notes Thompkins.

Sessions in English/Language Arts are also part of the curriculum for girls in each stage of the academy. “We want them to be just as knowledgeable in language as STEM,” Thompkins says, adding that the program presents academic subjects to the students, as much as possible, from a female’s perspective. “Each component of the program has been designed with input from women engineering faculty, undergraduate and graduate students from Detroit-area universities to capture the interest of and to further motivate these young ladies in the direction of selecting an engineering major for a career choice after high school graduation.”

Thompkins worked with the Detroit Public Schools Office of Science Education and then visited at least 20 public schools, talking to principals and fifth-grade teachers. The application is very detailed and includes questions ranging from ethnicity to allergies. A 200-word essay is also required. “We want to maintain diversity and provide opportunities for all females,” he says. Of the 56 girls currently enrolled, 92 percent are African-American, 6 percent are Hispanic, with the remaining being bi-racial, Indian or Asian.

Corporate sponsors for the academy include NASA, Ford Motor Company and FCA, automaker DENSO, tech company Corning, Huntington Bank and Mid-West Steel. The annual student cost for the academy is $150.

**Picture Perfect**

“Ever since I can remember, I’ve wanted to know how things worked around me,” 11-year-old Jenesis Brooks wrote in her application essay for the 2018 GEA cohort.

The AP student at her elementary school went on to say how she finds engineering exciting.

“I like to program, and it makes me just want to fly in the air. For me, I get excited, and when I finish, I feel even more excited because I can see all of my hard work come to life,” she wrote. “I want to know how to build things and I want to know how to program. I want to know everything that is related to engineering. Engineering addresses real-world problems, and I love to problem-solve.”

Lucky for Jenesis, as a member of the 2018 Cohort, she is already developing skills to one day fulfill her dream to be an animation engineer. And Zakiyah Brooks couldn’t be more excited for her daughter.

“Attending the Girls in Engineering Academy provides my daughter with an engaging, fun and interactive learning experience that directly impacts the way she approaches learning and has left a positive impact on how she views herself academically,” her mother says. “I can’t say enough about how the GEA program has positively impacted her and is changing the trajectory for girls pursuing STEM opportunities of tomorrow.”

Recalling a family visit to an amusement park last summer, Brooks says Jenesis was as excited about explaining how the roller coaster worked as she was riding it. “She was talking about velocity,” her mom says, noting that her daughter had built a roller coaster as one of her academy projects.

One of Brooks’ favorite photographs is of Jenesis and her dad, Jomar Brooks (inset), walking across the campus of Wayne State University. She plans to one day have the photo as a side-by-side with one from Jenesis’ first day of college.

Jenesis Brooks, like all the girls in the academy, is a shining star in Thompkins’ eyes. At least twice a month, Thompkins will hear from a proud parent updating him about their daughter, either through an email or a phone call. He, too, delights in every one of the girls’ achievements.