enough." The same goes for their families and teachers, who have been behind them all the way.

Fred Stillwell, the teacher who first introduced Team Shift to the program, points out that the girls are somewhat downplaying what they've done. "There are 30 kids in my class every year who are all exposed to the same things," he says. "But these are the four who stuck with it and really ran with it. The key to the whole thing is that they are a team. As four unique people, they brought together their various talents and far exceeded what even they thought they could do."

Though their futures are wide open, the girls are all thinking about careers that expand upon their F1 in Schools experience. Awald and McCoy are both thinking about pursuing engineering fields, while Saldanha and Fitzgerald are less decided but know that they want to stay connection to the F1 in Schools program and find a way to give back to an organization that has given so much to them. "This experience has exposed us to a lot of different fields," says Saldanha. "We can see the different places we can go with our futures."

—Leslie Prives

Exit Is the Way In

All-girls competitive team excels in robotics

It is often said that to develop talent and cultivate passion in people, we should "start them young." This is the premise under which extracurricular activities, such as sports, or cultural pursuits, like language or music, become so important in elementary and middle schools. It is also a key factor in supporting future generations of engineers, who need to recognize their aptitudes for science and math at an early age. It is why William Lam, a member of IEEE Women in Engineering (WIE), is volunteering his time to coach an all-girls competitive team in a robotics club.

Exit 5 Robotics (www.livingston-robotics.org/teams/fll/exit-5-robotics) is currently made up of nine sixth and eighth graders (ages 11–14) in Livingston, New Jersey. Founded in 2010 by Lam, the members, including one of Lam's daughters, are a collection of sisters, friends, neighbors, and classmates who share interests in science, technology, engineering, and math. "One of our friends in town had a team, Landroids, that was pretty successful at the time, and he encouraged us to get our kids involved," recalls Lam. His daughter, Chloe, was intrigued by the LEGO Robotics kit so, when she was old enough to join the league the following year, the Exit 5 team was born.

"It was challenging to put the team together," says Lam, "because, when we were first getting started, we didn't know who would really enjoy being on the team, so we just accepted kids in the neighborhood who thought robotics sounded interesting." As the team's success in the FIRST LEGO League (FLL) program grew, more children were drawn in by the premise and, at times, competition for spots was stiff. Kelly Eagen, who serves as one of the team's project coaches this year, says her 11-year-old daughter, Erin, had to get creative to prove to Lam that she deserved the next open spot. "Erin saw the team doing a demonstration at

The Exit 5 Robotics team.

Exit 5 Robotics Founder William Lam along with coaches Yitao Yu, Li Zhu, and Kelly Eagen.

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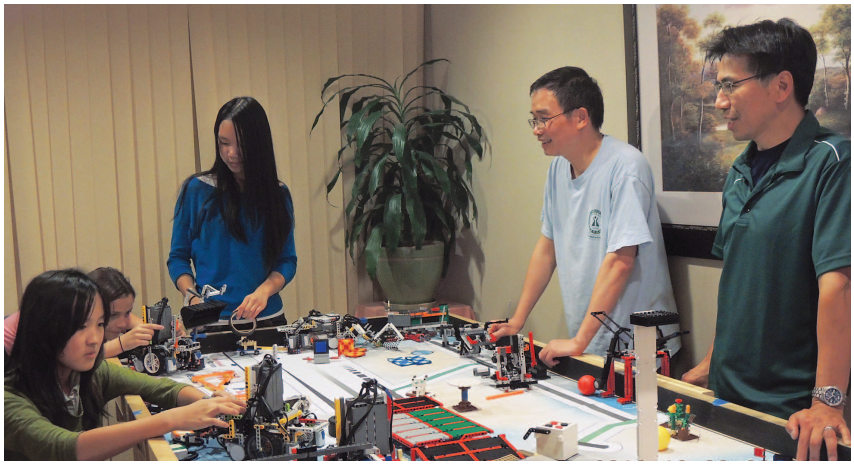

Annie Song, Erin Eagen, Alice Huang, Yitao Yu, and William Lam work on a robotics project.

school with the robots and wanted to join," she recalls. "There wasn't a spot for her at the time, but she wanted to participate so badly that she decided to 'harass' Coach Bill until one opened up." Laughing, Eagen says that she and Erin would follow the team around. "If they went to the Liberty Science Center, we went there, too." Her hard work paid off: once a spot was open, Erin nabbed it.

A Different Viewpoint

For Lam, this type of excitement is exactly what he hoped to foster when the team first started. "I look around our country today and I see a lot of young people growing up and it disappoints me that they know nothing about the world around them. It is especially prevalent with girls, once they get to sixth or seventh grade. I didn't want to see my daughters grow up this way." So when Lam joined the IEEE in 2005, he also joined WIE. His daughter, Chloe, was five at the time, and he wanted to see what engineering programs existed that were geared toward women. "I think women have a different way of looking at problems and creating solutions," he says. "You don't see enough of that in the engineering world today."

An electrical engineer who also holds a master's degree in information systems and an M.B.A. in technology management, Lam has always been a problem-solver. "I grew up in a Chinese restaurant where things were always breaking and I liked fixing them," he explains, describing himself as "handy." After college, Lam went to work at AT&T Bell Laboratories and then a start-up company before his current role as an independent consultant.

To the nine girls on the Exit 5 Robotics team, though, his most important role may be as "Coach William." The time commitment is heavy, especially right before competitions and particularly for this team, which has numerous titles to defend. The team was awarded first place for robot performance in the 2010 Bergen FLL Regional competition and third place in the New Jersey State Finals that same year, along with garnering the State Finals Judges Award. They won a first place Champions Award in the 2011 Liberty Science Center FLL Regionals and a second place Champions Award in that year's New Jersey State Finals. In 2012, they placed 17th in the World Invitational Open competition. Now the girls are hard at work on the 2013 challenge.

Each year's competition is built around a theme, and the challenge tasks to complete consist of two parts: the Robot Game, where the students program a robot to perform certain activities; and the Project, where the students complete a research project demonstrating their understanding of the challenge theme. Through it all, participants are guided by the FLL Core Values—a list of "rules to live by" that encourage friendly competition and teamwork—which are important enough to serve as the third pillar in the challenge.

The 2013 challenge theme is "Senior Solutions," which tasks the teams to come up with a science and technology-based innovative way to improve the quality of life for senior citizens. Evelyn, an 11-year-old on the team, explains that the Exit 5 girls have selected an idea

The Exit 5 Robotics team performs outreach to an inner-city middle school.

AN INTEREST AND AN APTITUDE

All of the girls who joined the team already had an interest and aptitude for science, technology, engineering, and math, but many shared that their participation on the Exit 5 Robotics team helped them confirm that they wanted to pursue related careers after college. Here, each team member shares her favorite part about being on the team as well as her plans for the future.

CHLOE, AGE 11
Favorite thing about Exit 5: Building the robots because there are an infinite number of possibilities.
Future plans: An engineer or scientist, but I'm not sure which field.

ERIN, AGE 11
Favorite thing about Exit 5: Seeing the robots do what I wanted them to do because I know that I succeeded in what I was doing.
Future plans: I used to want to be a cake decorator, but now I'm considering being an engineer.

EVELYN, AGE 11
Favorite thing about Exit 5: The fact that there is an endless amount of solutions to one single problem. We can have five different ideas to solve the same problem, and every idea is something that you want to try.
Future plans: I'm considering being a scientist but I don't know in which field. I was interested in every single unit we did in science.

FLORA, AGE 11
Favorite thing about Exit 5: Our funny moments together as a team, and I also enjoy watching the robot and knowing that I succeeded.
Future plans: I was considering being a doctor but in school I took a quiz on what my future career should be and the result was a mechanical engineer.

ALICE, AGE 13
Favorite thing about Exit 5: The fact that we're all in this together. I love knowing that there's always going to be eight people helping and supporting me.
Future plans: On the robotics team, I do a lot of advanced programming so I might be a computer programmer like my dad, but I'm also considering becoming a scientist, perhaps in genetics.

ANNIE, AGE 13
Favorite thing about Exit 5: Getting to do hands-on activities with my friends.
Future plans: I want to be a doctor so that I can help people.

STEPHANIE, AGE 13
Favorite thing about Exit 5: Being able to compete against other teams in a competition that's fun and where you're always learning something new.
Future plans: A computer software engineer.

TIFFANY, AGE 13
Favorite thing about Exit 5: The atmosphere. We're all working hard, but we really want to be here.
Future plans: I really like biology and math so I'm thinking of something in biotechnology, nanotechnology, or a doctor, or pharmacist.

WENDY, AGE 13
Favorite thing about Exit 5: My friends, because I enjoy working with them to build something that actually works.
Future plans: An engineer.

where they can improve seniors' quality of life by helping them stay active. Their idea is a bus that also offers internal equipment for seniors to complete hand exercises while being driven to their destination. Since the team has only five minutes to present their plan to the judges, they don't have to display a model or prototype but merely demonstrate that the idea has feasibility and that they've considered all factors in proving that the idea and technology have true potential.

The girls meet twice a week to work on the challenge, with one meeting focusing on the Robot Game and the other on the research project. Right before competitions, the intensity increases. "It's like an open house, every day of the week from 4 p.m. to 9 p.m.," explains Tiffany, a 13-year-old, who drops by five days a week to help out. For the project, the girls are coached by Kelly Eagen, whose training as a registered nurse is helping guide their understanding of senior citizens. Li Zhu, who is also a project coach, is impressed with how hard the team is working and how much the girls are getting out of the experience. "Some girls were not clear about what they wanted to do each day or, for that matter, the future," she says. "Now they are very happy knowing they are doing something meaningful and interesting."

Along the way, many of the girls have picked up ideas about what their future careers might be (see "An Interest and an Aptitude"). Huale Huang, another parent who serves as a robotics coach, is proud to see his daughter consider computer programming—his own occupation—as a potential career. "I am impressed that she has mastered high-level programming skills and applies her mathematics knowledge in robotics programming," he says.

A Helping Hand

It's not unusual to have many of the girls' parents step in to coach or mentor the team. The coaches credit Lam with creating the familial atmosphere, noting that he is just the right amount of "silliness and seriousness" with the girls and really makes sure everyone feels included. "I've learned a lot for my own career," says Lam. "This is really about project management and management of people. As more people get added to

the team, you have to make sure to fit in everyone's skills."

To make sure the team functioned at its best, Lam intentionally built the robotics team as an all-girls group. "Other teams warned me that when there's a mix of boys and girls, the boys tend to take on the construction and programming elements," he says. "I wanted to give each girl a chance to get hands-on experience." Wendy, a 13-year-old member of the team, agrees with this approach, describing that there were so few girls at the robotics camp she attended that "it felt very awkward and intimidating, and the girls were afraid of being overpowered." While a co-ed environment will likely be an inescapable future for the girls who choose to pursue engineering careers, for now, the separation gives them a chance to try new things without fear.

It also offers them an opportunity to bond as adolescent girls typically do—giggling and joking with one another and deepening their friendships. Yitao Yu, one of the robotics coaches, comments that, "what has amazed me is not only the talent these girls demonstrate, but also the great team effort to help and support each other. This robotic team experience will benefit them for a life time."

Chloe, Lam's eldest daughter, says her favorite part about her dad being the coach is that before competitions, her house is always filled with her friends. In fact, Chloe's younger sister, Annica, at only eight years old, is too young to join the team just yet but did participate with the Junior FLL team and is looking forward to joining the older girls next year. "I like to work together, too," she says. Fostering the supportive female environment continues to be a key mission for William Lam and Exit 5 Robotics, who are pursuing outreach opportunities with other female-based organizations, such as the Girl Scouts.

"At the end of the day, they're still young girls," says Eagen. "They had to stop and fix their hair before we went to meet the senior citizens!"

—Katianne Williams