Connecting Youth with Ham Radio in the Classroom

Two Staten Island Technical High School students share how an ARRL ETP School Station Grant helped to enhance the engineering curriculum by immersing them in hands-on radio activities.

Ashley Li and Olivia Wojtczak

Amateur radio initiatives at Staten Island Technical High School (SITHS) began in fall 2022 and wouldn't have been possible without the help of ARRL and the ham radio community. After attending one of ARRL's Teachers Institute on Wireless Technology sessions (**www.arrl.org/teachers-institute-on-wireless-technology**), one of our engineering teachers, Mr. Henriques, KD2ZZT, added concepts to our existing engineering curriculum (see the sidebar "SITHS's Engineering Program Evolution" for more information on how the program began and where it's headed) that support the ham radio license exam training and post-licensure activities. Additionally, our school received an ARRL Education & Technology Program (ETP) School Station Grant (**www.arrl.org/etp-grants**) that brought our experiences with amateur radio to the next level. The ARRL Education and Technology program, which supports the Teachers Institute on Wireless Technology and School Station Grants, is funded entirely by donors to ARRL.

SITHS Engineering Teacher Everton Henriques, KD2ZZT (on the right), assists Olivia Wojtczak (on the left) and Ashley Li (in the middle) with building a directional antenna.

Hands-On Coursework

The main purpose of introducing amateur radio into SITHS was to improve communications and telemetry applications for the school's solar car team — Seagull Solar, WSØLAR — which consists of a group of students and staff from different schools who are building a street-legal solar-powered car to eventually race in the Solar Car Challenge at the Texas Motor Speedway.

Now, we not only have a radio station at our school, but some students were also inspired to start a ham radio club for our school — SITHS Amateur Radio League (SITHS ARL), WS1THS — to further develop their ham radio practice. Currently, our station is set up for the use of student-dedicated communication frequencies and Staten Island's local repeater. Because it's a high-powered system, it allows for communication anywhere in the building. It also serves as an occasional crossband repeater and is mobile for off-grid satellite contacts.

SITHS ARL offers opportunities for students interested in learning about amateur radio applications beyond those offered in class. The radio club is also available for students who are unable to participate in any of the classes offered in the engineering curriculum. We are all enamored with the Geochron, which shows just about every Earth condition in real time on SITHS ARL's 4K station screen, thanks to ARRL's ETP School Station Grant!

So far, we've designed and built directional antennas for foxhunting and contacting the International Space

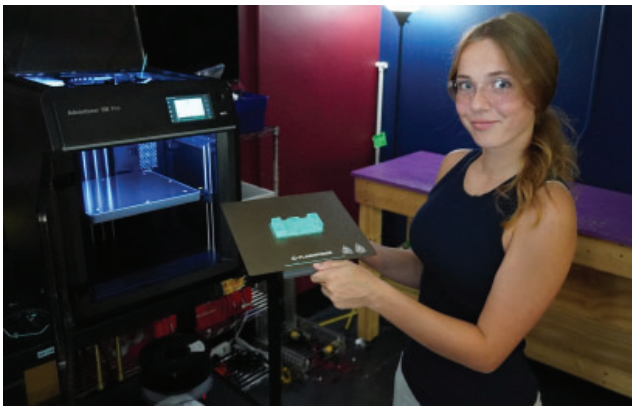
SITHS's Engineering Program Evolution

By SITHS Engineering Teacher Everton Henriques, KD2ZZT

The engineering curriculum at SITHS was originally intended to provide students with practical activities that address the concepts of the FCC licensure exams. After attending ARRL's Teachers Institute on Wireless Technology (TI), I learned additional ways to incorporate ham radio into the curriculum, while still supporting training for the exams, that added post-license activities. TI trained me for the Amateur Extra-class license, and I learned how to effectively promote foxhunting, satellite contacts, and HF applications with students.

The Staten Island Technical High School engineering program has received generous support from the ARRL Education and Technology Program School Station Grant and mentoring from several local hams. Resources like amateur radio equipment are important, but the time that local hams have donated has also been invaluable. Mentoring from local hams provides an opportunity for students to engage in a good amount of discussion about operating skills for young hams. This has helped students grow and has facilitated their abilities to take the lead on specific diverse projects.

I would like to thank Steve Goodgame, K5ATA; Ed Wilson, N2XDD; Wayne Greene, KB4DSF, and the network of teachers I gained from TI for providing me with the resources, training, support, and great ideas that my students now enjoy. If teachers are looking to bring radio and wireless technology into their classrooms, but also need to learn about it themselves, then I highly recommend attending ARRL TI! *Editor's note: For more information on TI, including the program's plans for the future, read "ARRL Teachers Institute: Looking Back, Moving Forward" by Steve Goodgame, K5ATA, in the January 2025 issue.*



Olivia Wojtczak built a part for one of her projects using the 3D printer that SITHS students in the engineering program have access to.

Station (ISS) and participated in skill-based labs applicable to ham radio that include soldering, building electronic terminal connections, learning about standing wave ratio (SWR), learning how to read power measurements, and understanding practical uses for amateur radio. We also engage in radio-related independent studies, including learning about radio programming and participating in simplex, repeater, and local net operations.

While this program is geared toward engaging students with fun projects and activities that introduce amateur radio practices, our understanding of radio extends far beyond the classroom. For example, having a ham radio license and knowledge of electronics and engineering concepts allows us to figure out how to communicate in areas where cell phones don't work or aren't permitted.

Growing Connections with Ham Radio

Ham radio immediately formed a community within our school. Students are excited to broaden their communication skills, acquire a real FCC license, and develop their practical circuit theory. Not only does ham radio create a sense of unity within our school by bringing together students with common interests, it also connects us to radio enthusiasts who are miles away.

Mr. Henriques said:

> We've received a great deal of support from ARRL members and staff, including ARRL Education and Learning Manager Steve Goodgame, K5ATA, and ARRL Hudson Division Director Ed Wilson, N2XDD, who both visited our school and ran the testing for our most recent batch of students. In that single day, they inspired several students to pursue future upgrades. Also, Ed was kind enough to donate an antenna kit to the club for students to explore the world of HF — it's a wonderful community!

What Classmates Are Saying

Amateur radio has opened us up to new opportunities (such as contacting satellites and learning about long-distance communications and wireless data transmissions) that can benefit us in a variety of careers, like those in the mechanical, electrical, and general mechatronic fields. Here's what some of our classmates have to say:

Lori Gallo, KE2CMD

> Getting my ham radio license has been a fun and engaging way to combine physics and engineering principles. While [it] was a part of our curriculum to get licensed, the skills I'm learning through ham radio are equally useful outside the classroom, both for hobby and emergency purposes.

Erica Yu, KE2CMO

I'm now able to join a network of engineers, innovators, and enthusiasts and collaborate with others to change the world!

Aaron Ye, KE2CMN

I'm amazed by the many opportunities that come with ham radio, because radio operations are the fundamental backbone to many existing technologies and communications.

Excitement for the Future

Since the amateur radio initiatives at SITHS began in 2022, 265 students have earned their license, including 228 Technician-class licensees, 27 General-class licensees, and 10 Amateur Extra-class licensees, and these numbers continue to grow.

We're all hoping that SITHS can host an ARISS contact with astronauts on the ISS. It's anticipated that the application process will begin in the spring of 2025.

Whether the knowledge acquired from this curriculum propels us toward our desired career paths or simply provides us with a new hobby, there is no doubt that ham radio offers us a unique experience that can be useful in the future.

The Staten Island Technical High School is now a Model School for the ARRL Education and Technology Program, setting the example for other schools interested in pursuing amateur radio to complement their STEM education program. These results and opportunities are possible due to the generous support of ARRL donors to the Education and Technology Program, which supports the entirely donor-funded ARRL Teacher's Institute on Wireless Technology. In 2024, several donors have stepped up to fully fund a seat for a teacher to attend, and others have donated what they can in smaller amounts. All of these gifts are an investment in the future of amateur radio. Those interested in making a difference in programs like this can contact the ARRL Development Office or give online at **www.arrl.org/GiveToSTEM**.

Watch students Kangxi Yang, KE2DYE, and Shiphi Panicker, AA1SP, talk about ham radio in the digital edition of *QST* (**www.arrl.org/qst**).

Photos provided by Steve Goodgame, K5ATA.

Ashley Li and Olivia Wojtczak are students at SITHS. They initiated the creation of the school's student-run newspaper, *The Tech Times* — Ashley is the editor-in-chief and Olivia is the managing editor. They recruited a team of talented writers to work on the periodical, which is distributed to the student body and staff monthly. Ashley is an aspiring civil engineer and hopes to receive her amateur radio license in the upcoming year.

For updates to this article, see the *QST* Feedback page at www.arrl.org/feedback.

Strays

QST Congratulates...

Jim Schmidt, WA4VOC, for receiving the Bullitt Amateur Radio Society's (B.A.R.S.), KY4KY, 2024 Amateur of the Year Award. Jim has provided a complete satellite system for B.A.R.S.'s Field Day operation for numerous years to help the club achieve many first-, second-, and third-category finishes. He has presented at meetings and is always available to answer questions.

Each year, B.A.R.S. selects one of its members as the Amateur of the Year. They look for someone who shares their knowledge, equipment, and time with club members and activities.

Jim Schmidt, WA4VOC, pictured with his 2024 Amateur of the Year Award. [Bud Sohl, KC4WQ, photo]