

Cricket

From MUSE magazine, February 2019, © 2019 by Cricket Media.

or the SOAR Early College High School InvenTeam, the path to the 2018 EurekaFest at MIT began very close to home. It was on a walk through the school's California campus.

Watching their fellow students, they realized that many kids travel solo. And they're not looking around. "We have our ear buds in, our hoodie up," says Madelen Flores. She's on the team and a senior at the school. "We're not really aware of what is around us, and not every place is lit."

Keeping an Iris Out

When team members saw walkers without much awareness of their surroundings, they perceived a problem. A sudden movement—or even an attacker—might startle these walkers. Meanwhile, the team conducted a survey of college students in southern California. It confirmed that many students don't feel safe, especially at night.

> Distracted kids need help staying alert to possible dangers while walking alone. From that simple idea came the team's unique invention: "Iris."

Iris is a wearable device that a student can attach to a backpack or purse. It features two kinds of sensors that can "see" a potentially dangerous object or person. They alert the wearer via a phone message or a LED light on a specialized wristband. Thermal sensors perceive heat. Ultrasonic sensors measure distance.

The team developed the idea by brainstorming ways to solve the problem, Flores says. "We knew we wanted to use different kinds of sensors," she explains. So they learned about the potential uses of devices that can sense heat, motion, and sound and how they could be incorporated into Iris. Since the InvenTeam operates as a school club, the different members brought a range of skills to the project.





From MUSE magazine, February 2019, © 2019 by Cricket Media.



EUREKA!

The event that brought the SOAR InvenTeam to the East Coast is sponsored by the Lemelson-MIT Program, which supports young inventors through grants to high school teams. EurekaFest, the program's annual event, hosts InvenTeams from across the country, collegiate recipients of the Lemelson-MIT Student prizes, and speakers at a multi-day event on MIT's campus in Cambridge, Massachusetts. The Lemelson-MIT Program is funded by the Lemelson Foundation and administered by MIT's School of Engineering.



These include coding, design, fundraising, and running a team blog, Flores says.

Developing Iris was a group effort, and not without hiccups. Nathan Campos led the tech team for the project. "We had to deal with the 3D printer orientation—getting it to print

correctly—the software, the sensors," he says. In particular, the team spent a lot of time adjusting the sensors so they would alert the wearer to a real problem but not give a lot of false alarms. Those might be things like passing cars or street signs. The group also made sure the sensors captured a threat before it was too close.

Iris will send an alert to the wearer depending on how nearby a potential danger is. Yellow is a warning. Red indicates that something is right behind him or her. "When you are walking to math class, you note that your phone has gone to yellow, so you turn and look," Campos says, describing how the device works. However, he stresses, Iris is just a warning system. "It's the user's responsibility to turn around." The students are still working on the device's ability to contact authorities.

> The team hopes to offer Iris for less than \$20 to make it affordable for high school and college students.

Tools to Succeed

SOAR stands for Students on Academic Rise. The school is located on the campus of Antelope Valley College, so SOAR has more public space than many other high schools. That's one more reason, Flores says, why the team members' fellow students can benefit from a tool like Iris.

A 3D printer helped the SOAR InvenTeam make a prototype.

Cricke

Most of the students at SOAR—65 percent—graduate not just with a high school diploma but also with an associate's degree (a two-year college degree).

Teacher Rachel Thibault leads the SOAR InvenTeam. Every year, the group works on an invention designed to solve a real-world problem their community faces. In 2018, they received a \$10,000 grant from the Lemelson-MIT Program. They traveled to Massachusetts to showcase their invention, alongside 14 other high school inventing teams from around the country, at EurekaFest.

Thibault says SOAR is unique, and not just because students start taking college classes their freshman year of high school. The school is part of a college- readiness program called AVID (Advancement Via Individual Determination).

"The goal of an AVID program is to take middle-of-the-road students and train them to excel through organization, communication, collaboration, and critical thinking. The kids leave our program as outstanding students," she says.

Once students are accepted into the program, "The professors at the college treat them the same as any other adult student," Thibault says. Younger kids must take the same placement tests as the college students, and they are graded the same way as their older classmates.

Flores says that coming to MIT and being part of EurekaFest was a fantastic experience for the

team. "I liked being able to present [Iris] to people—they gave us a lot of feedback," she says. They received input from other teams, including older teams, as part of the process. The group was also eager to explore Boston, a city many of them had never visited before. A few hoped to eventually attend a four-year college there.

The SOAR team invented a thoughtful device that helps users look around and stay safe. Just imagine what more achievements the team members have to look forward to!

Lee Gjertsen Malone is a journalist and author who lives in Cambridge, Massachusetts, not far from the MIT campus. Her next novel, *Camp Shady Crook*, will be published in 2019 by Simon & Schuster.

