

# FIRST ROBOTICS INFINITE RECHARGE

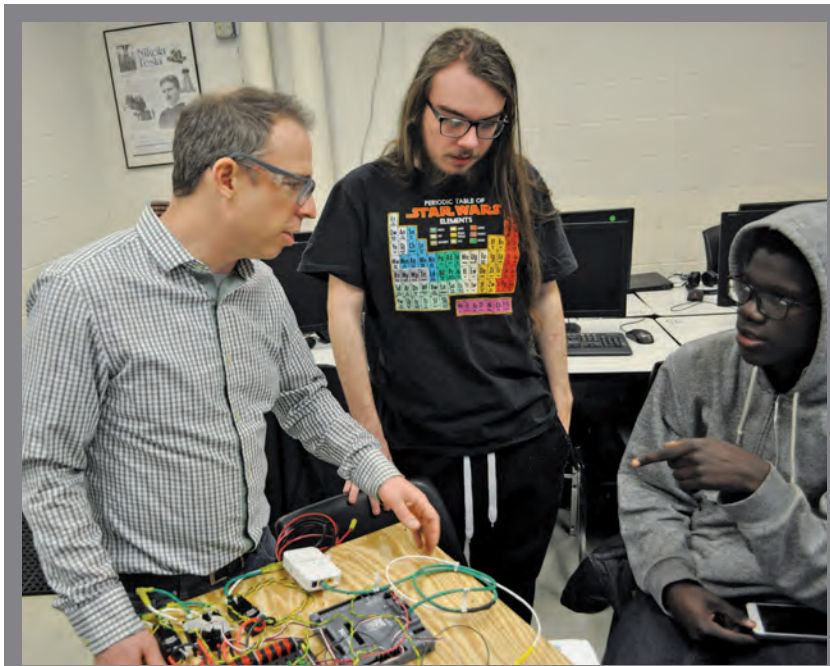


Teachers Bill Lopez and Matt Leifeld work with young scholars Regan Miller and Dartanian Barringer to strategize on ball intake.

Imagine a competition where excited, technology-driven high school students compete as teams, head to head with robots they have designed, built and programmed themselves. This happens annually and hundreds of teams were preparing to compete at Rockland Community College and RPI in March, Houston in April and Detroit in May when development came to a sudden halt.

FIRST (For Inspiration and Recognition of Science and Technology) was founded by inventor Dean Kamen in 1989 and is the world's leading youth serving nonprofit advancing science, technology, engineering, and math. This program inspires students in grades K-12 worldwide while teaching leadership by engaging them in hands-on robotics challenges.

FIRST LEGO League Jr. is for grade K-4, FIRST LEGO League is Grades 4-8, and FIRST Tech Challenge covers grades 7-12, while the FIRST Robotics Competition is grade 9-12.



Hudson Valley Pathways Academy First Robotics coach Noah Smith consults with young scholars Elijah Effner and Omari James regarding programming the robot.

The program is supported by corporations, educational and professional institutions and individuals who provide mentorship time and talent, equipment, and funding. Participation in FIRST is proven to encourage students to pursue education and careers in STEM-related fields. They develop self-confidence in STEM and real-world skills that can lead to careers in STEM related fields and more. High School participants are also eligible to apply for more than \$80 million in scholarships to participating colleges and universities.

Working with professional Mentors participants design and build a robot, and compete in high-intensity events that reward the effectiveness of each robot, the power of team strategy and collaboration, and the determination of students. The competition teams create powerful mentoring relationships between the students and professional mentors, many of which are engineers and other professionals. The event starts with a Kickoff event that unveils a new, exciting, and challenging game. From the Kickoff, teams have limited time to build and program a robot to compete in the game using a kit of parts provided by FIRST and a standard set of rules. This year's theme focuses on renewable sources of energy and is titled INFINITE RECHARGE.

FIRST Robotics has become an event to look forward to for the Hudson Valley Pathways Academy and other innovative schools around the country. It ties together the adrenaline rush of competitive sports and the brain-straining precision that accompanies technology and science. To actually succeed in FIRST, you have to be passionate, willing to learn from others, and solve problems in real time. Simple enthusiasm alone isn't enough in this nerve-wracking, but fun-filled annual competition.

FIRST Robotics is a program that builds student creativity, innovation, and critical thinking. The goal of FIRST is to build and design a robot that's able to perform multiple unique tasks and then put your teams' skills to the test in competitions that take place around the country.

This year the theme of First Robotics is *Star Wars, Infinite Recharge*. The main goal for the robot in this competition is to shoot and score "Power Cells" (foam balls) to energize a Shield Generator to protect the team. Students are tasked with designing a robot that can function both, autonomously and manually. The Robotics Challenge is a fun and interactive experience giving students an opportunity to take their creative ideas to the next level. The FIRST competition presents students with the task of learning how to build and code a bot from scratch, tied together with teamwork and problem-solving as factors for the success of completing the robot. The whole HVPA student body dedicated a lot of time and effort to assemble the robot this year.

The HVPA robotics team made many improvements since our inaugural year. FIRST Robotics has become a school wide effort with just about every student helping in one way or another. Young Scholars broke into assigned teams to design, machine, build, and code the robot. Others worked together to manage finances, create team logos, design t-shirts, and "brand" the squad. While other students participated as photographers, videographers, website developers, social media marketers and journalists, working on this article for the HV Mfg magazine. Some students even learned how to design Star Wars themed costumes from industry professionals.

As a team the staff and teachers have been actively involved with the students. Matt Boice has helped with assembling, materials, and the build protocol. Teachers, Matt Fagan, Noah Smith, and Joyceanne Wlodarczyk have mentored students through various aspects of development. William Lopez has acted as coach and building consultant. Matt Leifeld was a productive design and programming coach. The students turn to mentor and Principal, Peter Harris for logistical, budgeting, and finance support. Administrator, Steve Casa is a fully involved mentor and industry partner liaison.

Chapter One student, Ben Dubois, gave us feedback on what he's gained from his FIRST robotics experience, some challenges he's had, and what he's excited about for the competition. Building something this complex brings trial and error, this was one of the things Ben struggled with. He said, "The biggest challenge I've faced so far is the repetition and problem-solving... we'll be running into the same problem this year. We have to find good solutions and sometimes figuring it out is really hard." Even with his struggles, he's still managed to be persistent and keep working when things get tough.

Math teacher, Matthew Leifeld echoes what Ben said. "Learning how to code was a process of problem solving. Each student has run into difficulties and issues that they've had to figure out. Because of this, students have gained skills working





Consultant instructor Sal Ligitino coaches Heidi Cardenas-Ruballos in her first attempt at cutting a part for the robot.



Young scholars Brandon Pendell and Travis Boice work together to construct the bumpers for the robot.

as a team and persevering. These dispositions will help them in preparation for their future career and provide them with the necessary competencies.”

Robert Reilly Shaw, a first year student and coder for this year’s competition, explains the process of learning how to code. “It was a lot of research and studying and when working with code you need patience. It takes a lot of time and effort to code a robot to do the necessary tasks for the competition.”

Founder of the HVPA robotics team and science teacher, Noah Smith, shows what participating in FIRST Robotics is like for a student. He says, “Among other things, FIRST Robotics emphasizes cooperation, growth, and the soft skills for leadership under pressure.” Smith continues, “This past year students have learned java, applied physics, and how to meet deadlines.”

Regan Miller, a third year student at Pathways, chosen as student “coach” for last year’s team, has benefited greatly from

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the robotics program. “FIRST has really tested my leadership skills. As a “coach” I motivate my peers, organize and divide labor, and help my teammates set goals.” Competitions have given Regan the opportunity to meet students from other schools and work together with them. At competitions “I’ve been able to communicate with other teams to devise strategies, share resources, and improve each others robots.”

Local business professionals visited with the students and mentored them through various phases of the project. Linda Engler from Ad Essentials spent time teaching photography, marketing and journalism to those students responsible for communications.

Alethea Shuman, VP of Sales and Engineering from USHECO provided help in project management and CAD design.

Ken Myers, the Laboratory Supervisor at the Center for Automation Technologies and Systems Vice President for Research at RPI, acted as a mentor in machining and design strategy. Ken provided materials and consulting on building the robot.

Salvatore Ligotino, Robotic Instructor at Ulster BOCES career and technology center and SUNY Ulster played an instrumental role in the project. Sal provided support in building, design and implementation of the plan to create the Robot.

Ilya Vett, a longtime costume and puppet designer for the Lion King on Broadway and Jaf Farkas a prop designer in the film industry visited the classroom and offered assistance for the design of the mascot’s costume.

Al Kloss from Saultana Upholstered Furniture helped with sewing the fabric for the bumpers that were required for competition. Numerous other industry partners offered help and the hope for next year is to have a more integrated process. The Council of Industry members have supported the schools’ FIRST Robotics efforts with an eye on the future.

HVPA’s robotics team was putting the finishing touches on their robot when they were informed that school would continue remotely and that the competitions were to be suspended due to COVID-19. 49 teams were registered to participate in the event at Rockland Community College and 27 teams at Rensselaer Polytechnic Institute (RPI) in March. The HVPA team was invited to attend both cooperitions.

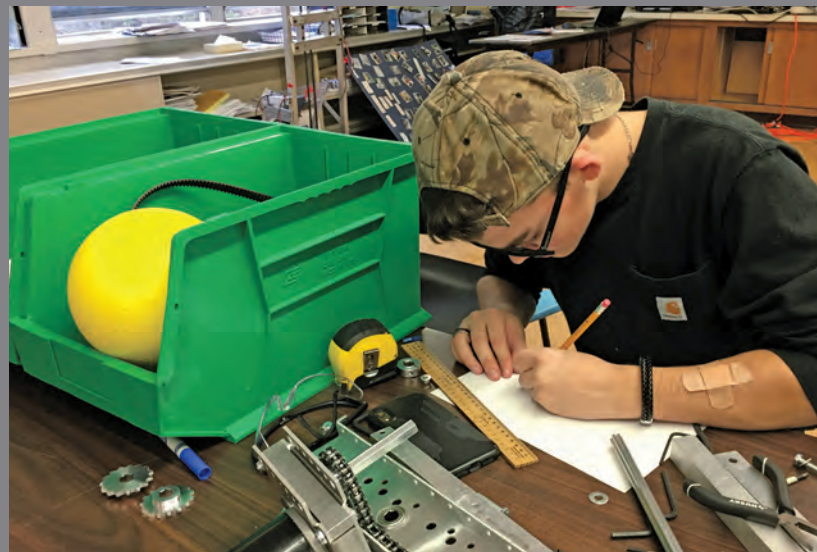
The whole FIRST community was disappointed when hearing that the competitions were cancelled, but that was short-lived with all the more pressing real concerns over family and friends getting sick or worse passing away from the COVID-19 pandemic. The FIRST community quickly shifted from disappointment to thinking about how they could help the local community. Salvatore Ligotino, the HVPA Robotics Instructor, was helping make plastic parts for splash guards at SUNY New Paltz.

Perhaps the program has achieved such amazing results because FIRST is known for Gracious Professionalism and Coopertition. If you haven’t heard these terms before – “Gracious Professionalism is a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community. With

Gracious Professionalism, fierce competition and mutual gain are not separate notions. Gracious professionals learn and compete like crazy, but treat one another with respect and kindness in the process.” And at FIRST, Coopertition is “displaying unqualified kindness and respect in the face of fierce competition.” Coopertition is founded on the concept and a philosophy that teams can and should help and cooperate with each other even as they compete. Coopertition involves learning from teammates. It is teaching teammates. It is learning from Mentors. And it is managing and being managed. Coopertition means competing always, but assisting and enabling others when you can.



Erik Augustin-Santos, Juan Neri-Ramos, Maxwell Roque, and Matthew Albert organize tools and work on electrical elements of the robot.



Benjamin Dubois plans critical elevator movement system.



Last year nearly 100,000 high school students on 3,940 FIRST Robotics Competition teams took part in 100 district events, 11 District Championships, and 62 Regional Events (in the U.S., Australia, Canada, Israel, Mexico, and Turkey), and the FIRST Championship. Teams are comprised of professional mentors and 10 or more student members in grades 9-12. In addition, each FIRST team has one or more sponsors. Those sponsors include companies, universities, or professional organizations that donate their time, talent, funds, equipment, and much more to the team effort.



Pictured are Communications team members Yshecka Smith and Serenity Wroblewski working on drafts for this article. Other members of the team include Bean Crane, Erryn Teague and Matt Petty.



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