

- Special Section -



# How the Granite State supports STEM education and careers

## THE PIPELINE ... Scholarships, college credits for students



COURTESY CARA SANDFORD STUDIOS  
 Students at the New Hampshire Technical Institute in Concord are helping to fill the needs of area employers in science, technology, engineering and mathematics.

By Kathleen D. Bailey  
 Special to the Union Leader

**WHEN DR. GRETCHEN** Sawicki, president of the New Hampshire Technical Institute, needed a disc golf course designed and built for her students, she didn't have to look further than a student — and a group of enthusiastic community partners.

For several years, professionals, pundits and prognosticators have pointed to two factors in the Granite State: an exodus of talented younger workers and a shortage of people to fill positions in science, technology, engineering and mathematics-related fields. The acronym STEM covers the four fields, and New Hampshire's high schools, colleges and business personnel are connecting in order

to fill both gaps.

### Smarter Pathways

The Concord-based New Hampshire Charitable Foundation was aware of the gaps as far back as 2014 and sponsored Smarter Pathways, an effort to identify ways to encourage students to seek careers in the STEM fields. The program engaged business, education, government and non-profits to look at ways to keep New Hampshire students engaged in math and science, and expand the "pipeline" from school to careers in those fields.

At that time, students' proficiency in science and mathematics diminished dramatically as they progressed through school. At that time, by fourth grade only 51

► See **The Pipeline**, Page D2

## THE CLASSROOM ... Six years later, it's still full STEAM-Ahead NH



TED SEIBER/UNION LEADER FILE  
 Cristian Sepulveda, right, and Trevor Leavitt, left, students in the STEAM Ahead program at Manchester High School West, use their laptops in biology class in October 2014, the year the program was launched.

By Paul Feely  
 New Hampshire Union Leader

**WHEN THE COVID-19** pandemic hit New Hampshire last spring and school districts across the state shifted to remote learning status, some school officials feared the impact the move might have on STEAM Ahead NH at Manchester High School West.

Turns out even a pandemic can't derail the popular program, though it did slow it down a bit. "Our schools need to adapt to the demands of the community, to the demands of the world," said West High principal Richard Richard. "And STEAM is one of those programs that, from its inception really, started to think outside the box, to do things the way we should be doing them. We

can't wait until we get back at it in person, but we'll keep plugging along."

Since the summer of 2014, Manchester High School West has been the site of the birth and development of STEAM Ahead NH. The idea was launched when local business owners Jeremy Hitchcock of Dyn and Nick Soggu of SilverTech, both graduates of Manchester schools, were inspired to support the creation of a program focused on the STEM fields. They worked with former mayor Ted Gatsas, who suggested including the arts to include the creative thinking aspect often missing in STEM initiatives — traditionally geared toward science, technology, engineering and math.

► See **The Classroom**, Page D3

## THE ECONOMY ... NH Tech Alliance helps launch startups



ALLEGRA BOVERMAN/UNION LEADER  
 Helios Hockey founder Bill Near, who works out of a lab in Portsmouth, received mentoring and other assistance from the New Hampshire Tech Alliance.

By Jonathan Phelps  
 New Hampshire Union Leader

**STARTUP COMPANIES** ARE critical to the economy as technologies adapt and grow, and the New Hampshire Tech Alliance is ready to help.

The alliance helped fledgling companies like Waypoint Robotics in Nashua launch. Last year, the company moved into a new machine shop four times larger than its previous space.

Other companies include addaptation, Helios Hockey and Performology. The alliance works with both early-stage and more advanced startups.

"Entrepreneurship is critical to an economy," said Joshua Cyr, senior director of startup initiatives at the alliance. "There is a life cycle for businesses, and we need new businesses to be formed to grow and to keep up with people who are retiring or businesses that are shutting



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► See **The Economy**, Page D5

## The Pipeline

percent of New Hampshire students were "proficient or better" in science, dropping to 31 percent by eighth grade. Math proficiency slid from 68 percent in eighth grade to 37 percent in 11th grade.

Members of the initiative worked on projects ranging from teacher preparation to partnerships and internships exposing students to these fields.

The effort ended up with a 25-page report, a brace of new goals, and an increased number of STEM-related scholarships from the foundation. The foundation originally committed to increasing STEM scholarships to \$500,000 each year. But the need, and the talented young people, were too great, and the foundation awarded \$695,000 in 2013 and \$848,000 in 2014.

Michael Turnelle, director of education and Career Pathways for the New Hampshire Charitable Foundation, wrote in an email, "NHCF did have a priority focus in STEM scholarships for a period of about five years. Since that initial focus (ended a couple of years ago), we have tried to maintain our funding to STEM fields, while simultaneously concentrating on and promoting scholarships to our seven community colleges. We have been very successful in maintaining our STEM funding, with the following amounts awarded:

- 2018 \$1.26 M in STEM scholarships;
- 2019 \$1.24 M in STEM scholarships; and
- 2020 \$1.22 M in STEM scholarships."

### From the front lines

Jeremy Hitchcock, entrepreneur and philanthropist, has been interested in science since sixth grade, when he began to see how

"physical principle could be predicted," he said in a phone interview. He was later to co-found two tech businesses, Dyn, which he sold in 2016 prior to its acquisition by Oracle, and Minim, where he is currently CEO.

Hitchcock was involved in the Smarter Pathways initiative. He observed, "The traditional high school model had standard programs for students. About 10 years ago, we started questioning the traditional high school model."

Among those questions were how educators looked at math. "Is calculus always the gold standard?" he asked. Now programs such as New Hampshire Scholars recognize different kinds of math, such as data, statistics and probability.

"I've been impressed the past five or 10 years," he said, "as to where we were and where we are now."

Like the science it seeks to understand, STEM recognizes "There are lots of different ways to understand the world around us, and more ways to get there."

Through Smarter Pathways, Hitchcock said the participants discovered that New Hampshire already had between 500 and 800 programs encouraging STEM education around the state. Some were established, like VEX Robotics and Dean Kamen's FIRST; others were experimental and even homegrown. "What I like about New Hampshire," Hitchcock said, "is that there's a lot of local control and room to try things out."

"We learned from the study, and shared our 'best practices,'" he said.

Until recently, the community college model was "we offer everything to everyone," according to Hitchcock. But now the



Computer engineering students work in the classroom at New Hampshire Technical Institute in Concord.

attention is becoming more personalized and focused. "It's more a matter of, 'Where's this person now, where do they want to be, and what are the necessary steps to get there?'" The schools learn more heavily on advising and career-preparedness, "and that's a good thing," he said.

Douglas Cullen, manager of career services for Pinkerton Academy in Derry, has seen an evolution over his own career, from the name vocational education to career and technical education. Pinkerton was one of the first New Hampshire schools to make the shift in name, according to Cullen, back in the 1990s.

Cullen networks with a number of employers and said that even after years of promoting STEM, business and industry are still feeling the shortage. It's across all five major sectors of CTE — computer science,

hospitality, health, manufacturing and construction, he said.

Cullen added, "Ironically, the shortages aren't necessarily the 'hard' STEM skills, but the 'soft' skills that make a person employable."

Pinkerton offers computer science programs, an engineering program with two manufacturing courses, building, automotive and health careers among others. "Our newest computer science class is on programming. Students are learning to code."

### Making the connection

Business and industry leaders no longer wait for qualified graduates to come to them, but are linking up with four-year colleges, two-year colleges, certificate programs and even high schools. NHTI's Sawicki is excited about a new program at "The Tech" that connects the school with the community. The

Innovation Lab links students with the community in project-based learning, according to Sawicki. Businesses and nonprofits come to the school with hands-on "micro-projects" that a student or student team can complete, Sawicki said. The Disc Golf Course is an example: The Student Senate gave it to the college as a gift. But the school still needed someone to design it, so they tapped one of the architecture students.

"Eventually," she said, "we hope to reach all our programs with projects in marketing, engineering, mathematics, business and architecture." The requests honored depend on the need and the industry, she said, adding that the school itself is a client and puts students to work on projects.

NHTI has always lived up to the "tech" in its name, with practical majors that span the disciplines. The school has offered an as-

sociate's math major for about 10 years, and has two dental programs, dental hygiene and dental assisting.

### A running start

Programs such as Project Running Start, which gives motivated high school students community college credits at a discount, have helped tremendously, according to Hitchcock. In particular, it gives a boost to students not marked as traditional "college material." "It says to them, 'Hey you're taking college level classes, congratulations,'" he observed.

Pinkerton Academy is also partnering with the University of New Hampshire at Manchester for another initiative, First Steps, where high school students earn college credit for their computer science programs. It is an Advanced Placement course at Pinkerton and earns college credits for the students, he said.

### Building on the foundation

All the professionals agree there is more work to be done so the STEM pipeline will be even wider. Hitchcock noted that STEM and liberal arts aren't mutually exclusive. And at the heart they are both asking the same questions. "Engineering is 'how do you do it' and humanities are about asking the right questions," he said.

Cullen sees a rise in the demand for the "middle-skill" market, two-year associate degrees certifying students as "engineering technicians" or similar positions. "It's not necessarily a bachelor's, but two years, maybe a third for certification," he said.

Hitchcock concluded, "Great employers are looking for smart, educated people."

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## The Classroom

NH is to build upon the partnerships between the school district and business community to provide the opportunity for students to graduate from high school with literacy in key technical areas, saving students and their parents a year of college tuition costs.

The laboratory/academy-based program includes internship opportunities through local cultural institutions and businesses, while taking advantage of the technology research and development resources. Credits are earned through a variety of opportunities including concurrent high school and college credit courses, college courses on the college campus and/or high school campus, online and internships in community-based businesses and cultural institutions.

Through this partnership, high school students are provided the opportunity to earn up to a full year of college credit while they are in high school at no cost. Credits are earned in a variety of ways. High school courses are aligned with college courses and taught by master's-level teachers, with students receiving both high school and college credit for the successful completion of these courses.

### Mastering the five 'Cs'

Dichard said it comes down to the five 'Cs' in life. "If they can do those five 'Cs' they have a pretty good opportunity to do well in life," Dichard said. "A kid that can communicate, a kid that can collaborate, a kid that can critically think and solve a problem, a kid that can be creative and think outside the box, and a kid that's just a good citizen. Ask any employer

— you're going to hire that person right away."

Dichard said while the STEAM Ahead's engineering class is full, overall the number of students participating is down — thanks in part to COVID-19.

"The issue with COVID is we weren't able to do a good job with recruiting," Dichard said. "The week that we went out remote (last spring), the following week we were scheduled to go into the schools and do our recruiting. We had students and faculty lined up to go into the middle schools. We weren't able to do the same recruiting efforts, so the incoming class is a little smaller."

Dichard said he hopes to establish a feeder program from Middle School at Parkside in the near future. The current feeder system draws students from McLaughlin Middle School.

Learning remotely has impacted STEAM Ahead.

"The engineering teacher has asked us to get kits, so we can send home kits and the kids can work on stuff," said Dichard. "They pick them up and then he'll work them through those kits. The COVID-19 situation has required us to think outside the box on virtually everything we do, and I don't think it's necessarily a bad thing. We needed to be ready for this, and we are learning a lot along with the students."

A 2017 study conducted by researchers at the University of New Hampshire showed students who participate in Manchester's STEAM Ahead program have higher grade-point averages than students in traditional learning environments.

To examine how participation in STEAM Ahead impacted students'



Manchester High School West teacher Liz Kirwan learns how to write computer code during the Coding Across the Curriculum TeachCode Academy at UNH Manchester in 2016.

academic performance, the grade-point averages (GPA) and preliminary scholastic aptitude test (PSAT) scores for students taking part in STEAM Ahead and students in the traditional learning environment were compared using secondary academic records.

According to the study results, STEAM Ahead students had a higher mean GPA for both freshmen and sophomores. Out of a 4.0 scale, freshmen students in the traditional learning environment had a mean GPA score of 1.76, while freshmen students participating in STEAM Ahead had a mean GPA score of 2.57. Sophomore students in

the traditional learning environment had a mean GPA score of 1.59 while sophomore students participating in STEAM Ahead had a mean GPA score of 2.31.

### Improving test scores

The second measure used to examine students' academic performance was sophomore students' PSAT scores. PSAT scores were available only for sophomore students who had opted to complete the exam. The study results show the mean PSAT score for students participating in STEAM Ahead was 115 points higher than that of students in the traditional learning environment, out

of 1,520 possible points.

The research also found that students who participate in STEAM Ahead had fewer days tardy or absent when compared with students in the traditional learning environment. "The data on the program continues to be through the roof in terms of engagement," said Dichard. "Those kids that are opting in are doing great. They're going to amazing schools, their attendance is great, they're engaged. The project-based approaches, the life-skills approach that the courses take, kids are actually engaged and interested in what they're doing."

Dichard said they've added a few courses recently to the end of the STEAM line, such as biotechnology.

Last year, Jacob McClelland became the first Harbor Freight Fellow in New England, when he completed an internship at Werner Mazda in Manchester. The program offers apprenticeship experiences with professional trades persons at their businesses.

"It helped me see the options I have and it showed me what I should look for when I need to get better, like colleges and trade school," said McClelland. "It improved my hands-on and listening skills, and made my love and passion for my trade grow even more than it was before."

Such programs help both students and businesses, Dichard said.

"The business gets an intern, there's a stipend involved, and all the learning is done outside the school walls," said Dichard. "This kind of program is going to explode. I think it's almost like the employer is grooming their own employee from scratch."

**“If they can do those five ‘Cs’ they have a pretty good opportunity to do well in life. A kid that can communicate, a kid that can collaborate, a kid that can critically think and solve a problem, a kid that can be creative and think outside the box, and a kid that’s a good citizen. Ask any employer — you’re going to hire that person right away.”**

**RICHARD DICHARD**  
Manchester High School West principal

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# WOMEN IN STEM ... DHMC's research operations led by all-female team

World-class clinical research is being performed in the Granite State and the team that underpins the endeavor shares one thing in common ... they are all women.

Dartmouth-Hitchcock Medical Center is New Hampshire's only academic medical center and Executive Vice President Susan Reeves, who oversees research operations, said, "We only focus on hiring the best person for each job, and in this case, they were all women. This is an incredibly talented group who came into these roles from top research institutions around the country as well as from inside our organization."

In 2016, clinical research operation responsibilities moved from the Geisel School of Medicine at Dartmouth to DHMC. Managing a high quality research program required DHMC to construct a new Office of Research Operations and recruit its leaders.

"The ORO infrastructure is the glue that holds together the research mission. The ORO exists to support the 15 departments and centers through which research is envisioned and administered," said Reeves. "The ORO is the engine that makes it all run."

A desire to take care of people is necessary for a career in health care, but a passion for math and science is also a must. Jennifer Lopez is the director of research operations finance. Her role is to understand the detailed financial flow involved with research operations. "I oversee anything that has a dollar sign tied to research," said Lopez.

Kristen Katopol is the director of the Human Research Protection Program, the office that oversees the



From left are members of the Office of Research Operations at Dartmouth-Hitchcock Medical Center: Abby Statler, director of research quality and safety; Kristen Katopol, director of Institutional Review Board; Jennifer Lopez, director of research operations finance; and Barbara Moskalenko, director of research operations.

federally regulated Institutional Review Board. The IRB monitors all research studies involving human subjects for ethical and regulatory compliance and to make sure patient rights, safety and welfare are protected. "I'm the advocate for people enrolling in research studies," Katopol said.

Jami Wilson is the director of research nursing and director of the Clinical Research Units. She leads about 50 research nurses, many of whom migrated to the research environment after years in the clinical area. Wilson makes sure they understand and enact the role of the nurse in the research setting.

Director of Research Operations Barb Mos-

kalenko oversees research operations across several departments including the centralized clinical trials office, centralized research lab, and manages non-clinical research division managers, coordinators and regulatory staff across multiple research departments.

Protecting individuals who participate in research studies is essential. Director of Research Quality and Safety Abby Statler makes sure every part of a research project conforms to established rules and regulations. "I also help champion policies and procedures that will harmonize research efforts and clinical care standards across our system of 15 multi-faceted research divi-

sions," she said. In March, as part of

COVID-related work-from-home orders, the entire staff for research operations went remote, and clinical research was scaled back. Not surprisingly, DHMC scientists recognized an opportunity to study COVID. "We were the only institution in New Hampshire to participate in early Remdesivir drug studies. Convalescent plasma and other medication studies have since been initiated here too," notes Reeves.

"Not only did we have to figure out how to get all of the infrastructure built for trials specific to patients diagnosed with COVID-19, but we had to do this with unheard-of speed and with everyone working remotely. The ORO leaders appreciated that their work could change the course of the disease some patients and worked around the clock to get these studies open."

The women leaders in the ORO encourage young people to explore the endless opportunities in medical research. "In research administration, I've found

that a lot of us just fell into our roles," Lopez said. "I had a financial background already but found that applying it to the meaningful work that our clinicians and scientists are doing was so much more rewarding."

In fact, the leaders all agree that the reward of contributing their skills to the greater good of humankind is what drew them into medical research.

"For young people who have an interest in health care, research or highly technical jobs like informatics, now is the time," Reeves said. "The need for people with these skills is ballooning across the country."

Research operations is a growing field that provides flexibility to travel to new places, see and experience new things.

"Research is constantly evolving. The landscape is constantly moving and shifting. If you are a curious person and interested in learning, growing and being challenged, there are positions for you," said Statler.



Engineer Vaso Partinoudi is the director of Career and Technical Education at Milford High School.

## WOMEN IN STEM ... Milford teacher encourages her female students to shine

By Rob Levey  
Special to the Union Leader

WHILE OPPORTUNITIES in science, technology, engineering and mathematics continue to outpace other sectors, stigmas still exist that prevent many girls from considering such careers.

"I'm a female engineer and I've been stereotyped ever since high school," said Vaso Partinoudi, director of Career and Technical Education at the Milford High School & Applied Technology Center.

Currently pursuing her doctorate with research focused on how to attract and retain female students in engineering, Partinoudi said the stereotype that men are more suited for STEM careers is taught early.

"Mothers are the number one reason, according to my research," she explained. "Mothers reinforce the stereotype that engineering and other STEM fields are for men. It creates a barrier for females."

It is a barrier she has sought to take down throughout her career.

"When I started working in high school, I taught computer science and engineering, and there were three girls and 22 boys," she said.

"I thought to myself that nothing has changed, so it became very important for me to find opportunities for my female students to shine."

One of those opportunities has been to nominate her female students for National Center for Women & Information Technology Awards for Aspirations in Computing. Award recipients are selected based on their aptitude and aspirations in technology and computing.

"Last year, I nominated six girls," said Partinoudi.

Three of her students won the award in New Hampshire with McKayla Hartman, a senior at Newmarket High School, also winning National honorable mention.

According to Hartman, Partinoudi's effort to nominate her for the award is just one of the ways she has encouraged her to pursue STEM.

"She helped me find an opportunity to teach and expose elementary students to coding for the summer," she said. "She met me at a conference in New Mexico for Geoscape Environment Modeling and introduced me to Ph.D. students and professors who are pioneers in their field."

She cited Partinoudi as instrumental in also encouraging her and another student



Newmarket High School senior McKayla Hartman says CTE – Career and Technology Education – is the most rewarding thing students can do to prepare for higher education.

COURTESY

to enter last year's New Hampshire State Science and Engineering Expo with a project on 4D printing.

"She was beyond supportive and pushed us every step of the way," she said. "As a team, we received recognition from Yale University."

Hartman's exposure to engineering has taken place at Seacoast School of Technology, one of nearly two-dozen Career & Technical Education Centers in New Hampshire.

"CTE centers are the only place in many ways where students can be exposed to computer science and engineering," said Partinoudi.

As far as Hartman is concerned, getting involved in CTE "is by far the most rewarding thing one can do to prepare for higher education."

"I have gotten the opportunity to study cancer cells, CRISPR, and the human genome," she said. "I have worked with advanced modeling and simulation software, digital electronics such as Arduino boards and robotics, and have been able to push my boundaries of knowledge by taking CTE classes."

Hartman said the most valuable thing she has learned from CTE is teamwork.

"You have to be able to communicate with others and work together to be successful in your career," she said. "I have had the pleasure to work with some of the most talented students and teachers to think outside of the box, form friendships, and support one another to achieve amazing things."

In looking to the future, Partinoudi said she believes CTE represents an important pathway for girls to pursue STEM-related careers.

"All CTE directors and teachers are doing their very best to support our female students to fulfill their dreams," she said. "Women are just as capable as men in any STEM field."



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Bilal Jordan of Nashua-based Performology is congratulated by Liz Hitchcock of Millworks Fund II after winning the first-place \$200,000 award at the New Hampshire Tech Alliance's Startup Shindig at Oracle+DYN in 2019.

## The Economy

From Page D1

down for a variety of different reasons."

Many startups are also key to innovation with high growth potential.

"Entrepreneurship is solving a problem that you find in the marketplace and doing it as a viable commercial entity," Cyr said.

The alliance runs several programs each year for startup technology companies. In November, the alliance will host what they call a Speed Venture Summit.

"It is an event sort of like speed dating for startups and investors," Cyr said. "The goal of this event is for these startup founders to meet and have the opportunity to pitch to a number of different investors throughout the region."

Two other programs include a boot camp for entrepreneurs still developing an idea for a company and Accelerator NH, which has been put on hold because of the pandemic.

"The tech accelerator is a smaller group size, and it is intended for startups that are launched and need to accelerate their growth," Cyr said. "It is a pretty intense three-month process."

Performology, a small startup company in Nashua founded in 2016, took part in the Accelerator NH program last year.

The largest benefits of the program were the support from the alliance, guest speakers and connections with other startups, said Bilal Jordan, founder and CEO. The company has developed software to help employees keep track of goals.

"Going through that accelerator program really kind of prepares you for the process of pitching your software company to investors," he said. "I think that portion is valuable, especially for first-time entrepreneurs who may not have experience building a

pitch."

The alliance helps entrepreneurs navigate the unknown in starting a new company, Jordan said.

The company hopes to grow from 30,000 users to 100,000 users by the first quarter of next year.

The initial idea of a startup is likely to change to address market needs.

"You have to have people who are able to build and you have to have people who can sell," Cyr said. "That is probably all the same person or two founding members who are able to pull it off."

The COVID-19 pandemic will likely further fuel innovation and more startups, Cyr said.

"A lot of people are sitting at home right now, and they are seeing problems — maybe for the first time or they are in the position where they have time or interest to try to solve these things," he said. "That is where innovation is born."

# THE PLEDGE ... USNH aims to double STEM grads by 2025

By Rob Levey  
Special to the Union Leader

**I**N 2012, THE UNIVERSITY System of New Hampshire committed to double the number of STEM-educated graduates from its institutions by 2025, a pledge made in response to growing demand across several industries.

"Health, biological sciences and advanced manufacturing will continue to be growth industries for New Hampshire," said said USNH Chancellor Todd Leach. "Our future economy is going to be increasingly dependent on our ability to support our industry partners with the educated workforce that they need."

STEM programs available across the USNH number in the hundreds, including marine science, physics, NASA research, agriculture, nursing, astronomy, analytics and cyber security, just to name a few.

## New facility at PSU

One highlight is at Plymouth State University, which features a program in Electromechanical Technology and Robotics that will expand into a new space sometime next summer.

This space, explained PSU's Dr. Martin Hellwig, will include an electronics lab, robotics and fabrication lab, testing/staging area, combined computer lab/classroom and social spaces in which students may "hang out."

"All in all, there will be some 6,000 square feet of robotics fun and education," he said. "I am really excited about this since the program will finally get its long awaited 'home.' I will also be able to take visitors on tours through the space and show them all the cool stuff we are going to do there."

In addition to its new 'home,' the program is going through a curriculum redesign that Hellwig said will enable students to progress through it faster with more flexibility in electives.

"I also plan to teach part or all of the Robotics in Aviation and Spaceflight course at the Plymouth airport where a brand new classroom is planned in cooperation with the airport and town

of Plymouth," he added.

Regarding scholarships, each school's financial aid office is able to advise students on opportunities specifically related to STEM.

## ASPIRE grant at KSC

At Keene State College, one such opportunity is available through a new ASPIRE grant, which enables TRIO staff to support 60 additional students who are seeking STEM degrees.

Along with Head Start, AmeriCorps and VISTA, Legal Services, Community Action Centers, GED and Job Corps, TRIO started with President Johnson's 1964 economic opportunity legislation.

The ASPIRE grant, according to KSC's Kelly Ricaurte, is an Upward Bound Math-Science scholarship, which she said the U.S. Department of Education fully funded in the amount of \$297,601.

"The Upward Bound Programs are college preparatory programs for high school students from underrepresented populations in New Hampshire and Vermont," she explained. "These programs prepare students for success in high school and enrollment in college through an academic year component and a Summer Residential Academy on the Keene State campus."

While in the programs, Ricaurte said students receive academic instruction and tutoring, career counseling, mentoring, course selection advising, college admission support, and assistance with financial aid and scholarships.

"These programs are provided at no cost to students who qualify," she said.

As for the future of STEM across member institutions, Leach noted it will be a priority.

"As the state's public system of higher education, it is embedded in our mission to support the education and workforce needs of the entire state and to secure career pathways that will retain our students and future workforce in New Hampshire," he said.

To learn more about STEM at any of USNH member institutions, their respective websites may be accessed at usnh.edu.



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# NEXT-GEN ENGINEERS ••• BAE promotes STEM through educational programs

By Kimberly Houghton  
Union Leader Correspondent

**B**AE SYSTEMS, the state's largest manufacturing employer, has established several educational programs that promote science, technology, engineering and math, including Girls Who Code, Women in Technology and its popular Microelectronics Boot Camp.

The company is committed to driving forward advanced manufacturing in New Hampshire and throughout the country, says Dan Palmer, communications lead for BAE Systems' Operations Department.

Reinforcing STEM initiatives to engage young people is a vital step in helping to develop the future workforce, Palmer said.

In 2016, the company launched its Microelectronics Boot Camp, a joint collaboration with Nashua Community College. With an overflow of manufacturing jobs that need to be filled in New Hampshire, the boot camp aims to prepare college students for STEM careers, said Suzanne Oliveri, supervisor and staffing coordinator for BAE Systems' Operations Department.

To date, the program has graduated 146 participants, she said, adding the hiring rate for those graduates is currently at 75 percent. Upon graduation, students are guaranteed an interview at BAE Systems, as the participants are then prepared to begin entry level wire bonding positions.

The 10-week course teaches students basic military standards and assembly

techniques for radio frequency and microwave electronic assemblies, and is designed to meet industry demands.

"We have expanded the program so it is just not hires for the microwave department," said Oliveri, explaining it has also branched out to focus on bonding positions, manual assembly and inspection.

My Turn, a nonprofit organization based in Manchester, supports about three to four students in each boot camp class, according to Elizabeth Harrington, head of community investment.

"My Turn provides students with support services like housing, transportation and child care and tuition while in the boot camp," Harrington said.

She emphasized the need during the COVID-19 pandemic to ensure that STEM continues to be a priority, especially during remote learning.

Earlier this year, BAE Systems partnered with Girls Who Code in an effort to close the gender gap in

various technology and engineering fields. The company sponsors Girls Who Code at Home to give female youth access to skills they need to break barriers utilizing various computer science activities.

The company also previously organized a Women in Technology program in collaboration with area high schools that gives young women hands-on opportunities to explore careers in various technical disciplines while working in groups with mentors who support their pursuit of a technical career.

Individuals who ultimately come to work at BAE Systems know they are making a difference working on advanced electronics that impact commercial aviation and national defense, said Shelley Walcott, BAE Systems spokeswoman.

"The work that is done here is done with a sense of purpose," said Walcott, explaining there is so much value in the next generation of engineers.

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**Daniel Valentine**, a My Turn participant in BAE Systems' Microelectronics Program, looks through a microscope during a recent bootcamp session.

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KIMBERLY HOUGHTON/UNION LEADER FILE PHOTO

BAE Systems sponsors the Girls Who Code program, which is aimed at encouraging female students to pursue STEM careers.



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The Union Leader recently had the pleasure of speaking with Cyrena-Marie Arnold, vice president of Customer Success at Athenium Analytics. Arnold, at left, has worked her way through various jobs in meteorology including her time as director of Summit Operations the Mount Washington Observatory. She recently wrote a children's book, "The Weather Story with Frances Fox." The book is a story for kids of all ages and teaches them about weather. Wicked STEM is all about featuring the local STEM success stories and showing what is possible right in your backyard. Check out our conversation with Arnold online.



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