NJ STEM Month is an annual celebration in March co-hosted by the New Jersey STEM Pathways Network and the Research & Development Council of New Jersey that highlights the Garden State's incredible accomplishments in science, technology, engineering, math and innovation!

Numerous events take place all throughout the State as part of the celebration. Each year, the STEM Showcase at the State House is considered the marquee event for NJ STEM Month. Unfortunately, due to COVID-19 the in-person celebration had to be canceled this year.

Nevertheless, we still wanted to give organizations the opportunity to highlight all the work they’ve been doing to improve the STEM pipeline in New Jersey. We are excited to present to you the NJ STEM Month Virtual STEM Showcase...
**HIGHLIGHTS**

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**STEM Advocate of the Year:** Patrice Scully, Practice Manager at IBM

Celebrating a true spokesperson for STEM in New Jersey, this honor highlights an organization or individual who most effectively communicates the importance of STEM to New Jersey and its citizens. IBM’s Patrice Scully was selected for this award for her leadership and passion in bringing engineering education to students through IBM’s Discover Engineering program.

**STEM Civic Leadership Award:** Arushi Aggarwal, Founder & CEO of Unknown16

Organization or individual who demonstrates extraordinary civic leadership in STEM in their community. Arushi was selected for this award for volunteering at local libraries teaching students STEM and developing the app iBlum to connect communities, government and businesses and encouraging them to make positive community changes while acting socially responsible.

**STEM Corporate Champion of the Year:** Schneider Electric

An honor highlighting an organization that has demonstrated a deep commitment to supporting New Jersey’s STEM economy. Global energy specialist Schneider Electric, was selected for this award for ensuring that their commitment to their partnership with Delran High School in Burlington County remains strong by supporting their different programs and initiatives.

**STEM Collaboration of the Year:** Sanofi, Students 2 Science & the Office of the Somerset County Superintendent of Schools

This award celebrates the individuals and/or organizations moving beyond silos to create a connection in New Jersey. Sanofi, Students 2 Science (S2S) & the Office of the Somerset County Superintendent of Schools were selected for this award for a collaborative effort to bring authentic hands-on STEM programs to students and teachers in Somerset County at no cost to the districts.

**STEM Educator of the Year:** Dr. Vanashri Nargund-Joshi, Professor at New Jersey City University & Liberty STEM Ecosystem Co-lead

Awarded to an individual or organization that has dedicated their time and energy to successfully improving STEM learning outcomes for students in New Jersey. Dr. Nargund-Joshi was selected for this award because of her role in leading the Liberty STEM Alliance Ecosystem, conducting numerous parents and students workshops, and creating “The Parent Academy,” a platform for parents, families, caregivers and educators that focuses on increasing their scientific knowledge of learning and development to improve the lives of children.

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**MINI-GRANTS:**

Thanks to the generosity of the Overdeck Family Foundation, NJ STEM Month mini-grants of up to $500 are awarded to different organizations with the purpose of enhancing their STEM Month events.

28 Participating Organizations
17 Counties Impacted
8,305 Estimated Learners Impacted

**BY THE NUMBERS:**

29,000+ Learners Impacted
250+ Unique Events in March 2020
20 Counties Participated

**STEM MONTH AWARDS**
The NJ STEM Month Awards are opportunities to highlight the most outstanding examples of leadership, collaboration and achievement in STEM in New Jersey.

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**2020 STEM MONTH AWARDS WINNERS**

@NJSTEMPathways
#NJSTEMMonth

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About Us

The New Jersey STEM Pathways Network, a strategic public-private alliance, was established in 2014 by the New Jersey Office of the Secretary of Higher Education to define and guide a STEM vision for cradle to career pathways in New Jersey.

The NJSPN is chaired by Laura Overdeck, Chair of the Overdeck Family Foundation and Founder of Bedtime Math, and is managed by the Research & Development Council of New Jersey.

The NJSPN aims to attract, cultivate and retain a 21st century workforce in New Jersey, ensuring the state remains a top global competitor in the STEM industry and continues its rich history of innovation.

Our Vision

For New Jersey to attract, cultivate and retain a 21st century workforce that is engaged and supported through statewide alignment of public and private STEM educational resources, ensuring that the state remains globally competitive in STEM industries and continues its rich history of innovation.

Our Mission

The NJ STEM Pathways Network defines and guides a statewide STEM vision for cradle to career formal and informal learning opportunities that strengthen academic skills and inspire students; facilitates research and recommendations on STEM talent pipeline needs and barriers to success; and exposes students to the many educational pathways, experiences, and professionals that can prepare them for STEM degree programs and careers in New Jersey.

Our Work

Replicating the National STEM Learning Ecosystems model, the NJSPN has fostered the creation of five STEM Learning Ecosystems to advance collaboration across educators, business, government and community-based organizations in order to form more integrated cradle-to-career pipelines. Representing nine New Jersey counties, the Ecosystems are opportunities to address unique regional challenges, while also providing a space to pilot, scale and replicate work that expands a statewide vision of STEM.

DATA DASHBOARD

Based on a recommendation that encouraged the NJSPN to identify uniform outcome measures to track the collective impact, the NJSPN leadership team proposed the creation of a data dashboard tool that presented several STEM indicators of success to provide stakeholders an accessible tool to assess the state of STEM and measure their progress over time. As such, the Heldrich Center proposed the development of the New Jersey STEM Dashboard to present key indicators that match with NJSPN goals.

To visit the dashboard: https://njstempathways.org/dashboard.
The New Jersey STEM Strategic Advisory Board was launched by the New Jersey STEM Pathways Network in 2019, an initiative of the Research & Development Council of New Jersey, and will provide leadership and expertise for a statewide STEM vision in education and workforce. It also plans to fund innovative STEM programs with data-driven results. The Board includes business and philanthropic leaders.

For anyone interested in being part of the STEM Strategic Advisory Board, contact Kim Case at kcase@rdnj.org.
The Delran STEM Ecosystem Alliance (Delran STEM) is a collaboration of K-12, higher education, business/industry, and community partners working together to achieve their mantra “STEM for ALL,” with a focus on underrepresented populations. Their goal is to develop skills in future innovators and creators who will meaningfully contribute to the economy of New Jersey.

Delran STEM serves 3,000 students in Delran, Burlington County by preparing them to achieve proficiency in STEM fields. They focus on these three underlying principles: Pointing girls and historically underrepresented students toward role models in STEM; Seeking out and successfully engaging young people to participate in high-quality, diverse and interconnected STEM learning experiences; and underscoring that an early and sustained interest in STEM leads to a plethora of meaningful careers.

Delran STEM provides an integrative, interactive system with a shared vision for cultivating a sustainable and collaborative STEM community, characterized by proactive and passionate thinking. The Ecosystem provides all Delran learners with equitable access to high-quality STEM learning and work opportunities.

Innovation and Fabrication Lab

The Delran Innovation & Fabrication Lab is a state-of-the-art facility promoting the importance of early STEM experiences leading to college and career pathways.

Students in Do It Yourself, Engineering & Drafting, Production Design 1 and Production Design 2 created the following technological projects using vinyl cutters, 3D printers, and laser cutters, all designed using CAD design software. The courses kicked off as the lab opened its doors in September 2019. A multitude of community engagement events and teacher professional development workshops occurred throughout the year.
The HSMC (Hunterdon County, Somerset County, and Mercer County) STEM Ecosystem believes in the foundational principle that communities must come together for the benefit of providing STEM opportunities for all. The Ecosystem brings together multiple superintendents of schools from Hunterdon, Somerset, and Mercer Counties in New Jersey.

Additional support comes from business industries, higher education institutions, private and public preschools, local arts organizations, environmental education centers, before-school and after-school providers, and municipal leaders.

All partners are working with the intention to unite each of their efforts for communities to impact New Jersey’s STEM workforce gap and to ensure students have a positive STEM identity. HSMC STEM Ecosystem members are committed to guiding principles that provide STEM opportunities for all students, support to community leaders, and partnerships between K-12 institutions and higher education institutions.
The Liberty STEM Alliance is a renowned community dedicated to enriching STEM opportunities in Hudson County by incorporating all voices, creating pathways, and serving as an information hub.

Most recently, ecosystem co-lead Dr. Vanashri Nargund-Joshi started The Parent Academy, a research-in-practice platform focused on increasing parents’ scientific knowledge of teaching & learning processes and overall child development. The Parent Academy offered a series of workshops for families at the Greenway Family Access Center for all children of ages 2-8 (including children with all abilities). One particular workshop, “STEM in the Kitchen”, focused on empowering parents, caregivers and families to include kids in the kitchen on a daily basis and unfold simple concepts of STEM through daily interactions. The workshop involved multiple hands-on activities for parents to experience and tips for identifying STEM concepts in their day to day conversations in the kitchen, grocery stores, gardens and over the dining table. This workshop allowed parents to think about their families’ food philosophies and how to implement them seamlessly in their daily routine. There were multiple explicit STEM activities that families got to experience. In the Science Station portion of the workshop, parents learned about osmosis through a demonstration using a potato, and parts of whole grains. In the Technology and Engineering portion, parents learned how simple machines in the kitchen resembled STEM objects and concepts, such as a knife being a wedge and pizza cutter being a wheel & axle and how every recipe is an algorithm and coding exercise. In the Math Station portion, parents learned about simple ways to discuss math concepts such as counting, sequencing, and sorting through kitchen activities. The program ended with all the kids making colored rice baggies and participating in other food related activities. Every family left with an apron, a kid-friendly knife and a packet with kitchen-related STEM activities.

LIBERTY STEM ALLIANCE

Major Projects

- County Hack-a-Thon to advance Computer Science
- Workforce development events, with Latinas in STEM
- Professional Development for educators
NEWARK STEAM COALITION

The Newark STEAM Coalition is a cross-sector collaborative established to cultivate STEAM opportunities for Newark students through the collaboration and alignment of the public (government) and private sector (businesses), the school district, institutions of higher learning, science and cultural institutions, workforce development organizations, and youth-service providers. By capitalizing on Newark’s rich resources in the arts, culture, education and research, the Coalition prepares Newark’s young people for success into the 21st Century by building competencies across Science, Technology, Engineering, the Arts, and Math (STEAM).

The Newark STEAM Coalition’s mission is to inspire “STEAM learners” by developing a resource-rich, cross-sector ecosystem that provides multiple pathways for Newark’s PreK-16 students to build competencies across Science, Technology, Engineering, the Arts, and Math and prepare them for success beyond the 21st Century.

Their vision is to be globally recognized as a STEAM hub of creativity, innovation, achievement, and inclusiveness—offering multiple educational and career pathways to prepare all types of learners for post-secondary education and careers producing “STEAM Learners, Thinkers & Doers”—attracting and inventing new business, innovating, and enabling opportunity and prosperity for all in our community.

Core Values

Acknowledging Science & the Arts are Symbiotic—
The Scientific Method and Design Process is intrinsically linked, aligned & work better together than apart.

Believing in the Arts—
The Arts processes of Creativity, Design & Innovation are fundamental to achieving a deeper understanding of Science, Technology, Engineering and Math.

Believing in Creativity and Inquiry-Based Learning—
Creativity is essential to deepening learning, improving outcomes and preparing for the workforce in a STEAM Continuum.

They are Inclusive AND Aspirational—
We recognize the significance of each STEAM discipline to our collective, and commit to deepening our knowledge across fields to develop a cohesive STEAM pipeline.
**SOUTH JERSEY STEM AND INNOVATION PARTNERSHIP**

The South Jersey STEM & Innovation Partnership (SJSIP) is a community of collaborative partners to improve STEM education and career pathways across southern New Jersey. Our growing community includes collaborators representing industry, post-secondary education, K-12 schools, philanthropy, small businesses and STEM-rich organizations engaged under a common vision for STEM.

**SJSIP Initiatives**

- SJSIP compiled a list of resources and organizations offering help in transitioning the classrooms to online learning and shared it with local school districts.
- Mindbytes, a member organization of SJSIP, releases integrated STEAM activity every week for families.
- Online STEM learning support for families extended by the partners in the Ecosystem.
- All the afterschool programs have been transitioned to online system so that there is no break in learning for the students.
Bloomfield College is a comprehensive, liberal arts institution located in Bloomfield, New Jersey serving 1,643 students with inspiring stories. Of these students, 48% are African-American, 31% Hispanic, 49% low-income, 74% were eligible for Federal Pell Grants and 55% identify themselves as first generation. We offer over 40 academic programs, as well as graduate programs in Business, Creative Arts + Technology and Education. The College was ranked No. 1 in NJ and No. 20 nationally in promoting the social and economic mobility of its low-income students to high economic achievement, including top economic quintiles according to a study published in The New York Times.

Our highly respected Frances M. McLaughlin Division of Nursing boasts a 94% licensure exam pass rate and is recognized as one of the top ten nursing programs in New Jersey. In 2019, the Creative Arts + Technology’s Game Design program ranked #1 in New Jersey by The Princeton Review. That same year, Bloomfield College launched an E-sports and is a member of the National Association of Collegiate Esports (NACE). Several years ago, the new Center for Technology + Creativity was unveiled offering our students cutting edge technology and innovation.

Students at Bloomfield College can major in STEM fields such as Accounting, Biology, Biochemistry, Chemistry, Clinical Laboratory Sciences, Computer Science, Economics, Expanded Media, Finance, Game Design, Game Programming, Graphic Design, Interactive Multimedia, Management Information Systems, Mathematics, Medical Imaging Sciences, Medical Laboratory Science, Music Technology, Network Engineering, Nursing, Pre-Chiropractic Studies, Pre-Medical Studies, Pre-Podiatry Studies, and Education degrees with specializations in Biology, Chemistry, and Mathematics. Divisions such as Creative Arts + Technology work with alumni like Ray Rivera ’08 (SkyTank Labs) to create internship opportunities for students.

STUDENT RESEARCH

With financial support awarded from the Independent College Fund New Jersey, student Jhanvi Soni is working with Dr. Maria Vogt on conducting research on extracting caffeine from tea using extraction emulsions. Honors Program student Elizabeth Vogt worked on a research project called “Elliptic Curve Cryptography: How it Works.” Another student Nadira Fant completed her Capstone project on “How we interact with information when it is taken from a virtual space and presented in a physical one.” Working closely with Professor Yuichiro Nishizawa and Dr. Fiona Harris-Ramsby, Creative Arts + Technology student Michael Stoess created his Capstone project using Magic Leap, a head-mounted virtual retinal display. Students Amanda Xavier and Nadiim Doyle are NASA New Jersey Space Grant Consortium (NJSGC) Academic Year Fellows. Working with two science faculty, Dr. Gregory Edens and Dr. Rebecca Walter, they are pursuing research in the Kinetics of the Reaction of Ethyl Acetate and Sodium Hydroxide and the Gender Differences in Fatality Rate from COVID-19.
LOUIS STOKES ALLIANCE
FOR MINORITY PARTICIPATION

Started in 1991 and funded by the National Science Foundation, the Louis Stokes Alliance for Minority Participation (LSAMP) program is designed to increase the number of non-medical science, technology, engineering and math (STEM) professionals from traditionally under-represented minority (URM) groups in these fields.

Garden State-LSAMP is a collaboration between seven NJ universities and one community college. Started in Academic Year 2010, GS-LSAMP doubled the number of URM STEM Bachelor’s degrees awarded within just four years, only the second LSAMP to accomplish this. Now a senior alliance, the number of STEM degrees awarded last year to URM students by GS-LSAMP institutions tripled over the baseline (see graph). Additionally, the total number of STEM degrees awarded to GS-LSAMP members increased 70% in Phase II (2014-2019) over Phase I (2010-2014).

GS-LSAMP has received $12.5M in funding from NSF for its programming, which focuses largely on providing research experiences to its undergraduate students. Research has been shown to increase both retention and success in STEM fields. Last year alone, over 225 research opportunities were funded by GS-LSAMP and countless more were available through related programs. Additional funding has been obtained as a direct result of GS-LSAMP, including a $1.1M Bridge to the Doctorate grant, which will provide 12 students with $32,000 stipends + tuition for the first two years of graduate school at Rutgers - Newark. In total, $28.21M in funding has been obtained for or through GS-LSAMP.
Bolstering the State’s STEM education and career pipeline, the Governor’s STEM Scholars is a public-private partnership among the Research & Development Council, Governor’s Office, Department of Education, Office of the Secretary of Education, and industry and higher education that identifies and develops New Jersey’s next STEM thought leaders who will drive a world-renowned STEM economy.

Program components include field trips and symposiums introducing the scholars to STEM opportunities in industry, academia, and government. The Governors STEM Scholars mentors undergraduate and graduate scholars who, in turn, mentor teams of high school students on year-long research projects. A sample of the projects being completed at different research institutions across the State this year include:

**Team 6: “Evaluating Micro- and Macro- Plastic Concentrations on New Jersey Coastal Beaches”**: This research project addresses the microplastic crisis and confirms its presence in New Jersey coastal beaches. Further studies include offering possible solutions to removing the plastic concentrations from our beaches and oceans to protect the health of our wildlife, planet, and own species.

**Team 7: “Microfluidic Devices to Characterize Endothelial Pathology”**: Microfluidic devices are important to biomedical research because they provide an authentic testing space for vascular problems. This research project uses a bone capillary microfluidic device to study endothelial pathologies like osteomyelitis, and can be applied to other experiments, such as proteomic analysis of metastatic secretions from the endothelium.

**Team 9: “Cube Satellite Test Bench”**: By making an open facility to quickly test CubeSats of all kinds, the Governor’s STEM Scholars program and the Space Technology Association of Rutgers, The State University of New Jersey will enable New Jersey colleges and research universities to become leaders in the growing space research industry.

**Team 14: “Investigating the Efficiency of CX-5461 Cancer Drug on Mutated C-kit1 Sequences Using Nanopore Technology”**: Mutation on Ckit1 gene has been observed in several types of malignancy, notably: leukemia, melanoma, and gastrointestinal tumors. This research project utilizes nanotechnology to examine how point mutations on Ckit1 gene break the DNA structural integrity and consequently reduce the efficacy of cancer drug.
Hudson County Community College (HCCC) has the mission of providing high-quality educational opportunities that promote student success and are accessible, comprehensive, and learning centered. To support NJ STEM month, HCCC was planning the following three activities:

1. **Girls in Technology:** Now in its seventh year, the HCCC “Girls in Technology” symposium provides the young women attending with opportunities to learn about STEM (Science, Technology, Engineering and Mathematics) studies and careers from educators and individuals actually working in STEM, and STEM-related, careers.

2. **STEMtastic:** Jersey City Public Schools, in partnership with the Department of 4TH Youth Development of Rutgers University and HCCC, is offering an exciting opportunity to a select group of students in grades six through eight. Our goal is to provide our district’s future STEM professionals with a forum to explore their curiosities and engage in new learning experiences. Our theme for STEMtastic is computer engineering.

3. **NJ STEM Showcase:** Carolina Balcarza and Dr. Clive Li would have been at the Statehouse in Trenton to showcase their summer science research program. The eight-week intensive summer research program combines formal classroom instruction and hands-on research both independently and under HCCC STEM faculties. HCCC students are given the opportunity to work with high school students and faculties on scientific research projects of their choosing, with the goal of having their research entered in competitions or published in scientific journals.
Junior Achievement’s INSPIRE New Jersey is a powerful and exciting initiative that will bring together a coalition of educators and industry leaders to give hundreds of New Jersey 8th and 9th grade students hands-on experiences and information about STEM and other high-growth career opportunities, igniting a spark and helping them envision a bright future for themselves. Provided at no cost to schools,JA INSPIRE New Jersey supports teachers, provides career education and mentorship to students at a time they need it most, engages state and regional businesses, key industries, government and public service organizations, and nonprofits; highlights NJ’s higher education institutions, and strengthens NJ’s future workforce. This unique program, first of its kind in our state, begins in the classroom with teacher-led activities that focus on soft skills, job interview techniques, information on career clusters and future job outlook, and a career assessment based on individual students’ strengths and interests. These activities prepare students for the JA Inspire Career Expos held on NJ college campuses. Here, students will connect with representatives from all industry sectors at 20-50 interactive career stations, with a focus on STEM and other high-demand, high-growth careers. Employee volunteers share their career advice with students and engage them with equipment, technology, and the opportunity to “step into the shoes” of workers. Students conduct mini-interviews, take notes, and participate in hands-on activities that open their eyes and minds to the world of work.

This positively impactful event not only helps NJ youth gain a sense of purpose and map a plan of action as they consider their high school path, but helps our region build its future workforce. New Jersey has to strengthen its economic-innovation engine to remain competitive. The growing STEM job marketplace needs talent for middle skills jobs and jobs that require a college degree. Placing more emphasis on STEM education, mentorship, and career exploration is essential to better prepare our children for the future and to support the next generation of innovators. This is the very innovation New Jersey desperately needs to support its pharmaceutical, biotechnology, and chemical industries.
Linwood Middle School tied for the eighth most diverse school in New Jersey and expands the NJ STEM pipeline by actively seeking to increase student exposure to STEM/STEAM during the critical middle school years. They have expanded offerings and increased the access of students from all backgrounds to advanced STEM coursework. They offer high school level courses in Algebra and Geometry, and have increased the participating percentage of our eighth grade class from 8% to 43% over six years. A high school Algebra-Based Physics class is also offered. The program Linwood Middle School had selected to highlight for the NJ STEM Showcase was their new AMPED on Algebra offering.

Through last spring’s receipt of a Title-funded re-allocated STEM grant, they have developed a new approach to Algebra instruction that contextualizes its presentation through the lens of student-run business. This innovative program (“AMPED on Algebra”-- Algebra in Manufacturing Process, Entrepreneurship and Design) was developed in Colorado (https://contextuallc.com/amped/faq/). This implementation is the first in NJ and the first in a middle school. Their students and teachers have done an amazing job leveraging the professional development provided through the grant. Using the arts, engineering, entrepreneurship and algebra, student makers use a heat press, Cricut machines and 3-D printers in a fabrication lab that ties student-led entrepreneurship to financial algebra.

Students on the cusp of Algebra readiness are successfully stepping up and thriving in the content as they engage in math, engineering and college and career readiness practices. Additionally, they have been good stewards of these funds, developing a program that is self-sustaining.

Students in the AMPED program participate in their STEM-based parent academies, such as their December “Winter Solstice and Solar System Celebration”, highlighting engineering practice.

In March, they held their evening Title-funded parent academy, “March Math and STEM Madness”. This annual school event has expanded from its original form in 2016, and has grown to showcase student learning in math, physics and engineering, with student presentations and hands-on activities. More than a “curriculum fair”, they celebrate pi day, Einstein’s birthday, and the math-sports-physics connection, among other workshops and demonstrations. Their AMPED on Algebra students demonstrated 3-D printing, their algebraic analyses of their business ventures to date. They also sold their fabricated products. The event’s finale was a dynamic Physics Show presented by Dave Maiullo of Rutgers and “That Physics Show” (https://www.thatphysicsshow.com/), funded by a STEM Month mini-grant of $500!

The AMPED on Algebra pilot demonstrates positive impact on student interest and perceptions of core STEM-related academic content. Their students have evidenced the excitement, motivation and increased conceptual understanding through this hands-on approach that will be expanded to reach more students. Engaging students in relating STEM to real life is central to building a STEM-literate workforce for the New Jersey pipeline. We look forward to scaling up to reach more learners through STEAM-based algebra!
Mindbytes hosted a Family STEAM Palooza at the Greenway Family Access Center offering Family STEAM Activities for the families of ages 3-6 (including Children with all abilities), both organizations are part of the Early Learning Priority Group at the NJSPN. This event helped families understand how to develop core STEM skills and how to pursue their interest at home at minimal cost.

There were 5 stations that students and their families rotated. A Science station, a Math station, Engineering station, an Art and Science Station and a Technology station. Each station had child-friendly activities such as making their own playground with simple machines, a challenge of building a tower, working with arts and circuitry, understanding conductivity, promoting visual thinking etc. The program ended with an informal conversation with parents on how to foster STEM skills in young children and what they can do at home and outside of school.
From Dr. Jared E. Keshishian, Chair of the North Bergen STEM Academy

The North Bergen STEM Academy, was established in 2015, as a college preparation program for those students who are ready to pursue STEM and related careers through an accelerated and rigorous course curriculum. Over the past five years, the committee, made up of a variety of administrators and educators, has kept to their founding principles of excellence, teamwork, and transparency. The Academy follows a cohort style of education, in which the students take all their science and math classes together all four years. This style of education ensures that students go through nothing alone and that the reliance on their fellow cohort members is necessary and valuable. Yet, every student is different and has certain passions outside of their academics, that is why we built in freedom to choose classes that will not only add their personal interest but allow them to see the connection STEM has with other disciplines. As the students’ progress through the Academy, we begin to focus on their career paths, by aiding them in researching collegiate options, finding Saturday and summer programs, and ultimately getting them an internship when they are of age. Throughout their four years, the students’ interests in career paths change which is why they are exposed to a variety of experiences, from field trips, to summer programs to competitive college studies.

If you have any questions, or would like more information, contact Dr. Keshishian, Chair of the Academy at (201) 295-2835, Mrs. Stern-Protz at (201) 295-2804, or the high school’s main office at (201) 295-2800.
“STEM Research Educators” work at the intersection of science and teaching. They bring scientific knowledge and compassion to their role in helping students prepare for rewarding careers in STEM fields. They provide expertise in delivering research-based learning opportunities that target K-12 learners.

At Kean, STEM Ed students are exposed to a variety of clinical and observational experiences through student teaching and extracurricular activities. Explore teaching, in and out of the classroom, through NJC-STM’s outreach activities. Students may participate in the NJ-China Sister School Partnership through Wenzhou Kean University, volunteer at the inner city Students-2-Science program in Newark or work on advancing stem education and curriculum through our partnership with the NJ STEM Pathways Network.

Our students graduate with deep content knowledge as well as real world research and curricular experience. STEM Ed teachers are in high demand in NJ and throughout the nation. NJCSTM’s STEM Ed program offers graduates the flexibility to teach, enter administrative roles or pursue a career in research.
The New Jersey Center for Teaching & Learning (NJCTL) is a nonprofit that is providing a simple, scalable solution for our nation's massive STEM teacher shortage and the great social injustice that comes from depriving underserved students access to STEM education and the important opportunities this learning provides.

NJCTL empowers teachers of every academic and cultural background to effectively teach K-12 mathematics and science to all students with the Progressive Science Initiative® (PSI®) and the Progressive Mathematics Initiative® (PMI®).

NJCTL's inclusive new pedagogy shakes up traditional STEM education and actively engages both teachers and students with:

- Accessible teacher training as well as free open source curricula that align with current standards
- A new sequence in which STEM subjects are taught to ensure students can apply their learning as they progress
- Innovative use of new technology such as interactive white boards and student polling devices for engaging instruction and real-time assessment
- A highly collaborative classroom structure that helps every student fulfill their potential, rather than rejecting those who don’t learn as quickly
- Online Courses for teachers to learn our Teaching Methods as well as the content, and how to teach the content of Physics, Chemistry, Mathematics and Computer Science

For more information, watch our overview video at njctl.org/video-overview.
New Jersey City University (NJCU) is located in Jersey City, NJ, one of the most diverse cities in the nation, and just minutes from New York City. NJCU’s College of Arts and Sciences, Education, Professional Studies, and School of Business offer 47 undergraduate degree programs and 30 graduate programs, including emerging and interdisciplinary fields.

In 2019, NJCU was awarded the Hispanic Serving Institute-STEM (HSI-STEM) grant. The HSI-STEM grant activity focuses on in-service and pre-service STEM teachers, by extending unique opportunities to increase the quality of their training and improve their teaching effectiveness through a 3.5-day institute that teaches STEM teacher candidates how to instruct through the teaching of coding and programming of robots. The purpose of this supplemental activity is to enhance and expand adoption and integration of STEM-based activities and lessons with practical, hands-on applications of quality STEM products being used by K-12 education. This past February, approximately fifty K-12 teachers participated in a day-long STEM made simple summit.

Goals and Objectives
The goal of this STEM summit is to enable teacher candidates to experience how comprehensive STEM tools can be used to support pedagogical applications in the K-12 classroom. Objectives include; increase awareness and interest of STEM applications through the Stem Made Simple® (a hands-on experiential program built in part on the 5E model of inquiry-based instruction), modeling how STEM supports Computation Thinking and cross-curricular applications, creating hands-on opportunities for teaching students to experience STEM education both as a learner and as a guiding teacher, demonstrating how the Design Thinking process and Problem-Based Learning (PBL) can help drive STEM adoption in schools and building capacity among teaching students with their knowledge of STEM and applications.
What is STEM for Success?
STEM for Success is a project of the NJIT Collaborative for Leadership, Education, and Assessment Research (CLEAR) to bring together stakeholders, coordinate efforts, and develop needed resources and activities to promote career readiness through collaborative Technology, Engineering, Applied Arts, Math and Science (TEAMS) best practices in education.

STEM for Success is currently initiating a long-term alliance-building effort to support women in STEM. We are impacting girls from elementary school through college and early career supported by its STEM Education Support Program.

These efforts align with CLEAR's role in the NSF INCLUDES Network, a national network connecting all NSF INCLUDES programs across the US. See Network Spotlight: Leadership and iSTEAM for Females in Elementary School (LiFE) project.

How we engage our stakeholders?
STEM for Success serves as the backbone for organizations aligned with our vision to foster collaborative change through TEAMS best practices. With these partners, STEM for Success aims to build a coherent system to recruit, induct, engage, manage and facilitate learner progress through a support system of interested peers, mentors, and other stakeholders.

This past year we:
• Held teacher professional development events,
• Sent college students into elementary school classrooms,
• Facilitated after-school and weekend engineering design and coding activities for middle schoolers (https://www.theceop.com)
• Hosted Newark Public School’s Girls who Code showcase (see CBS News coverage).
• Supported schools preparing for the US ARMY STEAM Tank Challenge

What did STEM for Success do during NJ STEM Month 2020?
Our program provided small grants for STEM clubs to showcase their learning and activities leading up to STEM month 2020.

2/27 STEM For Success PD workshop for Educators and Administrators from 6 NJ districts
2/29 Spring into STEM all day event providing students and educators with hands-on minds-on experiences with active learning, maker space and innovation labs at NJIT.
3/5 Visit to NJIT by Barringer HS (Newark) to explore NJIT’s makerspace and learn about engineering design and STEM careers.

Our elementary school girls STEM club members showcased their efforts at these NJ STEM Month events for students and parents to learn more about and be inspired by STEM:

3/11 Family STEAM Challenge at Hurden Looker Elementary, Hillside.
3/12 Family STEM Night at Discovery Charter School, Newark.
3/20 (Postponed) Family Hands-on Experience in STEM at Calvin Coolidge Elementary, Hillside
3/26 (Postponed) Family Science Night at George Catrbone School, Long Branch
3/27 (Postponed) 1st Annual STEM Showcase at George Washington Elementary, Hillside.
March (Postponed) Reducing Cafeteria Waste event at Theodore Roosevelt School, Weehawken.

STEM for Success organized the following events that were postponed. Visits to NJIT’s Makerspace, STEM activities and STEM careers presentation.

3/16 Visit to NJIT by Long Branch HS
3/24 Visit by Hurden Looker Elementary, Hillside
3/26 Visit by Discovery Charter School, Newark
3/27 Visit by Borough School, Morris Plains.

(The activities were made possible through funding from NSF INCLUDES #1744490 and Arconic)
For more information on our activities and to get involved: https://www.stemforsuccess.org/
NEW JERSEY MAKERS DAY

New Jersey Makers Day inspires and activates libraries to showcase and highlight STEM and maker culture, enhancing lifelong learning.

One of the major objectives of New Jersey Makers Day is to build a structure that gives organizations the skills, resources, support, and relationships necessary to offer valuable hands-on learning experiences. While the growth in the number of sites has leveled off, we continue to see tremendous growth in the quality of experiences offered at these sites. For our 2019 New Jersey Makers Day, we had 303 participating locations spread across 20 counties. These locations hosted an estimated 2,755 individual programs, with a total estimated attendance of 83,290.

ROBERT FULTON ELEMENTARY SCHOOL

Robert Fulton Elementary School is a neighborhood based school system serving students from Pre-Kindergarten to High School. Heather Ricco, a second grade teacher at the school, incorporates STEM education into her daily curriculum. Heather Ricco is a second grade teacher at Robert Fulton Elementary School. She incorporates STEM education into the curriculum daily. Her class is well acquainted with using technology in the classroom, as she provides many opportunities for them to do so. Students are given the opportunity to explore and put their own creativity skills to use during lessons. For example, they will be given time to grapple with a math problem and manipulatives before any instructions are given. Students work in groups, promoting teamwork and effective communication. Mrs. Ricco also provides hands on experiences for students to build, create and problem-solve. In addition, she invites experts from outside of school as an incentive to excite her students about science, technology, engineering and math.
Dean Tetteh through the RCBC STEM programs supports NJ STEM through community activities with students participating in the NASA space station virtual reality (VR) RV mobile lab. The RV is equipped with 4 VR stations that transport participants into outer space for a 2-minute demonstration of what it is like to be in outer space looking down at the earth. The RV has been at Earth Day, Burlington County Library Makers Fair, RCBS Science Slam, Delran High School STEM summer camp and many other events.

RCBC STEM added a new Mechanical Engineering Technology (MET) A.A.S degree program built from the ground up with industry and academia working together to incorporate the technical and soft skills, that companies are looking for in today's labor force. An industry forum identified the skills and a technical conference worked to incorporate the findings into the program's curriculum.

The MET program is one of many 3+1 majors students can consider for obtaining a bachelor degree from Rowan University with all courses provided at the RCBC Mt. Laurel campus.
The Brain Bunch helps children from all backgrounds learn about their brains. With the help of professional neuroscientists and medical doctors involved in the neuroscience field, they have built an appealing curriculum for young students. In their sessions, students can explore basic anatomy, mechanisms, and roles of the brain through a hands-on approach. More importantly, we have connected the science behind the brain to exciting and routine experiences through our modules: music, sports, painting/art, magic/optical illusions, food, and movies. They provide resources during sessions including drawing books, shirts, and brain erasers as prizes that further engage students in these activities. Through their kid-friendly approach, they have enabled students between grades 2-6 to attempt advanced activities in groups or on their own, such as building neural circuits, exploring real sheep brains, and solving the mysteries confined within optical illusions. Early neuroscience education can offer students answers for many of their questions, deepening their interest in the STEM fields.

Over the past year, The Brain Bunch has organized over 20 sessions in libraries and schools across the state, focusing on regions with a high proportion of students from backgrounds underrepresented in STEM. They have also hosted sessions in the counties of Middlesex, Somerset, Essex, Union, Orange, Bergen, and others. The Brain Bunch’s mission is to enable every elementary school student in New Jersey to have a meaningful exposure to the field of neuroscience while they are young. The children of today, who will lead our society tomorrow should understand the importance of studying the brain in order to help overcome the biggest projected medical threats of the future to the United States, including dementia, which is already the leading cause of death in England. In addition, as we try to automatize our world, we need to understand our brain’s patterns in order to reflect them within our technologies.

Most importantly, The Brain Bunch is committed to helping students explore the brain because neuroscience can make education appealing, helping every child discover his/her passions. Their initiative encourages students to uncover STEM and develop a lifelong growth of their curiosity.

If you would like to learn more about the program and see their various resources, please visit thebrainbunch.com.
Toms River Regional Schools STEAM Academy & Authentic Science Research Course
District students have the opportunity to apply for the three year Authentic Science Research Course. 10th-12th grade students compete in local, state, and national competitions with their research. ASR students present their research to the public at the annual ASR Symposium. Dr. Mary Beth Kretz is the Director of ASR at TRHS East and Mrs. Christine Girtian is the Director ASR at TRHS North and TRHS South. The TR HS East Authentic Science Research (ASR) STEAM Academy students are collaborating on hydroponics projects with Ocean County College's Dr. Angel Camillo, Eric Antonelli & Dean of STEM Dr. Sylvia Riviello. The STEAM Biomedical Strand is part of the RWJBH CMC Hospital Healthcare Learning Collaborative, Live Stream Surgery sponsored by Liberty Science Center and The Rutgers Cadaver Lab. The Engineering students participate in and collaborate with Ocean County College and their Engineering Club as well as Aviation STEM Day and Lakehurst Naval Base Labs.

Global Wolbachia Project
This year students from all three Toms River ASR programs will be participating in The Global STEM Wolbachia Project. The Global STEM Wolbachia Project is a local & international initiative to contribute to the national Wolbachia database helping high school students learn more about molecular, microbiology, & mosquito management techniques. Toms River Regional Schools Authentic Science Research (ASR) students will partner with Israeli students from Shimon Ben-Zvi in Givatayim, Israel & exchange data on the prevalence of Wolbachia in local mosquito populations. The Israeli students are led by Dr. Pirchi Waxman. In the summer of 2018, Dr. Pirchi Waksman, TR HS South AP Bio teacher Michele Martini & TR North & South Director of Authentic Science Research Christine Girtain did biotech training together. In Feb of 2020, Dr. Waksman stayed with the Girtain family. Dr. Waksman visited with the district’s ASR students, helped judge one of the intermediate school science fairs and spoke about the Global STEM collaboration at the Central Ocean Rotary Club’s lunch meeting.

The Bordenstein Lab at Vanderbilt University will be partnering with Toms River Regional Schools supplying controls, primers & virtual assistance. The objective of this particular initiative is to teach teachers & students techniques used in molecular biology, including pipetting, PCR, & gel electrophoresis, in order to engage them in a possible future career choice & a capstone research project. https://www.vanderbilt.edu/wolbachiaproject/

Wolbachia is a bacterium that lives within arthropods & filarial nematodes. Wolbachia infected mosquitoes are expected to reduce the spread of Dengue & Zika. Wolbachia research may contribute to a decline in New Jersey mosquito-borne diseases in the future.

TR STEM Camps
TR Schools partnered with the Camp Invention, https://www.invent.org/programs/camp-invention NAVAIR at Lakehurst Naval Base, The DNA Learning Center from Cold Spring Harbor Labs https://dnalc.cshl.edu/ & Richard Chan from MiniOne https://theminion.com/pcr-system/ to offer several STEM camps for students. Camp Invention is for students entering grades K-6, World of Enzymes is for grades 6-9, and BioCoding and DNA Barcoding are for high school students.
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To learn more about New Jersey STEM Month, visit https://njstempathways.org/njstemmonth.

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