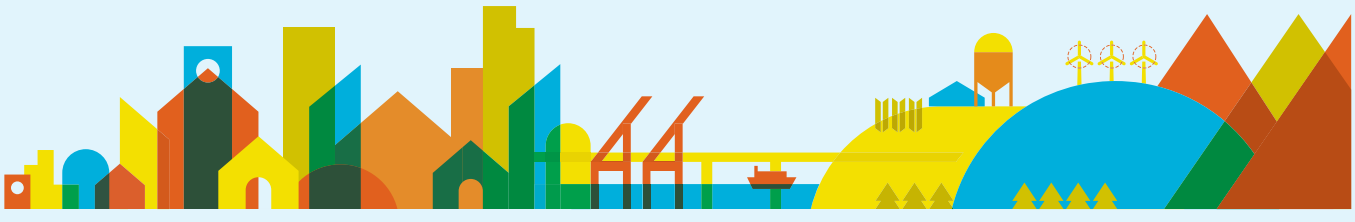
WASHINGTON STEM
REIMAGINING SCIENCE, TECHNOLOGY, ENGINEERING + MATH EDUCATION

STEM = IN ACTION

A COMMUNITY PROFILE OF LONG ISLAND REGION, NEW YORK



LONG ISLAND, NEW YORK: A SNAPSHOT

Comprised of Nassau and Suffolk Counties, Long Island is more populous that 38 states.

Key Demographic Data:

Population: 2,832,882

Racial shifts 2000-2010: 9.1% African American increase; 56.2%Hispanic increase

Key Industries:

Aerospace

Electronics and Computer Technology

Biotechnology, Medical Imaging and Health Care Systems

Agriculture & Food Processing

Projected STEM Jobs:

188,510 by 2018, increased 13% vs. 2008

Education Institutions:

125 public school districts serving over 476,000 students

19 colleges and universities

STEM: AN ECONOMIC IMPERATIVE FOR LONG ISLAND

The estates in the Hamptons and prosperous bedroom communities for people who commute to New York City are what many people think of when they think of Long Island. But Long Island is much more than iconic beach communities and country suburbs. And like many parts of the country the region is struggling to fill STEM-related jobs with local talent.

Long Island is the home of the Brookhaven National Laboratory of the U.S. Department of Energy and its world-renowned accelerators. It is also the home of the Cold Spring Harbor Laboratory and the scientists who discovered the double helix structure of DNA. The largest industrial park on the East Coast is on Long Island, as is the largest solar array in the Northeast. The region has become a center for high technology employers from the computer, bio-tech and energy industries.

At the same time, the defense industry on Long Island lost 60 percent of its jobs as the industry restructured nationally. High paying defense jobs were replaced primarily by lower paying service jobs, leading Long Island's average pay per employee to hit a 10-year low.

Today, over 100,000 Long Islanders remain unemployed and at least as many are under-employed or have given up looking for work. Twenty percent of Long Islanders live in poverty exacerbated by the area's high cost of living, and many young people – not prepared with STEM and industry specific skills to qualify for the highest paying jobs - leave for better prospects elsewhere.

Jobs do exist. Good paying jobs. But the shift in industry base has been profound resulting in dual challenges for Long Island: unemployed local workers do not have the skills for the jobs that do exist, and those recruited from outside of region who do have the necessary skills are shocked by the high cost of living and don't stay.

In fact, Long Island's largest employer, North Shore- LIJ Health System has struggled to fill over 1,000 technical positions due to a significant gap in the local applicant pool's ability to do the work. Although the quality of the local education system is very strong, not enough students are interested in and pursuing STEM fields. A recent review of enrollment at Long Island's regional colleges and universities revealed only five percent of students were graduating with STEM-related degrees. Not nearly enough to fill the gap or get ahead of growing demand of regional employers. To find the right talent, several aerospace employers with current positions open have recently been seeking employees from North Carolina.

So what is the answer? How can Long Island match opportunity, talent and business need to spur economic growth? Longtime Long Island residents Ken White, Cheryl Davidson and Mark Grossman believe the answer lies in strengthening the STEM pipeline. Specifically, they are focusing squarely on the industry segments with the greatest workforce need as well as the greatest opportunity to create long term gains for Long Island. And they are working shoulder to shoulder with leaders across the region to create solutions through the coordinated effort of the Long Island Regional STEM Hub.

"Long Island has many businesses, as well as educational and scientific institutions, that need a technical workforce, but sufficient numbers of students are not pursuing studies in STEM, and too many young people are leaving Long Island when good jobs are available here."

– Ken White, Manager of Brookhaven National Laboratory Office of Educational Programs

URGENCY AND OPPORTUNITY ALIGN IN THE REGIONAL ECONOMIC DEVELOPMENT STRATEGY

Ken White joined the Brookhaven National Laboratory (BNL) following his service in the U.S. Navy as a nuclear plant operator, chemist and several years as a training instructor at a local utility. His own educational pathway and experience in training became a passion for STEM education and the opportunities it creates for underserved groups. BNL recognized Ken's leadership and appointed him the Manager of BNL's Office of Educational Programs that engages students and teachers with the Lab and its partners, enabling him to merge his passion with his profession.

A longtime supporter of STEM education, BNL was working to bring more power to its own contribution to STEM talent development, as well as help other businesses determine how they could contribute. Ken knew and believed that, "By making connections early on with business, students can identify career opportunities and help reverse the often cited 'brain drain' taking place on Long Island." These relationships with businesses can also be leveraged to engage STEM teachers in work experiences that integrate authentic engagement in lessons and build an awareness of job opportunities on Long Island and the associated skill needs to fill those jobs.

Not far away at the Long Island Works Coalition (LI Works), Execute Director Cheryl Davidson was working tirelessly with local school districts, higher education, and business partners to build career academies and pathways for students. When the Long Island Association (LIA) agreed to co-host a regional dialogue on STEM education in 2009, Cheryl and her team at LI Works rolled up their sleeves to make it happen. This was the first in a series of eight regional Progressive Dialogues, led by Rensselaer Polytechnic Institute, that ultimately lead to the formation of the Empire State STEM Learning Network (Empire STEM).

Cheryl recognized the STEM Progressive Dialogue as an opportunity to catalyze community action to improve student readiness more broadly across the region. She believed there needed to be a more coordinated effort involving not only K12 and higher education, but significantly more engagement with and commitment from business as well – and convinced people from these communities and more to meet at the LIA offices on the county line between Nassau and Suffolk counties. She refused to let the Dialogue turn into yet another meeting with flipcharts and findings but no subsequent action and continued to volunteer with the statewide project even as LIWorks faced the economic challenges the recession brought to so many community-based organizations.

Following the region's Progressive Dialogue, Cheryl made sure conversations about the Long Island STEM Hub continued. She was joined by Ken and the New York State Department of Labor Commissioner's Regional Representative for Long Island, Mark Grossman. Mark was well aware of the region's employment challenges, and, as the father of two daughters growing up on Long Island, the issues – and opportunities – of providing all students with a firm grounding in STEM was also deeply personal. They discovered a mutual interest in moving from talk to action and recognized the need to find a way to mobilize the region in a way that would be both impactful and sustainable. As a first step, Cheryl shared the Long Island story at the Empire STEM network creation event in 2010 and all three joined the network's regional hub design team.

Together they embarked upon a journey to develop a common mission and vision, shared and goals which enabled the formation of a coalition – a STEM hub created by and for the Long Island region.

SLOW DOWN TO GO FASTER

In the summer of 2011 when the hub design work was gaining momentum on Long Island, another catalytic opportunity arose. New York State Governor Andrew M. Cuomo launched the Regional Economic

Development Council (REDC) initiative to transform the state's economic development from a top-down model to a community-based, performance-driven approach. 10 REDCs were announced and tasked to develop strategic plans and regionally-consolidated funding applications to compete for resources pooled from nine state agencies and 29 existing programs.

The Long Island REDC was co-chaired by the President of Hofstra University and the President of LIA, the organization that brought the STEM dialogue to Long Island in 2009. The 20 members of Long Island's REDC included Dr. Samuel Aronson (Director, Brookhaven National Laboratory) and Joseph Cabral (Senior Vice President and Chief Human Resources Officer, North Shore-LIJ Health System), who co-chaired the Workforce and Education Work Group with Dr. Hubert Keen, the President of SUNY's Farmingdale State College. In a defining moment for the STEM movement on Long Island, Ken, Cheryl, and many of their emerging STEM network partners were invited to join the Workforce and Education Work Group that included Mark in a liaison role to the state.

The Workforce and Education Work Group came to recognize STEM as a powerful opportunity to align and drive workforce development for economic growth across Long Island. At the same time, the fledgling STEM hub leaders recognized that "The Council was an ideal opportunity to steer the STEM Hub into a business activity and tie directly into the business community," as Ken later observed. The team knew that with the business community on board, both the potential for impact and long term sustainability were more likely.

To capitalize on the opportunity to create a strategic alignment with the work of the REDC, the launch of the Long Island STEM Hub was intentionally paused. Ken, Cheryl and their colleagues on the Workforce and Education Work Group were able to ensure STEM strategies were directly embedded into the REDC's strategic plan and then align STEM hub efforts to this plan. With this groundwork in place, the Long Island Regional STEM Hub was ready to launch in December 2011.

MOBILIZING THE REGION

Long Island Regional STEM Hub was the third to launch of ten hubs forming in Empire STEM. LI STEM Hub was able to accelerate designing and building support for their work because of what Ken, Cheryl and Mark had learned through their work on Empire STEM and the linkage with REDC. The work with the REDC also directly accelerated BNL and its partners' ability to advance the hub's efforts by securing $45,000 from the Long Island Community Foundation and $320,000 from the Empire State Development Group in late 2011 through the REDC. By leveraging its strong network of partnerships and their extended networks, the LI STEM Hub came out of the gate with hundreds of stakeholders engaged in its work.

Over 250 leaders from industry, education, government and informal education came together to officially launch the LI STEM Hub and its efforts. The Long Island Regional STEM Hub, stewarded by BNL and supported by North Shore-LIJ Health System (NSLIJ), is focused on preparing students for the regional workforce through enhancing students' and teachers' STEM experiences. The LI STEM Hub promotes workforce development to stimulate the high tech economic growth and vitality of the region. Academic relevance serves as a major theme creating significant opportunity for businesses to engage with school and university systems, and integrate non-academic settings such as museums, research labs, and not-for-profit programs.

Given that the region's education system comes from a place of strength, the goal was not necessarily to change it, but to harness student interest and show them the way to STEM careers that can provide significant opportunities for them in Long Island. "The school systems are capable", Ken explained, "It's more about shifting academics to match with the actual opportunities on Long Island." The missing link was deep, ongoing employer engagement in creating the connections to careers both inside and outside of the classroom.

This combined with New York's emphasis on regional economic development, led Ken, Mark and Cheryl to an important conclusion: the focus for Long Island needed to be on the connection to employers. But not just any employers. Industries that are experiencing or are targeted for real growth, those that provide serious opportunities for Long Island residents.

The LI STEM Hub designed an approach using Regional Industry Councils (RIC) charged with identifying the needs of select high growth industries and the best ways of preparing the workforce that meets those needs. RICs, composed of key leaders from industry, higher education, K-12, Government, education in the Long Island community, create a

formal structure for collaboration between employers and educators to accomplish specific objectives within a given industry base. Eight RICs are in development: Healthcare and Life Science, Advanced Manufacturing, Aviation, Energy and Environment, Engineering, Global Business, Homeland Security, and Information Technology. Indeed, the LI STEM Hub's launch put the 250 attendees in eight working sessions grouped by RIC to guide the longer-term strategic plan for the STEM Hub.

Within six months these are already RICs making a real and notable impact in Long Island by eliminating the long-standing silos between industry and education. "An awful lot of work was being done in Long Island, but only peripheral knowledge of each other existed. Now the walls are breaking down and it has positive long-term implication for our community", Ken remarked. An early success of the RICs was placing several students into internships with local STEM companies. "This was the outcome of simply having people sit around the table and talk about what they are doing", Ken explained.

SNAPSHOT OF THE HEALTHCARE REGIONAL INDUSTRY COUNCIL

Joseph Cabral, Senior Vice President and Chief Human Resource Officer of the largest employer on Long Island, North Shore-LIJ Health System, understands firsthand the imperative for strong STEM educated workforce. Every day he faces the challenge of filling significant numbers of open jobs with local talent. Talent that may not have skills and knowledge in line with healthcare industry needs, or be aware of the various career opportunities these good jobs represent.

Joe co-chaired the Workforce and Education subcommittee of the previously described Governor's Regional Economic Development Council. It was in that role that he and Cheryl had the opportunity to work together and recognized their joint interest in developing talent to fill the STEM pipeline. Convinced of the critical importance of tying industry to workforce development efforts, Joe hired Cheryl into a new position he created, Director of Workforce Readiness. Cheryl, with her intimate knowledge of the region's needs and assets, and commitment to growing STEM talent, now serves as the Coordinator of the Health Care & Life Science Regional Industry Council for the LI STEM Hub.

In this role Cheryl is helping lead a team of over 40 participants, representing both the academic and local business community, to help better prepare students with the skills and education needed for careers in Long Island's local healthcare industry. Other organizations including Winthrop University Hospital, NuHealth System, Adelphi and Hofstra University, Suffolk County Community College and Farmingdale State College, and the Feinstein Research Institute all readily came on board. Although still in its infancy, this Council is working hard to make real changes for the Long Island community.

Current efforts include:

- Creating Healthcare Career Academies in high schools: Three are successfully running and more schools are interested.
- Coordinating industry needs with higher education: They have already identified disconnects between industry needs and higher education programs. For example, some nursing schools are currently producing LPN candidates, but hospitals are focused on hiring RN bachelor degree students.
- Placing students in internships: Several students were placed in the early phases and plans are underway for more.

Ken described this, "faster, more direct and active dialogue between the industry and academic community" as a primary vehicle for identifying and closing these gaps much more quickly and effectively than Long Island ever before.

CONNECTION TO THE EMPIRE STATE STEM LEARNING NETWORK

Empire State STEM Learning Network was designed and launched collaboratively with and by local regional leaders across the state. It was born of a Progressive Dialogue process hosted in regions all across New York to ensure insights and guidance was gained directly from the people doing good work on the ground.

Because Empire STEM was created by the regions, for the regions, and was focused on regional success, the Long Island team was able to avoid potential pitfalls in the relationship between the state and regional agencies – something experienced by the state network and the affiliated networks launch earlier in Ohio and North Carolina. "The state-level STEM network was and is incredibly useful", Ken remarked. Empire STEM provided a Hub Development Workbook to guide the development process and communications collateral to help the Long Island

THE SPECIFIC OBJECTIVES OF THE REGIONAL INDUSTRY COUNCILS ARE TO:

1. Identify skill sets and educational attainment requirements (degrees, certification)
2. Identify gaps related to current and projected supply
3. Identify proven frameworks for improving the supply to meet the demand (Career Academy, Cradle of Aviation, etc.)
4. Asset mapping for existing resources and identify gaps
5. Create a database of resources (equipment, internships, field visits, project partners, best practice, etc.) for the region, state and national (i.e. J&J Nurses Week)
6. Define measureable outcomes (ROI) for business and schools
7. Develop relationships with Career Academy and STEM program Alumni to keep them engaged and connected to Long Island industry
8. Assist teachers in real-world projects and availability of experts in the field (curriculum, externships, projects)
9. Communicate to others in the industry, colleges, high schools, community

Regional Hub form and launch. The LI Regional Hub has a deep and sustaining connection to Empire STEM and its partners, both contributing to and benefiting from the work of other regions in and beyond New York. This relationship with Empire STEM accelerated the creation of an impactful model for their community.

"This is 'agile development' in action!" says Margaret Ashida, Director of Empire STEM at the State University of New York Office of the Education Pipeline. "Empire STEM's five-step regional hub development process was derived from insights shared by Battelle and other state STEM networks, and prototyped in the Greater Southern Tier by Corning Incorporated and MST Connect. Long Island leveraged the open sharing of tools and techniques to accelerate their progress and is in turn sharing their learning with others."

PROGRAM ACCOMPLISHMENTS: WHERE THEY ARE IN SIX SHORT MONTHS SINCE LAUNCH

Although the Long Island STEM Hub is a newly formed organization, they have already seen success from their efforts and look forward to continuing to build upon this foundation. Key program accomplishments include:

- Embedded STEM strategies in the region's overall economic development plan
- Secured over $360,000 in funding to further the region's STEM efforts
- Launched the Long Island STEM Hub with over 250 diverse community and business stakeholders participating
- Designed and recruited leaders for eight industry councils specifically aligned to high growth sectors in Long Island
- Laid the groundwork of infrastructure and partnerships for a student internship program

LESSONS LEARNED

- Find enlightened self-interests – "what's in it for me" is an essential question as the theory of action is to engage stakeholders in imbedding STEM in their "day jobs" and aligning their priorities and resources accordingly. This is harder work where one size doesn't fit all, but is a critical success factor for longer-term sustainability.
- Connect to regional industry networks and major initiatives – this facilitates alignment with the priorities of the region and feeds into the "what's in it for me" to support long-term sustainability.

- Slow down to speed up - take the time to do the Progressive Dialogue, to talk with a wide variety of stakeholders in the formation of the hub (an ongoing process), and to align with opportunities that leverage existing and emerging efforts at the state and regional level .
- Communicate openly, often, and by a variety of means – the importance of communication can never be overstated and is often an overlooked fundamental component for success.
- Spread the work around, many hands make for light work – most supporting the Long Island STEM Hub are full time employed in other activities. The use of Regional Industry Councils provides an effective way to classify resources, direct inquiries and partnerships, and to align the Hub work with regional economic priorities.

ADDITIONAL INFORMATION

To learn more about Long Island's STEM initiative efforts:

- Visit the Long Island STEM Hub: www.listemhub.org
- Visit the Empire STEM Learning Network: www.empirestem.org

SOURCES

Interview with Ken White, Manager of the Office of Educational Programs, Brookhaven National Laboratory

Interview with Margaret Ashida, Director, Empire State STEM Learning Network

Brookhaven National Laboratory News. Launching the Long Island STEM Hub – Preparing Students for Careers in Science, Technology, Engineering, and Mathematics. (2011).

The Long Island Regional Economic Development Council. A Strategic Development Plan for the Long Island Region. (2011).

Empire State STEM Network

The Empire State STEM Learning Network (Empire STEM) is mobilizing interconnected regional STEM hubs across New York State with work plans relevant to local needs, capacities and priorities that are aligned with the statewide framework. The Network envisions a system of STEM education from cradle through career that features:

- Inquiry from the earliest ages
- Interdisciplinary teaching and learning
- Learning after- and out-of-school
- Inspiring real world experiences
- Learning and earning

Empire STEM is part of the Office of Community Colleges and the Education Pipeline at the State University of New York, the largest comprehensive system of higher education in the nation. Its formation was based upon research conducted through the 2009 Progressive Dialogue on STEM Education led by Rensselaer Polytechnic Institute.

Regional STEM hubs of the Network have been launched in 5 of the 10 economic regions of New York State: the Capital Region (Tech Valley STEMSmart Alliance); Central New York; Finger Lakes; Greater Southern Tier; and Long Island. Hub development is underway in the Hudson Valley; Mohawk Valley; New York City; North Country; and Western New York.

For more information visit: **www.empirestem.org**

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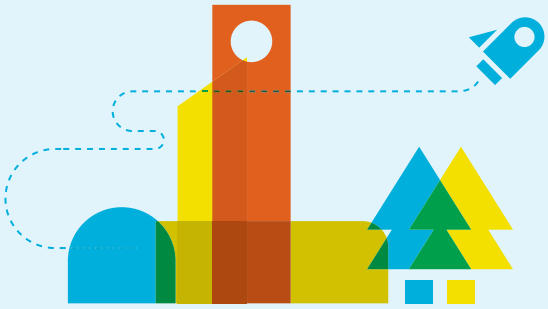

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