

Northeast LSAMP Impact Report



Contents

Introduction P.1

Northeast LSAMP Campus Profiles P.2

Bridge Programs P.4

The URI Experience P.4

Alliance Campuses P.5

Opportunities for Undergraduate Research P.6

The UMass Example P.6

Alliance Campuses P.6

LSAMP Scholars P.7

The UConn Model P.7

Alliance Campuses P.8

Alliance-Wide Events P.9

Student Leadership Conference P.9

Poster Presentation and GEM GradLab P.10

Winter Symposium P.11

Economic Implications P.12

2001-2011

Introduction

In 1990, NSF set goals to more than triple the number of underrepresented minority (URM) B.S. degree recipients in science, technology, engineering and mathematics (STEM) to 50,000 and increase by five-fold the number of URM STEM doctorates by the year 2000. That year, the University of Massachusetts Amherst (UMA), the University of Connecticut (UConn), the University of Rhode Island (URI), Northeastern University (NU) and Worcester Polytechnic Institute (WPI) joined forces to form the Northeast Louis Stokes Alliance for Minority Participation. The primary goal, consistent with LSAMPs across the country, was to increase enrollment, retention and graduation rates of under-represented STEM students; the expectation was that forming this Alliance would contribute to the success of this goal beyond that possible through the initiative of any single institution. The proposal built on existing successful recruitment and retention efforts while recognizing variation in the status, approach and rate of momentum for each institution.

In order to achieve the Alliance objectives, context-appropriate activities were planned on each campus, including: enhanced recruitment of minority students from targeted New England public schools and community college; bridge programs for incoming students from under-represented populations in area high schools; research opportunities for undergraduate STEM students; and mentoring of these students by graduate students and faculty. Further each campus designed programs and activities to encourage institutionalization of these efforts.

As noted the NE-LSAMP is a multi-state, multi-institutional alliance; state flagship, Land-Grant, Carnegie “research extensive” campuses (UMA, UConn and URI) partner with a large urban private university (NU) and a small private engineering and science university (WPI).



Northeast LSAMP Campus Profiles

University of Massachusetts, Amherst (UMA)



UMA is located in the Pioneer Valley of western Massachusetts offering a rich cultural environment in a rural setting and is the lead institution of the Northeast LSAMP. It offers 86 bachelor's degrees, six associates, 72 masters and 50 doctoral programs in eight schools and colleges.



THE UNIVERSITY OF RHODE ISLAND

URI is comprised of four campuses, the Kingston campus is the flagship campus and a member of the Northeast LSAMP. URI offers 80 majors in 9 colleges. 13,250 undergraduate students were enrolled in 2010.

Worcester Polytechnic Institute (WPI)

WPI, located in central Massachusetts was established "to create and convey the latest science and engineering knowledge in ways that are most beneficial to society." WPI offers more than 50 undergraduate and graduate degree programs and in 2010 enrolled 3,391 undergraduate students.

University of Connecticut (UConn)

UConn is comprised of 5 regional campuses; Storrs is the main campus and a member of the Northeast LSAMP. It includes 14 schools and colleges and offers seven undergraduate degrees representing 99 majors as well as 17 graduate degrees, 86 research and professional practice fields of study, and 5 professional degrees. 17,345 undergraduate students were enrolled on the Main Campus (Storrs), fall 2010.



Northeastern University (NU)

NU, known for its signature co-op program, offers 94 undergraduate and 169 graduate programs. In 2010 15,699 undergraduate students represented all 50 states and 125 countries.



The diversity of the 5 institutions comprising the Northeast LSAMP is reflected in the various LSAMP supported activities on each campus. Using our common commitment to LSAMP as a lynchpin, we have established working relationships for project planning, information sharing, database management, and budgetary operations as well as alliance-wide activities.

Much is currently known about which strategies work best in the recruitment, admissions and retention of a diverse student body, especially with underrepresented minority students (Astone and Nunez-Wormack, 2000; Tapia, et al., 2003; National Science Board, 2002) . Among the most successful strategies are comprehensive programs in which faculty, current students, and administrators work together to recruit, mentor and support minority students (Brotherton, 2001). As “selective institutions”, our Phase II work has combined proven interventions (mentoring, undergraduate research opportunities, etc) and interventions with high potential for success (Supplemental Instruction in “barrier courses”, individual tracking) both to normalize rates of URM persistence and graduation in STEM and to increase professional/graduate education placements of NELSAMP students.

The Northeast LSAMP has developed programs and strategies that address campus needs while contributing to the sharing of best practices throughout the Alliance. As a result the following have become institutionalized on Alliance campuses: bridge programs; offices of undergraduate research; and LSAMP scholars programs including tutoring and Supplemental Instruction. Examples are described in detail below.





Bridge Programs

The URI Experience

Bridge programs which bring students from targeted communities to Alliance campuses to experience hands-on activities in STEM disciplines have proved to be an effective recruitment activity. At URI at least two bridge programs per year have resulted in more than fifty students enrolling into STEM programs on an annual basis. The recruitment effort at URI began with visits to area high schools and included technical presentations to students. Students at one public high school, Times Square Academy, were recruited for a summer bridge program. 12 students from the 9-12th grades participated. The most remarkable characteristic of this group was their enthusiasm; all 12 students have since enrolled in and graduated from URI. This summer bridge program has continued to grow and is now connected with the services the campus has to offer.

Interactions with the high school teachers and administrators contributed to the growth of this program; the high school teachers' recruitment of their students into these programs has made a significant improvement in the number and quality of participants. This improvement is particularly noticeable in the increased confidence of the participants resulting in a significantly greater number enrolling in URI.

The confidence of the recruited students is illustrated by events at the Providence Academy of International Studies. Historically, only 7 or 8 students per year applied to URI from that high school; only several of these students were admitted. The first year recruitment activities were introduced at the Academy 19 students applied to URI, the majority of which were accepted; 9 attended (the others attended the Community College of Rhode Island because they lacked the financial resources to attend the University).

When these recruiting activities began the general attitude of the high school teachers was that most of their students would not be successful at the university and therefore did not encourage the students in this direction. Students who participated in the bridge program and were ultimately accepted in to a STEM discipline at URI returned to their former high schools to talk to the teachers and students. Teachers' attitudes changed; this change is evident by the increasing number of students interested in participating in and the complementary growth of the bridge programs as noted. (continued)

Bridge Programs

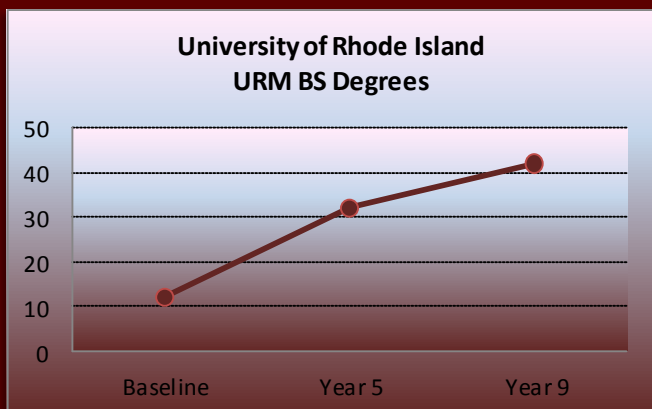
The URI Experience (continued)

Attitudes changed on campus as well. When the bridge program began there were few, if any, connections at the university to support the retention of students. Developing a relationship with the campus student chapter of the Society for Hispanic Professional Engineers (SHPE) led to a strengthening of the student group and a significant increase in the number of students participating. The SHPE chapter accepted any student who wanted to join the group; STEM students dominated the chapter. The development of this cohort has had a positive impact on retention rates. A relationship with the student chapter of the Society of Black Engineers (NESBE) was next. This chapter was also willing to accept all students interested in joining the group regardless of their major. The increase in students interested in these activities was obvious at our Student Leadership Conference in the fall. At least 60 students from URI attended this event, the largest group from any one institution.

Over the past several years counseling efforts have resulted in individual meetings with many STEM students from under-represented populations. This experience was presented to the university president and the deans from each of the STEM colleges; the president has since provided funding for a counselor in the College of Engineering. This counselor now works full time in the dean's office and serves to coordinate some LSAMP activities and to maintain a strong relationship with the student chapters of SHPE and NSBE.

Students who have come through the various LSAMP supported programs are now mentoring new students in these programs. Further, they now have the opportunity to participate in research. Through the AMP program students are supported to work with faculty on original research during the summer; this work often continues through the school year.

Although the number of under-represented students earning baccalaureate degrees did not quite double in the first five years of this effort they have more than doubled since. In May, 2008 46 under-represented minority



students graduated with bachelor's degrees in a STEM discipline – in 2003 only 17 such degrees were awarded. We are pleased that growth has continued in this area.

Alliance Campuses:

NU and WPI also offer LSAMP-supported Summer Bridge programs for entering first year students. Activities include: team building; leadership; near-peer mentoring; and engineering challenges. The students are encouraged to develop cohort relationships with each other, while having the opportunity to work with physics, mathematics, chemistry and engineering faculty. These programs are designed to prepare students for academic success in their STEM discipline.

At WPI a one-week residential program is sponsored during the month of August, prior to the start of classes. Its purpose is to assist in the transition from high school to college by providing a series of interactive sessions with members of WPI faculty and staff. Academic enrichment courses are offered in physics, mathematics, and writing and literature. Seminars to enhance and improve study skills and techniques are provided and cover such topics as note taking, reading comprehension, test taking, time management and study methods. In addition, students begin to think about their personal growth and development through sessions that discuss such issues as clarifying goals and values, making appropriate choices, and developing healthy relationships. The Orientation Program also provides participants with leadership training, cultural awareness, social activities, and the chance to interact with upper-class students.

Opportunities for Undergraduate Research

The UMass Amherst Example



The presence of LSAMP on Northeast Alliance campuses has significantly contributed to either the establishment or growth of offices supporting undergraduate research, assisting students in navigating the opportunities available. On the UMA campus developing activities for LSAMP highlighted several issues pertaining to presenting students with the related options and opportunities that are all somehow inter-related: unfilled opportunities existed; students in the LSAMP targeted

populations were either unaware of these opportunities or how to take advantage of them; and that the excellent opportunities offered through REU programs, mostly funded by the National Science Foundation, were scattered and operating completely autonomously on our campus as they are on many. Commitment to resolving these issues and to offering students quality experiences has resulted in the progression of activities noted here.



The Office of Undergraduate Research and Studies (OURS) was established to help students find existing research opportunities either on campus during the academic year or elsewhere during the summer. Students are coached and assisted in negotiating their way through resumes, cover letters, interview skills and the like so that they are competitive. The number of students taking advantage of this office has grown remarkably and we are exploring ways to enhance its growth.

The value of REU programs is apparent; It became increasingly clear that we could offer an even better experience for students if we could combine the energy and efforts of the various REU programs. The autonomous nature of each program, so common at institutions of higher education, meant that each coordinator had to resolve issues such as stipend distribution, housing, and the like. At UMA a council of coordinators representing the various summer programs began to meet regularly; the council has become known as the REU Network and continues to meet regularly. As a result, the Northeast LSAMP has been able to provide REU opportunities for students from Alliance partners to take advantage of the excellent array of programs offered on the various Alliance campuses during the summer months.

Alliance Campuses:

At URI all LSAMP students have the opportunity to participate in undergraduate research as do students at UConn and NU. At UConn all LSAMP students are expected to do research prior to their senior year. The potential mentoring relationship created in these environments is invaluable in maintaining the students' interest in the field, and a desire to please the mentor raises the grades of the students. NU students are encouraged to do research through the collaborative opportunities developed with other funded programs on campus. All WPI students engage in research as part of the curriculum.

LSAMP Scholars

The UConn Model

The LSAMP program at UConn adapted an existing entry-level one-credit course designed to help incoming first year students transition to college. Taught by the LSAMP coordinator, LSAMP Scholars are taught how to: navigate their way through the university, study effectively, track down research opportunities and obtain other critical skills necessary to a successful STEM student. The class meets weekly in groups no larger than 15. The students are reminded repeatedly that there are high expectations of them and they are being given the tools needed to succeed.

The LSAMP support staff is a secondary academic advisor for the students' in the program and meet with each student no less than four times a year. Mentoring with this level of personal and academic intensity allows the coordinator to identify any problems early on, before they intensify. Research shows that close oversight and effective advisement is strongly tied to lower attrition rates, and that students who fully commit to this relationship are more likely to succeed academically (Wilder, 1981).

Leadership development workshops are offered monthly; while not for credit, the workshops give students the opportunity to explore topics related to their academic and professional development. Topics include, but are not limited to resume writing, networking skills, study skills and overcoming the stress of majoring in a STEM discipline. The workshops often involve teamwork contributing to the development of a cohort. This feeling of belonging, both academic and social, fosters success and improves retention (Tinto, 1987, 1993, 2006). The annual LSAMP Leadership Launch is one of the more popular experiences. Each fall students participate in an outdoor challenge course that requires leadership skills, teamwork, physical readiness and problem-solving skills. One of the activities is a 15-foot wall climb where all of the students must get over the wall as a team. Each year new students emerge as leaders and build their confidence as they support and encourage each other.

Peer-mentoring, known to be an effective strategy for engaging students, is an integral part of this program. The first-year experience course incorporates this into the program. Not only are LSAMP undergraduates encouraged to find mentors, the program encourages them to be mentors.

Graduate led tutoring is provided for the students during regularly scheduled hours throughout the semester. First year students are required to meet with their tutors on a weekly basis and attend group review sessions hosted by LSAMP.

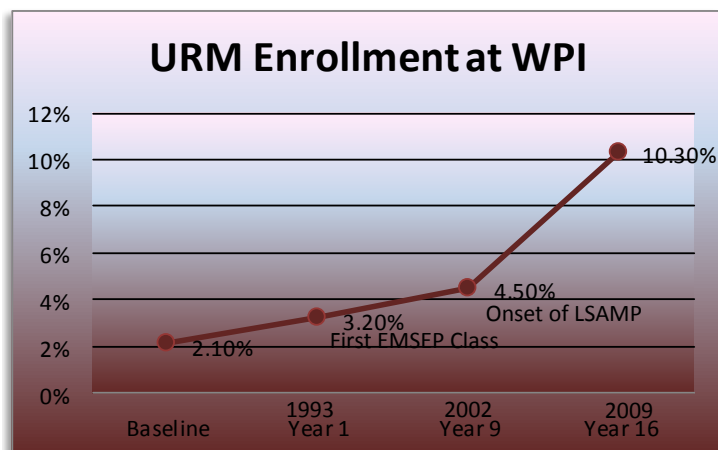
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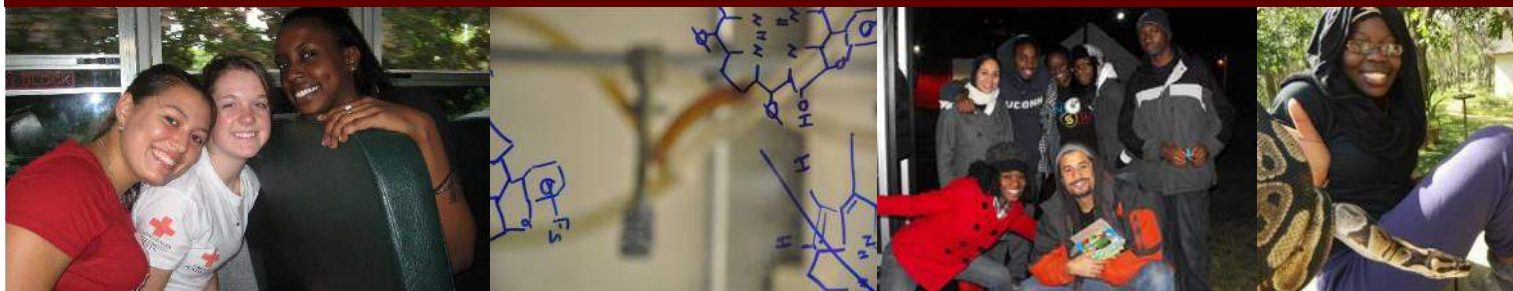
LSAMP Scholars Alliance Campuses

UMA LSAMP students participate in an LSAMP-supported course known as SEMinar Scholars designed to support cohort development, an awareness of existing resources and an encouragement to engage in research experiences. Appropriate campus personnel who manage these offices and upper class and graduate students who have personal knowledge of the benefits of these resources participate in a seminar to talk first-hand about the benefits of being part of LSAMP. NU and URI offer similar support as these are strategies known to positively contribute to persistence in the sciences (Bronstein, 2008).

The constellation of support offered at WPI has proven to be highly successful in recruiting, retaining, and graduating students of color. Prior to the start of EMSEP, only 2.1% of the WPI student body was students of color. In 1993 with the first EMSEP class, enrollment increased to 3.2%. This enrollment held steady until 2002, where with the onset of LSAMP, the population of Students



of color more than doubled in percentage from 4.5% to its current representation of 10.3%. This number has remained steady for approximately the past five years.





Alliance-wide events further enhance the networking by providing a common experience for the students to learn from and about each other. Confronted with the challenges of our various academic calendars and unique institutional demands the Northeast LSAMP has persisted and now has no less than two Alliance-wide events annually; we strive for three.

Alliance-wide Events

Student Leadership Conference

The Student Leadership Conference was the initial effort in the development in Alliance-wide events. The Conference has been held in a central location and traditionally offers a keynote speaker, generally an LSAMP alum who is now successfully engaged in their profession, a graduate student panel to discuss, on a more personal level, the experience and future implications of research experiences and activities that will contribute to successful networking. Sessions discussing opportunities for research and how to access them, getting into graduate school and other post-college opportunities has also been included. In recent years Spring has proven to be a difficult time to schedule events given the specific calendars from each campus. We have been able to hold Alliance-wide events in the early fall and mid-winter which more students are able to participate in.



Poster Presentation and GEM GradLab

Last fall we held the first LSAMP Research Experience for Undergraduates Poster Symposium at NU; Medgars Evers College-CUNY and the Urban Alliance also participated. This event, which was partnered with the GRAD Lab, received such rave reviews that it is now considered an annual LSAMP event. Students from Alliance institutions traveled to NU for the Friday night Poster Symposium. Almost 70 students from Northeast Alliance campuses traveled to Boston; 25 posters were judged based on faculty/administrator judging criteria and prizes were awarded. Saturday morning students assembled for the GRAD Lab (Getting Ready for Advanced Degrees) and Regional Graduate School Fair. The event is offered through the Massachusetts Consortium of STEM Programs and includes the following flagship universities: UMA, Boston University, Harvard University, MIT, NU, Tufts University and WPI. These seven schools, along with the other members of the Northeast LSAMP, URI and UConn, provide this opportunity for historically URM students to participate in a full-day comprehensive symposium on graduate school that increases awareness regarding the impact of research and innovation, increases the ability to envision a future as a STEM leader and enhances the ability to identify, apply and successfully gain entry to graduate programs.

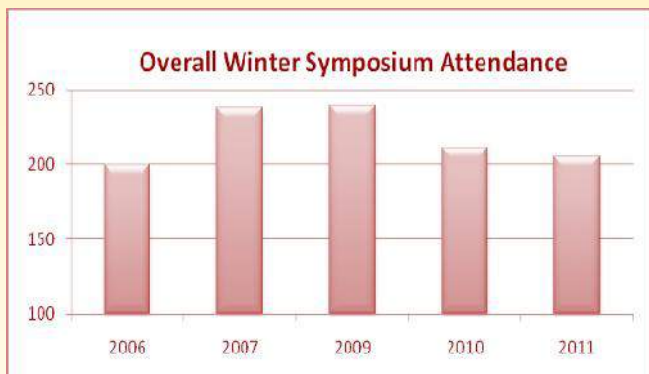


A survey of the event was completed and the results of the survey items demonstrate that since this conference was a more intimate affair with more focus on students who had conducted research, the number of students attending was lower than the Winter Symposium. Of the 38 valid student email addresses, 19 responded to the evaluation survey for a response rate of 50%. The contents of the survey were similar to the instrument used in past conferences, with additional questions appropriate to the content. On a Friday night, participants came from 3 of the 5 NE-LSAMP schools (URI, NEU, and UConn) as well as from two other schools from other LSAMP awardees (Medgar Evers, NYC-LSAMP and Roxbury Community College, Urban LSAMP). The intent was for LSAMP students to attend this evening event in advance of the larger GEM event taking place the next day. A majority of the respondents (56%) were juniors or seniors. Students represented the biological sciences, math, engineering, nursing, chemistry, and computer science. Most (73.7%) attendees were female and self-identified as being from a URM group. As expected, almost 75% of the participants brought and presented posters either as part of a group or on their own. In contrast to some of the other LSAMP events, 79% of the respondents learned about this event directly from a faculty member (as opposed to via email or through staff). A majority of the students (52.6%) at the poster symposium expressed that they were planning on going to graduate school after graduation. When asked about the content of the symposium, 94.4% felt that it was appropriate and informative. The same proportion of students also said that they would recommend this symposium to others. The poster symposium was very well received, with 92.4% reporting that the symposium was useful to them. The guest speaker (Dr. Marcus Huggans) and post-symposium workshop (Dr. Ruth Washington) were also very well received.

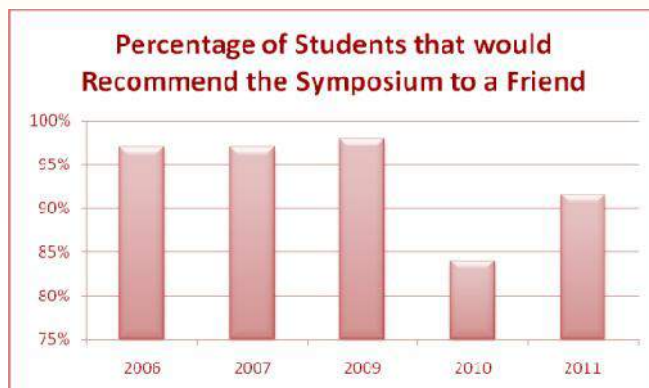
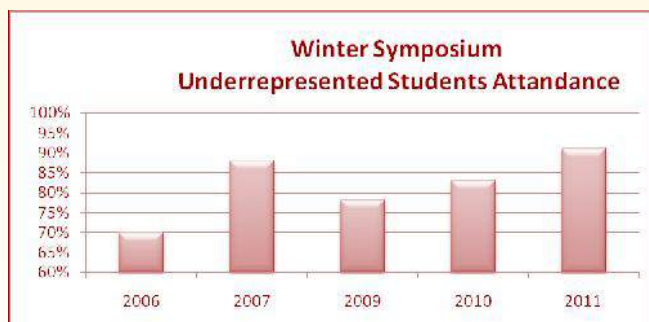


Winter Symposium

UConn has hosted a Winter Symposium since 2006; in recent years it has become an Alliance-wide event. The objective of the event is to engage STEM and health-profession undergraduate students in meaningful conversations regarding the importance of pursuing co-curricular academic enrichment activities during their undergraduate years. The symposium is comprised of a career-type fair, a speaker or panel, and workshops. The fair invites students to speak with representatives from industry and academia which provide research opportunities. Alliance partners are represented along with other regional sites students may easily become involved with. The speaker and/or the panel encourage persistence in STEM disciplines and the workshops engage students in the hands-on activities necessary to succeed in these ventures with offerings such as applying to graduate school, successfully finding an REU and professional development sessions such as resume writing and preparing for job interviews.



Attendance at the Winter Symposium has remained at approximately 200 students. A yearly survey of attendees indicates that the event is productive in securing mentors, research positions, and graduate school contacts, and in providing useful advice about how to attain personal and professional goals.



The results of these survey items describe the LSAMP Winter Symposium participants from January 21st, 2011. Students from UConn represent more than three quarters of the survey respondents. NU, URI, and WPI contribute about 24% of the survey respondents. There was no representation from UMA. This is not surprising given that the conference was located at UConn and there was a major snow storm particularly compromising activity in western Massachusetts. The survey population closely resembles the actual roster of participants. After two invitations to complete the survey, a total of 86 out of 136 valid email addresses responded to the survey, for a response rate of 63.2%. It should be noted that weather was a factor in preventing students from other colleges from attending the symposium. Twenty-four students from schools other than UConn had registered, but did not attend. They were also surveyed, but had a much lower response rate. The most common reason given for not attending was transportation cancellation due to weather.

Economic Implications

It is widely recognized that educating undergraduates in STEM fields is required for the United States to remain globally competitive and continue to hold a leadership role in the world. Throughout the past decade, growth in STEM jobs has been three times greater than in other jobs, according to the US Department of Commerce. That faster rate of growth is expected to continue for the next decade. In recognition of this trend, the developing world has stepped up the pace of educating its workforce in STEM fields, and this will also have long-term effects on the United States. The number of natural science and engineering degrees awarded in the developing world increased more than three times from 1998 (239,000 awarded) through 2006 (807,000 awarded). The United States is currently producing roughly 235,000 natural science and engineering baccalaureates (NSF, 2010). The United States needs to intensify its efforts to feed the STEM pipeline in order to keep pace with the rest of the world and to meet future national workforce needs.

UConn, as well as other Alliance members, has also partnered with area corporations and used the LSAMP model to create similar programs that feed the STEM pipeline. Some examples of successful partnerships and spin-offs include the Travelers Edge Science Wizards program that brings science into middle and high schools, the NSF-funded STRONG-CT program for life sciences majors that added a partnership with three community colleges, and the privately funded Rowe Scholars program that supports gifted students pursuing degrees in health-related fields.

The Northeast LSAMP has worked with many other campus to support and partner with these enhancements geared to increase the development. An example of this support and collaboration, leading to enhanced student opportunities includes but is certainly not limited to: Gk-12 programs; Broadening Participation in Computer Science; Urban Alliance; Center for Ocean Sciences Education Excellence in New England; and Geosciences Education. Essentially the Northeast LSAMP is ready and willing to partner with any effort that will increase and enhance the opportunities for undergraduate scholars to persist to excellence in their STEM disciplines.