

LOUIS STOKES
LOUISIANA ALLIANCE
FOR MINORITY PARTICIPATION

IMPACT REPORT

1995 - 2015

LIGHTING the Path to OUR FUTURE

WITH
SCIENCE,
TECHNOLOGY,
ENGINEERING AND
MATHEMATICS



LS-LAMP
PARTNER
INSTITUTIONS:

Southern University
and A&M College
(Lead Institution)

Dillard University

Grambling State University

Louisiana State University

Louisiana Universities
Marine Consortium

McNeese State University

Nunez Community College

Southern University at New Orleans

Southern University at Shreveport

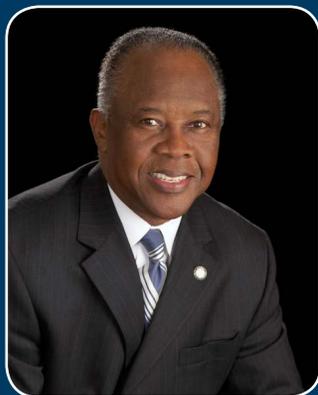
Tulane University

University of Louisiana at Lafayette

University of New Orleans

Xavier University of Louisiana

LOUIS STOKES ALLIANCES FOR MINORITY PARTICIPATION

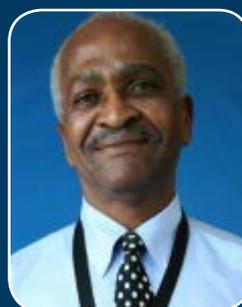


DR. A. JAMES HICKS
Program Director
Louis Stokes Alliances for Minority Participation

LS-LAMP LEADERSHIP



DR. JOSEPH C. RALLO
Chairman,
LS-LAMP Governing
Board and
Louisiana Commissioner
of Higher Education



DR. KERRY DAVIDSON
LS-LAMP Co-PI
and Deputy Commissioner for
Sponsored Programs
Louisiana Board of
Regents



DR. DIOLA BAGAYOKO
LS-LAMP PI and
Project Director



DR. LURIA YOUNG
LS-LAMP Co-PI



DR. ELLA L. KELLEY
LS-LAMP Co-PI
(Deceased)



LOUIS STOKES
LOUISIANA ALLIANCE FOR
MINORITY PARTICIPATION (LS-LAMP)

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ON THE COVER: SUBR LS-LAMP graduate Ronald Alexander, chief student marshal for the SUBR fall class of 2012.



Remembering Dr. Ella Lee Kelley

1948 - 2015



Dr. Ella Lee Kelley, a trailblazer in science, technology, engineering and mathematics (STEM) education is a nationally recognized educator and advocate for STEM education and research. Dr. Kelley joined the faculty of the Department of Chemistry at Southern University and A&M College in Baton Rouge in 1983. Throughout her more than three decades at Southern University, she served as Co-Director of the Timbuktu Academy (1990-2015) with her husband, Dr. Diola Bagayoko, since the Academy's inception. She rose through the academic ranks to hold a number of administrative positions including chair of the Department of Chemistry, Associate Vice Chancellor of Academic Affairs and Dean of the Dolores Margaret Richard Spikes Honors College.

In 2003, Dr. Kelley received the U.S. Presidential Award for Excellence in Science Mathematics and Engineering Mentoring (US-PAESMEM). During her tenure as professor of chemistry, she authored over a dozen refereed technical publications in biochemistry, teaching, mentoring, and learning strategies. She was also the co-principal investigator of the Louis Stokes Louisiana Alliance for Minority Participation (LS-LAMP) and campus coordinator of the Southern University LS-LAMP program.

In addition to her professional successes, she was a committed wife, a proud mother of three to Dr. Namory Bagayoko, an orthopedic surgeon; Kelley Bagayoko Adams, an attorney; and William Bagayoko, a computer specialist; and grandmother of twins, Ella and Nawali Djibri.

Dr. Ella Kelley was an administrator, mentor, motivator and director, with a passion and dedication for STEM and students pursuing STEM degrees. The many lives that have been touched by this incredible individual is a testament of her ability to connect with all STEM scholars including Ph.D. students, Ph.D. /M.D. students and B.S. degree students. Throughout her more than 30 years with the Timbuktu Academy, she demonstrated a strong passion for pre-college students through her work with the Timbuktu Academy Pre-College Summer Programs—Getting Smatter at the Timbuktu Academy (GeSTA), Summer Science Institute at the Timbuktu Academy for Middle School - SSI-M, Challenge 2000 and Summer Science Institute (SSI).

Over the course of the past several months, many scholars, colleagues, administrators and friends have acknowledged her outstanding achievements. These same individuals have defined noteworthy networks, delighted in her generosity, expressed memorable events, and shared the positive impact that she had on their lives.

The LS-LAMP community echoes the sentiments and expressions of all of the individuals who have remembered and honored Dr. Ella Lee Kelley. We would like to take this time to show our sincere appreciation and love for this phenomenal woman. Dr. Kelley had a long-standing commitment to our scholars and was integral to establishing a strong educational foundation for the Timbuktu Academy and LS-LAMP programs. Her memory will forever live on through her family, friends and students. LS-LAMP pays homage to this extraordinary woman and recognizes her for a job well done.

Please go to <http://dr-ella-lee-kelley.forevermissed.com/> to view Dr. Ella L. Kelley's Memorial web site.

EXECUTIVE SUMMARY

The Louis Stokes Louisiana Alliance for Minority Participation (LS-LAMP) is a comprehensive, statewide, coordinated program aimed at substantially increasing the number and quality of minority students enrolling in and completing baccalaureate degrees in science, technology, engineering, and mathematics (STEM) and subsequently going on to pursue graduate studies in STEM disciplines. LS-LAMP consists of twelve (12) institutions and one research facility with Southern University and A&M College as the lead institution.

During the 20 years (1995-2015) of its operation, LS-LAMP has had a transformative impact on Louisiana STEM education, overall, and on minority STEM education, in particular. This success was achieved through the adoption and institutionalization of the 10-Strand Systemic Mentoring Model at all LS-LAMP partner institutions. The LS-LAMP Strategic Implementation Plan (SIP) (<http://www.phys.subr.edu/TA/ls-lamp/sip.pdf>) provides a clear, comprehensive and detailed roadmap for the achievement of the goals of LS-LAMP. Enhancement of institutional infrastructure, curriculum reform, institutionalization of LS-LAMP and the acquisition of external funding for the continuation of LS-LAMP beyond NSF support are additional accompanying activities.

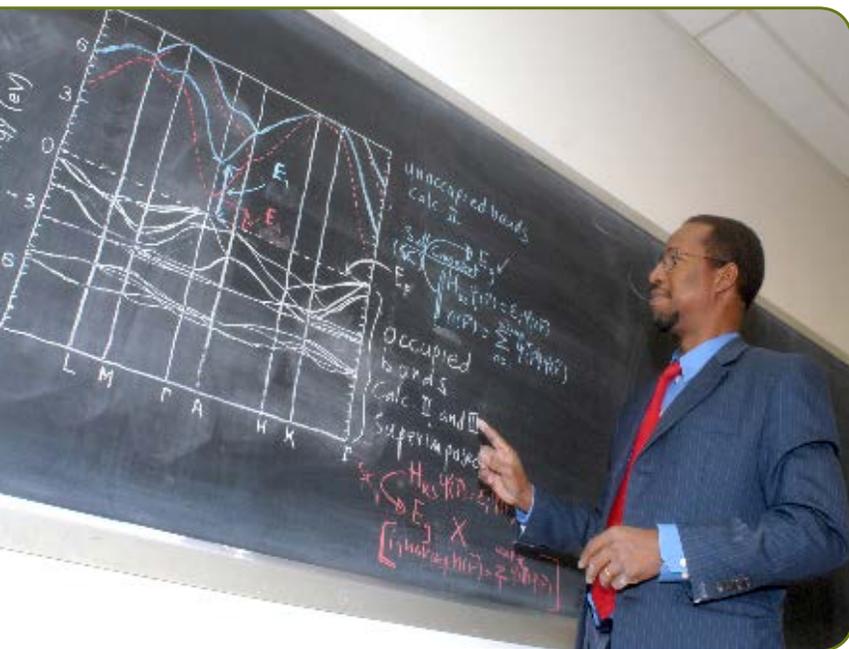
IMPACT OF LS-LAMP

The impact of LS-LAMP is wide-ranging and not limited to minority STEM education or to the LS-LAMP partner institutions. LS-LAMP has not only achieved the stated objective of increasing the number and the quality of under-represented minorities in STEM disciplines but has also succeeded in changing the culture of the educational operation in partner institutions. **In the past 20 years, LS-LAMP has developed a comprehensive and universally applicable model of systemic mentoring.** The LS-LAMP 10-Strand Systemic Mentoring Model has been validated in practice through the achievements of LS-LAMP as well as through peer-reviewed publications in educational research.

STEM Ph.D. degrees to minority alumni of LS-LAMP | The most significant indicator of the impact of LS-LAMP is the number of STEM Ph.D. degrees awarded to minority STEM Baccalaureate degree graduates of LS-LAMP partner institutions. The number is a direct measure of the impact of LS-LAMP and an indicator of the increase in the quality of the minority STEM BS degree graduates from LS-LAMP Institutions. **Since 2000, a total of 226 STEM Ph.D. degrees have been awarded to LS-LAMP alumni.**

STEM Baccalaureate degrees awarded to LS-LAMP scholars | There was a steady increase in the annual minority STEM BS degree production from 507 degrees in 1996 with a leveling off at about 761 degrees per year in the period between 2001 and 2004. The devastation due to Hurricane Katrina in September 2005 particularly, on four (4) of the STEM BS degree producing partner campuses and one community college in the New Orleans area resulted in the significant drop in STEM enrollment and STEM BS degree production. It is only since 2011 that there has been a stabilization of the enrollment and degree production. The drop in degree production since 2006 can be attributed in part to a) the devastating aftermath of Hurricane Katrina, b) the draconian cuts in state funding for higher education, c) the increase of the out-of-state fee to \$3,000 per semester, and d) the elimination of open admission and the increase in admission requirements at several partner institutions. All of these factors led to a precipitous drop in enrollment. We believe that the LS-LAMP systemic mentoring activities, including financial support, have in part mitigated the adverse effects of the factors listed above and helped to maintain and to stabilize the degree production. **The LS-LAMP minority STEM degree production between 2011 and 2014 (746, 703, 699, 721) indicates that a level of stability has been achieved in minority STEM degree production. It is also an indication of the post-Katrina recovery of the five New Orleans partner campuses and the continuing success of the other LS-LAMP partners in spite of the adverse effect of the factors listed above.**

Financial support | Supplemented by funding from state, industry and private sources, financial support was provided to students in the form of research stipends and book awards. As a result, the students were able to devote significantly more time to their studies by eliminating or reducing the amount of time spent on off-campus jobs. **In the 20 years of operation, LS-LAMP has awarded direct financial support to 9,476 undergraduate students pursuing STEM BS degrees.** This number does not include the hundreds of students who receive indirect financial support for conference travel, field trips, meetings, workshops, etc.



Research Participation | At the undergraduate level, it is a critical and mandatory activity of LS-LAMP. It is the single largest cause of the significantly increased transition and success of LS-LAMP alumni to STEM graduate schools and their pursuit of graduate STEM degrees. Since 2000, a total of 3006 undergraduate students have conducted summer research at universities, national labs and in industry through paid research internships.

Conference Participation | This activity is a key factor in immersing scholars in a professional culture. LS-LAMP scholars attend conferences and present the results of their research. These presentations are the culmination of a series of steps designed to promote research and research oriented careers for LS-LAMP scholars. Since 2000, a total of 3,796 LS-LAMP scholars have attended state and national conferences and made poster or oral presentations of their research findings.

Guidance to Graduate School | In addition to research experience and conference participation, all LSLAMP scholars are expected to participate in activities such as GRE preparation, graduate school site visits, professional development through seminars/workshops, and the enhancement of computer and technological skills. All these activities contribute toward the preparation for a smooth transition to graduate school. Since 2000, more than 1,489 LS-LAMP scholars have transitioned to graduate school to pursue Masters or Ph.D. degrees in STEM. The Bridge to Doctorate is an LS-LAMP activity which provides financial support to LS-LAMP alumni from all over the country to pursue a Ph.D. in a STEM discipline at Louisiana State University, the LS-LAMP bridge institution. To date, more than 72 minority STEM graduate students have successfully participated in the six (6) BD cohorts. Of these 22, have been awarded a Ph.D. degree in a STEM discipline and nine (9) have gone on to serve as faculty members in universities across the country.

Grants Catalyzed By LS-LAMP | A significant result of LS-LAMP activities was a quantum increase in external funding at LS-LAMP partner institutions. In the last four (4) years alone, grants equaling more than 22 million dollars were awarded to LS-LAMP partner institutions; they were catalyzed by LS-LAMP in one form or another.

LS-LAMP Impact on teaching, learning, and mentoring (TLM) knowledge base | During the last 20 years, LS-LAMP has published more than 60 papers on systemic mentoring. Some of the major refereed publications pertaining to the basic tenets of teaching, mentoring, and learning have been validated by publications and reports by the National Academies of Science and the National Research Council.

The above results clearly demonstrate the significant, positive impact of LS-LAMP on minority participation in STEM higher education which has occurred over the last 20 years in spite of the effects of natural disasters like Hurricanes Katrina and Rita, drastic cuts in state funding for higher education and other impediments.

Enhancement of institutional infrastructure, curriculum reform, institutionalization of LS-LAMP and the acquisition of external funding for the continuation of LS-LAMP beyond NSF support are additional accompanying activities.

The impact of LS-LAMP is wide-ranging and not limited to minority STEM education or to the LS-LAMP partner institutions. LS-LAMP has not only achieved the stated objective of increasing the number and the quality of under-represented minorities in STEM disciplines but has also succeeded in changing the culture of the educational operation in partner institutions.

INTRODUCTION

The Louis Stokes Louisiana Alliance for Minority Participation (LS-LAMP) is a comprehensive, statewide, coordinated program aimed at substantially increasing the number and quality of minority students enrolling in and completing baccalaureate degrees in science, technology, engineering, and mathematics (STEM) and subsequently going on to pursue graduate studies in STEM with emphasis on the Ph.D.

This Alliance is currently composed of twelve (12) institutions of higher education and the Louisiana Universities Marine Consortium (LUMCON), a research facility with Southern University and A&M College as the lead institution. The original alliance was joined by Xavier University in 2010.

LS-LAMP is a Senior Alliance with 20 years (1995 - 2015) of successful operation. We are currently in Year 1 of a new five-year funding cycle as a Senior Alliance (2015 – 2020).

The \$15 million of NSF funding (1995-2015) has been supplemented with \$10 million from the Louisiana Board of Regents. In addition, each partner campus has provided in-kind and cash matching costs equal to the LS-LAMP funding that it has received. As a result, an additional \$10 million has been provided as institutional leverage collectively by LAMP campuses. NSF's investment of \$15 million over two decades has catalyzed external funding for LS-LAMP partner institutions resulting in more than \$50 million to grow and create new LS-LAMP activities and programs. More details about how LS-LAMP has leveraged NSF's investment, can be found in the *"Impact on the Diversification of the Funding Base and Leveraging"* section of this report on page 17.

From 1995 – 2015, LS-LAMP has had a transformative impact on Louisiana STEM education overall and on minority STEM education in particular. This success was achieved through the adoption and institutionalization of the 10-Strand Systemic Mentoring Model at all LS-LAMP partner institutions. The LS-LAMP Strategic Implementation Plan (SIP) (<http://www.phys.subr.edu/TA/ls-lamp/sip.pdf>) provides a clear, comprehensive, and detailed road map for the achievement of the goals of LS-LAMP.

The impact of LS-LAMP is wide-ranging and not limited to minority STEM education or to the LS-LAMP partner institutions. LS-LAMP has not only achieved the stated objective of increasing the number and the quality of under-represented minorities in STEM disciplines, but has also succeeded in changing the culture of the educational operation in partner institutions. In the past 20 years, LS-LAMP has developed a comprehensive and universally applicable model of systemic mentoring. The LS-LAMP 10-Strand Systemic Mentoring Model has been validated in practice through the achievements of LS-LAMP as well as through peer-reviewed publications in educational research.

\$15 million of NSF funding (1995-2015) has been supplemented with \$10 million from the Louisiana Board of Regents



IMPACT OF LS-LAMP

MINORITY STEM PH.D. DEGREES AWARDED TO LS-LAMP GRADUATES

The most significant performance indicator of the LS-LAMP impact is the number of STEM Ph.D. degrees awarded to minority STEM baccalaureate degree graduates of LS-LAMP partner institutions. The number is a direct measure of the impact of LS-LAMP and an indicator of the increase in the quality of the minority STEM BS degree graduates of LS-LAMP institutions who go on to pursue graduate degrees. An increase in the number of Ph.D. awards since the establishment of LS-LAMP would be a clear demonstration of the significant, positive changes that are attributable to LS-LAMP systemic mentoring activities. We are proud to state that 226 STEM Ph.D. degrees (an average of 15 per year) were awarded between 2000 and 2014 to minority STEM Bachelor degree graduates of LS-LAMP partner institutions (see Figure 1). Data from webcaspar.nsf.gov indicates that between 1996 and 1999, 58 graduates from the same (LS-LAMP) institutions were awarded STEM Ph.D. degrees (an average of 14 Ph.D. degrees per year). This significant increase of three minority STEM Ph.D.s per year demonstrates the impact of the LS-LAMP 10-Strand Systemic Mentoring Model and of the special emphasis that LS-LAMP places on undergraduate research and guidance to graduate school. The overwhelming majority of the Ph.D. recipients are former LS-LAMP Level 1 scholars who received research stipends, book awards and other forms of direct support from LS-LAMP.



Left to Right: Dr. Louis Stokes, Dillard LS-LAMP graduate Dr. Kelly Nash, and a program officer.

FIGURE 1 | STEM Ph.D. Degrees Awarded (2000-2014)

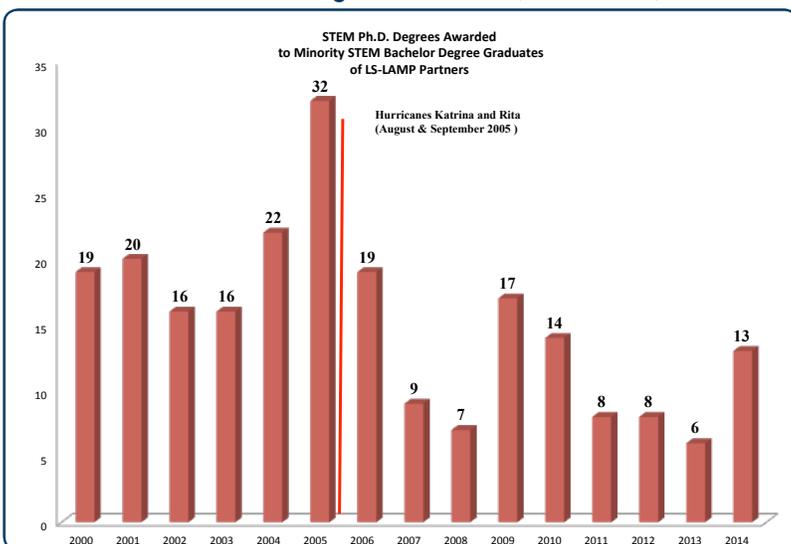
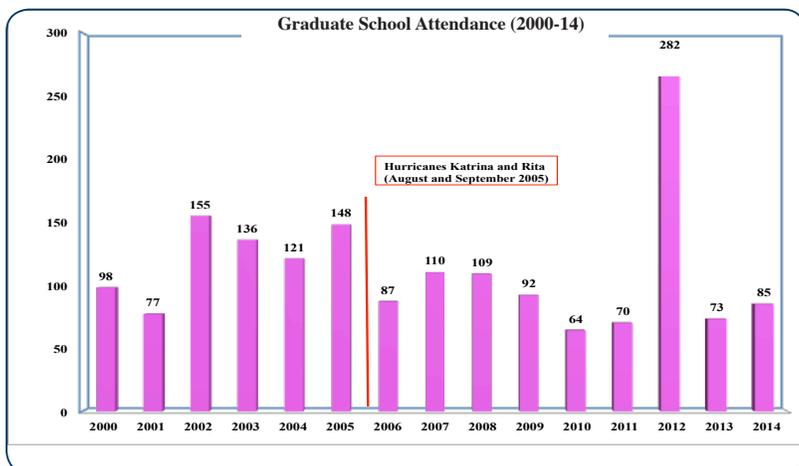


FIGURE 2 | Graduate Attendance (2000-2014)



In 2012, SUBR and LSU each matriculated more minority students to a STEM graduate program than any other LS-LAMP partner.

undergraduate research and guidance to graduate school. The overwhelming majority of the Ph.D. recipients are former LS-LAMP Level 1 scholars who received research stipends, book awards and other forms of direct support from LS-LAMP.

Figure 2 shows the transition to STEM graduate schools by minority STEM graduates of LS-LAMP. The annual transition to graduate school rate has suffered to some extent due to the significant disruption to the five (5) LS-LAMP campuses caused by Hurricane Katrina.

The increase in the award of Ph.D. degrees and the transition to STEM graduate schools is a direct manifestation of the special emphasis placed on undergraduate research available on campus and through a wide variety of opportunities such as the DOE-NSF Faculty and Student Teams (FaST), SULI, Committee on Institutional Cooperation (CIC) and other Research Experiences for Undergraduates (REU) programs.

UNDERGRADUATE STEM DEGREES AWARDED TO LS-LAMP SCHOLARS

The minority STEM BS degree production of the alliance is shown in Figure 3. There was a steady increase in the annual minority STEM BS degrees production from 507 degrees in 1996 and then a leveling off at about 761 degrees per year between 2001 and 2004. The leveling off can be attributed in part to

a) the state-mandated 300% increase in the out-of-state tuition at all the institutions, 2) the elimination of open admission at several of the LS-LAMP partner institutions, and 3) the increase in admission requirements in several institutions that led to a significant drop in enrollment. We believe that the LS-LAMP systemic mentoring activities, including financial support, have in part mitigated the adverse effects of the factors listed above and helped to maintain the degree production at a relatively higher level. The 2011 LS-LAMP minority STEM degree production of 623 is a clear indication of the post-Katrina recovery of the five New Orleans partner campuses and the continuing success of other LS-LAMP partners. With the inclusion of Xavier University as part of LS-LAMP in (2010-11), the LS-LAMP minority STEM BS degree production has gone up to 746.

The devastation from Hurricanes Katrina and Rita is the primary cause for the precipitous drop in the degree production after 2005. However, as described farther below, LS-LAMP activities provided significant assistance to the displaced students from five (5) LS-LAMP partner campuses that were shutdown when the entire New Orleans area was evacuated.

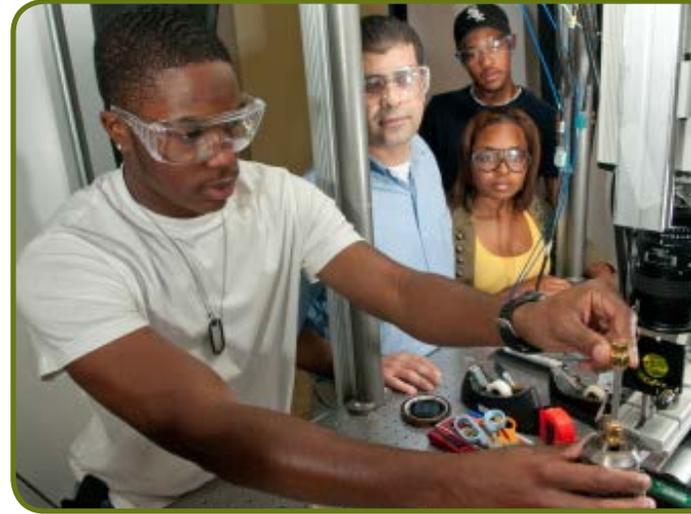
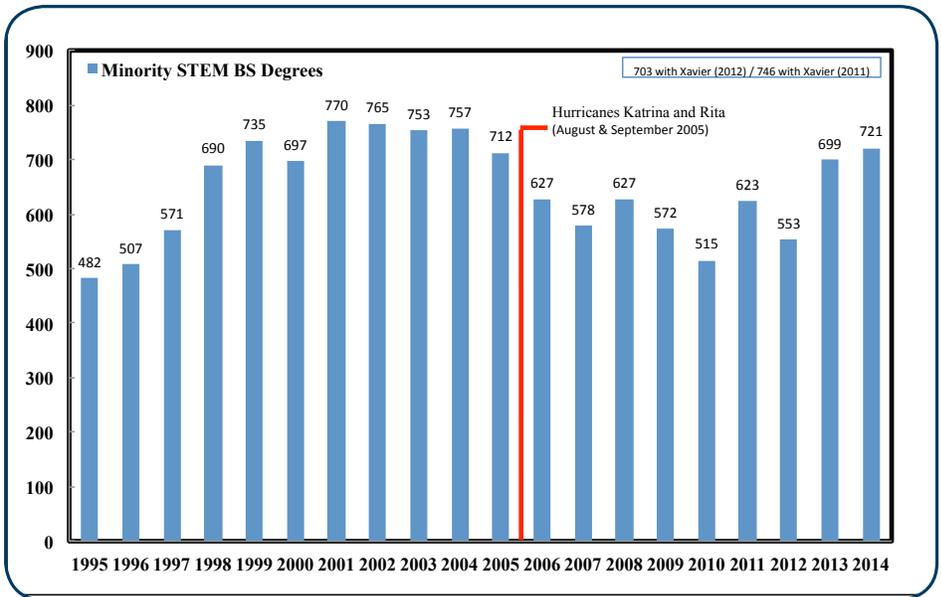


FIGURE 3 | LS-LAMP Minority STEM BS Degrees (1995-2014)



LS-LAMP RESPONDS TO HURRICANE KATRINA

Hurricane Katrina, the sixth-strongest storm ever recorded, blasted through Louisiana, Mississippi and Alabama on August 29, 2005, and forever changed the face of the landscape and people's lives. Katrina devastated the New Orleans area levee system which was breached and the lake waters flooded the city. To add to the massive devastation and displacement from Hurricane Katrina, yet another storm, Hurricane Rita, struck southwestern Louisiana and southeastern Texas on September 24th.

All five (5) of the LS-LAMP partner institutions located in New Orleans were evacuated. Among the displaced students were 250 of the 750 Level 1 LS-LAMP Scholars. In the aftermath of Hurricane Katrina, professors and students from the New Orleans city universities took academic refuge in other schools. The LS-LAMP and Timbuktu Academy staff at Southern University Baton Rouge quickly mobilized to welcome and provide assistance to its displaced affiliates. The LS-LAMP office became the centralized administrative service area to scholars pursuing degrees in science, technology, engineering and mathematics (STEM) disciplines. Staff paid no attention to the clock but stayed as long as they were needed. Everyone—no matter what their job – pitched in to do the work that needed to be done. But work is really not quite the word to describe the caring and compassion that served as the hallmark of those incredible weeks immediately after the hurricane.

After Hurricane Katrina, more than \$100,000 of assistance was provided to 145 displaced scholars

LS-LAMP assisted over 150 displaced scholars. LS-LAMP staff members assisted displaced students who were trying to register to continue studies in other states and cities. Faculty members at SUBR and LSU guided students from SUNO and UNO through the curriculum selection to accommodate their plans of study. LS-LAMP also assisted them in the registration process and provided financial assistance in the form of book awards, stipends and housing. More than \$100,000 of assistance was provided to 145 displaced scholars. All possible efforts were made to ease the transition of displaced students in their new locations and to minimize the disruption to their studies in the aftermath of the hurricanes.

UNDERGRADUATE RESEARCH AND ASSOCIATED ACTIVITIES

Undergraduate research is the major activity that undergirds the achievement of LS-LAMP goals. It is supported by the other systemic mentoring activities such as conference participation, enhancement of communication and technological skills, and the development of a professional culture. All LS-LAMP scholars are expected to participate in academic year and summer research. Up-to-date information regarding summer research opportunities is available on the LS-LAMP website (www.lslamp.org) and the Timbuktu Academy website (www.phys.subr.edu/timbuktu.htm). All students participating in research are required to provide reports to their faculty research advisors and to present their research at state and national conferences. The figures below show the research and conference participation of LS-LAMP scholars between 2005 and 2014.

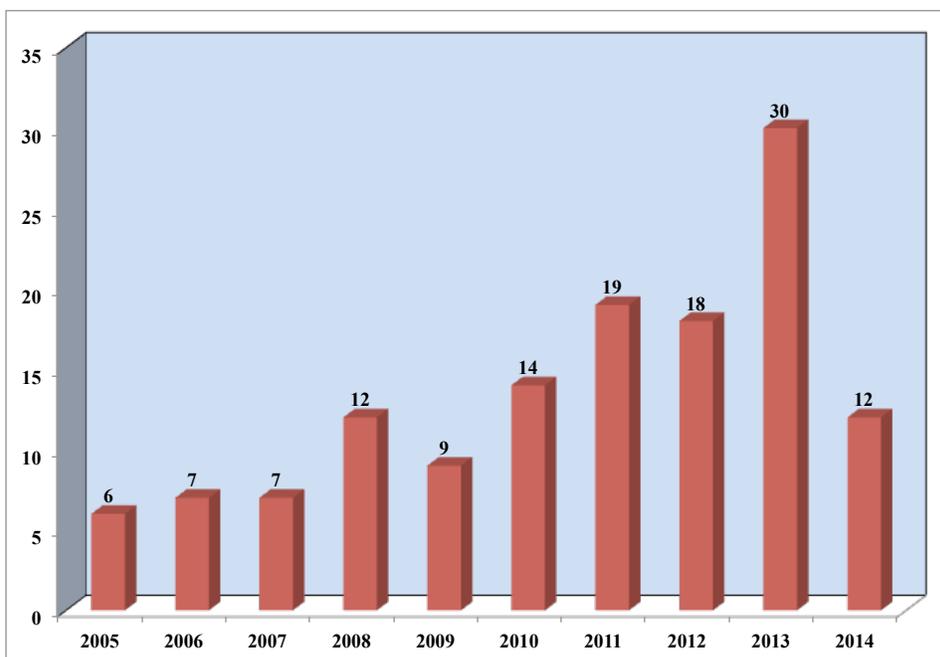
Table: Research and Conference Participation by Undergraduate Minority LS-LAMP Scholars

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Research Participation	240	270	241	226	146	101	156	201	128	124
Conference Participation	414	282	256	127	194	279	227	196	234	263

LS-LAMP COMMUNITY COLLEGE TRANSFERS AND OUTREACH

LS-LAMP, from its inception, believed that community colleges would play an important role as feeder institutions of minorities to 4-year and graduate STEM degree programs. As a result, Southern University at Shreveport, Louisiana (SUSLA) and Nunez Community College (Nunez) were included as partners in the alliance. University of New Orleans (UNO), Grambling State University (GSU), Southern University and LSU became the main beneficiaries of the transfers from these community colleges to their STEM baccalaureate and graduate degree programs. With the establishment of the Louisiana Community and Technical College System, numerous 2-year institutions appeared in locations close to LS-LAMP partners. This made it possible for other alliance partners such as McNeese State University and Southern University at New Orleans to initiate college visits, tutoring, summer research workshops and other outreach activities to attract more community college transfers.

FIGURE 4 | Community College Transfers from SUSLA and Nunez (2005 - 2014)



The two community colleges in LS-LAMP have several agreements in the latter category. Nunez Community College presently has college articulation agreements with the University of New Orleans, Nicholls State University, Dillard University, University of Southern Mississippi, and Southeastern Louisiana University. It has one, in practice, with Southern University New Orleans. The two-year campus of Southern U. Shreveport has established agreements with SU Baton Rouge, Grambling, LSU Baton Rouge, LSU Shreveport, and SU New Orleans. An articulation agreement between Southern University-Baton Rouge and the Baton Rouge Community College (BRCC) enables BRCC graduates to join SUBR directly as juniors.

THE LS-LAMP RIPPLE EFFECT

During the 20 years of its existence on partner campuses, the impact of LS-LAMP has permeated all corners of institutional operation. Many of the LS-LAMP activities have been expanded and new ones have been introduced. LS-LAMP has transformed

the culture of the partner campuses through its emphasis on undergraduate research and vigorous pursuit of external funding.

RESEARCH ACTIVITIES CATALYZED BY LS-LAMP

From its inception, LS-LAMP has made undergraduate research a major tool to achieve its goals of increasing the number and quality of minorities in STEM and supporting them in the pursuit of STEM graduate degrees. As a part of its activities to increase external funding at the campus level, LS-LAMP has provided information on new funding opportunities and conducted grant-writing workshops that have enabled faculty and students from all disciplines to increase the number and quality of grants submitted to federal and state agencies. Research grants have enabled faculty members to provide funded research opportunities to undergraduate students and to support student travel to state and national conferences to present their research findings.



LS-LAMP INSTITUTIONALIZATION

LS-LAMP institutions continue the process of institutionalizing, making permanent the LS-LAMP systemic mentoring activities. This enables them to improve and to expand LS-LAMP activities and to ensure LS-LAMP sustainability beyond NSF funding. A listing of these efforts is given below.

- All partner campuses have adopted, adapted, and implemented the Ten Strand Systemic Mentoring Model of LS-LAMP. This action has been transformative on most campuses and its broader impacts reached more than the minority students.
- Southern University and A&M College in Baton Rouge (SUBR) has taken the lead on this front. Student Advisement/Mentoring is an explicit criterion for tenure and promotion for which 3/5th of the total points allowed must be earned for an application to succeed, irrespective of marks in the other categories. Since 1997, the administration has provided 25% release time for one Departmental Mentoring Coordinator in each of the 10 STEM departments and units. The mentoring coordinators work with the chairs to ensure that the departments have organized mentoring activities that address recruitment, advisement, tutoring, research participation, retention, graduation rates, and graduate studies of STEM majors.
- The mathematics department at Southern University-New Orleans has established a fully staffed Math Laboratory operated by student tutors and LS-LAMP scholars.
- UNO LS-LAMP has established a strong relationship with the UNO Learning Center. LS-LAMP scholars tutor students that come for assistance. In addition, LS-LAMP is organizing tutoring sessions in individual departments for discipline specific courses.
- Prior to LS-LAMP, there were no systemic programs that had a direct focus on minority STEM students at Tulane University. Because of LS-LAMP, Tulane has initiated a Systemic Planning Committee that has developed a plan to increase minority STEM graduation rates. In 2011, Tulane established the Center for Engaged Learning and Teaching (CELT) that is presently housing Tulane LS-LAMP. Through the Center, Tulane has implemented a team approach to tutoring. The teams include faculty members from Tulane, Dillard, and Southern University in New Orleans. CELT is partly focused on increasing access and success for minority STEM scholars.
- Dillard University has made undergraduate research a formal requirement for the Bachelor degree, holds an annual student research conference, and established a faculty development and instructional innovation and support center.
- Grambling institutionalized tutorial and technical skills development activities adopted into program services offered by the Office of Retention. This office coordinates academic advisement activities.
- LSU, through the Office of Strategic Initiatives led by Dr. Isiah Warner, has vastly expanded the support infrastructure for students, in general, and for minority STEM students, in particular. It secured funding from several NSF and non-NSF sources that include Howard Hughes Foundation, Halliburton, and others.

TEACHER PREPARATION

LS-LAMP has conducted two major teacher preparation programs -- Teaching Scholars and MainSTey. NSF funded the Teaching Scholars programs in late 1996 for one year. LS-LAMP Teaching Scholars (TS) was a collaboration among three systemic mathematics and science reform projects jointly sponsored by the National Science Foundation and the Louisiana Board of Regents [Louisiana Collaborative for Excellence in the Preparation of Teachers (LaCEPT), the Louisiana Systemic Initiatives Program (LaSIP) and the Louisiana Alliance for Minority Participation (LS-LAMP)]. The Teaching Scholars program is based on the campuses of Grambling State University, Southern University-New Orleans, and Southern University-Baton Rouge. The program goals were:

- to increase the number of well-qualified, minority mathematics and science teachers in the state;
- to train additional teacher-leaders in standards-based mathematics or science education reform; and
- to increase the number of education program graduates receiving teaching certification.

Students were actively involved in the observation and practice of the teaching processes in classrooms of LaSIP-trained teachers in a school-based situation in order to receive active exposure to classroom mathematics or science teaching that models successful reform practices. LS-LAMP Teaching Scholars participated in the following activities during the academic year and the summer:

- Worked with a campus faculty mentor in LaCEPT sponsored, reform-based teaching or in the development of curricula and standards-based lessons that fit the curriculum framework;
- Developed leadership by delivering presentations at professional meetings or conferences that acquainted the Scholars with issues, principles, and successful techniques associated with standards-based teaching of mathematics and/or science; and
- Organized multimedia presentations and hands-on workshops for teachers and scholars to introduce new concepts and further enhance teaching skills in the following: reform teaching, inquiry, hands-on interactive approach; critical thinking and reasoning, self-discovery; national teacher examination preparation, and utilization of technology in the classroom.

MainSTey was a Mathematics and Science-Technology Based Education/Industry Partnership between Texas Instruments Inc., the Mathematical Association of America, Louisiana Board of Regents and Southern University in 1998-1999. As a partner, Texas Instruments provided the equipment that was utilized by the program participants. Each year, teams of 2-3 faculty participants from AMP institutions, participated in four different training activities which provided curriculum reform training to AMP faculty members who teach mathematics and science courses required of prospective mathematics and science education teachers. Every year, the cohort was responsible for producing a set of workbook activities for publication. Results to date:

- Cohort 1 (1996/97) - 23 faculty participants from 9 institutions received training, which means that annually approximately 5,500 students will receive the benefit of their training in the classroom.
- Cohort 2 (1997/98) - 26 faculty participants from 11 institutions received training through the MainSTey project. With this group, approximately 6,000 students will receive the benefit of their training.
- Cohort 3 (1997/98) - 30 faculty participants from 12 institutions are currently receiving training through the project. Approximately 6,500 students will receive the benefit of their training.

Seventy-nine faculty members from 32 institutions participated in MainSTey. More than 18,000 students would benefit from the MainSTey training received by the faculty.

A professional quality workbook of calculator activities was completed and published in 2002.

LS-LAMP IMPACTS ON THE TEACHING, MENTORING, AND LEARNING (TML) KNOWLEDGE BASE

Profound impacts of LS-LAMP that are far-reaching in space and time consist of its significant contributions to the teaching, mentoring, and learning (TML) knowledge base through publications. Indeed, from 1996 to present, we have made sixty (60) publications dealing with TML. Our annual reports contain most of these publications.

LS-LAMP and its sister program at SUBR, the Timbuktu Academy, have placed systemic mentoring on a rigorous, scientific basis. The most stable law of cognitive science, the power law of human performance, was utilized to demystify totally the process of knowledge and skills acquisition as well as that of developing research proficiency and productivity in any field. We cannot overemphasize this point, given the commonly held belief of many students, teachers, and parents in a deterministic relation between innate abilities and intellectual performance (in studies and research) – particularly among minority groups and others with a low socioeconomic status. The established relation between perceptions/emotions and motivations points to a highly

inhibitive nature of this belief. It is also profoundly self-defeating for parents and students as well as teachers. We think that a summary of our work in this area could be greatly helpful to LS-AMP and other programs with similar objectives. The second publication below explains the power law of human performance.

Specific illustrations of the intellectual merit of some of our publications are provided below. The two publications below, along with others dealing with the Ten-Strand Systemic Mentoring Model of LS-LAMP and the Timbuktu Academy, have been validated by the contents of national publications including the 2005 Urban Institute Report on the Evaluation of LSAMP, nationwide, and the National Academies' 2011 publication entitled "Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads." [National Academies of Science, 2011]

"Basic and Advanced Research Training for the New Millennium: the Model of the Timbuktu Academy." D. Bagayoko, R. Bobba, E. L. Kelley, and S. Hasan. *Journal of Materials Education*, Vol. 24 (1-3), Pages 177-184, 2002.

"The Philosophical Foundations of Systemic Mentoring at the Timbuktu Academy." D. Bagayoko. *Science Next Wave*, American Association for the Advancement of Science (AAAS). An online publication available at <http://nextwave.sciencemag.org/>, 2002.

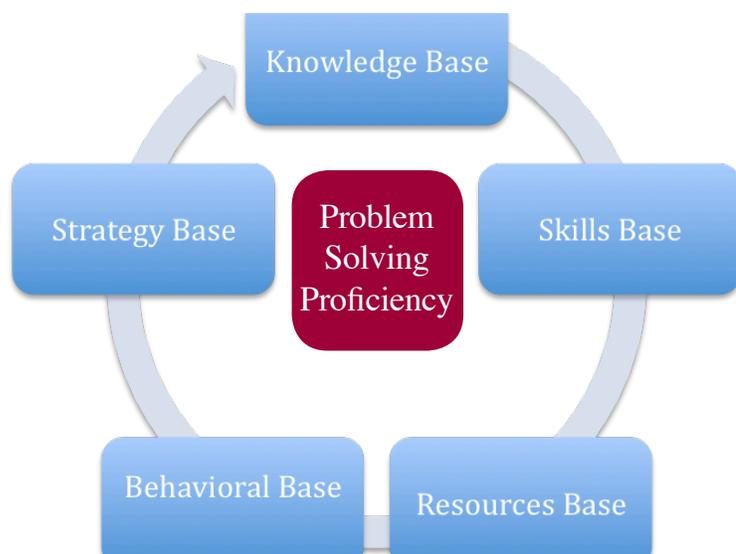
Specifically, the Urban Institute Report identified academic integration, social integration, financial support, and professional integration as summative constructs that portend not only student retention, but also progression, on-time graduation, and the increased likelihood of graduate school attendance. The publications above, and other contributions of ours cited therein, made several years before the Urban Institute Report appeared, established this statement relative to these constructs in the report.

The National Academies' publication noted above provided a list of best-practices that support the academic and research success of college students [See Page 10 for desired or effective Program Characteristics]. In particular, every one of these characteristics is explicitly included in our systemic mentoring model. They are summer programs (for middle and high school students), research experiences, professional development activities, academic support and social integration, and mentoring. In fact, for minority students, the Ten-Strand Systemic Mentoring model is more coherent and comprehensive than the listing in the Academies' Report. Our review of pre-college and college level standardized test scores showed that minority and low socioeconomic status students need explicit assistance with communication skills enhancement. Without this enhancement, the doors of many colleges and graduate schools will remain closed for them - due to very low verbal scores on these tests (standardized college and graduate admission tests). Under mentoring, the Academies' publication rightfully specifies providing undergraduate or graduate students with "information, advice, and guidance and support generally at critical decision points." These features are explicitly addressed in strands 1 (financial support), 3 (scientific advisement), and 10 (guidance to graduate school or to the job market).

Our 2000 refereed publication of a "Problem Solving Paradigm (PSP)" [College Teaching, Winter 2000, Vol. 48, No.1, Pages 24-

27, 2000 - by Bagayoko, Kelley and Hasan] was totally confirmed or validated by the content of the 2001 publication of the National Academies of Science entitled "Adding It Up: Helping Children Learn Mathematics." Specifically, in 2000, we identified five (5) categories that are woven together to beget problem solving proficiency or expertise. They are declarative knowledge, procedural knowledge, behavioral temperament, strategy & experience, and resources. "Adding It Up," in 2001, identified conceptual understanding, procedural fluency, strategic competence, productive disposition, and adoptive reasoning as the five strands for mathematical proficiency. Except for adaptive reasoning, there is a one to one correspondence between these strands and the categories in our problem solving paradigm. As for adaptive reasoning, it is embedded into declarative knowledge, procedural knowledge, strategy and experience, and behavioral temperament for our problem solving paradigm

THE PROBLEM SOLVING PARADIGM



that does have the critically important category of “resources” that is missing in the “Adding it Up.” The importance of resources is mildly conveyed by that of learning materials, literature for research, equipment, etc. The paradigm applies to non academic and non research problems for some of which resources can be deterministic when other factors are comparable!

Even though we do not discuss it here in detail, we should note that our contribution to research on misconceptions in learning is expected to impact the field significantly. Indeed, before our work, studies on misconceptions could not distinguish between a lack of knowledge and a wrong concept or a misunderstanding (misconceptions). The introduction of the Certainty of Response Index (CRI) constitutes a straightforward method for distinguishing between a lack of knowledge and a misconception. Further, the ease with which this method can be implemented in the classroom adds to its potential broader impacts. [“Misconceptions and the Certainty of Response Index (CRI),” S. Hasan, D. Bagayoko, and E Kelley, Phys. Educ. 34(5) September 1999.]

We have made over 500 presentations on the teaching, mentoring, and learning, with emphasis on the law of human performance and the Ten-Strand Systemic Mentoring model.

THE LS-LAMP 10-STRAND SYSTEMIC MENTORING MODEL

Systemic mentoring entails a weaving of the following “overlapping” strands. [The implementation of this model earned the Timbuktu Academy the 2002 US Presidential Award for Excellence in STEM mentoring.]

1. **Financial support** is provided to the scholars from a variety of sources – guidance, monitoring, and other components of systemic mentoring that guarantee the use of the resulting “time dividend” for studies, research, and related enrichment activities on a full time basis. The diversified funding base for the scholars include tuition scholarships (TOPS in Louisiana), the Federal Student Financial Aid, limited support from LS-LAMP, Louisiana Alliance for Simulation-Guided Materials Applications (LA-SIGMA), and other scholarship and fellowship sources, including unit and institutional funds.
2. **Communication skills enhancement** - A host of listening, speaking, reading, writing and related activities are aimed at developing the mastery of the applicable language (English), a vehicle of thought. This activity entails vigorous exposure to technical communication as provided for in “Writing for Success” (1998, McGraw-Hill Companies, pp. 135-176 and pp. 212-215), beyond regular English course work.
3. **Comprehensive, Scientific Advisement** - The proper sequencing of courses is treated with the utmost care. Indeed, the internal rigidity (or taxonomic structure) of science, technology, engineering, mathematics (STEM) disciplines requires this approach. Empowering the learner is a central aim of mentoring. This empowerment includes grasping the power law of performance and its extension, the integrated law of human performance (ILP); and knowing a few time-tested facts and practices (first-time memory retention curve, the value of effective study groups, a problem solving paradigm, the difference between lacking a background material and not being “smart.”)
4. **Tutoring** - Tutoring by faculty members and particularly by peers will continue to be available to the students or scholars who need it. (In fact, regular tutoring areas are often taken over by self-organized study groups!) Tutoring is for excellence, not for remediation; it is to address holes in a background and to reinforce known essentials; the need for it is not a sign of any lack of intrinsic smartness, so says the power law of human performance, but rather a wise recognition of the internal rigidity of STEM fields. Incidentally, tutoring by advanced scholars also promotes their communication skills and their sense of self-worth while they review materials (so says the ILP)!
5. **Generic research activities** - Rigorous literature searches are conducted by the scholars on several subjects. They master sophisticated search algorithms, electronic searches, and related iterations. The scientific literature is an unlimited source of research questions! Refereed literature is the standard for STEM disciplines. Discussions of the fine structures of the scientific method, critical thinking, and of creative thinking are part of this discourse.
6. **Specific research project execution by the scholars in our mentoring programs** - Faculty members and researchers at federal and industrial laboratories serve as research supervisors and mentors during the summer. According to the integrated law of human performance, research experiences should prepare for graduate studies and for productive research careers. Seeking summer research opportunities on-line, at conferences, and through visits to various laboratories and agencies is one requirement for a mentoring program. Assisting scholars to apply vigorously and professionally for these opportunities and maintaining adequate files on each scholar, partly for the purpose of writing substantial (as opposed to general and vague) recommendations, are some tasks for mentors to accomplish.
7. **Development of a professional culture** - Every scholar is exposed to discussions that explore the dimensions of ethics

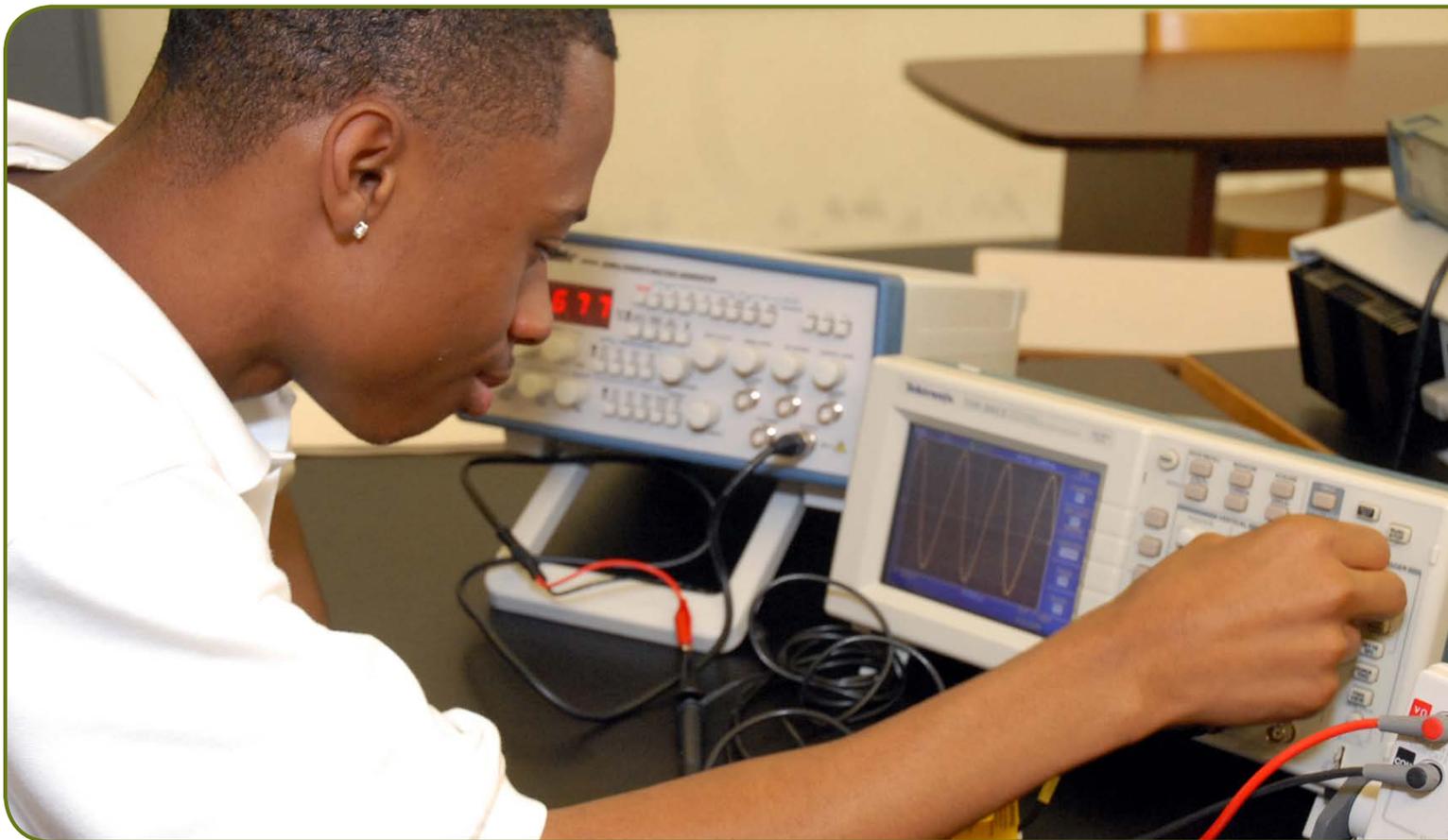
in science. Immersion in a professional culture demands regular reading of technical journals and appropriate magazines of professional societies, conference attendance, and collaborations with others. Current awareness needs no explanation in an era of information explosion. Professional practices and standards are set and seen in publications, regular (weekly) seminars, and at conferences. As for the need for and value of collaboration, we simply assert that not one individual has built or operated a nuclear submarine, an aircraft carrier, or a space shuttle alone!

8. **Development of Computer and Technological Skills** - The mastery of productivity tools, including word-processing, spreadsheets, database, graphics, other applications, and scientific programming (C++, FORTRAN, etc.) are needed. Electronic communication and productive surfing of the web are needed by the middle of the first semester. Advanced exposure has to include a programming language. (The need for these activities stems from practices in the environments to which the students are destined, i.e., graduate schools and the global, competitive market.)

9. **Monitoring** - Facilitated by the mentoring portfolios of scholars. Without this portfolio, a mentoring cannot be comprehensive or systemic as we now understand it. With monitoring, throughout the semester, potential problems are avoided before they become permanent F's. Preventive measures include concentrated efforts, extra-tutoring, and the last resort, dropping a course. The former two steps are best when they are taken as early as possible. The latter step is not an available option past a certain date after mid-term! The monitoring of research participation and performance is critical for another reason: the development or reinforcement of non-cognitive skills that undergird success (self-discipline, hard work, assiduity, working well with others, etc.). Monitoring and evaluation are part of a professional environment, without them, who will know what a beautiful job a scholar has done!

10. **Guidance to Graduate School** - It begins in the freshman year (or earlier) and includes research experiences, conference attendance, GRE preparation starting the freshman year, and opportunities for financial support for graduate studies! Placement in graduate programs follows steps similar to those for summer placement. The number and the extent of the opportunities depend on the cumulative grade point average for the BS degree, the courses taken, research experiences and results, and the GRE score. In addition, graduate preparation will include an understanding of the non-academic factors that are critical to success in graduate school (study habits, self-discipline, hard work, etc.). Emphasis will be placed on the establishment of a seamless transition to graduate schools.

The LS-LAMP Strategic Implementation Plan (SIP) embodies every one of the 10 systemic mentoring strands described above.



LS-LAMP STRATEGIC IMPLEMENTATION PLAN

The LS-LAMP Strategic Implementation Plan (SIP) was developed in 2000. It was based on our experiences in Phase I. It provides a clear, comprehensive and detailed roadmap for the achievement of the goals of LS-LAMP. Its sub-objectives and action steps address individually recruitment, systemic mentoring, retention, graduate school attendance, enhancement of institutional infrastructure, curriculum reform, institutionalization of LS-LAMP and acquisition of external funding for the continuation of LS-LAMP beyond NSF support. Achievement of the above objectives is a fail-safe means of attaining the LS-LAMP goals of increasing minority participation in STEM disciplines and success in graduate school. In addition to the annual budget, each LS-LAMP campus is required to submit an annual strategic implementation plan that provides specific details of the activities that will be conducted in order to achieve the LS-LAMP goals for the given year.

Subobjectives 1.5-1.7 of the LS-LAMP Strategic Implementation Plan (SIP) are below. The complete LS-LAMP SIP is available on the web at www.lslamp.org.

Subobjective	Action Steps	Owners
1.5 To introduce students to research tools and methods	1.5.1 Introduce students to research faculty	Campuses
	1.5.2 Make research involvement part of campus programs	Campuses
	1.5.3 Have students write up and publish research findings at student conferences	Campuses
	1.5.4 Require students to write summaries of research seminars they attend	Campuses
	1.5.5 Disseminate information on research activities	LS-LAMP Campus Staff
1.6 To involve LS-LAMP students in hands on research	1.6.1 Mandate and secure student participation in research (NSF requirement)	Campuses
	1.6.2 Place students in summer and academic year internships	Campuses
1.7 To strengthen students' professional skills	1.7.1 Encourage membership and participation in STEM discipline-specific organizations	Campuses
	1.7.2 Involve students in professional conferences/meetings	Campuses
	1.7.3 Have students make research presentations (local/state/regional/national)	Campuses
	1.7.4 Implement Shadow Day opportunities	Campuses
	1.7.5 Implement alumni mentoring	Campuses

ECONOMIC IMPACT OF LS-LAMP

Dimensions of the Economic Impacts of LS-LAMP

The economic impact of the Louis Stokes Louisiana Alliance for Minority Participation (LS-LAMP) has dimensions that do not fit into classic definitions.

Impact on Human Capital Development

One key reason for the above statement consists of the previous and continuing achievements of LS-LAMP in the production of minority science, technology, engineering, and mathematics (STEM) BS degree holders, on the one hand, and the pursuit of graduate STEM degrees, with emphasis on the Ph.D., by a significant percentage of these alumni. The contributions of the highly trained, technical workforce, for decades to come, constitute a singularly important economic impact.

The increasing proportion of minorities in the US population underscores the fact that expanding their participation in the STEM enterprise of this country is not only vital for economic growth and competitiveness, but also for national security.

Impact on Knowledge Capital

For the last 20 years, LS-LAMP has been contributing significantly to the body of knowledge in selected STEM fields and in teaching, mentoring, and learning (TML). In particular, the Ten-Strand Systemic Mentoring model of LS-LAMP and the Timbuktu Academy has been validated, as explained elsewhere in this report, by the content of the very recent publication of the National Academy of Science (NAS) on Expanding Minority Participation in STEM (NAS, 2011). Similarly, the content of the 2001 report of the NAS entitled "Adding it up: Helping Children Learn Mathematics" validated our 2000 publication of a Problem Solving Paradigm. Our work on misconceptions in teaching and learning introduced the Certainty of Response Index in misconceptions studies. In doing so, it provided, for the first time, a clear means for distinguishing actual misconception from a lack of concept or of knowledge.

For 50 years (1964-2014), the condensed matter theory community seems to have missed some essential features of density functional theory (DFT). **We have recently resolved this 50 year old band gap problem related to density functional theory (DFT).** This resolution has significant implications for condensed matter theory with direct applications in electronic industry, nano-science and technology, and particularly the Materials Genome Initiative (MGI).

We perform fundamental research in condensed matter theory in search of predictive capability applications of atoms, molecules, nanostructures, and semiconductors. Our ab-initio, self-consistent calculations of electronic and related properties of materials, utilizing the Bagayoko, Zhao, Williams (BZW) Method, as enhanced by Ekuma and Franklin (BZW-EF), have ushered in an era of truly predictive calculations whose results are confirmed by experiments. Without the highly accurate and predictive capabilities, made by the correct understanding and application of DFT, one cannot realize the dream of the Materials Genome Initiative. The reader is referred to Dr. Diola Bagayoko's publication in AIP Advances entitled "Understanding Density Functional Theory (DFT) and Completing it in Practice" [AIP Advances 4, 127104 (2014). DOI:10.1063/1.4903408 [http://dx.doi.org/10.1063/1.4903408] in the Journal of the American Institute of Physics (AIP). This manuscript rigorously explains that the derivation of DFT leads to requirements that must be met by calculations if their results are to have a physical content ascribed to DFT. It is our understanding that in this new direction, limitations due to calculations not meeting the validity conditions of DFT will not be ascribed to DFT.

One could easily neglect the very long term contributions of LS-LAMP alumni who have or will get research degrees to the STEM knowledge base. We submit that some of these alumni have already made names for themselves in STEM research and related publications.

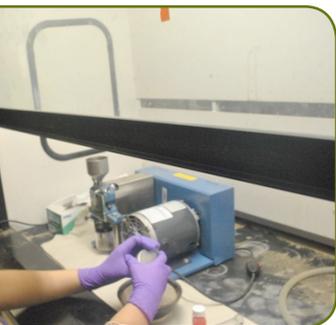
Impact on the Diversification of the Funding Base and Leveraging

NSF funding has not only been utilized to support campus activities but also leveraged to bring in more external funding to expand and to develop new LS-LAMP activities. A significant effectiveness measure is the number of new grants and resources that are catalyzed by and result from LS-LAMP. An estimate of grants confirmed that during the 20 years of



LS-LAMP operation, the campuses received more than \$58.4 million of external funding directly catalyzed by LS-LAMP. The grants included in this total are primarily major awards such as HBCU-UP (multiple awards), Science Talent Expansion Project (STEP), Bridge to the Doctorate (multiple awards), Research Initiatives for Minority Institutions (RIMI), and others. The Louisiana Board of Regents has continued to fund the alliance at the level of \$500,000 per year since the inception of LS-LAMP. **The NSF investment of \$15 million over 20 years has catalyzed external funding of \$58.4 million. LS-LAMP has catalyzed \$3.90 of external funding for every dollar of NSF funds invested in the alliance.**

COMMUNITY COLLEGE INTERACTIONS & PARTNERSHIPS



From its inception, LS-LAMP has understood the importance of community colleges and their vital role as feeder institutions for four-year colleges and university STEM programs. LS-LAMP partner institutions have worked diligently to establish viable programs to seamlessly facilitate the transfer from community colleges to four-year college/university STEM programs.

University of Louisiana at Lafayette | The Enrollment Management Division at the University of Louisiana at Lafayette has initiated a collaborative partnership with South Louisiana Community College (SLCC). The goal of this partnership will allow the students from SLCC to utilize university services and resources. Although in the formative stages of the partnership, both institutions understand the long-term benefits that the partnership will yield in terms of successfully transferring associate degreed students to ULL. Students who be served through this partnership will have access to ULL's tutorial services and ULL's LS-LAMP resources.



University of New Orleans | Summer 2010, UNO offered a week-long problem solving activity for community college students needing enrichment in algebra, trigonometry and algebra-based physics. UNO also hosted eight community college students (five from Nunez Community College and three from Delgado Community College) to participate in a short pre-college experience. The majority of the participants were general science majors at Nunez and Delgado. To date, three of the five program participants have transferred to four-year colleges. Two students transferred to UNO and one transferred to Nichols State.



Southern University and A&M College | SUBR has participated in a number of community college outreach activities including Baton Rouge Community College (BRCC) Recruitment Day held April 2, 2008 and March 18, 2009. During the fair, 114 students showed interest in applying to SUBR, the LS-LAMP Program and the Timbuktu Academy. SUBR LS-LAMP also participated in Southern University's Fall 2010 and Spring 2011 "College Night on the Bluff" events, which allowed high school juniors, seniors and their parents to visit the campus and receive information on college entrance requirements, financial aid and courses of study. The program also distributed LS-LAMP program information during Baton Rouge Community College's Fourth Annual Science, Technology, Engineering and Mathematics (STEM) Career Expo on Wednesday, February 9, 2011.

LS-LAMP Program Director Diola Bagayoko hosted a special recruitment session for students and school officials from the Hillsborough Community College Reach Out Program in Tampa, Florida on Tuesday, April 27, 2011. The session was held in the High Tech Classroom of the Pinchback Engineering Building on the campus of Southern University.



Louisiana State University | A component of LSU's HHMI Professors Program includes a partnership with Baton Rouge Community College (BRCC). Within this component, LSU has developed a transition model to increase students' success upon their transfer to four-year universities. A rigorous selection process was conducted with the aid of several faculty members from BRCC as well as staff from the LSU Office of Strategic Initiatives. During the Spring of 2011, LSU completed a successful selection of five new students for entry into the LSU / HHMI Professors Program at Baton Rouge Community College and facilitated the placement of these bright, young scientists into laboratory settings for LSU's Summer Research Experience. The selected students received tuition assistance and other support while participating in the summer program.

ANNUAL RESEARCH CONFERENCES & PRESENTATIONS



Five SUNO STEM students: Janica Gordon, Keith Perkins, Janice Carter, Jacquelle Tircuit, and LaQuinia Banks, attended the 2014 ERN conference in our nation's capital Washington, DC February 20-23, 2014



Scholars of the Louis Stokes Louisiana Alliance for Minority Participation (LS-LAMP) and the Project Director, Dr. Diola Bagayoko, attended the first annual conference of Louis Stokes Midwest Center for Excellence (LSMCE), October 20-22, 2013.



Fifteen SUNO STEM students: Janice Carter, Michael Okoronkwo, Samuel Okpechi, Keith Perkins, Favour Tangban, Adolph Vicknair, Sheldon Williams, Charisse Becnel, Trevor Gibbs, LaQuinia Banks, Noel Clark, Quintel Washington, Janica Gordon, Myeisha Keith and Goodnews Tangban attended the 71st National Institute of Science and Beta Kappa Chi Scientific Honor Society NIS/BKX Joint Annual meeting in Houston, TX. The students were accompanied by Dr. Joe Omojola, Dr. Murty Kambhampati, Dr. Rachid Belmasrou, Dr. Illya Tietzel and Ms. Phyllis Okwan. LaQuinia Banks, double major in math and biology secured first place for oral presentations in Mathematics/Computer Science/Physics & Engineering. Mathematics sophomore Myeisha Keith secured first place for poster presentations in Mathematics/Computer Science/Physics & Engineering and biology senior Samuel Okpechi won second place for the poster presentation in biology.

INTERNATIONAL RESEARCH

LS-LAMP partners continue to increase the number of minority scholars participating in research outside this country. The approach relies on the synergy and leveraging between LS-LAMP and existing and future international research opportunity programs and entities, including laboratories overseas. Through supplements to LS-LAMP and other projects, LSU has established mutually beneficial research collaborations with laboratories in Grenoble, France, and elsewhere. Graduate students and several undergraduate ones, including two (2) from SUBR conducted research in Grenoble.

In 2012, Southern University students, all majoring in a STEM (Science, Technology, Engineering and Mathematics) course of study, embarked on a four-week trip to Guiyang, China. The ten (10) SUBR STEM students spent three weeks in China participating in cultural activities and in sustainable science field experiences including an ecosystem study at Huangguoshu PuBu Waterfall and Tianxing Qiao Natural Park. The Southern students heading to China are: seniors Adrian Burkhalter, Krystal Finley and Donavon Walker; sophomores Clifton Blouin, Anjelica Pierson and Jeremy Williams; and freshmen Melvin Givens, Shannon Jones-Butts, Brianna Precciely and Nicholas Sargent-Johnson.



In 2013, seven (7) undergraduate and graduate SUBR STEM scholars participated in a 4 week course in a sustainability-based cultural and academic learning experience at Guizhou University (GZU) in Guiyang, China. This activity was funded by the NSF ACE grant to SUBR. For more pictures of the students cultural activities and research experiences, visit website <http://www.youtube.com/watch?v=f58EjSxkU-g&feature=youtu.be>

BRIDGE TO THE DOCTORATE

BD

LOUIS STOKES LOUISIANA ALLIANCE FOR MINORITY PARTICIPATION

The Louis Stokes Louisiana Alliance for Minority Participation (LS-LAMP) Bridge to the Doctorate (BD) is an activity of LSAMP. Louisiana State University (LSU) serves as the doctoral institution for the Bridge to Doctorate of LS-LAMP since 2005. The project is a direct and logical extension of LS-LAMP whose primary goal is to increase the participation of under-representative minorities in STEM disciplines and to ease the transition of these graduates into graduate school. The activity is an implementation and institutionalization of the 10-Strand Systemic Mentoring Model of LS-LAMP at the graduate level. As of Fall 2015, 89 graduate students have been supported through this activity.



As shown below, twenty-two (22) doctoral degrees have been conferred to participants of LS-LAMP BD. Of these, nine have held faculty appointments, with the remaining employed in various STEM research and educational positions. Another thirty-three (33) students are on the path to the PhD, while fifteen (15) have earned masters degrees.

LS-LAMP Scholar Name	LS-AMP Undergraduate Institution	Ph.D.	Graduation Date
Ursula White	Louisiana State University	Biological Sciences	August 2009
Wakeel Idewu*	University of Louisiana at Lafayette	Civil Engineering	May 2009
Raphyel Rosby*	Louisiana State University	Biological Sciences	May 2010
Latoya T. Paul*	Southern University and A&M College	Biological Sciences	May 2010
Adeyaba Abera	Virginia Polytechnic Inst. and State University	Electrical Engineering	December 2010
Monica Sylvain*	Howard University	Chemistry	December 2010
Kandace Thomas	Southern University and A&M College	Chemistry	December 2010
Stephanie. Daniels	Jackson State University	Chemistry	May 2001
Urban T. Wiggins *	Southern University and A&M College	Computer Science	Dec 2011
Leonard Moore Jr.*	Grambling State University	Chemistry	May 2012
Marsha Cole	Grambling State University	Chemistry	August 2012
Krystal Fontenot	Southern University and A&M College	Chemistry	August 2012
Cornelius Toole *	Jackson State University	Computer Science	August 2012
Luis Alvergue	McNeese University	Electrical Engineering	May 2013
Ashleigh Wright	Wofford College	Chemistry	May 2013
Marc Peterson	Southern University and A&M College	Chemistry	May 2013
David Murungi	Louisiana State University	Info. Sys. Decision Science	August 2013
Sherrisse Kelly Bryant	Florida A&M University	Chemistry	August 2013
Katrina Battle	Jackson State University	Chemistry	December 2003
Charisma Edwards*	Clark Atlanta University	Electrical Engineering	December 2013
Fareed Dawan	Louisiana State University	Mechanical Engineering	May 2014
Dalgis Mesa	Florida International University	Physics	May 2014

* BD Scholars currently or formerly in faculty positions



DILLARD UNIVERSITY | NEW ORLEANS, LA

Positively Impacting STEM Research in the 'BIG Easy'

Abdalla Darwish, Ph.D., Campus Coordinator

Dillard University (DU) LS-LAMP is the only recruitment program for all STEM departments in their Division of National Sciences. Resources from LS-LAMP are used to facilitate the implementation of instructional and academic support services for LS-LAMP students to increase the preparedness of these students for graduate studies. The STEM Learning Center exists because of LS-LAMP. Moreover, this has also resulted in increasing the number of Dillard graduates who go on to pursue STEM graduate degrees.

Dillard has established a Center for Teaching and Academic Excellence through the Mellon Foundation. This center will provide faculty with encouragement and support and will facilitate faculty release time. Abdalla Darwish, Ph.D., is a co-director of this initiative and it will ensure the systemic replication of the academic excellence fostered by LS-LAMP throughout the University. An improvement of Dillard's STEM infrastructure with major equipment acquisitions has continued under Darwish's leadership. Dillard's LS-LAMP program has been instrumental in the institutionalization of systemic mentoring for all entering freshmen.

Dillard has also experienced an increase in faculty grant writing. The importance of grant writing is now reflected in the DU faculty handbook. Dillard University has incorporated external funding awards into its formula for merit pay. Since the implementation of this measure, the number of DU faculty grant submissions has increased.



DILLARD UNIVERSITY | *Student Profiles*

NAME: ROSE-ANN BLENMAN-ABANGE, Ph.D.

ACADEMIC CREDENTIALS:

B.S., Physics, Dillard University

Ph.D., Biomedical Engineering, Mayo Clinic College of Medicine in Rochester, MN

Dr. Rose-Ann Blenman-Abange, the 2000 millennium valedictorian of Dillard University, blossomed in the sciences through the mentorship of Dr. Sylvanus Nwosu, Associate Professor of Physics. This certified Six Sigma Green belt received her Ph.D. in Biomedical Engineering, graduating Summa cum laude in 2006 from the Mayo Clinic College of Medicine in Rochester, MN.

Dr. Blenman-Abange is "a biomedical scientist with team leadership experience in the pharmaceutical imaging and biomarker development sector." She has presented numerous abstracts at scientific meetings dating back to 1997 with Dr. Nwosu to her most current presentation at the MRL Symposium in Whippany, NJ with other colleagues through her cancer research. She is the recipient of numerous awards and honors.

Dr. Blenman-Abange is the Project Manager, Oncology Biomarker and IVD Portfolio, PPM for MERCK & Co. in West Point, PA.



NAME: HASSAN MOORE, Ph.D.

ACADEMIC CREDENTIALS:

B.S., Physics, Dillard University, New Orleans, LA

Ph.D., Atmospheric Physics, Howard University

Dr. Hassan Moore is a 1993 Physics graduate of Dillard University. He received his Ph.D. in Atmospheric Physics from Howard University in 2006. An Assistant Professor and Director of Outreach at the University of Alabama at Birmingham, Dr. Moore has recently engaged high school students in robot designing through the upcoming Blazer BEST Robotics competitions in Birmingham, a hub for the national BEST (Boosting Engineering Science and Technology) Robotics program.

Dr. Moore states: "Their goal is to build a robot that can pick up three kinds of fake 'bugs', cross bumpy surfaces and corral them in just a few minutes. But the long-term goal of the program is to get them excited about engineering even as they learn the principles behind it."



NAME: TRIVIA FRAZIER, Ph.D.

ACADEMIC CREDENTIALS:

B.S., Physics, Dillard University

B.S. Biomedical Engineering, Tulane University

Ph.D., Biophysics, Tulane University

Dr. Trivia Frazier graduated Magna cum laude with a Bachelor's degree in Physics from Dillard University in 2007. Dr. Frazier was the first and only graduate of the 3-2 dual degree program in Physics and Engineering between Dillard and Tulane Universities. In 2008, Dr. Frazier completed an Honor's thesis and received her Bachelor's degree in Biomedical Engineering from Tulane University followed by a doctorate degree from Tulane University in 2012. Dr. Frazier completed a postdoctoral position that was funded by the National Institutes of Health in the Center for Stem Cell Research and Regenerative Medicine. Dr. Frazier's training includes mathematical modeling of biological growth using Math lab, and other methods in biophysics, including partial oxygen pressure modulation and confocal fluorescence microscopy to investigate and image cellular biomolecules, respectively. Dr. Frazier is excited to give back to her Alma Mater, and to work at an HBCU. Her hope is to encourage other African Americans to pursue doctorate degrees in Physics.



GRAMBLING STATE UNIVERSITY | GRAMBLING, LA

TAKING STEM EDUCATION TO THE NEXT LEVEL IN NORTH LOUISIANA

Danny Hubbard, Ph.D., Campus Coordinator

Grambling State University (GSU) continues to promote STEM education through (undergraduate) research training, mentoring, and other science enrichment activities. The LS-LAMP program at GSU expands on the commitment of STEM academic divisions by providing activities to increase student engagement in STEM learning; including preparation for graduate studies in science and science related career fields and research training. LS-LAMP students participate in summer research opportunities offered by industry and institutions of higher education throughout the country. Also, faculty have participated in summer training opportunities that include collaborative research projects with Colorado State University, the National Institutes of Health (Cancer Institute), the Louisiana Biomedical Research Network, the National Aeronautics and Space Administration, and the Department of Defense.

GRAMBLING STATE UNIVERSITY | *Student Profiles*



NAME: MARSHA COLE, Ph.D.

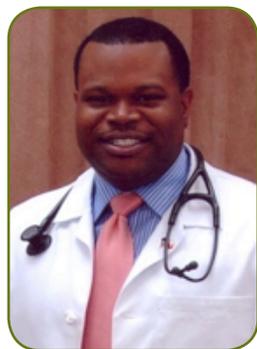
ACADEMIC CREDENTIALS:

B.S., Chemistry, Grambling State University

Ph.D., Louisiana State University

In August 2012 Marsha earned a Ph. D. in Chemistry (emphasis in Bio-analytical) from Louisiana State University Agricultural and Mechanical College in Baton Rouge, LA. Currently, Marsha is employed with the U.S. Department of Agriculture – Southern Regional Research Center located in New Orleans, LA. While an LS-LAMP scholar, she performed

research work at Grambling State University and participated in summer research opportunities at the University of Southern Mississippi (2004); Colgate-Palmolive Co. (2005); and Mary Kay (Cosmetics) Inc., (2006). Also, Marsha was a recipient of the Thurgood Marshall Scholarship, the LS LAMP Scholars Award, and the American Chemical Society (undergraduate) Scholars Award. In 2007, Marsha entered graduate school at LSU with financial support from the Bridge to the Doctorate Fellowship awarded by the Louis Stokes Louisiana Alliance for Minority Participation/ National Science Foundation.



NAME: DANIEL A. NWACHOKOR, M.D.

ACADEMIC CREDENTIALS:

B.S., Biological Sciences, Grambling State University

M.S., Public Health

M.D., University of Kansas School of Medicine

In May 2015, Daniel Nwachokor received the Doctor of Medicine (MD) from the University of Kansas School of Medicine. Currently, Daniel works in residency with the Memorial Family Medicine Residency Program (PGY-1) for Physicians at Sugar Creek (Sugar Land, TX). After completing undergraduate studies in Biology (2009) at GSU, Daniel continued to earn a Master of Science degree in Public Health, with a concentration in Social and

Behavioral Health, at the University of Kansas. Daniel's list of awards include the James G. Jones M. D. Scholarship sponsored by American Academy of Family Physicians Foundation, the John T. Stewart Scholarship for dual degree MD/MPH, and the Cedars-Sinai Medical Center's Washington Family Gifted Scholars Program in Neuroscience. As an undergraduate LS LAMP scholar, Daniel received the honor of highest ranking graduate in Biological Sciences at GSU in 2009.



NAME: BRIAN M. MOSBY, Ph.D.

ACADEMIC CREDENTIALS:

B.S., Chemistry, Grambling State University

Ph.D., Inorganic Chemistry, Texas A&M University

In May 2014, Brian received a Ph.D. in Inorganic Chemistry from Texas A&M University. Brian's research focused on the Novel Pathway to Multicultural Nanomaterials using surface modification of layered Zirconium phosphates. Currently, Brian has a postdoctoral appointment at the University of Illinois – Urbana Champaign (2014-2015). While completing the Bachelor of Science degree in Chemistry at Grambling

State University, Brian conducted thermal characterization studies of High Performance Polymers (supported by NASA). Also, Brian was an LS-LAMP scholar and an awardee of the American Chemical Society Scholars program. He completed three undergraduate summer internship appointments at Dartmouth College (2008), North Carolina State University (2007), and Tulane University (2006).



LOUISIANA STATE UNIVERSITY | Baton Rouge, LA

Strengthening Minority Access to STEM Education from Bachelor's to Ph.D.

Gloria Thomas, Ph.D., Campus Coordinator

The impact of LS-LAMP at Louisiana State University (LSU) has resulted in a significant number of students pursuing B.S. STEM degrees. Over the past 20 years, LS-LAMP minority STEM B.S. degrees have steadily increased and is second only to Southern University-Baton Rouge in the production of minority STEM baccalaureates. LS-LAMP at LSU has made outstanding achievements particularly in the area of external funding. LSU used its status as an LS-LAMP partner institution to obtain an NSF Bridge to the Doctorate (BD) Program.

LOUISIANA STATE UNIVERSITY | *Student Profiles*



NAME: CRAIG RICHARD

ACADEMIC CREDENTIALS:

Senior Biological Engineering major, Louisiana State University

Most recently, Craig Richard studied abroad at Alternative Energies and Atomic Energy Commission in Grenoble, France as a part of the GIANT International Internship Program. While there, he conducted research with the goal of enhancing the signal of surface plasmon resonance based DNA biochips using gold nano-objects and studied the interactions of oligonucleotides and their effect on signal profiles. He has also conducted research at the University of Illinois at Urbana-Champaign, Department of Bioengineering, and Cornell University Department of Plant Biology. Craig is an American Society of Agricultural and Biological Engineers Student of the Year, Black Scholars Award recipient, and has been awarded scholarships from the College of Engineering Alumni and the William H. & Barbara A. Brown Scholarship.



NAME: KRISTIAN BLACK

ACADEMIC CREDENTIALS:

B.S., Biological Sciences, Louisiana State University

Kristian Black is a first year medical student at the University of Michigan. While at LSU, Kristian conducted research under the mentorship of Dr. Daniel Hayes. His project focused on interactions between biological systems with nano particles and micro-infrastructures for drug delivery and tissue engineering. He also used his summers to conduct research. One such experience was at the University of Michigan in the Ginsburg lab as a Howard Hughes Medical Institute (HHMI) EXROP scholar. There, he focused on the development of a new Von Willebrand factor knockout mouse. As an undergraduate, Kristian won countless awards including the LSU Black Caucus Award, Mortar Board Top Ten Freshman Award, Daughters of the American Revolution Good Citizen Award, and membership in the Honors College and on the Chancellor's and Dean's Lists. He is now a University of Michigan Medical School Merit Scholar. Kristian believes his undergraduate research experience helped him bridge scientific discovery to the classroom and credits this as making him more competitive for medical schools.



NAME: FRANCIS ARINZE

ACADEMIC CREDENTIALS:

Senior Biology major, Louisiana State University

Currently, Frances Arinze is conducting research with Dr. Johnson's lab focusing on identifying pathogenic bacteria using multiplex PCR and other new generation sequencing techniques. She was recently a participant of the 2015 LSU LS-LAMP Summer REU and presented her research on Identifying Pathogenic Bacteria From Avian Cloacal and Fecal Samples Using Multiplex PCR at LSU's Summer Undergraduate Research Forum. She notes that participation in research has helped her to learn complex biological material more effectively and gives her hands-on experience to compliment her learning style. Francis stated that the program allowed her to meet and network with peers inside and outside of her field and provided great tips and info on personal/student developments.



McNEESE STATE UNIVERSITY | LAKE CHARLES, LA

Excellence in STEM Education with a Personal Touch

George Mead, Ph.D., Campus Coordinator

Several key science, technology, engineering, and mathematics (STEM) retention programs and activities at McNeese enjoy institutional status as a direct result of LS-LAMP. Systemic mentoring, tutoring, and evaluation are institutionalized within McNeese State University (MSU) to improve the academic quality of the undergraduate experience for all McNeese students. Institutionalization of programs at the University include (1) the Freshman Foundation course, University 101, required of all incoming freshmen; (2) the College of Science testing center; (3) the College of Science tutoring center; (4) a University writing center; and (5) University funded research with \$1,000 for each of the 27 different departments within the University. McNeese offers a summer bridge program which prepares incoming freshmen for entering STEM BS degree programs and plays an important role in introducing students to MSU. The McNeese Summer Bridge Program is a summer semester Academic Support program where participants earn seven hours of college credit (College Algebra, Pre-Calculus, College Trigonometry, and Computer Studies) and become acclimated to campus life and university services by living in campus housing.





NUNEZ COMMUNITY COLLEGE (Two-Year Institution) | CHALMETTE, LA

Opening Doors of Opportunity through Science, Technology, Engineering and Math

Kimberly Rutherford, Campus Coordinator

Minority STEM enrollment continues to increase at Nunez Community College. Nunez conducts once-a-month LS-LAMP Workshops for LS-LAMP students and affiliated students. Workshop presentations include those of invited scientists speaking to students about research and research opportunities, study skills, and the use of the EXCEL Center. The LS-LAMP program has great potential for serving as an entry point that matriculates into STEM BS degree programs. Nunez Community College presently has college articulation agreements with the University of New Orleans, Nicholls State University, Dillard University, University of Southern Mississippi, and Southeastern Louisiana University.

NUNEZ COMMUNITY COLLEGE | *Student Profiles*

NAME: CARL BURKE

ACADEMIC CLASSIFICATION:

Sophomore, Computer Science Major



The LS-LAMP program gave Carl Burke the opportunity and support he needed to complete a two-year computer science program at Nunez Community College and transfer to the Southern College of Art and Design in Atlanta, Georgia.

"LS-LAMP's financial support helped me to achieve my academic goals," says Burke.



NAME: SIERRA MCKEE

ACADEMIC CLASSIFICATION:

Associate of Science (Louisiana Transfer), Nunez Community College

The LS-LAMP program helped Sierra McKee take her academic experience to the next level. The LS-LAMP program at Nunez Community College afforded McKee an opportunity to conduct research at the University of New Orleans.

The purpose of her research project, "Evidence for Non-Conventional Intramolecular Hydrogen Bonds in the Molecular Structure of B-Thymine," was to discover how electrons move around in certain types of materials.

"I would not have received the opportunity to complete the summer research project without the help of LS-LAMP," says McKee. "The program also helped me to realize that there are more opportunities for transfer students."

The Nunez LS-LAMP program scheduled campus tours for LS-LAMP scholars aspiring to transfer to four-year colleges or universities. "During the tours, I realized that there were more transfer opportunities that better suited my academic and career goals," says McKee.



SOUTHERN UNIVERSITY AND A&M COLLEGE | BATON ROUGE, LA

Achieving Academic Excellence through Research and Systemic Mentoring

Diola Bagayoko, Ph.D., Campus Coordinator

SUBR LS-LAMP has continued to immerse its students in the **US Presidential Award Winning 10-Strand Systemic Mentoring Model** described elsewhere in this document. **From 2000 to 2015, thirty-eight (38) former SUBR-LS-LAMP Scholars received the Ph.D.** These students were all awarded STEM BS degrees from Southern University and A&M College. The excellent and comprehensive implementation of this model has been illustrated in the following areas. **From 2000-2015, a total of one thousand, one hundred seventy-two (1172) scholars have been immersed in a professional culture by attending at least 30 weekly seminars per academic year, which do not include additional meetings with visiting professors and undergraduate and graduate school recruitment sessions.** The weekly seminars primarily consist of (1) GRE preparation topics, (2) short-courses, (3) presentations by eminent guest speakers, (4) oral presentations by scholars, (5) guidance to graduate school, and (6) the dissemination of fellowship and research opportunities. During the seminars, Dr. Diola Bagayoko, LS-LAMP Project Director, gives short-courses on topics such as the “Power Law of Human Performance,” “Accuracy, Precision, Completeness, Coherence, and Clarity (APC³),” “Key Elements in Professional Conduct,” and “Ethics in Science.” **Additionally, in line with the implementation of the 10-Strand Systemic Mentoring Model, eight-hundred fifty-seven (857) scholars have engaged in peer tutoring and volunteerism efforts at the University and in their communities.**

From 2000 to 2015, four hundred eighty (480) scholars were selected to conduct summer research at laboratories around the country. The summer research sites include the University of South Alabama Mitchell Cancer Institute, Iowa State University, Louisiana State University, Morgan State University, Arkansas Center for Space and Planetary Sciences at the University of Arkansas, University of Chicago, California Institute of Technology, University of Kentucky, and Johns Hopkins University, just to name a few. Each summer, SUBR LS-LAMP has been awarded funds to send at least three (3) Faculty and Student Teams (FaST) to conduct research at the Department of Energy (DOE) Laboratories [Los Alamos National Laboratory, Brookhaven National Laboratory, and Fermi National Laboratory]. **As a result, one thousand, six hundred fifty-one (1651) scholars have attended conferences around the country from 2000 to 2015. Seven-hundred fifty-three (753) students gave oral or poster presentations.**

For the last eleven years, seven hundred seventy-two (772) scholars have been provided with financial support which allowed them to focus on their studies. Our comprehensive monitoring of current and former scholars includes the maintenance and updating of a mentoring portfolio. This portfolio is a pivotal factor in ensuring the comprehensiveness of our exemplary implementation of systemic mentoring. It is a needed tool for follow-up and for writing substantive letters of recommendation.

Dr. Ella L. Kelley served as campus coordinator (deceased): LS-LAMP Senior Alliance would like to commend Dr. Kelley for her admirable leadership, dedication, and commitment to SUBR LS-LAMP over the years (2000-2015). She will be truly missed.

SOUTHERN UNIVERSITY AND A&M COLLEGE | *Student Profiles*



NAME: BRANT CASSIMERE, Ph.D.

ACADEMIC CREDENTIALS:

B.S., Electrical Engineering, Southern University and A&M College

M.S., Electrical Engineering, Purdue University

Ph.D., Computer Engineering, Purdue University

Southern University and Purdue University graduate Brant Cassimere is supporting the Alaska Liquefied Natural Gas (LNG) project as the Integrated Project Design Basis and Reliability, Availability, & Maintainability Lead. Prior to assuming his current role, Brant worked as an ExxonMobil Global Services Company Electrical and Instrumentation Category Specialist, ExxonMobil Development Company (EMDC) facilities Electrical Engineer, Upstream Research Company (URC) Research Engineer, and as the EMDC Facilities Engineering Recruiting Coordinator. Brant has been employed with ExxonMobil for 7 years. Brant is a senior member of IEEE and Chair of the IEEE/IAS-PCIC Young Engineers Development Subcommittee (YEDS). He is also happily married to Erica Kinney Cassimere and has a 7 year old daughter (Morgan Brianna Cassimere).

NAME: MONIKA WRIGHT, J.D.

ACADEMIC CREDENTIALS:

B.S., Physics, Southern University and A&M College

J.D., Southern University Law Center



Monika Wright is a native of Maringouin, Louisiana. She received her Bachelor of Science degree in Physics from Southern University and A&M College in the fall of 2002. Upon receiving her degree, she served as the Graduate and Research Recruiter for LS-LAMP for six (6) years. In the spring of 2007, Ms. Wright earned her Juris Doctor (J.D.) from the Southern University Law Center.

Monika is currently serving as a Staff Attorney at the Division of Administrative Law in Baton Rouge, Louisiana, where she assists administrative law judges with state ethics violation and special education cases. She has received extensive training by the National Judicial College and the Federal Mediation and Conciliation Service.

"My experience as a product of the Timbuktu Academy and LS-LAMP is wrapped up in the efforts of one extraordinary man, Dr. Diola Bagayoko, who had the unswerving resoluteness (and vision) to prepare me for a future where excellence was the normal and mediocrity had no place," said Wright.



NAME: FRANK ALEXANDER, Ph.D.

ACADEMIC CREDENTIALS:

B.S., Electrical Engineering, Southern University and A&M College

Ph.D., Electrical Engineering, University of South Florida

Frank Alexander completed his Bachelor of Science in electrical engineering in spring 2009 and was accepted into the University of South Florida to pursue a Ph.D. degree in electrical engineering. As an undergraduate, he served as a Senator for the Southern University Chapter of the National Society of Black Engineers and the IEEE Southern University Chapter President. In addition to his student leadership positions, Dr. Alexander was an MRI Researcher at Time-Medical, in Shanghai, China, and an Electrical Engineering Intern at Delphi

Electronics & Safety. He has also participated in summer internships at Georgia Tech's Summer Undergraduate Research Experience and University of Kentucky's REU program. Dr. Alexander received the Master of Science degree in electrical engineering (August 2011) and the Ph.D. in electrical engineering (August 2014) from the University of South Florida.

SOUTHERN UNIVERSITY AND A&M COLLEGE

| *Student Profiles* continued

NAME: KINESHA HARRIS, Ph.D.

ACADEMIC CREDENTIALS:

B.S., Chemistry, Southern University and A&M College

Ph.D., Bio-Inorganic Chemistry, University of Iowa



Kinesha Harris has returned to Southern University to give STEM students the same quality education and mentoring she received as an undergraduate LS-LAMP scholar at Southern University-Baton Rouge. Today, Harris is an Assistant Professor in the Department of Chemistry at SUBR. She earned her Bachelor of Science degree with honors in Chemistry from Southern University in 1999 and her Ph.D. in Bio-Inorganic Chemistry from the University of Iowa in 2006. During her undergraduate matriculation at SUBR, Dr. Harris was a recipient of the Science and Engineering Alliance (SEA) Undergraduate Award and the American Chemical Society Organic Chemistry Award. Harris currently teaches General Chemistry and Biochemistry at SUBR and conducts research in the areas of natural products and protein chemistry. She is a member of a number of professional scientific organizations including the American Chemical Society, National Association of Black Chemists and Chemical Engineers (NOBCCHE), and AAAS. She is also a lifetime member of the Girl Scouts of the USA and currently serves as a Girl Scout Leader.



NAME: GLORIA THOMAS, Ph.D.

ACADEMIC CREDENTIALS:

B.S., Chemistry, Southern University and A&M College

Ph.D., Analytical Chemistry, Louisiana State University

Gloria Thomas has taken her LS-LAMP experience to the university classroom. Currently, the Executive Director of Research, Education and Mentoring at LSU and has spent the last decade as a successful academician. Thomas was a National Research Council Postdoctoral Fellow at the National Institute of Standards and Technology (NIST) and later joined the faculty of Mississippi State University. Thomas is also the principal investigator for the National Science Foundation Chemistry Research Experiences for Undergraduates (REU) Leadership Group and a member of the Executive Board of the National Organization of Black Chemists and Chemical Engineers (NOBCChe). She is also involved in the American Chemical Society as a past committee subcommittee chair of the Younger Chemists Committee. Thomas has published several research

papers including bioanalytical applications of electrophoresis and microdevice technology and new technologies and strategies in chemical education. In addition to her passion for education, Thomas also enjoys photography and iEverything.



NAME: LAKINDRA FRANCES

ACADEMIC CREDENTIALS:

B.S. and M.S., Physics, Southern University and A&M College

M.B.A., Webster University

LaKindra Francis-Jones is the Improved Target Acquisition Systems (ITAS) Image Enhancement (IE), Engineering Services, and Derivatives Program Manager at the Raytheon Company, Missiles Systems (MS) in Huntsville, Alabama. The ITAS IE Program at Raytheon is North Texas' largest Indefinite Delivery Indefinite Quantity (IDIQ) contract award of \$56 million and it is a Mission Systems enhancement effort that is strategically important and complex in terms of technology, programmatic, and schedule.

LaKindra is strong on execution, leads by example, and encourages her team to think of the user, the customer, implementation, and program affordability. For example, the Army and USMC were having trouble finding a contracting vehicle to support the ITAS Network Lethality (NL) and IE Low Rate Initial Production, so LaKindra was able to use her training and knowledge of government IDIQ contracting to help convince the Army and USMC leadership to utilize and approve the NL and IE IDIQ acquisition strategy.



SOUTHERN UNIVERSITY AT NEW ORLEANS | NEW ORLEANS, LA
 Rebuilding STEM Education After Hurricane Katrina

Joe Omojola, Ph.D, Campus Coordinator

In the aftermath of Hurricane Katrina, SUNO was faced with the termination of all STEM departments (except for biology and the previously reinstated mathematics program) which created significant problems not only for the students, faculty, and staff but also LS-LAMP. Although, optimally better in previous years, for two consecutive years SUNO matriculated more underrepresented minority students to graduate programs. SUNO remains positive and appears to have the appropriate faculty and students to maintain and indeed excel in the education and training of minority STEM students. The Mathematics Department at SUNO established a fully staffed Math laboratory operated by student tutors and LS-LAMP students. SUNO continues to increase outreach activities with the pre-college community emphasizing to minority students to enroll in baccalaureate STEM degrees.

SOUTHERN UNIVERSITY AT NEW ORLEANS | *Student Profiles*



NAME: IFEANYI CHUKWU ONOR, Ph.D.

ACADEMIC CREDENTIALS:

B.S., Biology, Southern University at New Orleans
Pharm.D., Xavier University of Louisiana

Ifeanyi Chukwu Onor began his studies at Southern University at New Orleans as a Biology major and an LS-LAMP scholar. Today, Onor is a PharmD graduate from Xavier University. He has participated in a number of research experiences including serving as a Research Assistant at Xavier's Center for Nanomedicine and Drug Delivery and a Research Intern for the Department of Biology at Southern University-New Orleans. Onor was also the Class President of Xavier's fourth year pharmacy students (class of 2011). Awards received include the Mother M. Agatha Ryan Award, the Albert P. Lauve Hospital Pharmacy Award, the Xavier University College of Pharmacy Award for Excellence and numerous other awards and accolades.

NAME: PAULETTE N. WILLIS, Ph.D.

ACADEMIC CREDENTIALS:

B.S., Physics, Southern University at New Orleans
B.S., Mathematics, Southern University at New Orleans
M.S., Mathematics, University of Iowa, Iowa City, IA
Ph.D., Mathematics, University of Iowa, Iowa City, IA



"The Department of Natural Sciences at SUNO is the reason I am where I am today. The guidance and mentorship of the faculty, most notably Dr. Joe Omojola in my case, is the primary reason I went on to graduate school. Before going to SUNO the thought never crossed my mind to get a Ph.D. in Mathematics. Dr. Omojola and other faculty at SUNO noticed my potential and encouraged me to pursue an advanced degree. In graduate school, when I spoke about my experiences at SUNO, many students told me they wished they had a mentor as an undergraduate and had been part of a department that cared about its students as much as the Department of Natural Sciences at SUNO," said Willis - Currently, Willis is the Senior Knowledge Engineer for Reasoning Mind.



NAME: CARMAN MALDONADO, Ph.D.

ACADEMIC CREDENTIALS:

B.S., Biology, Southern University at New Orleans
MPH / MD, Temple Podiatry School in Philadelphia

"The faculty at the Department of Natural Sciences helped me realize my full potential and to never give up in the face of adversity," said Maldonado, MPH and MD (3rd year) at Temple Podiatry School in Philadelphia, PA.



SOUTHERN UNIVERSITY AT SHREVEPORT (Two-Year Institution) | SHREVEPORT, LA Improving Access to STEM Education

Josephine Loston., Campus Coordinator

The excellent work at SUSLA has resulted in a steady increase of LS-LAMP budget allocations to SUSLA. These increases were based on tangible systemic mentoring activities and their results, including the transfer of LAMP students to four-year undergraduate minority Science, Technology, Engineering and Mathematic (STEM) programs. In 2011-15, 48 LAMP students transferred to four-year programs.

LS-LAMP at SUSLA continues to encourage its partnership with external and internal Programs. This initiative has significantly

increased the number and quality of graduates pursuing a four year degrees to any college/university in pursuit of a STEM baccalaureate degree, and secure prominent positions in higher education, and in industry.

SUSLA's Systemic mentoring plays a crucial role for all STEM student support activities at SUSLA. The goals of SUSLA's LAMP are to increase retention in STEM programs and to motivate students to broaden their knowledge in their chosen STEM discipline.

To strengthen the academic preparedness and enhance the professional development of students, LS-LAMP continues to encourage hands-on research experiences and professional and personal development activities. Since its inception, LS-LAMP has played a vital role in providing quality research and training opportunities to minority students by encouraging mentor-student relationships. Through this initiative, LS-LAMP scholars are matched with a STEM faculty mentor to actively engage students in STEM specific research knowledge and training. As a result of this effort, students are academically and scientifically prepared to carry out and complete independent research projects. To showcase their research knowledge, STEM scholars attended and presented their research results orally or in a poster format at local, regional, and national scientific meetings and conferences.

Selective STEM scholars served as undergraduate peer tutors in the Tutorial Lab Center which is supported by the HBCU-UP and LS-LAMP Programs. These programs provide tutoring and mentoring to qualified individuals. These joint efforts will continue throughout the implementation of the grant.

The LS-LAMP program continues to be a model for systemic reform and academic excellence at this two-year institution.

SOUTHERN UNIVERSITY AT SHREVEPORT | *Student Profile*



NAME: GWENDOLYN TENNELL

ACADEMIC CREDENTIALS:

Junior, Computer Science (Computer Information Systems), Louisiana State University

Gwendolyn Tennell is currently a junior attending Louisiana State University at Shreveport (LSUS) majoring in Computer Science, with a concentration in Computer Information Systems, BS. While in undergraduate studies, Tennell completed three research internships.

Tennell's undergraduate research in LAMP helped her to become knowledgeable in many different applications and programs such as Linux, Robotics, Swift, and Java Script:

"These programs provided hands-on experience that was vital and helped give me a great deal of confidence in my studies. The scholarships helped me purchase books and pay schools fees while a full time student. Without the program, I would not have received the opportunity to complete the summer research internships in my area of study. Not only did LS-LAMP give me the opportunity to do research, but I also had the ability to travel and present my results at local, regional, and national scientific meetings and conferences."



Empowering Minority Students through STEM Education and Research

Michael Cunningham, Ph.D., Campus Coordinator

Prior to LS-LAMP, there were no systemic programs that had a direct focus on minority STEM students at Tulane University. Because of LS-LAMP, Tulane has initiated a Systemic Planning Committee that has developed a plan to increase minority STEM graduation rates. In addition, the committee proposed establishing an Office of Science Education that is devoted to increasing access and success in STEM education and practice for all Tulane students. Tulane also implemented a team approach to mentoring. The teams consist of faculty from Tulane, Dillard and Southern at New Orleans.

Additionally, Tulane continues to contribute to LS-LAMP by offering research experiences for minority STEM undergraduates in summer research. From the inception of LS-LAMP, Tulane and LSU, the two Research 1 universities, have worked to provide summer research opportunities to LS-LAMP students from partner institutions. Tulane and Xavier Universities have formed an undergraduate training partnership in engineering called 3+2=2°, which allows Xavier students to receive two Bachelor degrees in five years: one in science from Xavier and one in engineering from Tulane. In addition, a new partnership called the Pipeline Program was established which provides opportunities for outstanding undergraduate students to gain admission into doctoral programs at Tulane.

Tulane's Office of Multicultural Affairs has developed two mentoring programs: Big Brothers/Big Sisters Multi-ethnic Peer Support and AGAPE. The Big Brothers/Big Sister program assists incoming students with the adjustment process. The goal of AGAPE is to establish an instant support network between freshmen and faculty/staff members.



TULANE UNIVERSITY | New Orleans, LA | *Student Profiles*

NAME: DANNIELLE SOLOMON-FIGUEROA
ACADEMIC CREDENTIALS:
B.S., Biomedical Engineering, Tulane University
Ph.D., Biomedical Engineering, Drexel University, Philadelphia, PA

Dannielle Figueroa amassed a wide range of research experiences and awards as a scholar in Tulane's LS-LAMP program. During the summer of 2003, Figueroa was an Undergraduate Research Assistant in the Tulane University Cartilage Tissue Laboratory. What began as just a summer project culminated as her undergraduate Honors thesis. Figueroa has also conducted research at the University of Texas Health Science Center in San Antonio and is currently a Graduate Research Assistant in the Vascular Kinetics Lab at Drexel University in Philadelphia, Pennsylvania.

"As I completed my undergraduate studies, I found that my research experience led to more interviews than my classmates," said Figueroa, who also credits her LS-LAMP mentors for helping her select the best graduate school and graduate fellowship.

Figueroa earned a Ph.D. in Biomedical Engineering from Drexel University in 2012. While there, her research activities included studying the effects of hyperglycemia on endothelial cell response to strain and extracellular matrix signaling. She was also president of the Drexel University Biomedical Graduate Association and a Drexel NSF IGERT Fellow.

NAME: MANUEL ALEJANDRO FIGUEROA
ACADEMIC CREDENTIALS:
B.S., Biomedical Engineering, Tulane University
Ph.D., Biomedical Engineering, Drexel University, Philadelphia, PA


The LS-LAMP Program not only prepares students for the rigors of STEM research and education, but also offers students research experiences that open the door of opportunity in a variety of areas—masters-level/doctoral research, employment in industry and national laboratories, college/university research labs, teaching opportunities and the list goes on. Manuel Figueroa experienced these opportunities after completing undergraduate studies as an LS-LAMP scholar in Tulane's Biomedical Engineering Program.

Figueroa hit the ground running conducting research in both his freshman and sophomore years. Upon graduation, Figueroa was accepted to the University of Rochester Biomedical Program with a full departmental fellowship. He was also offered a job with the Air Force Research Laboratory in San Antonio, Texas. Figueroa accepted the position with the Air Force and credits his LS-LAMP research experiences for the job opportunity.

During Figueroa's interview with the Air Force, he was able to describe in detail his freshman and sophomore years research projects, which focuses on the development of laser treatments to remove tumors from breast tissue. Coincidentally, the Air Force was searching for qualified people to work in their Optical Radiation Branch, which studies the biological effects of lasers on the skin and eyes.

"My freshman and sophomore years research experiences helped me get the job," said Figueroa.

Figueroa received a Ph.D. from Drexel University in 2012. While there, his research focus was nanoscience, particularly the development of Surface Enhanced Raman Scattering (SERS) nanoparticle substrates used to detect biological molecules. Figueroa specializes in Engineering Education. A former NSF GK-12 Fellow, he has significant experience developing STEM inquiry based lessons for middle and high schools in the Philadelphia area. Currently, he is an assistant professor at the Technological Studies Department at the School of Engineering.

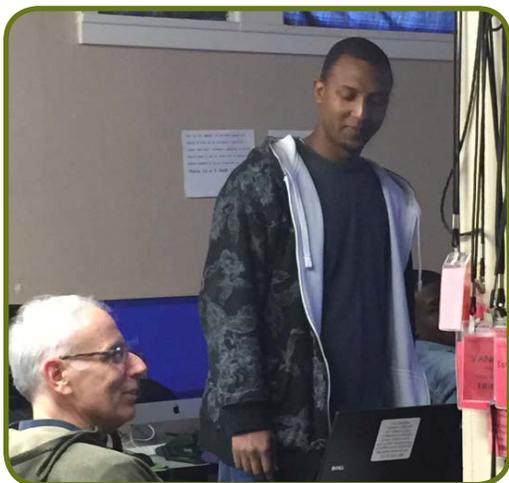


UNIVERSITY OF LOUISIANA LAFAYETTE | LAFAYETTE, LA
 Helping Students Move Confidently in the Direction of their Dreams

Bobbie DeCuir, Ph.D., and Vijay Raghavan, Ph.D., Campus Coordinators

The University of Louisiana Lafayette (ULL) LS-LAMP program continues to be a strong partner in the effort of increasing the number and quality of graduates pursuing degrees in STEM. Evidence of the program’s growth are the graduates who have completed their undergraduate courses of study and have gone on to receive doctoral degrees and have secured prominent positions in higher education and in industry.

UNIVERSITY OF LOUISIANA LAFAYETTE | *Student Profiles*



NAME: FABIAN STRAUSS

ACADEMIC CREDENTIALS:

Junior biology major, University of Louisiana Lafayette

Fabian Strauss is a junior biology scholar at the University of Louisiana Lafayette. He has been recognized for his academic excellence at the 26th Annual Black Student Achievement Awards Ceremony and has presented his reasearch at the 2015 MAZE Genetic Conference, with his mentor Ani Acharya. He also presented at a conference in Portland, Oregon with his previous mentor Sherry Kraysky.



NAME: WAKEEL IDEWU, Ph.D.

ACADEMIC CREDENTIALS:

B.S., Civil Engineering, University of Louisiana Lafayette

M.S. Engineering Science, Louisiana State University, Baton Rouge, LA

Ph.D., Civil and Environmental Engineering, Louisiana State University

Just like his LS-LAMP peers, Wakeel Idewu has acquired a number of prestigious honors for his research efforts and academic work. Idewu was awarded the National Science Foundation Bridge to the Doctorate Award, the Donald W. Clayton Excellence Award, the Minority Engineering Program Graduate Student of the Year, the Graduate Alliance for Education in Louisiana Award, and the Arthur Ashe Award.

Idewu participated in the Research Experience for Undergraduates Program at Louisiana Tech’s Institute for Micro-Manufacturing Lab. Idewu has also conducted research at the Virginia Military Institute, the Transportation Lab at Louisiana State University and the Department of Civil and Environmental Engineering at the University of Louisiana Lafayette. Today, Idewu teaches at the Virginia Military Institute in Lexington, Kentucky.



UNIVERSITY OF NEW ORLEANS | NEW ORLEANS, LA

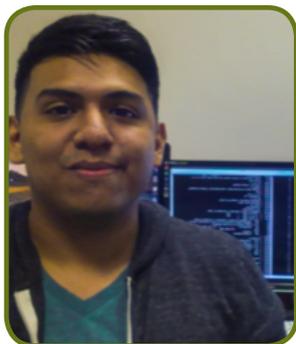
Taking the Next Step in Systemic Mentoring

Ashok Puri, Ph.D., Campus Coordinator

In 2009, the University of New Orleans freshman minority STEM enrollment increased considerably in part due to UNOs Next Step Summer Program, which enables students, in five years, to receive both a Physics and an Engineering degree. The successful utilization of LS-LAMP resources and the implementation of systemic mentoring practices have caused the program to expand to a year-round comprehensive systemic mentoring program. The Next Step Summer Program implemented institutionalized university credit courses and specialized sections that equips students with basic research skills through active research and instruction. In addition, the UNO Physics Department, under the auspices of the 3+1 dual degree program, recruits students from Dillard and SUNO. The UNO LS-LAMP program has also progressively moved toward an INCENTIVE-based program that provides support in the form of book awards for academic improvement and awards for winning research presentation competitions.

UNO LS-LAMP has also offered a week-long problem solving activity (summer 2010) to community college students needing enrichment in Algebra, Trigonometry, and Algebra-based Physics. Of which, eight (8) community college students, five (5) from Nunez and three (3) from Delgado, participated in a short pre-college experience.

UNIVERSITY OF NEW ORLEANS | *Student Profiles*



NAME: EDWIN GOMEZ

ACADEMIC CREDENTIALS:

Chemistry major at the University of New Orleans

Edwin Gomez, a Chemistry major at the University of New Orleans, was born and raised in New Orleans, LA. Before he was born, his family immigrated from Guatemala City, Guatemala. Edwin is the first in his family to be born in the United States and the first to graduate from high school. Edwin will also be the first to earn a Bachelors degree. For the past year and a half, he has been performing research in a computational chemistry lab. His research project involves modeling a protein on the surface of graphene in order to observe conformational changes in protein structure in different environments.



NAME: CLAUDIO CALDERON

ACADEMIC CREDENTIALS:

B.S., Civil Engineering, University of New Orleans

M.S., Environmental Engineering, Michigan State University (in progress)

Claudio Calderon was an LS-LAMP student during his junior and senior years of undergraduate studies at the University of New Orleans. He completed his undergraduate degree in Civil Engineering with a 3.7 GPA in December 2013. In the summer of 2013, he participated in a 10-week research program at Michigan State University (MSU). During the program, he developed a project focused on water quality using membrane technologies. Claudio was awarded the Exemplary Summer Research Citation by the National Center for Institutional Diversity (NCID).

Summer Research Citation by the National Center for Institutional Diversity (NCID).

"I enjoyed doing research, so I applied and was accepted for a Master's degree in Environmental Engineering at MSU. I'm currently in my last semester of studies with a 3.6 GPA. My research involves water quality improvement using membrane technologies. Right now, I'm looking at the mechanisms of water permeation during crossflow filtration processes that occurs on the membrane surface. This information will be used to obtain a better understanding of the mechanism to improve the efficiency of membranes in the future. The ultimate goal of the overall project is to be able to reuse produced water (oil fracking)."



XAVIER UNIVERSITY | NEW ORLEANS, LA
 Strengthening STEM Research Opportunities in the Crescent City
Syed Muniruzzaman Ph.D., Campus Coordinator

In 2010, Xavier University of Louisiana joined LS-LAMP as its newest alliance partner institution. Originally, Xavier University was part of LS-LAMP, however, they were invited to lead the United Negro College Fund (UNCF) AMP. In 2009, they expressed an interest in joining LS-LAMP and have been actively participating since. Xavier has a long tradition of conducting STEM activities with particular emphasis on undergraduate research which gives the undergraduate a competitive edge for admission to STEM graduate school. In 2010-11, 123 minority students earned BS STEM degrees. In addition, as an LS-LAMP partner, eight (8) Xavier students conducted research and reported their findings. STEM students at Xavier University are immersed in the 10-Strand Systemic Mentoring model of LS-LAMP. They are being groomed to make substantial contributions in the future to our state and to the nation.





LOUISIANA UNIVERSITIES MARINE CONSORTIUM | CHAUVIN, LA

Enhancing Minority Participation in Marine Science

Minorities have historically been underrepresented in Marine Sciences. In an effort to increase minority engagement and exposure, the LS-LAMP program partnered with the Louisiana Universities Marine Consortium (LUMCON) in 1997.

LUMCON provides quality educational opportunities in marine and environmental science for undergraduate and graduate students. The LUMCON LS-LAMP program focuses on topics such as marine geology; marine sedimentology; marine geochemistry; fisheries; mariculture; and coastal wetland loss, modification and restoration.

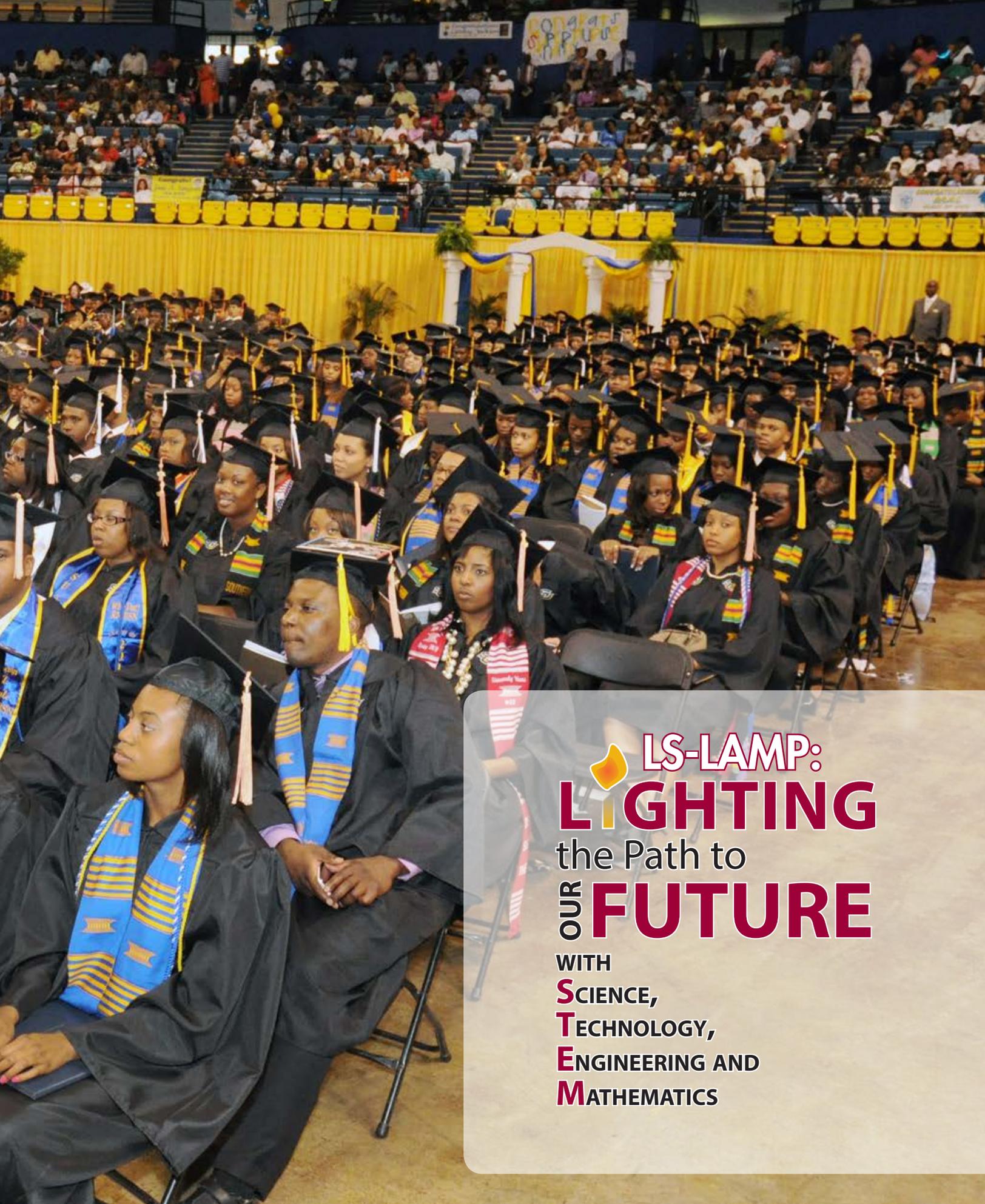
The research facility provides opportunities for LS-LAMP scholars and faculty to conduct research that expands their knowledge of Marine Science.

LUMCON has the following facilities available for research:

- **The Woody J. De Felice Marine Center**, which offers 26,000 square feet of laboratory, classroom and office space, dormitory rooms, five apartments and housing with up to 88 visitors
- **The Fourschon Remote Field Station** in Port Fourchon, Louisiana
- **The Feaman Bayou Field Station**, Vermillion Bay, Louisiana
- Network of **micro-computers and peripherals**
- Multiple **running seawater systems**
- Several **aquarium rooms** with running water for experimentation
- **Culture rooms** for growing plankton
- Temperature and light-controlled **environmental chambers**
- **Large race track flume** for hydrodynamic studies
- **Water Vessels**







LS-LAMP:
LIGHTING
the Path to
OUR FUTURE

WITH
SCIENCE,
TECHNOLOGY,
ENGINEERING AND
MATHEMATICS



LOUIS STOKES LOUISIANA ALLIANCE FOR MINORITY PARTICIPATION (LS-LAMP)

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