

**LOUISIANA SCIENCE, TECHNOLOGY, ENGINEERING
AND MATH (LaSTEM) ADVISORY COUNCIL
STATUS REPORT TO THE LOUISIANA
SENATE AND HOUSE COMMITTEES ON EDUCATION**



**LOUISIANA BOARD OF REGENTS
JANUARY 2019**

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EXECUTIVE SUMMARY

ACT 392 of the 2017 Regular Session commissioned the Louisiana Science, Technology, Engineering, and Mathematics Advisory Council (LaSTEM). Under the auspices of the Board of Regents, the LaSTEM Advisory Council is tasked to do the following:

- Coordinate and oversee the creation, delivery, and promotion of STEM education programs;
- Increase student interest and achievement in the fields of STEM;
- Ensure the alignment of education, economic development, industry, and workforce needs; and
- Increase the number of women who graduate from a postsecondary institution with a STEM degree or credential.

The Council is chaired by the Commissioner of Higher Education, and is comprised of 29 members including Louisiana State University, University of Louisiana, Southern University, and Louisiana Community and Technical College System presidents, Superintendent of Education, Representatives from the LA Association of Independent Colleges and Universities (LAICU) and its ten member colleges and universities, the LA Board of Elementary and Secondary Education (BESE) representative, various teacher and educator association presidents, Governor's office appointees, faculty appointees, LA Department of Economic Development appointees, the LA Workforce Investment Council president, members of the LA House and Senate, and business representatives.

As required by Act 392, this report provides an update of the work of the Council, emerging initiatives, and recommendations for legislation or policy changes. The LaSTEM Council was required by law to meet every month for the first year, beginning in September 2017. Thereafter, the Council convened every month until October of 2018 to accomplish objectives set forth by its three main subcommittees (PK-12 Education and Teacher Training, High School-Postsecondary Education, and Workforce). This year of hard work and success, outlined in this report, culminated with the inaugural Louisiana STEM Summit in September 2018. Held at the Pennington Biomedical Research Center, the Summit brought together over 500 attendees from across the state and representing all constituencies with an interest in STEM and STEM education. The Council has moved to quarterly meetings and will establish an Executive Committee to handle all business between meetings.

LIST OF ACRONYMS

LaSTEM	Louisiana Science, Technology, Engineering and Math
LAICU	Louisiana Association of Independent Colleges and Universities
FIRST	For Inspiration and Recognition for Science and Technology
BESE	State Board of Elementary and Secondary Education
LDOE	Louisiana Department of Education
SMART	Specific, Measurable, Attainable, Relevant, Time-Bound
BoR	Louisiana Board of Regents
CTEP	Classroom Teacher Enrollment Program
LED	Louisiana Economic Development
SEED	Southwest Louisiana Entrepreneurial and Economic Development

PART I: INTRODUCTION

This report, filed pursuant to ACT 392 of the 2017 Regular Session of the Louisiana Legislature, highlights the significant progress that the LaSTEM Advisory Council has made since inception, without legislative appropriations. The law provides a list of tasks for the LaSTEM Advisory Council, including:

- Create a comprehensive, statewide STEM plan that contains clear objectives to guide the development of STEM education and STEM career opportunities and aligns elementary, secondary, and postsecondary STEM curricula, programs, initiatives and activities;
- Coordinate all state STEM education-related programs and activities;
- Create a new STEM culture and promote activities that raise awareness of STEM education and STEM career opportunities;
- Integrate employers and educators by engaging business and industry, employers, professional and community-based organizations, and other stakeholders in STEM education and career and talent programs and activities;
- Encourage industry and business entities to provide funding, resources, and technical assistance to elementary, secondary, and postsecondary schools to promote interest in STEM discipline courses and career opportunities;
- Connect STEM education resources, initiatives, and programs regionally and throughout the state;
- Establish an information clearinghouse, to be housed at the Board of Regents, to identify and provide best practice resources for both the secondary and postsecondary educational systems and to review and acquire STEM education-related instructional materials;
- Empower STEM teachers and provide support for high-quality professional development for teachers of STEM subjects;
- As appropriate, join and participate in a national STEM network and collaborate with other states in STEM education program development; and
- Establish a competitive grants program to fund robotics competitions to provide students at all appropriate grade levels opportunities to improve STEM skills by participating in

events sponsored by a science and technology development program known as FIRST (For Inspiration and Recognition for Science and Technology) Robotics.

The Council and Subcommittee developed this broad-based charge from the text of Act 392 into five goals that guide the work of the Council and creation of the Regional STEM Centers (discussed in Part II). The LaSTEM Council goals are:

- **LaSTEM Goal 1:** Create a culture that advances STEM excellence; promotes the value of STEM education; advances the perspective that STEM principles are woven into every aspect of daily life; and increases the STEM literacy of the population such that Louisianans have the ability to compete and excel in the global economy.
- **LaSTEM Goal 2:** Promote STEM-oriented integrative and experiential learning activities starting in early childhood and extending through adulthood.
- **LaSTEM Goal 3:** Improve the size, alignment, level of mastery, and diversity of the pipeline of workers well qualified for specific high-priority STEM jobs, particularly expanding access to high-quality STEM education and employment opportunities for women, rural populations, people with special needs, underrepresented communities and other target populations.
- **LaSTEM Goal 4:** Remove barriers that prevent education systems from recognizing STEM coursework for diploma requirements and postsecondary opportunities and responding to emerging STEM needs.
- **LaSTEM Goal 5:** Create a clear set of metric, an accountability framework, and a funding and sustainability protocol to ensure the success of the Council's work.

The Council set ambitious and purposeful goals, and will use the majority of 2019 to focus on metrics and the establishment of the Regional STEM Centers. The following section will focus on the great success that the LaSTEM Council has achieved in its first full year.

Part II: A successful first year of engagement in STEM education in Louisiana

As discussed in the 2018 status report, the work of the Council is divided largely into four subcommittees: PK-12 Education and Teacher Training (Chaired by Dr. Susannah Craig of BoR), Postsecondary – High School (Chaired by Dr. Lupe Lamadrid of BoR), Workforce (Chaired by Dr. Lisa Vosper of BoR, and Fundraising (Chaired by Senator Hewitt). All of the subcommittee work is overseen and coordinated by LaSTEM Council Coordinator Dr. Vernon Dunn. Working groups spent most of 2018 identifying and defining SMART objectives, steps to implementation, and timelines for implementation. A summary of the priority objectives and any updates on their progress will be presented in Part III of this report.

Monthly Meetings: During its monthly meetings, through October 2018, the LASTEM Council hosted STEM organizations and STEM Champions to present the exciting ongoing work around the state and opportunities for growth and development. These presentations, known as the “STEM Showcase,” included:

- **January:** Operation Spark and Gallup
- **February:** Subcommittee Updates (No Presentations)
- **March:** Project Lead the Way
- **April:** Louisiana ACT STEM Report, LDOE/OpenSciEd
- **May:** LSU STEM Certification Pathways, Nepris
- **June:** LaTech STEM Commission
- **July:** NASA’s Michoud Assembly Center
- **August:** VEX Robotics, Learning Blade
- **September:** 2018 Louisiana STEM Summit
- **October:** STEM Premier

The first year of work for the LaSTEM Council included both successes from the Council itself and from the entities that make up the 29-member group. The following sections will highlight that work and the organizations and agencies that were vital to their success.

CTEP Reinstated: In June of 2018, The LaSTEM Council moved to support the reinstatement of the Classroom Teacher Enrollment Program (CTEP), which was unanimously

endorsed at the Joint BoR and BESE meeting in June. CTEP allows public school teachers to attend Louisiana public colleges and universities, free of tuition costs, on a space-available basis if teachers are denied enrollment in a tuition program provided by BESE. The program had been discontinued for several years since funding lapsed. As of December 2018, 50 courses were taken for 150 course hours at three institutions (LSU A&M, Southern University A&M, and UNO). Thirty-one teachers enrolled in courses in Fall 2018, included 26 women and 5 men. Dr. Susannah Craig, chair of the PK-12 Education and Teacher Training Subcommittee, oversees the management of the CTEP program.

New STEM Jumpstart graduation pathways: Also at the joint BoR and BESE meeting in June, two STEM-related Jump Start graduation pathways were approved for Fall 2018. The BoR and BESE approval of the Digital Design and Emergent Media and Environmental Protection and Sustainability graduation pathways brings the total count of Louisiana Jump Start graduation pathways to 51. Upon completion, students will receive a STEM workforce credential as part of their career or university preparatory diploma experience. Any Jump Start regional team can adapt or adopt these graduation pathways.

2018 STEM Summit: In September, the Council hosted the 2018 Louisiana STEM Summit at the Pennington Biomedical Research Center. The first of its kind in the state, the event welcomed over 500 guests including students, teachers, higher education administrators and system presidents, STEM business and industry partners, state legislators, and other organizations that offer STEM resources and support STEM education in the state. Governor John Bel Edwards, Senator Sharon Hewitt (LA-1), and LA Secretary of Economic Development Don Pierson opened the event, followed by recorded messages from U.S. Senator Bill Cassidy and Congressman Garret Graves, and a keynote live stream from Dr. Jeff Weld, Senior Policy Advisor for the White House Office of Science and Technology Policy. The Summit provided a full-day agenda for K-12 teachers and separate agenda for postsecondary professionals and other STEM supporters, during which speakers from around the country gave presentations on the work that they are doing both nationally and locally. The main objective of the Summit, however, was encompassed in the third agenda track, in which special invited Industry CEOs, K-12 Superintendents, Campus and System Presidents, and moderators from regional economic

development organizations coordinated by Louisiana Economic Development (LED) Faststart met in designated regional groups to discuss the creation of Regional STEM Centers in Louisiana. The conversations from these discussions were fruitful and set the groundwork for exciting work to come. If these three agendas did not provide sufficient entertainment for the attendees, there were also robotics presentations, ARMY and NASA demonstrations, and STEM booths on display in the hallways and lobby areas of the Pennington. Feedback from the participant survey revealed that attendees were grateful to learn of the many programs available to them in their area and excited for the opportunities to come.

Demonstrating the commitment of these regional groups to establishing centers, a follow-up Regional STEM meeting convened on Veteran's Day at the Southwest Louisiana Entrepreneurial and Economic Development (SEED) Center in Lake Charles, LA. The primary purpose of this meeting, and upcoming meetings like it at the other regional centers, was to engage those stakeholders around the state who were unable to attend the STEM Summit, and build new partnerships with stakeholders who are critical to the work. Dr. Kim Hunter Reed, Susana Schowen (LaSTEM Co-Chair, LED FastStart) Senator Hewitt and Dr. Lisa Vosper (BoR) facilitated the discussion with the industry and higher education regional partners who were eager to get work started. This key discussion followed the October LaSTEM meeting, in which the Council suggested that a document is written that outlines the framework for each Regional STEM Center. That document has been drafted and will be on the agenda for discussion and vote at the February Council meeting.

STEM Fellows: The BESE Tuition Program for Teachers is a competitive program that provides funding for selected teachers who enroll in courses at regionally accredited colleges or universities in Louisiana. Teachers who are selected to participate in the program and who are pursuing coursework to support their teaching of STEM are invited to join a cadre of educators called STEM Fellows who work together with the Department and the LaSTEM Advisory Council to further STEM initiatives across the state. Breigh Rhodes, STEM Specialist at LDOE, manages the program, and has already named 11 Louisiana educators as STEM Fellows since the program was created in 2018. The fellows represent a wide range of schools, grade levels, and subject

areas, and are excited to join the LaSTEM Council in helping shape STEM education and work in Louisiana.

VEX Robotics: As mentioned in the 2018 report, the LaSTEM Council supports the VEX Robotics grant initiative in the state. In the 2017-18 school year, VEX partnered with the Council to place robotics programs, equating to over \$90,000 in robotics equipment and training, in 17 middle and 66 high schools in different parishes in Louisiana (including the entire Lafayette Parish School System). This was a significant increase from the six middle and 39 high schools participating in the program in the 2016-17 school year. The grant program included placing a free robot in each school and providing a free two-day training for the corresponding teacher as well as ongoing support from VEX and the Robotics Education and Competition Foundation (VEX's sponsor). This has been a fun, low-cost, and highly successful opportunity to provide underrepresented students with exposure to robotics and computing training. For the 2018-19 school year, applications opened in October 2018, and VEX and the LaSTEM Council hope to accept at least 90 schools to receive the robotics grant.

STEM Endorsed High School Diploma: At its October meeting, the Louisiana Board of Elementary and Secondary Education (BESE) voted to approve STEM diploma endorsement options for high school students. The endorsement, the first of its kind and a direct result of language from Act 392, includes two options:

- A silver seal on the diploma that indicates a student has successfully completed a subset of required courses within a BESE-approved Jump Start STEM pathway; or
- A gold seal on the diploma that indicates a student has successfully completed all courses that comprise a BESE-approved Jump Start STEM pathway.

A list of courses required to receive the endorsement is currently available on the LDOE website. Each year, prior to the beginning of the school year, LDOE will publish an updated list of courses required to receive the STEM endorsement. It is expected that some students set to graduate in May of 2019 are already on track and eligible to receive one of the STEM endorsements on their diploma. Going forward, the Council plans to expand the endorsement options to make endorsement seals available to a wider range of students, as well as incentivize students and school districts to actively pursue the seal.

Festival Robotique 2018 (FIRST): The Second Annual Festival de Robotique, hosted by Senator Sharon Hewitt and sponsored by FIRST Robotics and Dow Chemical, was held in May 2018 at the Louisiana State Capitol. This is a "friendly" robotics competition for Louisiana FIRST teams who competed in the World Championships. The purpose of the all-day competition is to showcase the talents of our STEM students to legislators, educators, and state leaders and to reward and recognize the students on the floor of the Senate. Over 300 students and hundreds of guests attended last year's inaugural Festival de Robotique. Using a robotics competition platform, it is the mission of FIRST Louisiana-Mississippi to inspire our youth to pursue Science, Technology, Engineering, and Math (STEM) fields, and develop the technical and non-technical skills necessary to be successful, while also transforming our culture into one in which STEM is celebrated.

Part III Subcommittee Summaries and Policy/Funding Recommendations

I. PK-12 Education and Teacher Training

The PK-12 Subcommittee prioritized many recommendations into four major SMART objectives to focus the work.

- **Priority Objective 1 (SMART Objective 2.1):** Build and field test an open source curriculum that contains integrative and experiential learning activities for grades 6-8 that will be aligned to the new Louisiana science content standards.
- **Priority Objective 2 (SMART Objective 2.2):** Provide initial and ongoing professional development to grades 6-8 teachers, teacher leaders, principals, and Teacher Preparation Programs (TPP) faculty to use the new science curriculum aligned to the Louisiana Students Standards for Science (LSSS).

To meet the objectives for 2.1 and 2.2, the Louisiana Department of Education identified OpenSciEd for grades 6-8 open source curriculum materials and facilitated multiple training sessions on the new science curriculum for grade 6-8. As of November of 2018, 400 teachers have been trained and an additional 1700 teachers will be trained by August 2019.

- **Priority Objective 3 (SMART Objective 2.3):** Provide 6-8 science teachers with the materials required to successfully implement the integrative and experiential learning activities within the science curriculum aligned to the new LSSS and adopted by local school districts.

To meet the objective 2.3, the Louisiana Department of Education has been creating a STEM guidebook which will include STEM best instructional practices, resources, and integrative and experiential learning activities. The guidebook will be completed in February 2019.

- **Priority Objective 4 (SMART Objective 3.1):** Increase the percentage of highly qualified and certified STEM educators teaching mathematics and science classes statewide.

As previously discussed, the BESE Tuition Program for teachers and the CTEP program implemented by the Louisiana Board of Regents has been reinstated. In addition, the Louisiana Department of Education implemented the “Be A Teacher” campaign. The campaign was successful with a recall rate of 12.2% on TV PSA spots, 15.9% on social media, and a 23.4% on billboards. For improving the perception of the profession, respondents who said that a teaching career is “very attractive” went from 13% to 24% in the post-campaign survey. The percentage of unaided respondents that indicated that they were considering a career in teaching grew from 3% pre-campaign to 17% post-campaign. In addition, the Louisiana Department of Education and the Louisiana Board of Regents are supporting initiatives in Colleges/Schools of Education who are recruiting high school students for the profession. The Louisiana Board of Regents, through a grant from the State Higher Education Executive Officers Association (SHEEO), is supporting Project Pipeline Repair, which identifies high school junior and senior males of color, mentors them through a 2-year leadership program, and encourages them to select education in their postsecondary studies. Finally, Colleges/Schools of Education, the Education Research Consortium, the Louisiana Department of Education, BESE, and the Board of Regents are designing a Teacher Quality Rating System that includes recognizing the certification of teachers in high needs areas, which include mathematics and science.

II. High School and Post-Secondary

The High School and Postsecondary Committee worked with representatives of the Board of Regents, LDOE and LaSTEM in the development and implementation of the STEM endorsed High School Diploma beginning with the May 2019 graduating class. It is anticipated that more specialized STEM-related high school diplomas will be developed in the coming year.

Dr. Lupe Lamadrid and Dr. Vernon Dunn met with representatives from the Board of Regents Institutional Research Unit to discuss changes to the Student Profile System needed in order to accommodate the addition of STEM designations on student transcripts. This will necessitate collaboration between the LDOE, BoR IT, Institutional Research and other BoR staff to develop and implement these adjustments to the field specifications of the Student Profile

System. Once these changes have been made, it will be possible to track student achievement in STEM.

III. Workforce

The priority and focus of the LaSTEM Workforce Subcommittee is to improve the size, alignment, level of mastery, and diversity of the pipeline of workers well-qualified for specific high-priority STEM jobs, particularly expanding access to high-quality STEM education and employment opportunities for women, rural populations, people with special needs, underrepresented communities and other targeted populations; and move the needle by creating a clear set of metrics to document and ensure the Council's success. To this end, the Workforce Subcommittee recommended focusing on a single SMART objective and related metrics that will expand the STEM footprint in Louisiana and engage a diverse group of individuals that are work and STEM-ready:

Using existing sector partnerships and developing new ones where needed, including workforce development boards, local and regional economic development entities, and education and industry stakeholders, focused around the LaSTEM Regional Centers, develop comprehensive regional workforce development production targets and strategies to meet them for undersupplied fields in regional economic driver industries including manufacturing and technology. The targets will be established with annual production goals assigned to regional partners and institutions and structured across regions to meet statewide targets.

LED is currently updating their Workforce Supply-Demand Gap Analysis, which formed the basis of the Workforce Subcommittee's statewide completer targets. This analysis will establish progress towards the targets and identify new initiatives needed to fill the gap. The analysis will be completed by February 15, 2019, and the results presented at the next meeting of the LaSTEM Advisory Council.

In addition to the single SMART objective and metrics, the Workforce Subcommittee categorized and recommended referring its remaining objectives to particular entities that were already heavily invested in this work (e.g. State Department of Education/BESE, Louisiana Community and Technical College System, Louisiana Workforce Commission, Louisiana Economic Development, Board of Regents, etc.). The LaSTEM Coordinator will present at the first quarterly meeting of 2019, the letters of transmittal to those entities to the Council.

The remaining objectives were referred to other Subcommittees for action or to the newly created Regional STEM Centers Subcommittee, which the Workforce Subcommittee would continue to be heavily involved with. The work of developing the Regional STEM Centers began with the regional breakout sessions held at the STEM Summit and continued with a STEM leadership session in Lake Charles. As several regional teams build their STEM strategy, additional presentations have been held around the state to garner buy-in from stakeholders, including industry and education groups convened by the Central Louisiana Economic Development Authority (CLEDA) and the New Orleans-area Regional Innovation Alliance.

At the first Regional Meeting in Lake Charles, leaders in the five-parish region of Southwest Louisiana are focused on Science, Technology, Engineering, Arts, and Math (STEAM) programs that build career pathways for 21st-century communities. Calcasieu Parish School system has a two-year pilot program with Edge Factor to provide top quality online teaching and learning resources for educators, students, and parents that cover a broad range of STEAM related careers and pathways. Private industry provided robotics and coding curriculum, hardware, and professional development through the Carnegie Mellon Robotics Institute for information technology JumpStart classes. Sowela Technical Community College is leading in the field of Augmented Reality for both instruction and career development in a variety of STEM fields. Governor John Bel Edwards toured Sowela on January 29, 2019, to experience first-hand the power of this technology. McNeese State University announced plans to form a STEM College by combining the pure and applied sciences with engineering and computer science program under one dean. The goal is to have the capstone educational program for each local STEM pathway. Industry is funding a grant to inventory and organize STEAM

programs in the region. Education and business leaders will review the inventory and build comprehensive, top quality STEAM pathways that meet regional needs.

The business community, led by the Chamber SWLA, has STEAM as the focus in support of SWLA Vision 2040. Linda Bernardi, team lead for the IBM Watson program, was the keynote speaker at the annual Chamber Banquet on January 24, 2019. Bernardi explained the dynamic shift in how business uses technology to gather data on individual customer preferences to more effectively serve their customers. Explaining the impact of the Internet of Things (IoT) and Artificial Intelligence (AI) on all facets of human life, the crowd of 1200 business leaders understood the immediate need for high performing STEAM programs in all of our communities. The Chamber Education and Workforce Development Committee serve as the exchange and catalyst for discussion and action by the region's business, education, and government leaders.

The Workforce Subcommittee anticipates similar successes as other Regional STEM Centers become functional.

IV. LaSTEM Coordinator

The inaugural LaSTEM Summit generated an unprecedented attendance as well as financial support from donors. The Boeing Company, spearheaded by LaSTEM Council Member Mr. Kenneth Tucker (Director of State and Local Government Operations for Southeast Region), donated \$10,000 to offset costs to sponsor the event. Our partners at Dow Chemical sponsored the food, providing lunch to the over 500 attendees (a \$5,000 value). The 2019 LaSTEM Summit is tentatively set for Friday, September 6, and meetings are currently being scheduled to name the title sponsor for the event.

While the gathering of regional stakeholders and the discussion of the creation of Regional STEM Centers was the primary focus of the LaSTEM Summit, these centers will need funding to support them. The Council will vote in February on a document that outlines the structure of the RSCs, which will each require at minimum a Regional STEM Director, access to office space, and publicly accessible computer space. While some regions may already have the infrastructure to begin this work, most will **need the support of state appropriations provided to the LaSTEM**

Council to support this work. All of the work of the RSC will be overseen by the LaSTEM Council and the LaSTEM Council Coordinator.

Many of the organizations that have presented to the Council, and those on the long waiting list who would like to, have indicated that they would benefit from financial support from the LaSTEM Council. Indeed, other statewide STEM Councils including Iowa, Idaho, Tennessee, and Nevada, provide competitive yearly supplemental funds to STEM organizations, teachers, and students. These councils have the luxury of receiving yearly legislative appropriations from their respective state governments, as well as federal grants. To that end, to compete on a national scale, the LaSTEM Council **needs a substantial investment of a legislative appropriation**, as well as **additional staffing** to assist with federal grant writing and to accelerate the success of this critical work.

Signed:

A handwritten signature in black ink, appearing to read "K. H. Reed", written in a cursive style.

Chair, Commissioner of Higher Education