TAMIU Louis Stokes Alliance for Minority Participation (LSAMP): 2020 Annual Report

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Executive Summary

Program Context: Texas A&M International University implemented the Louis Stokes Alliance for Minority Participation (LSAMP) program in August 2019, an initiative funded by the National Science Foundation. The program, led by Dr. Khasawneh, seeks to increase research participation for STEM undergraduate students, by providing financial support for research presentations at state and national conferences. The program focuses on fostering achievement in minority, STEM students by aiding in the participation of enrichment activities and specific programs, such as undergraduate research and supplemental instruction, respectively. The research team is comprised of Dr. Mahmoud Khasawneh (PI), Dr. John Kilburn (co-PI), Dr. Jared Dmello (Senior Researcher and Program Evaluator), Alicia Segovia (Program Specialist), and Daphne Sanchez (Program Assistant).

Research Activities: The TAMIU LSAMP research team developed a survey-based study to investigate STEM students' perception of undergraduate research, their awareness of research opportunities, and barriers relevant to their participation in undergraduate research at their institution. The LSAMP Program Specialist assisted Dr. Khasawneh and the rest of the TAMIU LSAMP team, with participant recruitment and data collection. The survey was distributed to students who were STEM majors and who were of undergraduate classification. Preliminary findings from this study, entitled "*A Proposed Survey-Based Student-Centered Framework for Evaluation of Undergraduate Research Awareness in Minority-Serving Institutions*," was accepted for presentation at the American Society for Engineering Education's (ASEE) Annual Conference in June 2020, through a competitive, peer-reviewed process, and will be published in the conference proceedings.

Student Support: In Fall 2019, TAMIU hosted the 16th Annual Pathways Student Research Symposium, where 19 LSAMP students had the opportunity to attend or present their research and attend graduate school seminars. Supplemental Instruction (SI) sessions were implemented in early Fall 2019 and transitioned to virtual SI sessions due to the COVID-19 pandemic in Spring 2020. TAMIU will continue to provide virtual SI sessions for relevant courses until it is safe to transition back to face-to-face sessions.

Impact of COVID-19: As a result of the global pandemic, many professional conferences were cancelled or moved to a virtual environment, impacting the number of students that were able to receive financial support to attend conferences in Spring 2020. Nevertheless, TAMIU anticipates the number of students who will benefit from LSAMP participation to increase in future semesters as the institution transitions back to normal classroom settings.

Project Summary

The Texas A&M System LSAMP Research Alliance (TAMUS LSAMP-RA) will increase engagement and enhance success of URM students in STEM by implementing programmatic initiatives. Additionally, it will conduct research to explore the impact of research mentoring, determination, and persistence on underrepresented minority (URM) success in STEM. The research team will investigate various factors including quality of research mentoring relationships, URM students' determination, persistence in STEM, and their likelihood of pursuing graduate degrees. Through evidence-based programs and by conducting rigorous research to inform best practices for engaging and mentoring URM undergraduate students in research experiences, TAMUS LSAMP-RA will contribute to the goal of increasing the numbers of URM students continuing to graduate school.

Context

Texas A&M International University (TAMIU) is a new member of TAMUS LSAMP-RA and is a Hispanic Serving Institution (HIS). As of Fall 2018, 95% out of TAMIU's nearly 8,000 students self-reported as Hispanic. TAMIU has characteristics that prove this institution will make significant contributions to the Alliance and benefit greatly from its' participation, including a high URM percentage of student population, institutional emphasis on recruitment and retention in STEM, and emphasis in growing undergraduate research through the institution's Quality Enhancement Plan (QEP). TAMIU has a large number of first-generation, low-income, and/or at-risk students. As part of the Alliance, the TAMIU research team will conduct mini-studies to develop strategies that are aimed at increasing awareness of, and participation in, student undergraduate research activities. More specifically, the TAMIU research team will examine STEM students' perception of undergraduate research to evaluate awareness opportunities, availability of opportunities, barriers to participation, perceived impact on career options, and expectations from mentorship, among other factors. Additionally, TAMIU will implement specific programs, such as supplemental instruction for relevant lecture courses. To address these objectives, the research team is pleased to present this empirically driven annual report to the Office of the President.

Findings

During the 2019-2020 academic year, TAMIU implemented Supplemental Instruction (SI) sessions for selected STEM courses, starting with the Fall 2019 semester. SI sessions were held for General Chemistry I & II (CHEM 1311 & 1312, respectively), and Calculus II (MATH 2414). These lectures were selected because they historically have higher rates of D/F/W grades than other STEM courses, which suggests a greater number of at-risk students. The first SI session was held on September 6, 2019 for CHEM 1311, February 3, 2020 for CHEM 1312, and January 28, 2020 for MATH 2414. In total, 115 unique students participated in the SI sessions.[1] Student attendance by course session is shown in Table 1.

[1] Total student attendance was $N = 124$; however, 9 students attended SI sessions for more than one course.

Table 1: SI Sessions by Course

Course Name	Course Number	Semester	Attendance
General Chemistry I	CHEM 1311	Fall 2019	67
General Chemistry II	CHEM 1312	Spring 2020	44
Calculus II	MATH 2414	Spring 2020	13

In this first year of the program, students requested funding to present a total of 44 research presentations through the LSAMP program, of which 25 presentations were approved for funding.[2] The maximum amount a student could apply for was $2,000. For students that were not selected for funding, the primary reasons for the applications being denied were: 1) classification, 2) mentor to student ratio, and 3) overall competitiveness (GPA, research topic, and conferences selected). Applications were split fairly evenly across the two semesters (as shown in Table 2), though it is possible Spring 2020 applications were lessened due to the onset of the COVID-19 pandemic.

Table 2: LSAMP Conference Participation

Semester	Total # of Presentations for Which Funding Was Requested	Total # of Students Funded or Would Have Been Funded	Total # of Presentations Presented or Set to be Presented	Total # of Students Funded who Attended but Did Not Present at a Conference
Fall 2019	22	19	10	9
Spring 2020	22	15	15	0
Total	*44*	*34*	*25*	*9*

20 students were accepted to present their research across five professional conferences during this academic year, as shown in Table 3: 1) 16th Annual Pathways Student Research Symposium (Laredo, TX), 2) Orthopaedic Research Society (ORS) 2020 Annual Meeting (Phoenix, AZ), 3) American Chemical Society (ACS) Spring 2020 National Meeting & Expo (Philadelphia, PA), 4) Data Science Convention 2020 organized by SPE GCS Data Analytics Study Group (DSC20) (Houston, TX), and 5) 2020 International Conference of Advanced Research in Applied Science, Engineering and Technology (ICARASET 2020) (Houston, TX).[3]

However, due to the COVID-19 pandemic, both ACS and DSC20 were cancelled. Consequently, all 9 accepted students were unable to attend and/or present at these conferences, as shown in Table 3. While ICARASET 2020 was transitioned to a virtual meeting, 5 students were unable to

[2] Note: Of the 25, some conferences were canceled before formal notification of funding was made to the applicant.
[3] Of the 20, five students presented at both the 2019 Pathways Research Symposium and another conference (or were scheduled to present before the conference was canceled). Thus, 20 students gave 25 research presentations.

meet registration deadlines to participate in the session, because of delays in communication between LSAMP staff, students, and respective mentors resulting from TAMIU's transition to working remotely.

For a full bibliographic list of accepted student presentations from the 2019-2020 academic year, along with corresponding mentors, please see Appendix A.

Table 3: LSAMP Conference Presentations Participation

Conference Name	Total # of Presentations Funded or Would Have Been Funded	Funded Presentations Given at Conference	Funded Students who Attended but Did Not Present at Conference	Funded Presentations Not Given at Conference due to factors associated with the COVID-19 pandemic
16th Annual Pathways Student Research Symposium (November 7-8, 2020)	19	10	9	N/A
Orthopaedic Research Society (ORS) 2020 Annual Meeting (February 8-11, 2020)	1	1	0	0
American Chemical Society (ACS) Spring 2020 National Meeting & Expo (March 22-26, 2020)	8	0	0	8
Data Science Convention 2020 organized by SPE GCS Data Analytics Study Group (April 2, 2020)	1	0	0	1
2020 International Conference of Advanced Research in Applied Science, Engineering and Technology (ICARASET 2020) (March 30-31,2020)	5	0	0	5

In total, $22,351.43 were expended during the 2019-2020 academic year, as shown in Table 4. The category with the highest expenses was TAMIU Payroll ($19,705.18), which provided funds for the LSAMP staff member who administered the day-to-day operations of the program. In total, $2,236.16 were spent for student conference-related expenses, with another $410.09 in expenditures for faculty mentors to accompany. While students on average requested the maximum amount of $2,000.00, the actual average expense was $1,323.26 (*min* = $410.09, max = $1,739.68). As of the date this report is submitted, there remains $496.48 in outstanding encumbrances for professional conferences; these funds had been approved for early conference registration for ORS and poster printing costs. Additionally, students who attended the 16th Annual Pathways Student Research Symposium had majority of their cost covered by the A&M system and by TAMIU.

Table 4: Expenses

Expense Type	Expense Actual	Expense Encumbrance	Total
Travel Symposium	$0.00	$0.00	$0.00
Travel to Professional Conferences	$1,739.68	$496.48	$2,236.16
TAMIU Payroll	$18,507.64	$1,197.54	$19,705.18
Travel of Faculty with Student	$410.09	$0.00	$410.09
Total	*$20,657.41*	*$1,694.02*	*$22,351.43*

Research Deliverables

The research team submitted a peer-reviewed abstract that was subsequently accepted to the American Society for Engineering Education's (ASEE) Annual Conference in June 2020, which will be held in a virtual environment. In this paper, we present the preliminary findings from a study using survey-based methods to investigate STEM students' perception of undergraduate research, their awareness of research opportunities, and barriers relevant to their participation in undergraduate research at their institution. This paper will be published in the conference proceedings.

> Citation: Khasawneh, M., Kilburn. J., Dmello, J., Sanchez, D., Segovia, A. (June, 2020). *A Proposed Survey-Based Student-Centered Framework for Evaluation of Undergraduate Research Awareness in Minority-Serving Institutions* Paper presented at American Society for Engineering Education (ASEE) Conference, Virtual.

Additionally, to address the impact of the COVID-19 pandemic on higher education during the Spring 2020 semester, the TAMIU LSAMP research team is currently administering two IRB-approved surveys evaluating faculty and student experiences in transitioning to a virtual learning

environment during the semester. Dr. Dmello is leading this initiative, which has collected over 300 responses so far. We anticipate presenting findings from this study to the Office of the President and the Office of the Provost in a technical report during the Summer of 2020. We also anticipate submitting at least one manuscript for peer-review based on this research initiative.

Future Directions

TAMIU LSAMP will continue to provide travel money to eligible applicants for future conferences and presentations. SI sessions will continue as well; they will remain administered via an online platform until the University determines it is safe to transition back to face-to-face offerings. There are plans to expand SI sessions to include additional courses, such as Physics I and II (PHYS 1301 and PHYS 1302), courses that also have high D/F/W rates. Finally, the TAMIU LSAMP team plans to continue conducting empirical research to improve undergraduate retention, persistence, and performance in STEM fields here at TAMIU, and at institutions around the world through the dissemination of our findings to scholarly audiences.

Appendix A: Bibliography of Student Presentations

Berumen, O. (March, 2020). *Analysis of Parabens in Moisturizers*. Poster presentation at American Chemical Society (ACS) Spring 2020 National Meeting and Expo in Philadelphia, PA. (Mentor: Dr. Alfred Addo-Mensah, Associate Professor of Chemistry)

Botello, O. (March, 2020). *Developing a Web Application for an Access Control Model*. Poster presentation at 2020 International Conference of Advanced Research in Applied Science, Engineering and Technology (ICARASET'20) in Houston, TX. (Mentor: Dr. Mustafa Al-Lail, Assistant Professor of Engineering)

Botello, O. (November, 2019). *Software Design for Mobile Applications with Spatio-temporal Authorization*. Poster presentation at 16th Annual Pathways Student Research Symposium in Laredo, TX. (Mentor: Dr. Mustafa Al Lail, Assistant Professor of Engineering)

Contreras, Y. (March, 2020). *Analysis of Parabens in Moisturizers*. Poster presentation at American Chemical Society (ACS) Spring 2020 National Meeting and Expo in Philadelphia, PA. (Mentor: Dr. Alfred Addo-Mensah, Associate Professor of Chemistry)

Cortez, R. (March, 2020). *Thermal and Light-emitting Properties of bis(3-alkoxyphenyl) viologen bis(triglimide) salts.* Poster presentation at American Chemical Society (ACS) Spring 2020 National Meeting and Expo in Philadelphia, PA. (Mentor: Dr. Hari Mandal, Associate Professor of Chemistry)

Cruz-Perez, N. (November, 2019). *Impact of Climate Change in Supply Chain Logistics*. Poster presentation at 16th Annual Pathways Student Research Symposium in Laredo, TX. (Mentor: Dr. Haibo Wang, Distinguished Professor of Decision Science)

Fierro, P. R. (November, 2019). *Impact of Climate Change in Supply Chain Logistics*. Poster presentation at 16th Annual Pathways Student Research Symposium in Laredo, TX (Mentor: Dr. Haibo Wang, Distinguished Professor of Decision Science)

Fuentes, M. (February, 2020). *Using Machine Learning Algorithms for Predicting Orthopedic Surgery Outcomes*. Poster presentation at Orthopaedic Research Society (ORS) 2020 Annual Meeting in Phoenix, AZ. (Mentor: Dr. Deepak Ganta, Assistant Professor of Engineering)

Fuentes, M. (November, 2019). *Using Machine Learning Algorithms for Predicting Orthopedic Surgery Outcomes*. Poster presentation at 16th Annual Pathways Student Research Symposium in Laredo, TX. (Mentor: Dr. Deepak Ganta, Assistant Professor of Engineering)

Gloria, K. (March, 2020). *Analysis of Parabens in Moisturizers*. Poster presentation at American Chemical Society (ACS) Spring 2020 National Meeting and Expo in Philadelphia, PA. (Mentor: Dr. Alfred Addo-Mensah, Associate Professor of Chemistry)

Gonzalez, A. (March, 2020). *Breaking Bonds: A Theoretical Study on Bromine Halocarbons*. Poster presentation at American Chemical Society (ACS) Spring 2020 National Meeting and Expo in Philadelphia, PA. (Mentor: Dr. Kameron Jorgensen, Associate Professor of Chemistry)

Gonzalez, V. (November, 2019). *Evaluating the Efficiency of Lost Circulation Material Using Numerical Simulation*. Poster presentation at 16th Annual Pathways Student Research Symposium in Laredo, TX. (Mentor: Dr. Mohammed Al Dushaishi, Assistant Professor of Engineering)

Gutierrez, B. (March, 2020). *Thermal and Light-emitting Properties of bis(3-alkoxyphenyl) viologen bis(triglimide) salts*. Poster presentation at American Chemistry Society (ACS) Spring 2020 National Meeting and Expo in Philadelphia, PA. (Mentor: Dr. Hari Mandal, Associate Professor of Chemistry)

Mendez, K. (March, 2020). *Thermal and Light-Emitting Properties of bis(3-alkoxyphenyl) viologen bis(triglimide) salts*. Poster presentation at American Chemistry Society (ACS) Spring 2020 National Meeting and Expo in Philadelphia, PA. (Mentor: Dr. Hari Mandal, Associate Professor of Chemistry)

Moncivais, M. (March, 2020). *Resource Access within a Generalized Spatio-Temporal Role-Based Access Control Model*. Poster presentation at 2020 International Conference of Advanced Research in Applied Science, Engineering and Technology (ICARASET'20) in Houston, TX. (Mentor: Dr. Mustafa Al-Lail, Assistant Professor of Engineering)

Nguyen, L. (November, 2019). *How Hyperloop Enhance Transportation Sustainability by Reducing CO2 Emission.* Poster presentation at 16th Annual Pathways Student Research Symposium in Laredo, TX. (Mentor: Dr. Haibo Wang, Distinguished Professor of Decision Science)

Palomo, J. M. (April, 2020). *A Data-Driven Model to Predict Oil Production for Different Hydraulic Fracture Design in Eagle Ford Formation*. Poster presentation at Data Science Convention 2020 organized by SPE GCS Data Analytics Study Group in Houston, TX. (Mentor: Dr. Khaled A. Enab, Assistant Professor of Petroleum Engineering)

Peña, A. (March, 2020). *Breaking Bonds: A Theoretical Study on Bromine Halocarbons*. Poster presentation at American Chemical Society (ACS) Spring 2020 National Meeting and Expo in Philadelphia, PA. (Mentor: Dr. Kameron Jorgensen, Associate Professor of Chemistry)

Rodriguez, G. (November, 2019). *Using Hyperloop in Intermodal Transportation to Improve the Supply Chain Efficiency*. Poster presentation at 16th Annual Pathways Student Research Symposium in Laredo, TX. (Mentor: Dr. Haibo Wang, Distinguished Professor of Decision Science)

Salinas, P. (November, 2019). *Simulation of Downhole Drilling Vibration of Modern Drillstring Design*. Poster presentation at 16th Annual Pathways Student Research Symposium in Laredo, TX. (Mentor: Dr. Mohammed Al Dushaishi, Assistant Professor of Engineering)

Santos, M. (November, 2019). *How Hyperloop Enhance Transportation Sustainability by Reducing CO2 Emission.* Poster presentation at 16th Annual Pathways Student Research Symposium in Laredo, TX. (Mentor: Dr. Haibo Wang, Distinguished Professor of Decision Science)

Segura, C. (November, 2019). *Using Hyperloop in Intermodal Transportation to Improve the Supply Chain Efficiency*. Poster presentation at 16th Annual Pathways Student Research Symposium in Laredo, TX. (Mentor: Dr. Haibo Wang, Distinguished Professor of Decision Science)

Treviño, M. (March, 2020). *Implementation of Access Control Models Including Time and Location*. Poster presentation at 2020 International Conference of Advanced Research in Applied Science, Engineering and Technology (ICARASET'20) in Houston, TX. (Mentor: Dr. Mustafa Al-Lail, Assistant Professor of Engineering)

Vega, J. (March, 2020). *A Mobile Application for Zone-aware Software*. Poster presentation at 2020 International Conference of Advanced Research in Applied Science, Engineering and Technology (ICARASET'20) in Houston, TX. (Mentor: Dr. Mustafa Al Lail, Assistant Professor of Engineering)

Vielma, R. (March, 2020). *Towards a Spatio-Temporal Access Control Server*. Poster presentation at 2020 International Conference of Advanced Research in Applied Science, Engineering and Technology (ICARASET'20) in Houston, TX. (Mentor: Dr. Mustafa Al-Lail, Assistant Professor of Engineering)