# TAMIU Louis Stokes Alliance for Minority Participation (LSAMP): 2021 Annual Report

Mahmoud T. Khasawneh, Ph.D.

John C. Kilburn, Ph.D.

Jared R. Dmello, Ph.D.

Yahaira S. Franco, B.S.

Submitted to: Dr. Pablo Arenaz

TAMIU Office of the President

August 25, 2021

Table of Contents



This material is based upon work supported by National Science Foundation (Award No. HRD 1911375). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views the National Science Foundation.

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

## 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, has sought 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), and Yahaira S. Franco (Program Specialist).

**Research Activities:** The TAMIU LSAMP research team developed and implemented 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 TAMIU. 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. Findings from this study, entitled "*Undergraduate Research Awareness and its Effect on Retention and Interest of STEM Majors*," was accepted for presentation at the Institute of Industrial and Systems Engineers (IISE) Annual Conference and Expo in May 2021, through a competitive, peer-reviewed process, and will be published in the conference proceedings.

**Student Support:** As a result of the COVID-19 pandemic, many TAMIU students and faculty had disruptions in their research activities to adhere to safety guidelines. Additionally, many professional conferences were cancelled or moved to a virtual environment, impacting the number of students that were applying to receive financial support to attend conferences during the 2020 – 2021 academic year. 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. Supplemental Instruction (SI) sessions were transitioned to virtual SI sessions due to the COVID-19 pandemic in Spring 2020 and continued in this manner through Summer 2021. TAMIU LSAMP and the Dean of University College collaborated to create a full-time Learning Support Specialist (LSS) position as of May 2021. TAMIU will continue to provide SI sessions for relevant STEM gateway courses with high rates of D/F/W grades.

## Project Summary

The focus of the Texas A&M System LSAMP Research Alliance (TAMUS LSAMP-RA) is to increase engagement and enhance success of URM students in STEM by implementing programmatic initiatives. Additionally, it aims to conduct research to explore the impact of research mentoring, determination, and persistence on underrepresented minority (URM) success in STEM. The research team has been investigating 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. It should be acknowledged, the COVID-19 pandemic altered some of the project activity and data gathering plans, as some research initiatives were suspended due to lower rates of direct student-faculty on campus activity over the last year, as well as the very limited opportunities for travel. Despite this, we remain dedicated to continuing with the project goals and objectives through the current plan of action. Additionally, we were resilient with research efforts during the last year, seeking to address emerging areas as it pertained to the pandemic's impact on URM and STEM education.

## Context

Texas A&M International University (TAMIU) is a member of TAMUS LSAMP-RA and is a Hispanic Serving Institution (HSI). As of Fall 2020, 91.5% out of TAMIU's 8,525 students self-reported as Hispanic, 76% of all undergraduates are considered low income and 52.1% of all undergraduates are first-generation college students. TAMIU's demographics ensure that the institution will continue to 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 has been conducting 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 has focused on examining STEM students' perception of undergraduate research to evaluate student awareness and knowledge of undergraduate research, availability of opportunities, barriers to participation, perceived impact on career options, and expectations from mentorship, among other factors. Additionally, TAMIU LSAMP has implemented specific programs, such as supplemental instruction for relevant STEM 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

### Student Support

During the 2020-2021 academic year, TAMIU implemented Supplemental Instruction (SI) sessions for selected STEM courses, starting with the Summer 2020 semester. Online SI sessions

were held for General Physics I & II (PHYS 1301 & 1302, respectively), and Pre-Calculus (MATH 2412). For Fall 2020, online SI sessions were held for General Chemistry I (CHEM 1311) and Ordinary Differential Equations (MATH 3330). [1] There were no LSAMP sponsored SI sessions during the Spring 2021 semester while the University Learning Center (ULC) underwent some staffing changes and restructuring. In Summer 2021, LSAMP sponsored online SI sessions resumed for General Physics II (PHYS 1302), College Algebra (MATH 1314), and General Chemistry II (CHEM 1412). 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. In total, 88 unique students participated in the SI sessions.[2] Student attendance and difference in grade is shown by course session in Table 1.[3]

Table 1: SI Sessions by Course

| Course Name | Course Number | Semester | SI GPA | Non-SI GPA | Diff in Grade | Total Attendance | Individual Students |
|---|---|---|---|---|---|---|---|
| General Physics I | PHYS 1301 | Summer 2020 | 3.35 | 3.13 | 0.22 | 55 | 22 |
| General Physics II | PHYS 1302 | Summer 2020 | 3.62 | 3.18 | 0.44 | 47 | 22 |
| Pre-Calculus | MATH 2412 | Summer 2020 | 3.60 | 3.33 | 0.27 | 7 | 5 |
| General Chemistry I | CHEM 1311 | Fall 2020 | 2.00 | 1.75 | 0.25 | 41 | 18 |
| Ordinary Differential Equations | MATH 3330 | Fall 2020 | 3.36 | 3.03 | 0.33 | 63 | 15 |
| General Physics II | PHYS 1302 | Summer 2021 | 3.15 | 3.24 | -0.09 | 35 | 13 |
| College Algebra | MATH 1314 | Summer 2021 | 3.00 | 3.41 | -0.41 | 3 | 1 |
| General Chemistry II | CHEM 1412 | Summer 2021 | 1.83 | 1.64 | 0.19 | 11 | 6 |

Due to the COVID-19 pandemic, LSAMP-sponsored SI sessions for Summer 2020, Fall 2020 and Summer 2021 were offered virtually for students. Students enrolled for courses were able to attend the SI sessions from their home. Although attendance declined in comparison to when SI sessions were hosted in person before the COVID-19 pandemic, students were still actively

[1] The hired SI leader for Fall 2020 resigned half-way through the semester due to scheduling conflicts because of the COVID-19 pandemic. LSAMP sponsored SI sessions were halted for General Chemistry I for the remainder of the semester.

[2] Total student attendance was $N = 102$; however, 14 students attended SI sessions for more than one course.

[3] Negative difference in grade during summer 2021 can be attributed to sample size of the individual students attending SI. Additional training was provided to SI leaders in preparation to Fall 2021 transition to face-to-face.

attending the online SI sessions. In Fall 2020, the LSAMP-sponsored SI sessions were halted mid semester due to the SI leader resigning for personal reasons. SI sessions for General Chemistry and Ordinary Differential Equations were continued by SI leaders hired by University Learning Center. As a result of the consistent SI leader turnover, LSAMP proceeded to collaborate with the Dean of University College to create a full-time position for a Learning Support Specialist (LSS). The role of the LSS is to offer SI sessions, conduct workshops, and oversee other SI leaders. As of May 2021, the LSS has been hired. We anticipate that the LSS will increase our ability to assist more faculty and students in high need STEM courses. Additionally, throughout the summer the LSS and SI leaders attended a series of workshops and discussions aimed to bolster their skills and prepare them for face-to-face instruction. As we transition to face-to-face this fall, we expect to continue working with the SI leaders to increase communication with course instructors and bolster engagement with students to increase academic readiness.

During the 2020-2021 academic year of the program, students requested funding to present a total of 3 research presentations through the LSAMP program, of which 1 presentation was approved for funding. A total of 5 students applied to receive funding to attend workshops and research conferences for professional development only, of which 3 students were approved for funding[4]. 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) failure to submit all required documentation, and 3) overall competitiveness (GPA, research topic, and conferences selected). An overview of LSAMP funded student conference participation is shown in Table 2.

Table 2: LSAMP Conference Participation

| **Semester** | **Total # of Presentations for Which Funding was Requested** | **Total # of Presentations for Which Funding was Approved** | **Total # of Conferences or Workshops for Which Funding was Requested (Attendance Only)** | **Total # of Conferences or Workshops for Which Funding was Approved (Attendance Only)** |
|---|---|---|---|---|
| Fall 2020 | 1 | 1 | 1 | 1 |
| Spring 2021 | 1 | 0 | 4 | 2 |
| Summer 2021 | 1 | 0 | 0 | 0 |
| *Total* | *3* | *1* | *5* | *3* |

One student was accepted to virtually present their research at the 32nd Annual Consortium for Computing Sciences in Colleges (CCSC) South Central Conference (Richardson, TX). One student was funded to virtually attend Dr. Rafael Luna's webinar, "The Art of Scientific Storytelling" Personal Statement Writing workshop, hosted by the Louis Stokes Center for the

[4] Students requested funding to attend workshops/research conferences solely for academic and professional development. No research was presented by these students.

Promotion of Academic Careers (LS-PAC). Additionally, two students were funded to virtually attend the Energy in Data Workshop 2021.

> Citation: Al Lail, M., Moncivais, M., Trevino, M. (2021, April 9). *Towards a Software System for Spatio-Temporal Authorization* [Paper presentation]. Consortium for Computing Sciences in Colleges (CCSC) South Central 32nd Annual Conference, Richardson, Texas (Virtual). http://www.ccsc.org/publications/journals/SC2021.pdf

During the 2019-2020 academic year, students were funded to attend research conferences for the purpose of presenting STEM research projects. During to the COVID-19 pandemic, many STEM students were not able to continue their research projects from home, and those that were able to work on them remotely faced a delay in the completion of their projects. Therefore, the number of students that applied for LSAMP financial support to present their research at conferences decreased in comparison to the 2019-2020 academic year. As a result of this, LSAMP decided to allow the funding of students to attend workshops and research conferences for academic and professional development. These students were required to submit a self-report about their participation in these activities. It should be noted that this is the first academic year in which LSAMP sponsors students to attend workshops and research conferences for academic and professional development.

**LSAMP Scholar Highlights**

During the 2020-2021 academic year, there were two LSAMP scholar students that graduated in May 2021 and got accepted into graduate programs. Orlando Berumen graduated from TAMIU with a Bachelor of Science in Biology and a Bachelor of Science in Chemistry with a minor in Mathematics. Orlando started the Master's in Chemistry program at the University of Texas Rio Grande Valley this Fall 2021. David Ramon II graduated from TAMIU with a Bachelor of Science in Biology. David was accepted to the Doctor of Podiatric Medicine (DPM) degree program at Western University of Health Sciences – College of Podiatric Medicine located in Pomona, California. One of our current LSAMP scholar's, Marshal Moncivais, was accepted into the Summer 2021 Research Experience for Undergraduates program at Columbus State University in Security and Privacy for Mobile Sensing and the Internet of Things. TAMIU LSAMP will continue to provide students with undergraduate research opportunities, as well as workshops for students interested in graduate and professional degrees.

**Expenses**

In total, $21,243.16 were expended during the 2020-2021 academic year, as shown in Table 3. The category with the highest expenses was TAMIU Payroll ($20,534.16), which provided funds for the LSAMP staff member who administered the day-to-day operations of the program. In total, $110.00 were spent for student conference-related expenses. Since all the student conferences and workshops were held virtually, students did not request any funds for travel. The actual average expense for virtual conference and workshop registration was $36.67 (*min* = $30.00, *max* = $50.00). Additionally, the LSAMP research team spent $599.00 on registration fees to present one of the research initiatives at a virtual conference. Due to the COVID-19

pandemic, the 17th Annual Pathways Student Research Symposium was not held during the 2020-2021 academic year, and it is expected to be held during Fall 2021.

Table 4: Expenses

| Expense Type | Expense Actual | Expense Encumbrance | Total |
|---|---|---|---|
| Travel Symposium | $0.00 | $0.00 | $0.00 |
| Registration to Professional Conferences | $110.00 | $0.00 | $110.00 |
| TAMIU Payroll | $18,448.10 | $2,086.06 | $20,534.16 |
| LSAMP Research Team Conference Registration Fees | $599.00 | $0.00 | $599.00 |
| *Total* | *$19,157.1* | *$2,086.06* | *$21,243.16* |

**Broad Support for TAMIU Programs**

In spring 2021, TAMIU LSAMP co-PI, Dr. Mahmoud T. Khasawneh, and Program Specialist, Yahaira S. Franco, assisted TAMIU's School of Engineering in its pursuit for ABET Re-Accreditation for the Systems Engineering undergraduate program. ABET is a globally recognized non-profit, non-governmental agency that accredits programs in applied and natural science, computing, engineering, and engineering technology. ABET accreditation is significant because it provides assurance that a college or university program meets the quality standards set by technical professions. Since ABET accreditation is not permanent, it must be renewed periodically to ensure that the educational program has maintained its quality standards.

TAMIU LSAMP assisted the School of Engineering in its Re-Accreditation process by creating all the necessary surveys administered to Systems Engineering current students, senior students, alumni, and industry board members. The TAMIU LSAMP program specialist oversaw the analysis of survey data and produced a detailed empirical report on the survey findings. Additionally, TAMIU LSAMP coordinated and attended the industry advisory board (IAB) meeting. At the meeting, IAB members were given an overview of program operations during the COVID-19 pandemic, recent awards and promotions, program, and institutional data, the Systems Engineering undergraduate program, ABET accreditation and assessment results, stakeholders feedback, and thoughts, plans and challenges.

Additionally, TAMIU LSAMP has supported other STEM programs on campus reach more students by promoting their resources to the LSAMP scholars. The TAMIU LSAMP program specialist has helped STEM faculty network with faculty from other institutions to co-mentor students and produce research projects. Similarly, we have helped faculty find students to mentor and connected them with other programs on campus that can offer additional resources for them. LSAMP will continue to foster a network where students, faculty and programs can utilize campus-wide resources. The TAMIU LSAMP research team will continue to work with the Dean

of University College to identify ways to maximize the impact supplemental instruction has on student academic performance, as well as carry out research initiatives on the subject.

## Research Deliverables

The research team submitted a peer-reviewed abstract that was subsequently accepted to the Institute of Industrial and Systems Engineers (IISE) Annual Conference and Expo in May 2021, which was held in a virtual environment. In this paper, we present the findings from a study that implemented 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 Texas A&M International University. Findings of this study suggest that while 84.38% of the STEM undergraduate respondents are interested in undergraduate research, only 18.52% participate in it. In this paper, the TAMIU LSAMP research team makes recommendations to increase students' awareness and participation in undergraduate research, which were also presented to the University's leadership team to inform ongoing campus decisions pertaining to enhancing research participation. This paper won second place in the IISE Engineering Education Track best paper and will be published in the conference proceedings in Fall 2021.

> Citation: Khasawneh, M., Dmello, J., Franco, Y., Kilburn. J. (2021, May 22-25). *Campus Undergraduate Research Awareness and its Effect on Retention and Interest of STEM Majors* [Paper presentation]. Institute of Industrial and Systems Engineers (IISE) Annual Conference and Expo 2021, Virtual.

In the wake of the COVID-19 crisis in March 2020, higher education, and society more broadly, faced an unprecedented shift. During the Fall 2020 term, universities had to make decisions about how to effectively achieve their missions while maintaining the safety and well-being of their campus communities. As a part of this effort, TAMIU, like many institutions, adopted a FlexLive approach that included face-to-face and online synchronous/asynchronous learning. However, the impact of FlexLive courses on student learning and faculty teaching remains understudied in the academic literature, with little empirical evidence to demonstrate the effect of this form of education on broader success outcomes. To learn more about the campus community's experiences with FlexLive courses during the Fall 2020 semester as a part of TAMIU's response to the COVID-19 pandemic, the TAMIU LSAMP research team administered two surveys evaluating faculty and student experiences. Dr. Dmello is leading this initiative and 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 Fall semester of 2021. We also anticipate submitting at least one manuscript for peer-review based on this research initiative.

Additionally, there has been enhanced attention at the federal, state, and institutional levels on promoting student success, enhancing minority support, and bolstering STEM retention amongst undergraduate populations. However, to date, there remains little research that has sought to understand the effectiveness of supplemental instruction programs on enhancing overall student mastery of course concepts. For the first part of this project, the TAMIU LSAMP research team conducted interviews to investigate faculty perceptions of the impact of Supplemental Instruction (SI) on academic success in STEM undergraduate courses here at TAMIU. All interviews were

conducted remotely via Zoom and/or Phone. The TAMIU LSAMP research team anticipates submitting the findings from this study in a technical report during the Fall of 2021. For the second part of this study, we will be administering surveys to STEM undergraduate students attending SI sessions to investigate their experiences and perceptions of the impact SI has on their academic success. We anticipate initiating data collection during the Fall 2021 semester. Once both parts of the study are complete, we anticipate submitting at least one manuscript for peer-review based on this research initiative.

## Future Directions

During the 2020-2021 academic year, the TAMIU LSAMP website was fully established. TAMIU LSAMP will continue to provide conference attendance and participation money, eligible students can now apply for funding directly through our website. We anticipate using the website as a platform to educate students about the impact that undergraduate research participation can have on their careers, as well as how to get involved locally and through other institutions. Similarly, we will continue promoting research conference opportunities and workshops to increase student participation in undergraduate research. LSAMP-sponsored SI sessions will continue to be provided for STEM gateway courses. We anticipate offering SI sessions for more courses through the learning support specialist. Additionally, the TAMIU LSAMP research team is looking to collaborate with Dr. Nandita Chaudhuri (Texas A&M Public Policy Research Institute) on a research initiative focusing on a systematic evaluation of STEM enhancement programs across the A&M system. Another area of growing interest for TAMIU LSAMP is assessing students' skills matching with the job market needs in accordance with the State of Texas 60x30 initiative. The LSAMP external research team is working on gathering ethnographic data of student experiences. As more direct on-campus activity arises on campus, our TAMIU LSAMP research team plans to gather more data from our own students.