

National Science Foundation Cyberinfrastructure Campus Grant Report for CC* Regional



Accelerating Research and Education at Small Colleges in Texas via an Advanced Networking Ecosystem Using a Virtual LEARN Science DMZ



“

As a large, rural community college, this grant will allow our institution to provide the same network connectivity that large universities provide their students and staff.

- Ryan Fitzgerald,
South Plains College

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OVERVIEW



PRINCIPAL INVESTIGATOR

Amy Schultz

Lonestar Education and Research Network (LEARN)



CO-PRINCIPAL INVESTIGATORS

Curtis White

St. Mary's University



Ryan Fitzgerald

South Plains College

CAMPUS PARTICIPANTS

McLennan Community College
Midland College
St. Mary's University
South Plains College
South Texas College
Trinity University



PRIMARY OBJECTIVE

Connect participating schools to the LEARN network, provide technical training to staff, and offer opportunities for faculty and students to engage with experts in STEM fields, with the goal of creating a collaborative community of smaller schools in Texas.

“It was a great pleasure being included in this grant, it helped us out in several ways. It strengthened our core infrastructure and access to the Internet, giving us an alternate pathway.”

- Curtis White,
St. Mary's University



Trinity University Campus



McLennan Students

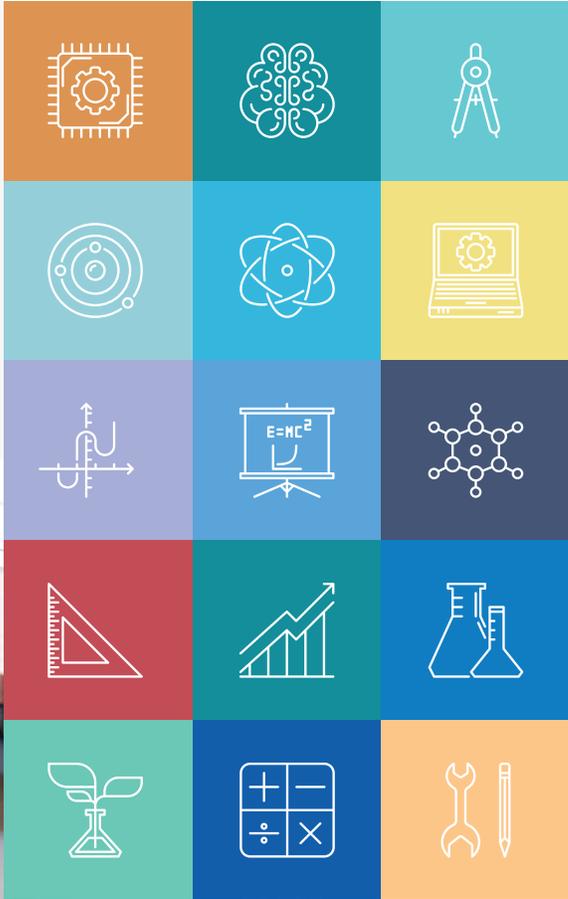
HOW IT STARTED

In October 2019, LEARN was awarded its first National Science Foundation (NSF) grant as a lead organization – a Campus Cyberinfrastructure (CC*) Regional award that helped develop a program for regional network connectivity for smaller colleges and universities in Texas.

The United States is determined to broadly increase STEM opportunities for scholars and students at small colleges and universities. This LEARN-led project focuses on this national need and brings sophisticated technology and accompanying expertise to students and faculty choosing to pursue

disciplines and research opportunities in these fields. The set of six diverse colleges have unique needs and programmatic foci, but many shared goals that can be addressed by faster, more advanced network infrastructure and access to high-performance computing.

This NSF-funded program opened up many opportunities for small higher education institutions in Texas to participate in the same statewide and national forums as the various large university systems and private universities, which are already members of LEARN.



Institution Student Enrollment & City Population

SOUTH TEXAS COLLEGE McAllen, TX	Population: 143,920	Enrollment: 28,184
MCLENNAN COMMUNITY COLLEGE Waco, TX	Population: 139,594	Enrollment: 7,329
MIDLAND COLLEGE Midland, TX	Population: 134,444	Enrollment: 5,170
ST. MARY'S UNIVERSITY San Antonio, TX	Population: 1,451,853	Enrollment: 3,419
SOUTH PLAINS COLLEGE Levelland, TX	Population: 12,665	Enrollment: 8,925
TRINITY UNIVERSITY San Antonio, TX	Population: 1,579,315	Enrollment: 2,581

CYBERINFRASTRUCTURE COMMUNITY OF PRACTICE

A critical element of the strategy for building a community of smaller institutions is providing a LEARN engineer to conduct outreach activities, provide technical training, assist campus IT staff in implementing network changes, and assist faculty, staff and students to effectively use the new network infrastructure and data transfer capabilities.

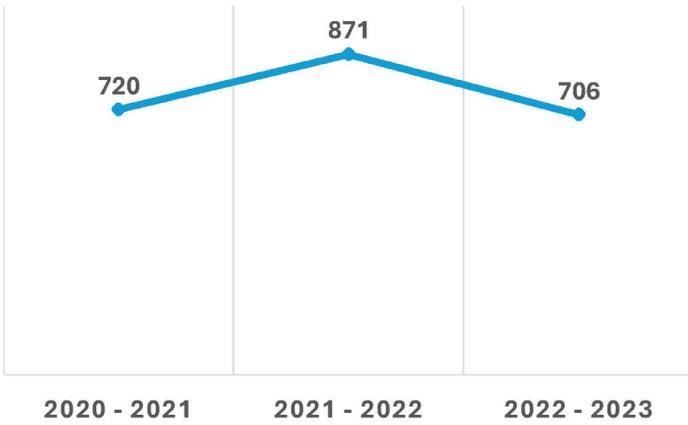


By providing training sessions in areas such as Science DMZ, perfSONAR, Border Gateway Protocol (BGP), and LEARN's MPLS architecture, LEARN has increased the technical knowledge and understanding for the participants of this grant.

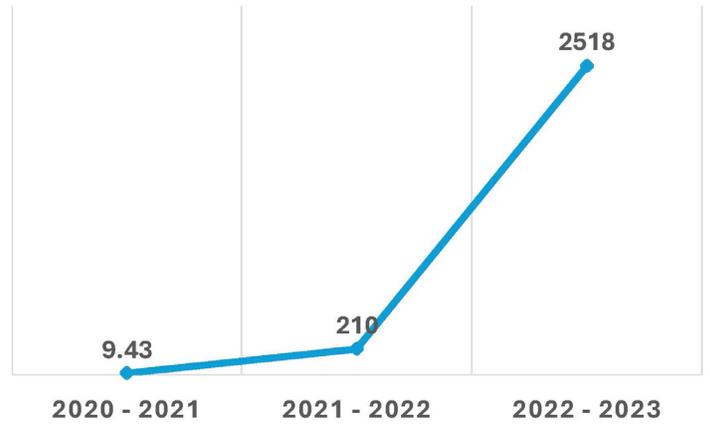
The knowledge and understanding of these technologies will benefit not only the campuses that employ the staff, but the individuals themselves, that now possess broader understanding of networking and additional skillsets they may not otherwise have had.

SCIENCE DMZ USAGE YEAR OVER YEAR

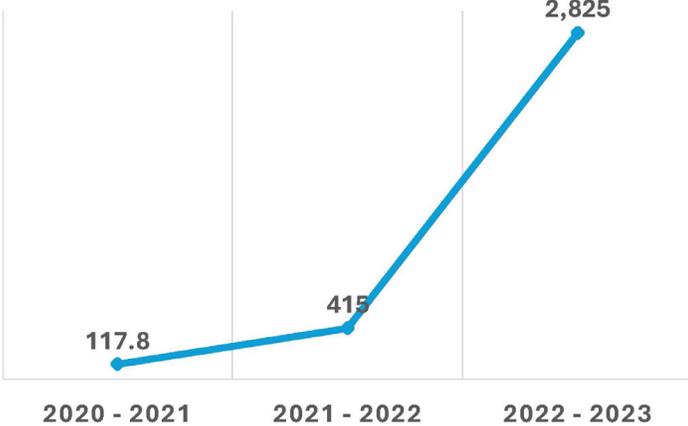
MIDLAND COLLEGE (GB)



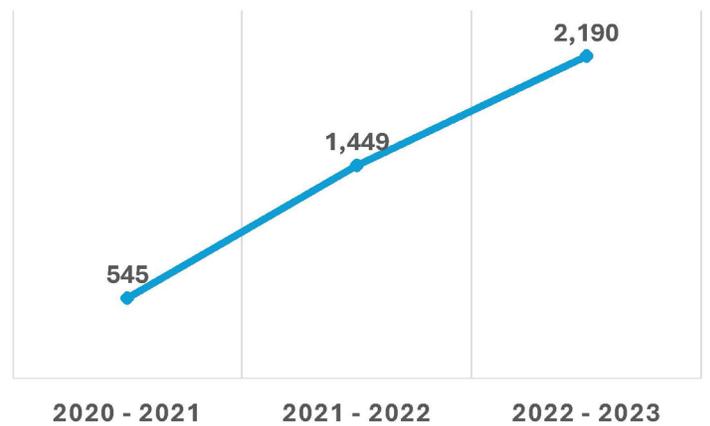
MCLENNAN COMMUNITY COLLEGE (MB)



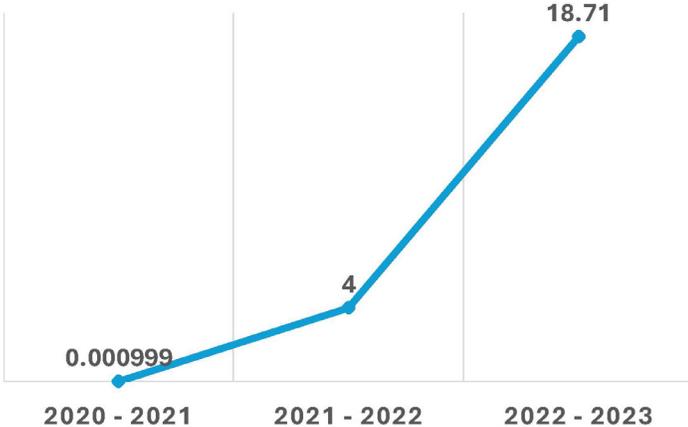
ST. MARY'S UNIVERSITY (MB)



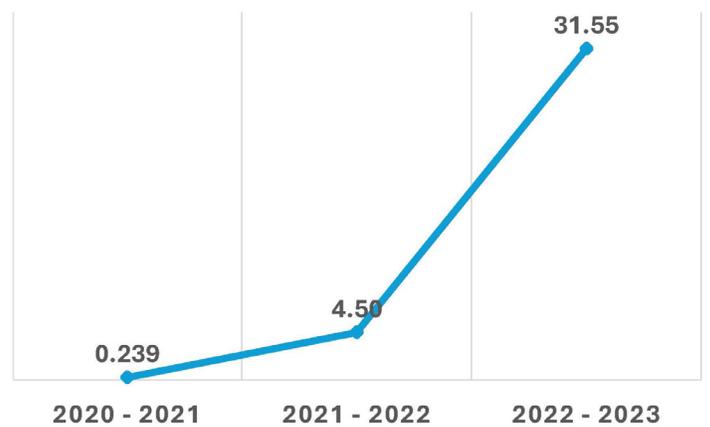
SOUTH TEXAS COLLEGE (MB)



SOUTH PLAINS COLLEGE (TB)

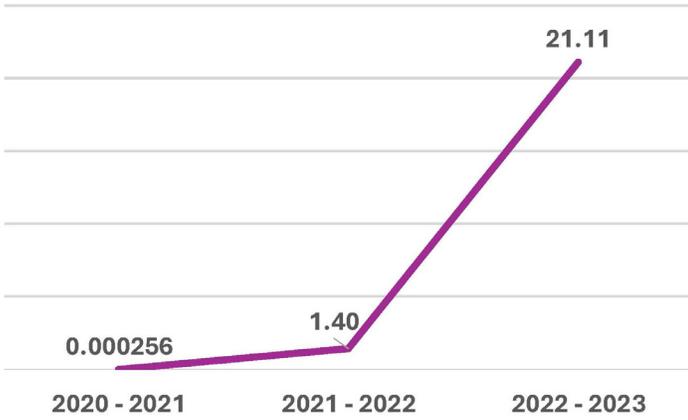


TRINITY UNIVERSITY (GB)

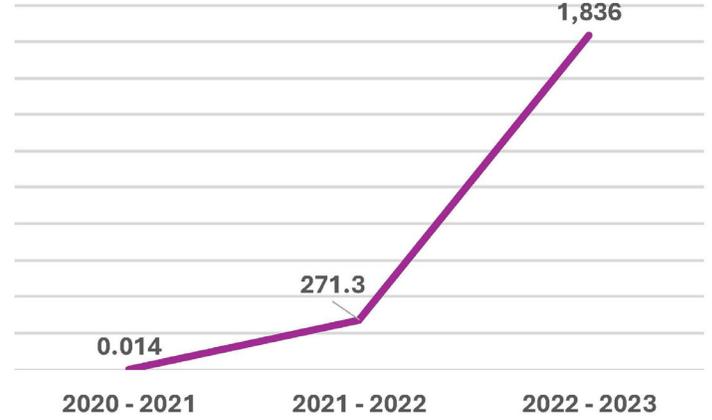


RESEARCH USAGE YEAR OVER YEAR

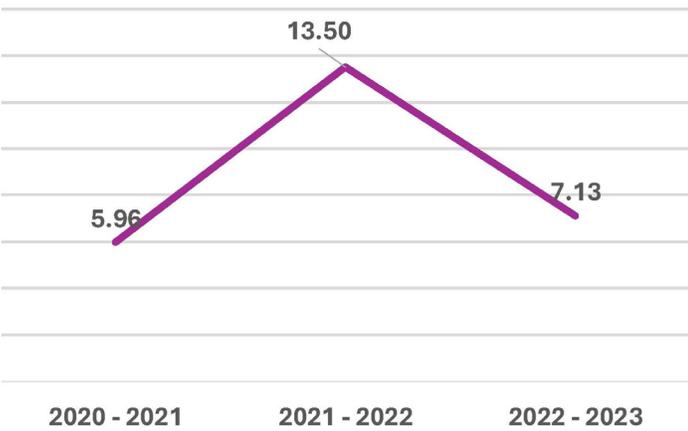
MIDLAND COLLEGE (TB)



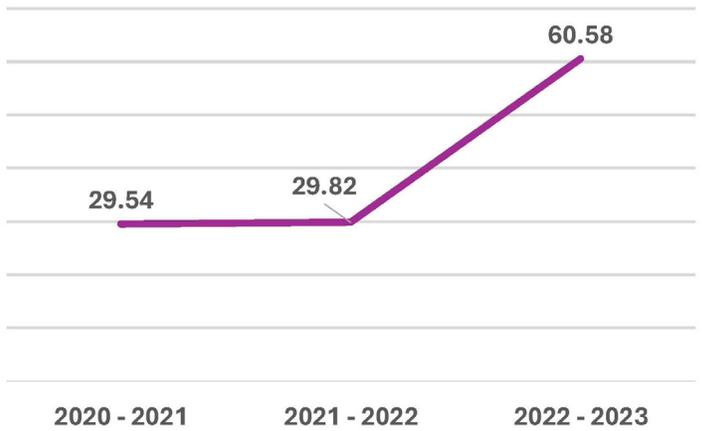
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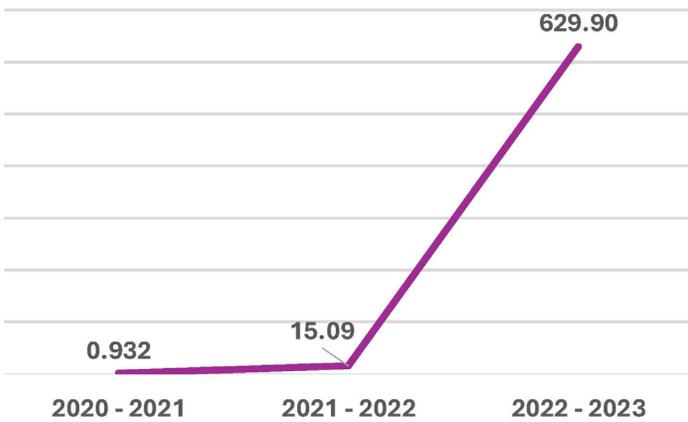
ST. MARY'S UNIVERSITY (TB)



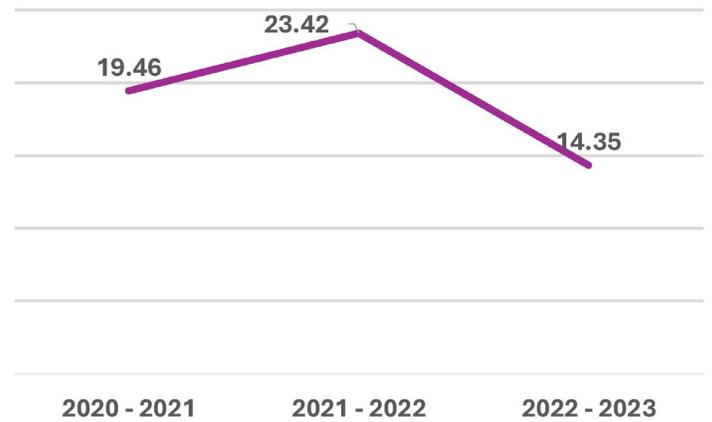
SOUTH TEXAS COLLEGE (TB)



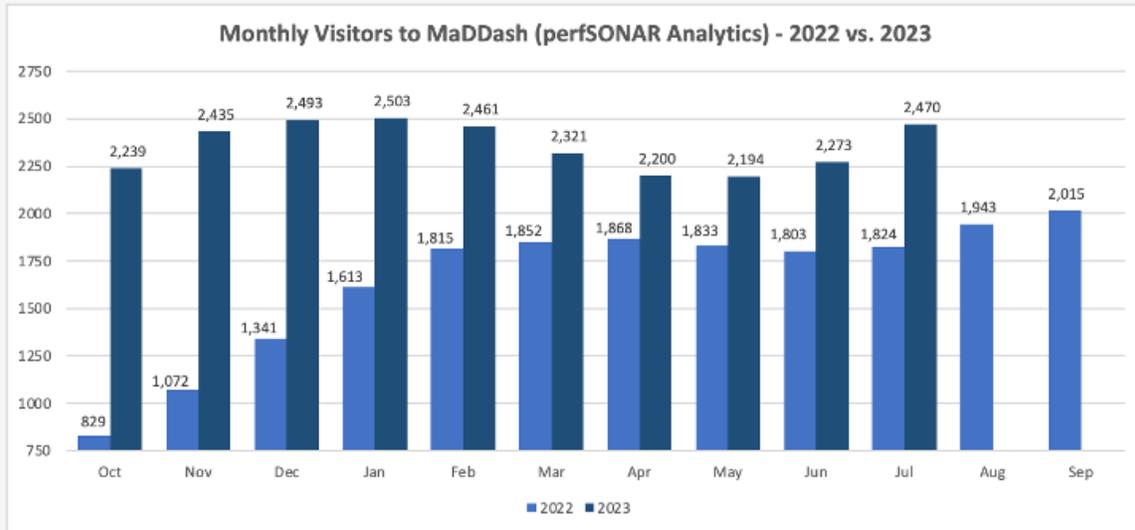
SOUTH PLAINS COLLEGE (GB)



TRINITY UNIVERSITY (TB)



MADDASH MONTHLY VISITORS YEAR OVER YEAR



Participating Campuses

 **SOUTH PLAINS COLLEGE**
Levelland, TX

 **MIDLAND COLLEGE**
Midland, TX

 **MCLENNAN COMMUNITY COLLEGE**
Waco, TX

 **TRINITY UNIVERSITY**
San Antonio, TX

 **ST. MARY'S UNIVERSITY**
San Antonio, TX

 **SOUTH TEXAS COLLEGE**
McAllen, TX

St. Mary's University Campus

SOUTH TEXAS COLLEGE



South Texas College, a community college in the Rio Grande Valley with students whom are distance education students and 70% of whom are the first in their family to attend college – is home of the offices for the North American Advanced Manufacturing Research and Education Initiative (NAAMRE). The research center trains workers to help fuel the region’s manufacturing economy and support innovation in rapid response manufacturing. But doing so requires access to large remote datasets for visualization and immersive reality, which are challenging to support.

Founded in 1993, this institution offers more than 120 degrees and certificates at the associate degree level. They have a faculty and staff of more than 2,700 to serve the college’s six campuses, two education centers and one virtual campus. Since 2000, the college has served over 99,000 dual credit students at 78 school sites. South Texas College’s Institute for Advanced Manufacturing is linked to all community and technical colleges in the region. South Texas College is the lead in training workers to fuel a regional manufacturing economy and to support innovation and rapid response manufacturing.

SOUTH PLAINS COLLEGE



South Plains College is the site of the Center for Clinical Excellence, a state-of-the-art nursing simulation facility located at the Reese Center. In addition to ADN(RN) Nursing programs, SPC offers programs in Child Development, EMS, PTA, Radiology, Respiratory Care, Surgical Tech, and Sterile Processing Tech. The Center houses five simulation suites to train future healthcare workers. The Center’s high-fidelity virtual manikins require gigabyte-size file updates which necessitates greater bandwidth. A high-speed, low-latency connection to LEARN allows the Health Science Division at South Plains College to keep current equipment online and decrease downtime for students.

South Plains College has Five locations located in 3 different cities. As a community-serving institution of higher education, the Arts and Sciences programs, Health Science programs, Technical programs, and Workforce Development programs offered by the college are designed collaboratively with committees from education, local business, healthcare, and local industry.

TRINITY UNIVERSITY



Trinity University is a national liberal arts and sciences university in San Antonio, the 7th largest and one of the fastest growing cities in the U.S., where students learn from and participate in a multicultural urban environment. Trinity University’s endowment is valued at \$1.7 billion, and the University’s student profile reflects a highly selective national liberal arts institution where 49% of enrolled students are U.S. students of color.

With the D. R. Semmes School of Science and the Michael Neidorff School of Business, Trinity emphasizes meaningful education in the natural, physical, social, and behavioral sciences rooted in the humanities. Trinity’s outcomes rate proves the importance of its liberal arts foundation. Within six months of graduation, 98% of recent graduates were employed or enrolled in graduate school.

MCLENNAN COMMUNITY COLLEGE



Nearly half of the student population at McLennan Community College (MCC) is of African American and Hispanic ethnicity. The Highlander Undergraduate Research Institute (HURI) was established in 2011 to promote student success through embedded research (Biology, Genetics, Math), travel-based research courses (Caribbean Coral Reef Research in Roatan, Honduras) and academic cooperative courses. MCC is one of only 26 community colleges in the nation to be part of the NSF-funded Community College Undergraduate Research Initiative (CCURI).

Increased networking capacity through LEARN will support the Texas Integrated Diving and Ecological Studies Laboratory – T.I.D.E.S. – allowing participants in the unique program to move data to/from campus from remote sites in the Caribbean, share data collection among multiple sites, and access cloud resources in research and instruction.



MIDLAND COLLEGE



Midland College (MC) is a public community college with its main campus located in Midland. Out of the total student population, nearly half are of Hispanic/Latino heritage. Although MC offers bachelor's degrees, its mission remains focused on academic associate degree programs that transfer easily to four-year universities and technical degree and certificate programs which provide the skills necessary for immediate entry into the workforce. In addition, Midland College offers special transfer programs to Texas Tech University Health Sciences Center and Texas A&M University.

In addition to contributing to the general scientific body of knowledge, some research projects involve students, giving them hands-on experiences of how scientists work to solve “real-world” problems and facilitate student-mentor relationships that have a profound impact on student success.

ST. MARY'S UNIVERSITY

ST. MARY'S
UNIVERSITY



St. Mary's University (StMU), a nationally recognized private liberal arts institution in San Antonio, Texas, was founded to bring education to the underserved in South Texas. It has a mission to provide a quality, integral education of liberal arts, STEM, and the Marianist faith tradition, educating for academic excellence, service, justice, and peace, with an emphasis on adaptation and change. StMU, a federally designated Hispanic Serving Institution, is ranked #10 in Regional Universities West in the 2020 edition of US News & World Report.

The undergraduate student body reflects the regional population: 48% from Bexar County, 73% minority in 2018 (66% Hispanic), and 35% first-generation college students. In 2019, StMU educated 3,648 students (2,373 undergraduates) in four schools, including the School of Science, Engineering, and Technology (SET), which increased enrollment in 2018 by 13% from 2014.



South Plains College

“With the BGP that LEARN Engineers helped us get up and running, everything is seamless – it was wonderfully well-executed.”

- Curtis White,
St. Mary's University

GRANT PARTNERS

Texas Advanced
Computing Center at
University of Texas at
Austin

www.tacc.utexas.edu

Internet2

www.internet2.edu

The Quilt

www.thequilt.net

Engagement and
Performance
Operations Center

www.epoc.global



McLennan Community College Campus

Through partnerships with the Texas Advanced Computing Center at the University of Texas at Austin, Internet2, The Quilt, and the Engagement and Performance Operations Center, LEARN hopes the project can be extended more broadly to other research and education networks across the United States and to the smaller campuses in their regions.



LEARN would like to extend a special *Thank You* to the contributors below:

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Myra Ochoa
Daniel Ortega
Neal Pape
Robby Ramirez
Gerno Reinard
Darrel Ross
Shawn Shreves
Charles Velasquez
Curtis White

“

We are making massive strides to modernize our offerings on campus. I hope to increase awareness and comfort level of students in the new science facility and create opportunities to discuss our science departments on campus.

- Kristin Bingham,
South Plains College

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