

The Accessibility of Space

Making the Space Industry Accessible to
Texas High School Students

Keilly O'Reilly

The Bush School of Government and Public Service



THE TEXAS LYCEUM



**Mosbacher Institute *for*
Trade, Economics, and Public Policy**

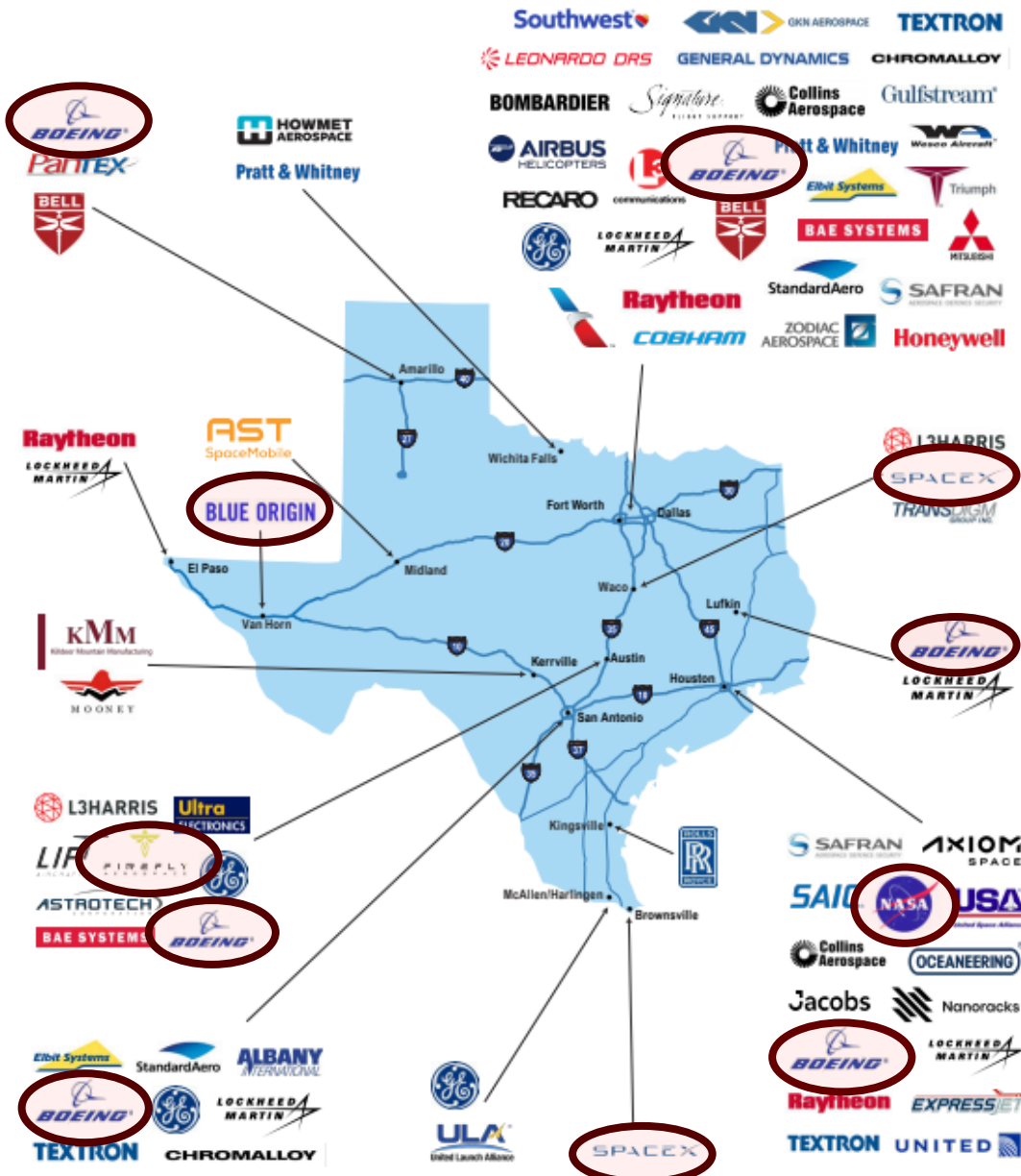
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Research Question:

Are Texas high school students well-prepared for careers in the space industry?

**What does the space industry look
like in Texas?**

Space in Texas



- As of 2022, 138,000 Texans were employed in the space industry, and the sector is expected to grow rapidly.
- Texas hosts four spaceports, dozens of aerospace companies, and is one of the largest clusters of aerospace engineers in the nation.
- Texas is home to both established organizations and emerging space companies. Many of the leading companies are in or near rural areas.

What are the qualifications for careers in the space industry?

Space Job Qualifications

- According to the Texas Economic Development & Tourism Office, leading organizations in space exploration and commercial space transportation and manufacturing in Texas include:
 - NASA Johnson Space Center
 - SpaceX
 - Boeing
 - Blue Origin
 - Firefly Aerospace
- In early February 2024, I combed through every job posting that these five companies offered in Texas and found that...



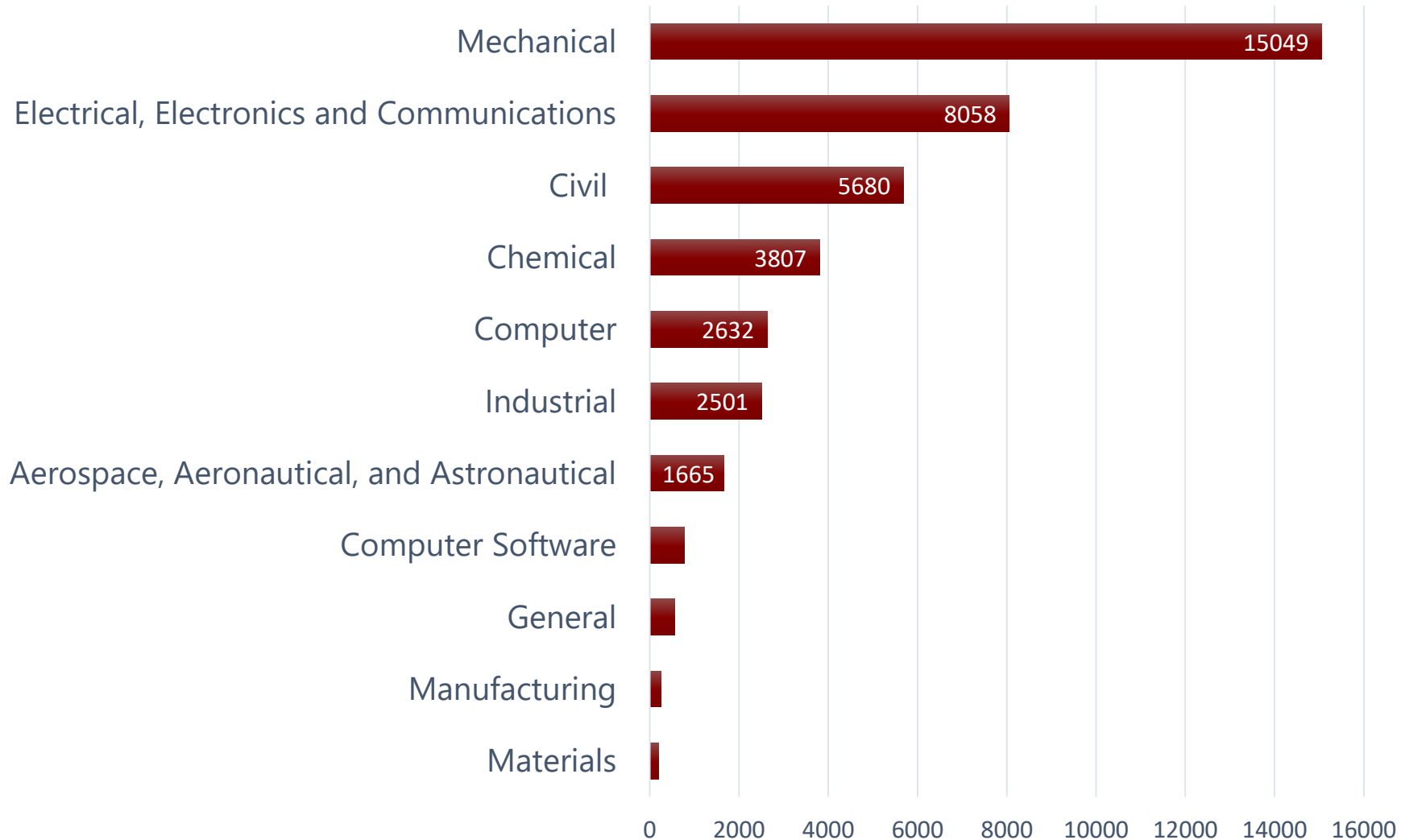
Space Job Qualifications

- ... Although other positions, like scientists and technicians, exist that require other educational backgrounds,
- Around 53% of job openings within these companies require or prefer a Bachelor's of Engineering in one of the following specialties:
 - Aerospace, Aeronautical, and Astronautical Engineering
 - Chemical Engineering
 - Civil Engineering
 - Computer Engineering
 - Computer Software Engineering
 - Electrical Engineering
 - General Engineering
 - Industrial Engineering
 - Manufacturing Engineering
 - Materials Engineering
 - Mechanical Engineering

**Are Texans achieving the credentials
for those careers?**

Degrees Granted

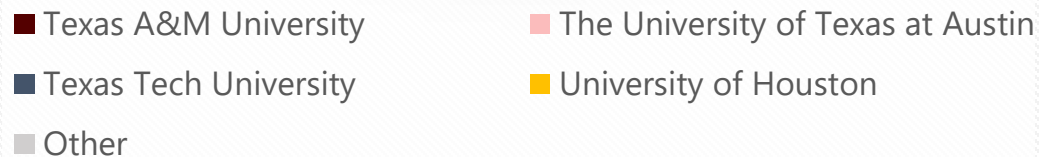
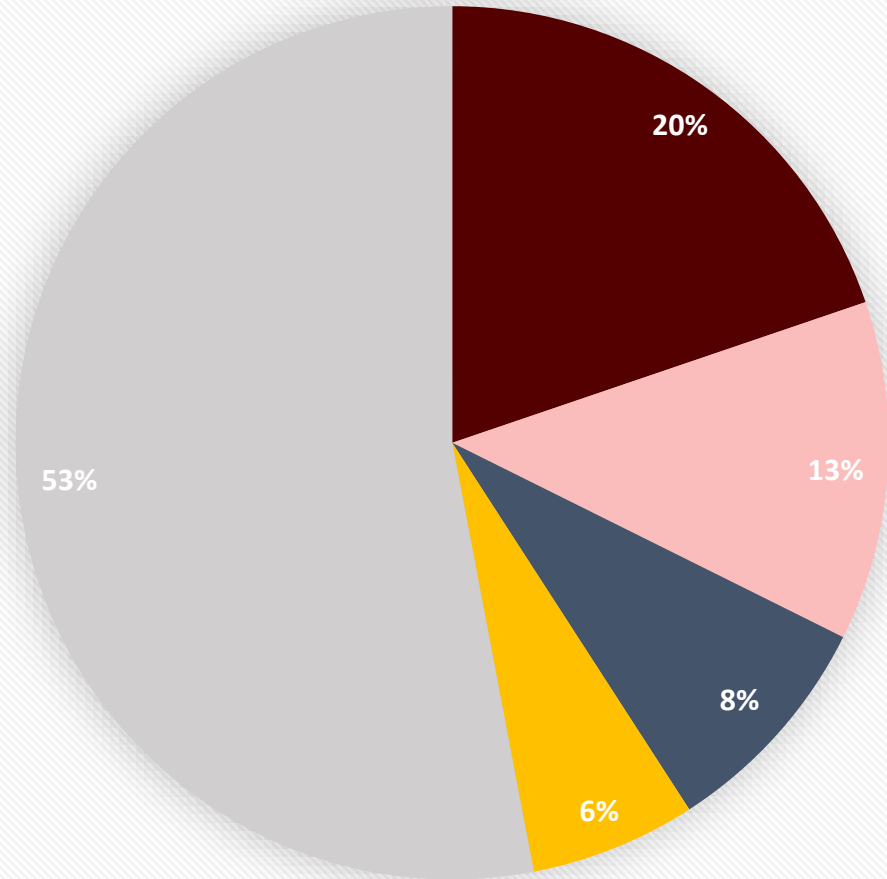
Space-Related Undergraduate Engineering Degrees Granted in Texas, 2018 - 2022



Between 2018 and 2022, 41,170 students graduated in Texas with a Bachelor's degree in these Engineering specialties, representing around 11% of graduates nationally.

**Where are those degrees being
produced?**

Space-Related Undergraduate Engineering Degrees Granted by Texas Colleges and Universities, 2018 - 2022



Texas A&M

Texas A&M is one of 24 schools in the nation to hold a triple-designation as a land-, sea-, and space-grant university.

> 12 A&M colleges are conducting space-related research.

There are 316 active space exploration projects.

> 430 former A&M students currently work at NASA.

A&M has \$154 million in space exploration funding.

A&M has recently approved the creation of the Texas A&M Space Institute and will be building the facility next to NASA's Johnson Space Center.

**How do you get one of those
degrees?**

Attaining the Credentials: TAMU

Texas A&M's required high school coursework for admission into the university includes:

- Four years of English.
- Four years of *Mathematics*
- Four years of *Science*
- Two years of the same foreign language.

To be successful in the Entry to a Major Program, a student ideally needs to be familiar with chemistry, physics, pre-calculus, and calculus at the high school level.

A&M/
College of
Engineering
Application

A&M/
College of
Engineering
Admission

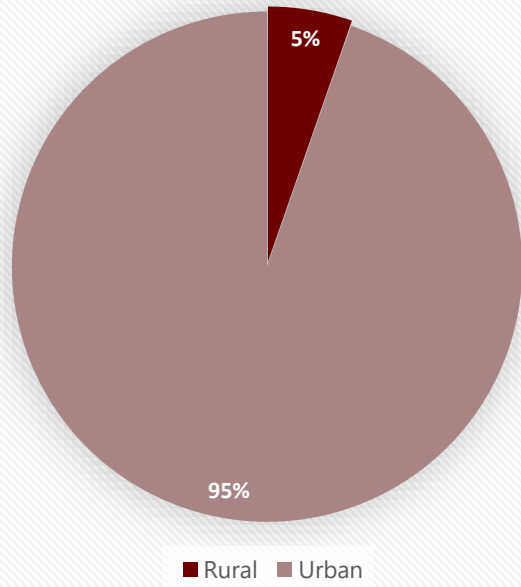
Entry to a
Major
Program

Engineering
Specialty
Application

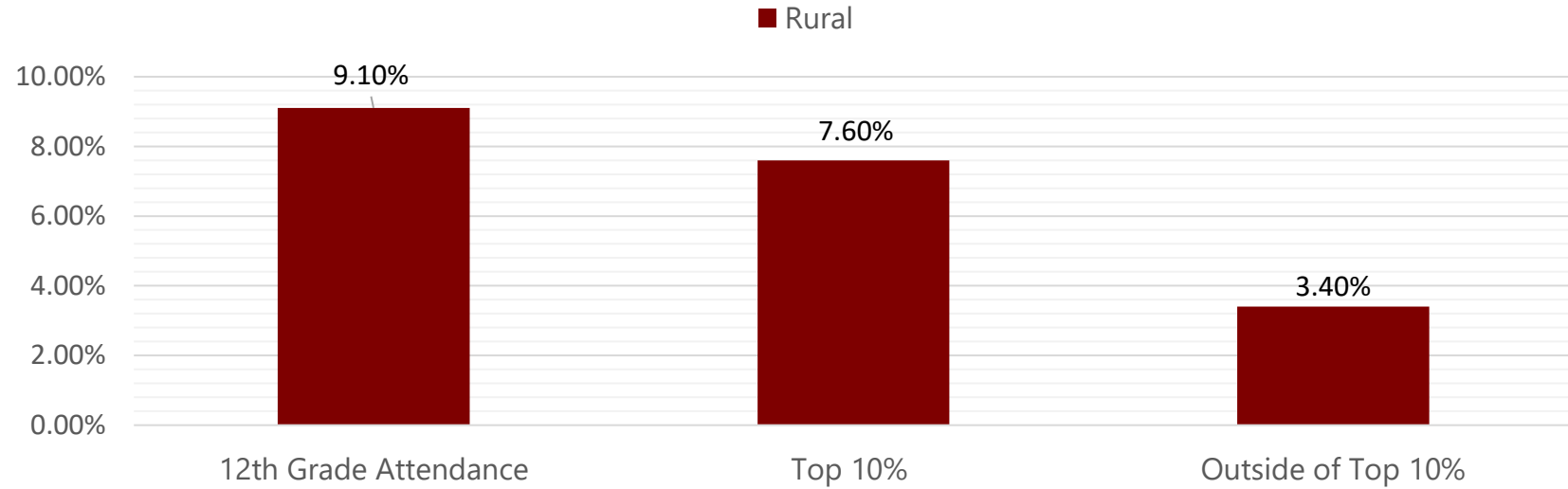
Engineering
Specialty Study

**Who faces barriers to getting those
degrees?**

Total Student Admissions to the TAMU College of Engineering, 2019 - 2023



High School Attendance and Student Admissions, 2019 - 2023

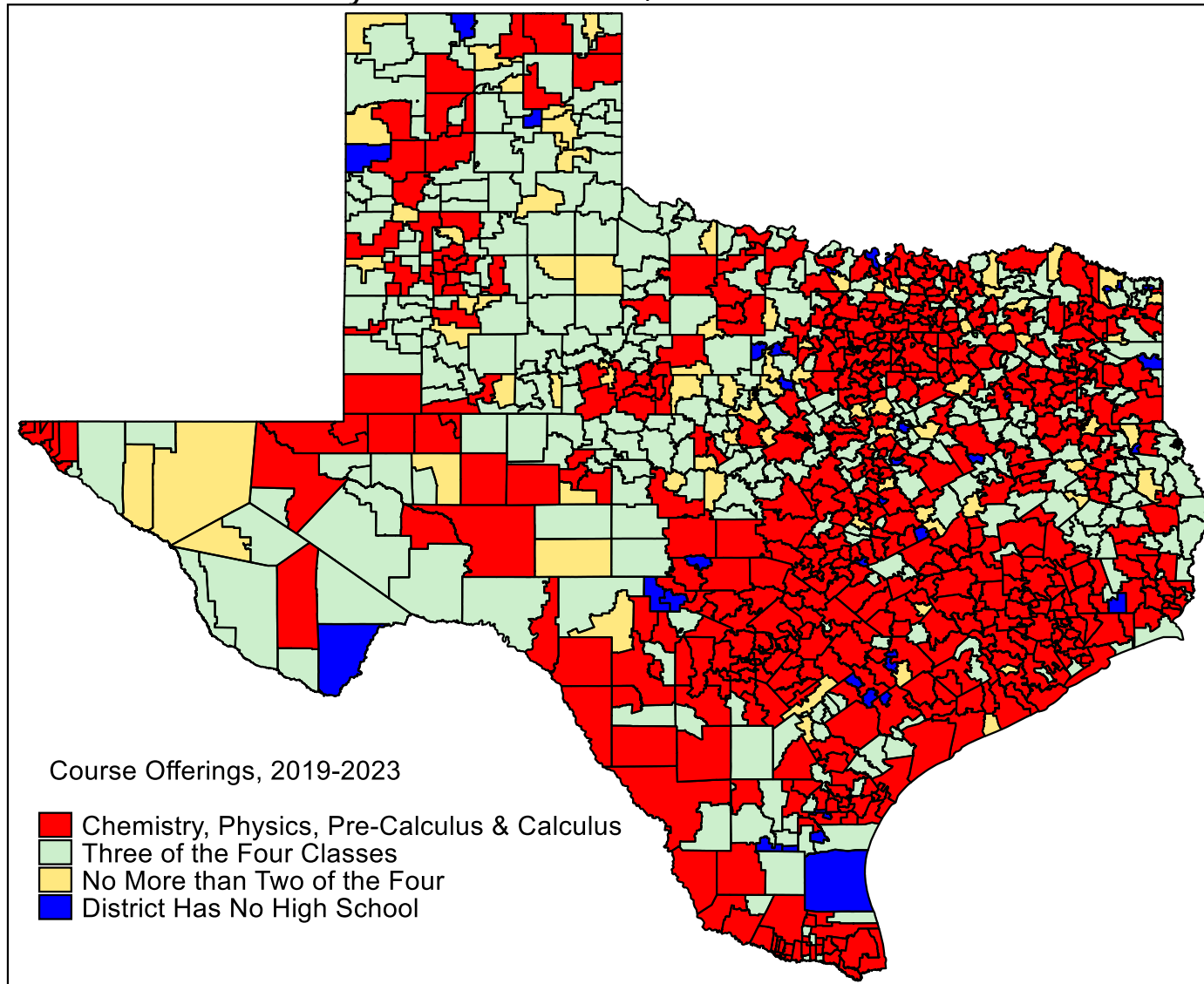


Admissions outside of the top 10% are disproportionately urban.

**Are chemistry, physics, pre-calculus,
and calculus being offered at the
high school level?**

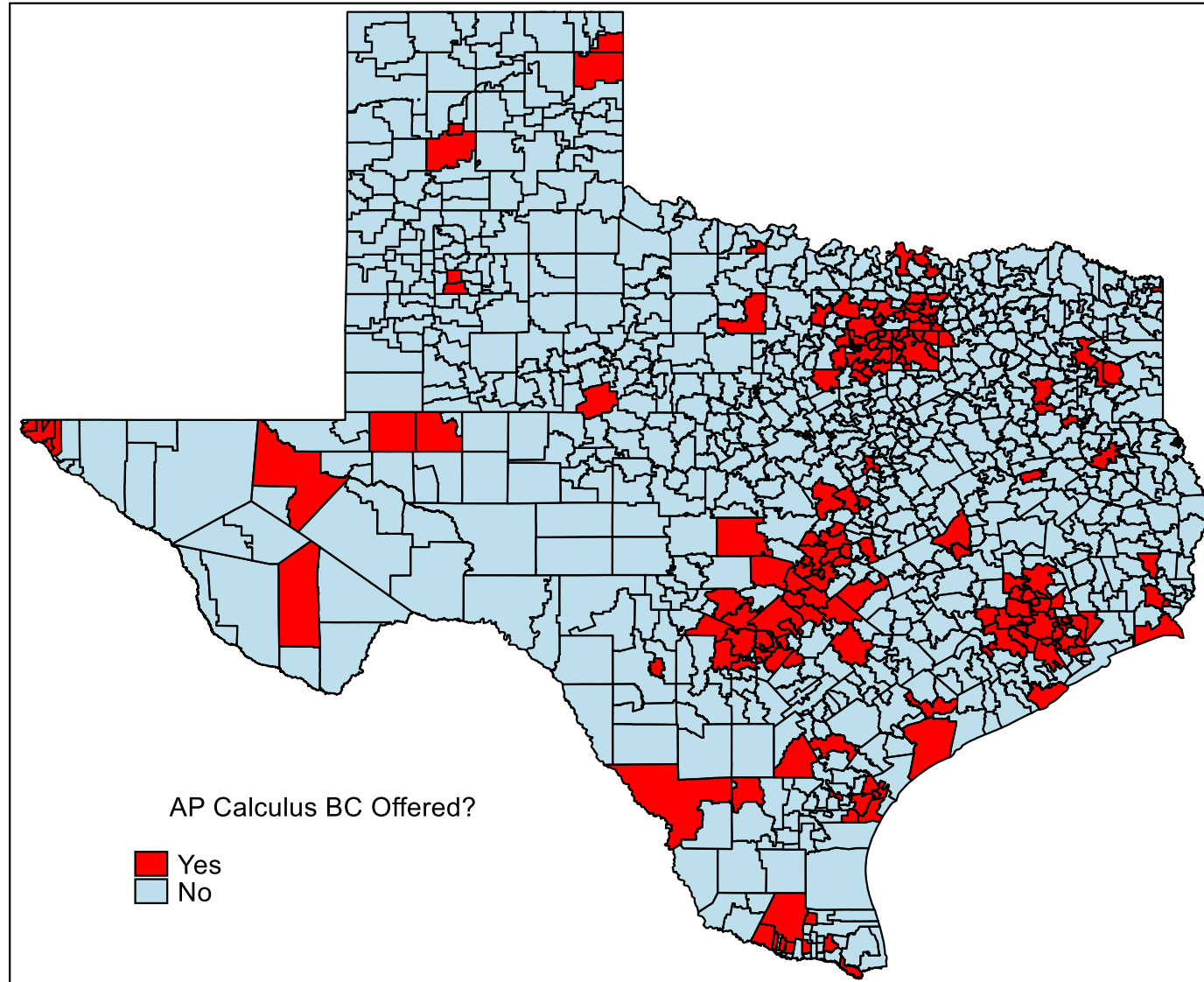
Barriers to the Credentials

High School Chemistry, Physics, Pre-Calculus, and Calculus Course Offerings
by School District, 2019 - 2023



Barriers to the Credentials

High School AP Calculus BC Course Offerings by School District, 2019 - 2023



What's the Takeaway

- The Texas space industry is rapidly growing with many organizations building facilities in or near rural areas.
- Over half of the job openings in leading Texas space companies require or prefer a Bachelor's of Engineering in an engineering specialty.
- The institution with the highest amount of these space-related undergraduate engineering degrees granted from 2018 – 2022 is Texas A&M University.
- Over the past five years, high school students admitted to the Texas A&M College of Engineering were disproportionately urban.
- Rural districts are less likely to have access to high school STEM courses that are required or advantageous for admissions.
- Students attending rural high schools would benefit from chemistry, physics, pre-calculus, and calculus classes offered to them, particularly if they desire a career in the space industry.

Recommendations

- Increase the flexibility of teaching certifications by allowing already certified teachers to teach outside of their field of certification.

Recommendations

- Explore opportunities that would allow students to take courses from outside of their home district, including district collaboration, online/distance education, and specialized summer courses.

Thank you!

Keilly O'Reilly
Keilly.oreilly@gmail.com

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