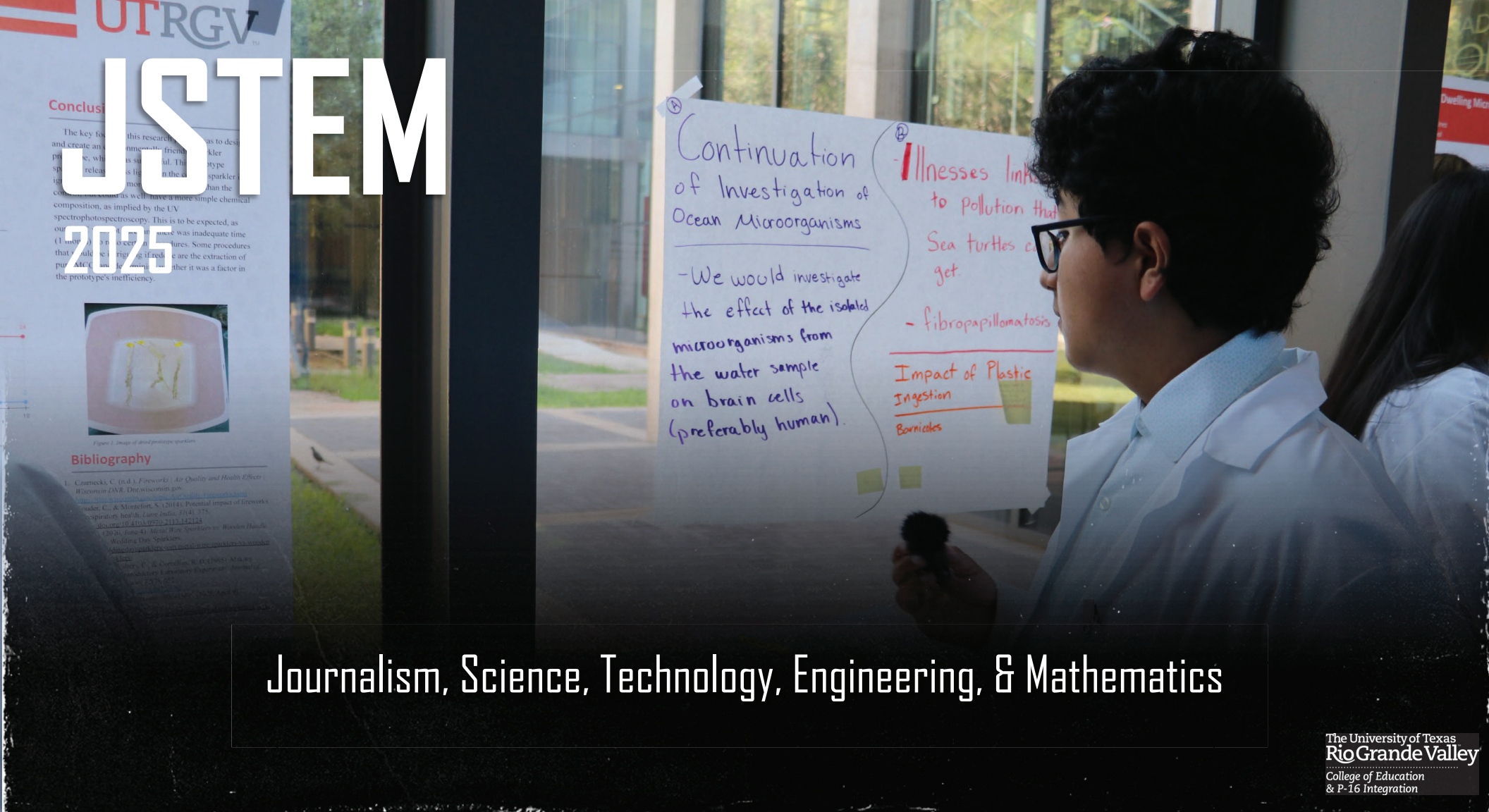
JSTEM

2025



Journalism, Science, Technology, Engineering, & Mathematics

The University of Texas Rio Grande Valley
College of Education & P-16 Integration

JSTEM 2025

During the 2025 Summer Program of JSTEM, the student were given the opportunity to research topics that peaked their upmost interest with the support of the mentors and faculty. Here are the highlights of each groups' project this year.

Team: Air PC

Title: Simulated Impact of Kerosene-Based VOCs Emitted by SpaceX on Plant and Soil Health

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SpaceX is located in Boca Chica, Texas and has recently launched a rocket, the Falcon 9. The rocket fuels used during launches emit volatile organic compounds (VOCs) into the air. SpaceX uses rocket grade-kerosene to fuel their rockets, which emits kerosene in the air. Kerosene is a type of volatile organic compound that can exist in a gas, liquid, or solid(waxy) form. Kerosene is a mixture which can be represented as C12 H26 - C16 H32 . SpaceX releases kerosene into the air that can affect the environment in many ways. The purpose of this project is to investigate how Volatile Organic Compounds (VOCs) released by SpaceX activity in Boca Chica affected the environment of the Rio Grande Valley (RGV). Specifically, this study aims to evaluate the impact of VOCs on soils and plants health by comparing samples from affected and unaffected areas.

Team: Alvin & the Chipmunks

Title: The Effects of Different Water Sources in the Rio Grande Valley on Saccharomyces Cerevisiae

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South middle School

This project looks into the RGV water filtration system to see how pollutants in the water are affecting people who live there. When the yeast cells and water samples were gathered (Canal water from Santa Cruz, Tap water from UTRGV, RGV River water, and Distilled) it was expected to find more bacterial growth in the canal and river water samples rather than the filtered water such as, distilled and tap water. It is believed that there would not be any bacterial growth in the distilled water and little to none in the tap water. Where as, there might me quite a bit of bacteria in canal water and river.

Team: Fantastic Four

Title: Investigating the Effects of Water Dwelling Microorganisms on Yeast Cells

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Harlingen School of Health Professions

Mia Solis
Harlingen School of Health Professions

Paola Sanchez
Donna High School

Elisa Martinez
Harlingen School of Health Professions

The main purpose of our project was to investigate what harmful effects microorganisms can have on yeast cells, which is a eukaryotic organism. By investigating the effects of microorganisms on yeast cells, it allows us to simulate how it might affect humans since they are both eukaryotic cells. In order to complete our experiment, we first collected our sample which are ocean water, rain water, and Rio Grande River water. We investigated two generations using the streak and spread method. Then, we conducted gram staining of all three samples and looked at the slides under the microscope. Next, we created a hybrid agar that would allow the yeast and bacteria to grow. After this step we ran out of time, but we were able to grow something, that we are unsure of what it is, on the plates. On top of that, we did both a coagulase and catalase test as our last step.

Team: The Aristocrats

Title: Alteration and Design of an Eco-friendly Sparkler Prototype

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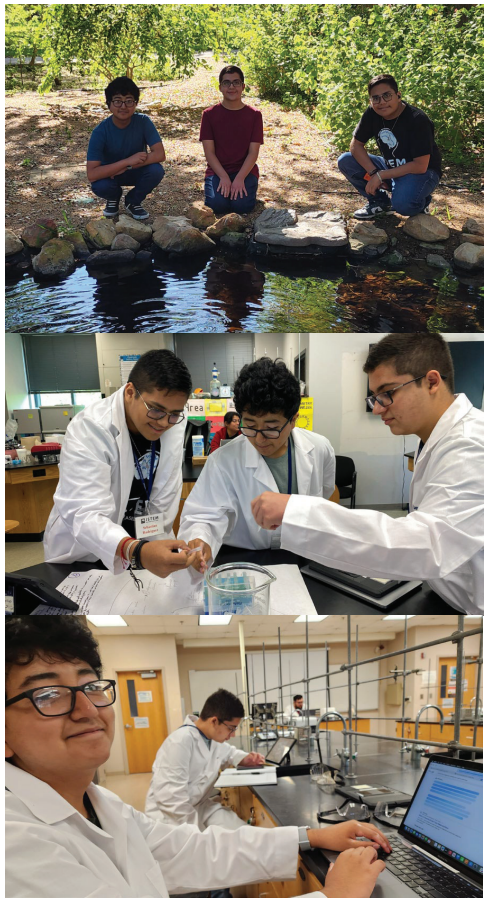
Jimmy Carter Consolidated Early College

Sebastian Amilcar Rodriguez
Jimmy Carter Consolidated Early College

Leonardo Gael Garcia
South Texas ISD Science Academy

The key goal and focus of this research project is to design and develop an environmentally-friendly sparkler prototype that releases prominently less particulate matter (PM) in the surrounding atmosphere, which is composed of more biodegradable materials and components than other commercial sparklers, and all the while maintaining a similar product cost in comparison to other commercial sparklers.



Team: The Lithiums

Title: The Effects of Electromagnetic Radiation on the Proliferation and Viability of *S. Cerevisiae* Cells

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Electromagnetic Radiation (EMR) affects humans in various ways, both positively and negatively. This effect can be through the types intensity, and duration of the exposure. On the positive side, rays from the sun can be beneficial to the cell as it promotes growth. For example, ultraviolet (UV) radiation in small amounts helps the body produce vitamin D, which is essential for healthy bones. However, prolonged exposure to higher energy can be very harmful for humans. These forms of radiation can damage DNA, accelerate aging, and increase the risk of skin cancer. For the purpose of this research, *Saccharomyces cerevisiae*, commonly known as baker's yeast, was used in this experiment due to its fast growth and structure. *Saccharomyces cerevisiae* is a model organism that has been used because it's genome is easily manipulated, undergoes rapid growth (doubling time is: 30 minutes) and has many conserved cellular processes with humans.