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**Irene Salazar**
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**Renee A. Da Silva**
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*The University of Texas at San Antonio*

# STUDENTS

**Alaniz, Jonathan**
St. Philip's College, Biology

*Cataclysmic Variables Data Analysis of the CV2117-54*

Research Completed at:
University of Texas at San Antonio
Mentor: Eric Schlegel, Ph.D.

**Bailey, Mauricio**
Northeast Lakeview College, Engineering

*Autonomous Aerial Drones Employing Object Detection to Accomplish Photogrammetry on a Moving Target*

Research Completed at:
University of Texas at San Antonio
Mentor: Patrick Benavidez, Ph.D.

**Baldwin, Rachel**
San Antonio College, Engineering

*Gravitational Anomaly Examination of the Bee Bluff Geologic Feature near Uvalde, Texas: A Probable Impact Site*

Research Completed at:
San Antonio College
Mentor: Dwight Jurena

**Chavana, Joshua**
San Antonio College, Engineering

*2019 Prototype Hydrogen Fuel Cell Vehicle*

Research Completed at:
San Antonio College
Mentor: Alfred Alaniz

**Cortez, Rocio**
St. Philip's College, Biology

*Are Blood-borne Parasites a Major Contributing Factor in the Decline of Howler Monkeys (Alouatta Palliata)?*

Research Completed at:
St. Philip's College in Collaboration with Ithaca College and the University of Minnesota in Costa Rica
Mentor: Mary Kelaita, Ph.D.

**Dillon, Tasheka**
St. Philip's College, Biology

*Assessment of Insecticide Resistance on Aedes Mosquitosi San Antonio Using CDC Bottle Bioassays*

Research Completed at:
Texas A&M University—San Antonio
Mentor: Megan Wise de Valdez, Ph.D.

**Garcia, Richard**
Palo Alto College, Engineering

*The Uncertainties of Bridges*

Research Completed at:
University of Texas at San Antonio
Mentor: Arturo Montoya, Ph.D.

**Harris, Matthew**
St. Philip's College, Chemistry

*The Effects of Deficient CX3CR1-FLN Signaling on Demyelination in the Corpus Callosum of Reference Versus Variant Expressing Mice Utilizing the Cuprizone Animal Model of Demyelination*

Research Completed at:
University of Texas at San Antonio
Mentor: Astrid Cardona, Ph.D.

**Hawkins, Kristopher**
St. Philip's College, Biology

*Howler Monkey Diet*

Research Completed at:
St. Philip's College in Collaboration with Ithaca College and the University of Minnesota in Costa Rica
Mentor: Mary Kelaita, Ph.D.

**Hernandez, Elizabeth**
Northwest Vista College, Engineering

*Tissue Engineered Skeletal Muscle with Different Myogenic Proportions to Study Angiogenesis*

Research Completed at:
University of Texas at San Antonio
Mentor: Christopher Rathbone, Ph.D.

**Hooker, Adam**
Northwest Vista College, Electrical Engineering

*Deep Learning Approach to Creating Heterogeneous Model of Lunar Environment*

Research Completed at:
University of Texas at San Antonio
Mentor: Yufang Jin, Ph.D.

**Lopez, Sara**
Palo Alto College, Biology

*Water Quality Comparison Between Medina River Natural Area and Medina River Downstream of the Leon Creek Water Recycling Center*

Research Completed at:
Palo Alto College
Mentor: Robert Miranda, Ph.D.

# STUDENTS

**Maldonado, Gabriela**
Northeast Lakeview College, Biology

*The DNA Uptake Pilus Involvement in Type VI Secretion System Dependent Killing of Vibrio Cholerae*

Research Completed at:
University of Texas at San Antonio
Mentor: Karl Klose, Ph.D.

**Martinez, Joseph**
Northwest Vista College, Engineering

*Signal and System Diagnostics for Software Defined Radios Using GNU Radio*

Research Completed at:
University of Texas at San Antonio
Mentor: Brian Kelley, Ph.D.

**Medina, Isaac**
San Antonio College, Engineering

*2019 Prototype Hydrogen Fuel Cell Vehicle*

Research Completed at:
San Antonio College
Mentor: Alfred Alaniz

**Nava, Milton**
Northwest Vista College, Biomedical Engineering

*Poly (β-amino ester) pH-Sensitive Nanocarriers for the Intracellular Delivery of Gene Editing Tools*

Research Completed at:
University of Texas at San Antonio
Mentor: Gabriela Romero Uribe, Ph.D.

**Ramirez, Justin**
Palo Alto College, Biology

*Comparison of Water Quality Between Leon Creek and Medina River Downstream of the Leon Creek Water Recycling Center*

Research Completed at:
Palo Alto College
Mentor: Robert Miranda, Ph.D.

**Rangel, Isaias**
Northwest Vista College, Engineering

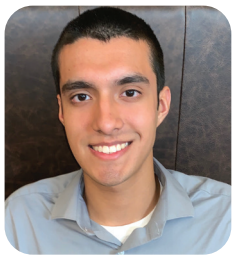
*Finite Element Analysis, Nonlinear Elastic Membrane Analysis, and Geometric Modeling for AAA Wall Stress Prediction*

Research Completed at:
University of Texas at San Antonio
Mentor: Ender Finol, Ph.D.

**Rockel, Ian**
St. Philip's College, Biology

*Non-human Primate Microbiome Sampling*

Research Completed at:
St. Philip's College in Collaboration with Ithaca College and the University of Minnesota in Costa Rica
Mentor: Jonathan B. Clayton, Ph.D.



**Rios, Tristen**
Northeast Lakeview College, Biology

*Synthesis and Characterization of Copper (II) Complexes with Heterocyclic Ligands*

Research Completed at: The University of the Incarnate Word
Mentor: Rafael Adrian, Ph.D.

**Salazar, Liliana**
Northeast Lakeview College, Biology

*Type 1 Secretion for Heterologous Antigen Expression in a Tularemia Vaccine*

Research Completed at:
University of Texas at San Antonio
Mentor: Xhavit Zogai, Ph.D.

**Silva, Gerardo**
San Antonio College, Engineering

*2019 Prototype Hydrogen Fuel Cell Vehicle*

Research Completed at:
San Antonio College
Mentor: Klaus Bartels

**Soto, Madison**
San Antonio College, Engineering

*2019 Prototype Hydrogen Fuel Cell Vehicle*

Research Completed at:
San Antonio College
Mentor: Dan Dimitriu, Ph.D.

**Tandog, Joshua**
Northwest Vista College, Engineering

*Investigating Macrophage Activations using Deep Learning*

Research Completed at:
University of Texas at San Antonio
Mentor: Yufang Jin, Ph.D.

## STUDENTS

**Urrutia, Felipe**
Northeast Lakeview College, Biology

*Insect Response to an Improved Water Treatment Basin: Pre-construction Sampling and Analysis of Collection Methods and Habitat Influences.*

Research Completed at:
University of Texas at San Antonio
Mentor: Brian Laub, Ph.D.

**Willars, Shaun**
Northwest Vista College, Biology

*Methodology and Complex Molecule Synthesis*

Research Completed at:
University of Texas at San Antonio
Mentor: Oleg Larionov, Ph.D.

**Zapata, Sabrina Nicole**
Palo Alto College, Biology

*Effect of Soil Microbes and Plant Competition on Sideoats Grama Germination and Early Development*

Research Completed at:
Texas A&M University—San Antonio
Mentor: Jose Rodolfo Valdez Barillas, Ph.D.

**Zarate, Alejandro**
St. Philip's College, Engineering

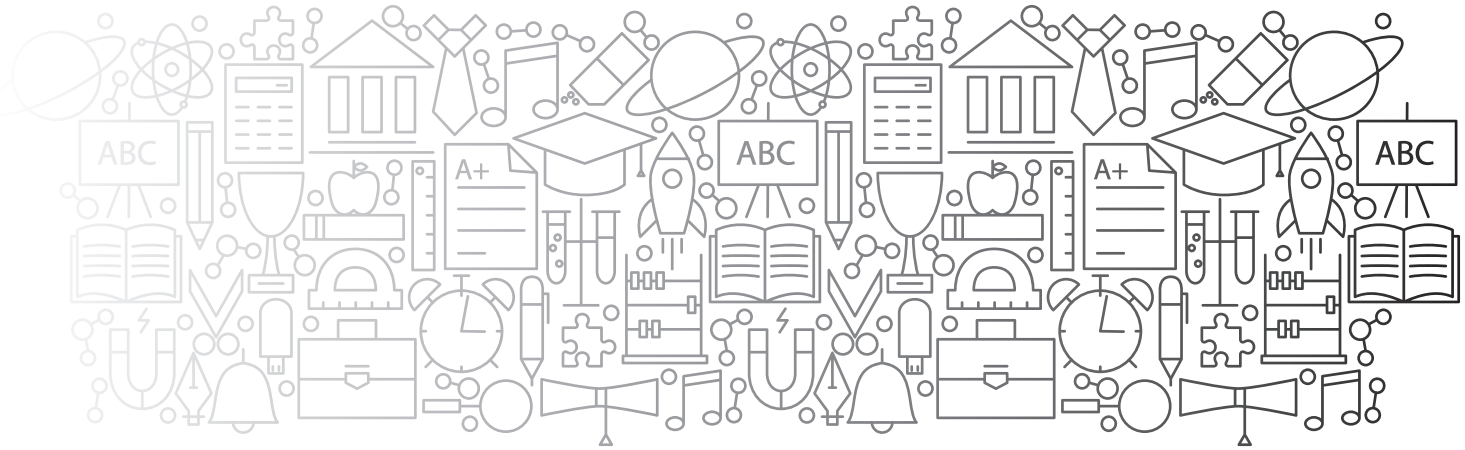
*Automated Unmanned Ground Vehicles (UGV)*

Research Completed at:
University of Texas at San Antonio
Mentor: Patrick Benavidez, Ph.D.

**Zelaya, Litzy**
Northeast Lakeview College, Engineering

*Novel Endotracheal Tube System*

Research Completed at:
University of Texas at San Antonio
Mentor: R. Lyle Hood, Ph.D.




# Congratulations, Students!

# Alamo Colleges CIMA Researchers (not pictured)

## St. Philip's College

1. **Title:** *"Volatile Organic Carbons Absorbed by the Ball Moss, Tillandsia Recurvata: Preliminary Studies" (Part 1)*
**Authors:** Colon, Brandon; Armstrong, Chrishall; Park, Jeewon; and Alba, Lourdes (Faculty Advisor)

   **Abstract:** Methanol Extracts were prepared separately from the leaves, roots, and flowers of Tillandsia recurvata collected from different environments, including a set deliberately exposed and grown for two months in automotive vapors. Gas Chromatography-Mass Spectrometry was used in tandem to determine the uptake of volatile organic compounds of the exposed plants in comparison with the normally grown plants. Results indicate a definite capability of Tillandsia for absorbing volatile organic carbons.

2. **Title:** *"Development of a Method for the Extraction of Potential Pharmacologically Active Compounds from the Ball Moss, Tillandsia Recurvate" (Part 2)*
**Authors:** Armstrong, Chrishall; Park, Jeewon; and Alba, Lourdes (Faculty Advisor)

   **Abstract:** A novel method for obtaining biologically active materials from Tillandsia recurvata was developed and compared with extraction methods using organic solvents alone for extraction.

   Freshly picked samples of Tillandsia recurvata from an urban, non-industrial area in San Antonio, Texas were used to establish base-line data for the extraction. Plant material in methanol-water was subjected to ultra-sonication to disrupt the cells and release the biologically active compounds. Extracts recovered by that method were compared with extracts prepared by methanol extraction alone. The percentages by dry mass showed comparable total quantities extracted. The subsequent analysis of fractions by HPLC showed greater amounts of isolated compounds and more distinct peaks, indicating more efficient extraction.

3. **Title:** *"Determining the InVitro Growth Characteristics of Tillandsia Recurvata (Ball Moss) Prior to Environmental Studies" (Part 3)*
**Authors:** Burroughs, Rosa; Perez, Elizabeth; Perez, Jaid; and Alba, Lourdes (Faculty Advisor)

   **Abstract:** Ten freshly picked units of the Ball Moss Tillandsia recurvata were arranged uniformly in polycarbonate containers and grown in the controlled environment of a growth chamber. For comparison, a counterpart set, also arranged similarly in a polycarbonate container, was grown in the ambient conditions of the Research Lab average T = 22 Celsius and indoor fluorescent ceiling lights.

   Diameters and masses of the individual plants were measured at regular periods for a total of two weeks. Comparison of growth showed optimum conditions to be 24C.

4. **Title:** *"Investigating Learning and Memory in Apis Melliera Cecropia"*
**Authors:** Rodriguez, S.D.*; De Jesus-Soto, M.G.; Fletcher, S.J.; Pretends Eagle, T.J.; Pentanidou, T.; Tscheulin, T.; Barthell, J; Giray,T.; Abramson, CI. (St. Philip's College*; University of Puerto Rico; Southeast Oklahoma State University; North Dakota State University; University of the Aegean; University of Central Oklahoma; and Oklahoma. State University).

   **Abstract:** Investigating Learning and Memory in Apis melliera cecropia, the native honeybee, on the Greek Island of Lesvos. My team of four, Sierra Dee Rodriguez of St. Philip's College, Michael G De Jesus-Soto of the University of Puerto Rico, Troy Joseph Pretends-Eagle of North Dakota State University and Skylar Fletcher of Southeastern Oklahoma State University are currently working on six experiments with Charles I. Abramson of Oklahoma State University and Tugrul Giray of the University of Puerto Rico. Our experiments are novel and elegant in nature, where our focus is training the bees to push a cap to reveal a hidden food source. In addition, we are applying learning assays to evaluate the honeybees' capacity to be trained to other special tasks and their social ability to learn from each other without human interference.

5. **Title:** "*Metal Organic Frameworks: Synthesis and Catalysis"*
**Authors:** Panthi, Basu D. (Faculty Advisor); McCance, Sophia; Harrison, Matthew; Hendry, Jayden; Toure, Abdoul; and Serpas, Jonathan

   **Abstract:** Catalysis is a process in which the rate of a chemical reaction is increased by the presence of some other chemical substances. That chemical substance is called a catalyst. Catalysis has an extremely significant role in industries. Various types of catalysts have been used in industries, including manufacturing that dates back to 1746. The target of this research is to explore a new material with better catalytic performance.

   Metal-Organic Frameworks (MOF) have drawn attention as potential catalysts offering highly porous materials with high surface area and thermal stability. Current work presents simple MOFs synthesis and some test reactions. nickel, cobalt, copper, and zinc metals were used, and terephthalic acid, adipic acid, and imidazole were used as the organic framework. Oxidation of alcohol, Aldol condensation, and esterification was used as the pilot reactions. Very impressive results were observed with this experiment.

## San Antonio College

6. **Title:** "*2019 Prototype Hydrogen Fuel Cell Vehicle"*
**Authors:** Chavana, Joshua; Medina, Isaac; Moore, Alexandra; Hahn, Austin; Soto, Madison Rose; Ewald, Eric; Vega, Norma-Gene; Rosario, Andres; Navarro, Joseph; Johnson, Chris; Silva, Gerardo; Webb, Eleida; and Alaniz, Alfred (Faculty Advisor)

   **Abstract:** Students created a prototype vehicle that competed in the Shell Eco-marathon Americas 2019 fuel efficiency event. For this project, the team's mission was to design, build, and test a hydrogen fuel cell vehicle made with composite materials, and other lightweight structural components. For the electrical system, the team researched various powertrain options to improve the performance of the 2018 vehicle's electrical system while maintaining high fuel efficiency. The original 1000-watt fuel cell was measured to have decreased in efficiency by 15% resulting in poor performance and was replaced with a new 500-watt fuel cell. The team focused on reducing weight, maintaining aerodynamics, and increasing electrical system efficiency. With a multitude of modifications over the years, the team succeeded in constantly breaking San Antonio College fuel efficiency results, achieving 1286 mpge in 2019. Furthermore, the information learned from alternative fuel sources, automotive components, and project management has paved a clearer road on how to be more environmentally conscious especially within the transportation industry. In practice, our research will lead to future reduction in carbon emissions and global warming.

7. **Title:** *"Gravitational Anomaly Examination of the Bee Bluff Geologic Feature near Uvalde, Texas: A Probable Impact Site"*
**Authors:** Aguilar, Ashley; Baldwin, Rachael; McCaskill, Patrick; and Jurena, Dwight (Faculty Advisor)

   **Abstract:** The 2019 Student Undergraduate Research Program (SURP) Team continued work on a geological site known as Bee Bluff. This possible impact structure is located 20 miles southwest of Uvalde, Texas, near the west bank of the Nueces River, adjacent to US 83 in La Pryor, Texas. Through observed planar deformation and gravity anomalies, it is theorized that a meteorite caused the geological formation approximately 30 million years ago. Geologist William F. Wilson first categorized Bee Bluff as a potential impact site in the early 1970s. Later, in the late 1990s and early 2000s, geologist Dwight Jurena continued to gather field information on Bee Bluff. Today Dwight Jurena continues his work with several SURP groups. The 2019 team has been utilizing surveying techniques and gravitational measurements in order to form an image of the structure's southern rim and using an automatic level (Leica 28x), stadia rod (CTS/Berger 16ft MeasureMarkand), seco rod (level 5001-10), in addition to various other field instruments. Elevation of previously staked hubs was recorded and compared with previous gravity measurements. Comparing previous gravity data with the 2019 data, a complete cross-section of the crator's southern-uplift has been finalized, showing a gravity anomaly across the structure.

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# CIMA-LSAMP UNDERGRADUATE

## Research Program 2019

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