

MCNAIR SCHOLARS ABSTRACT JOURNAL

Presented at the
Twenty-fifth Annual McNair Scholars Research Symposium
Lamar University, Reaud Event Center
November 11, 2024



Developing Leaders
Through Graduate Education



OFFICE OF THE ASSOCIATE
PROVOST FOR ACADEMIC AFFAIRS
LAMAR UNIVERSITY
McNair Scholars

November 11, 2024

Dear Friends:

Welcome to the Twenty-fifth Annual McNair Scholars Research Symposium. We thank you for joining us to celebrate the accomplishments of Lamar University's McNair Scholars.

By the time you read these abstracts, the Scholars will have successfully completed their Oral Defenses and spent weeks preparing for today's presentations. The McNair Scholars Program at Lamar University is in its twenty-fifth successful year and each year we are amazed at the intricacies of the topics the Scholars cover in their research. The research you will hear tonight is the culmination of a year's worth of commitment and dedication from the Scholars as well as the Lamar faculty and staff that have devoted their time and skills to collaborating with the Scholars on their research.

We are very fortunate to have the support and encouragement of many faculty and staff members who have worked with our students as social mentors or who have presented workshops and seminars on the many aspects of graduate and faculty life. These individuals give a valuable gift to our students – time in volunteering to support, encourage, and nurture our Scholars' aspirations.

We would like to extend heartfelt appreciation to the Faculty Mentors who have fostered the academic growth of the Scholars this year. Some of the university's most talented undergraduates have worked with extraordinary faculty this year. Many hours of hard work and dedication went into these research projects and the success of the Scholars is largely attributed to the mentors' talents, expertise, and motivation.

Scholars, as you look forward to continuing your education, look at this year as foundation work for what you will accomplish in graduate school and beyond. You have overcome many obstacles this year and have much to be proud of. It has been a pleasure to see your creative ideas come to fruition in the form of your presentations tonight. Our congratulations go out to each McNair Scholar on completing an incredible project and for carving a path to even more illuminating experiences.

We hope you enjoy listening to our Scholars today. We are honored to have these talented students and dedicated faculty at Lamar University, and we wish to extend our commendations and congratulations to everyone on a job well done.

Pamela K. Comer, Director
McNair Scholars Program

Lamar University Mission Statement

Lamar University is dedicated to student success by engaging and empowering students with the skills and knowledge to thrive in their personal lives and chosen fields of endeavor. As a doctoral granting institution, Lamar University is internationally recognized for its high-quality academics, innovative curriculum, diverse student population, accessibility, student success, and leading-edge scholarly activities contributing to transforming the communities of Southeast Texas and beyond.

Lamar University McNair Scholars Program Mission Statement

The mission of the Lamar University McNair Scholars Program is to provide promising undergraduates with the knowledge necessary to achieve and successfully obtain a terminal degree. The federally funded TRiO program accomplishes this through enhancement workshops, advanced research, a mentoring program, and a supportive atmosphere.

Lamar University McNair Scholars Program Vision

The Lamar University McNair Scholars Program will continue to increase the number of eligible low-income, first generation students or those underrepresented in graduate study who enroll and complete graduate programs earning a terminal degree.

We will remain a program that strikes a deep chord within our students to pursue and complete an education (not just a degree) beyond their undergraduate degrees.

We are dedicated to providing an exceptional undergraduate research experience including cultural and service activities, integrating state-of-the-art computer facilities and software, and providing dedicated faculty mentors and staff.

We will continue to be a leading undergraduate research program that opens doors to all disciplines towards furthering the pursuit of graduate degrees.

Our curriculum will reflect the most current trends in order for our students to gain acceptance to the most ardent schools of graduate studies.

The McNair Scholars Program is committed to helping students build solid foundations in their professional and personal relationships through mentoring, group building activities and fostering a sense of accomplishment in their educational goals at the end of their program.

“The farther we see, the further we go.”



The Advent of TRiO Programs

Since their establishment in the mid-sixties as part of Lyndon Johnson's War on Poverty Program, the federal TRiO Programs have attempted to provide educational opportunity to help Americans overcome class and social barriers to higher education. The TRiO programs are funded under Title IV of the Higher Education Act of 1965. While student financial aid programs help students overcome financial barriers to higher education, TRiO programs help students overcome class, social and cultural barriers to higher education. There are eight TRiO programs including: Upward Bound, Talent Search, Student Support Services, Veterans Upward Bound, Educational Opportunity Centers, Upward Bound Math & Science, the Ronald E. McNair Post-Baccalaureate Achievement Program, and a training program for TRiO staff.

There are more than 150 McNair programs across the United States and Puerto Rico, serving over 4,000 undergraduates. The McNair Scholars Program has been at Lamar since 1999 and has seen over 200 graduates attend over 30 different graduate programs across the world.

The Lamar University Ronald E. McNair Post-Baccalaureate Achievement Program is 100% federally funded at \$230,215 annually by the U.S. Department of Education.

The Life of Ronald E. McNair



Ronald Erwin McNair was born October 21, 1950, in Lake City, South Carolina, to Carl and Pearl McNair. Although he grew up amidst crushing poverty, McNair always exhibited a deep thirst for scientific knowledge. In 1971, he graduated magna cum laude with a Bachelor of Science in Physics degree from the North Carolina A & T State University. In 1976, he earned his Ph.D. degree in Physics at the Massachusetts Institute of Technology and went on to work with the Hughes Research Laboratory where he became recognized as an expert in the field of laser physics.

In addition to his academic achievements, Dr. McNair received three honorary doctoral degrees and many fellowships and commendations. These included the Presidential Scholar, 1967-1971; Ford Foundation Fellow, 1971-1974; National Fellowship Fund Fellow, 1974-1975; Omega Psi Phi Scholar of the Year, 1975; Distinguished National Scientist, National Society of Black Professional Engineers, 1979; and Friend of Freedom Award, 1981. He also held a fifth-degree black belt in karate and was an accomplished jazz saxophonist.

Dr. McNair realized his dream of becoming an astronaut in 1978 when he was selected from a pool of ten thousand applicants for the NASA space shuttle program and became the second African-American to fly in space. After his death aboard the space shuttle *Challenger* in 1986, Congress approved funding for the Ronald E. McNair Post-Baccalaureate Achievement Program, which is dedicated to the support and promotion of the high standards of achievements exemplified by McNair.

SCHEDULE OF PRESENTATIONS

Session	Reaux	Room 104
One	Estrella Balderas	Olivia Cobb
Two	Kaitlin Ricks	Kenzie Marriott
Three	Vicky Longoria	Chloe Lopez
Four	Matthew Flores	Maci Simmons
Five	Christie Luong	E.J. McMillen
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Session One

Reaud

Additive Nanoparticles for the Improvement of Mechanical and Anti-Bacterial Properties in Polyetheretherketone (PEEK)

Estrella Balderas and Dr. Paul Bernazzani, Faculty Mentor

The need to prevent the by-products and negative aesthetic effects of titanium dental implant corrosion has initiated a search for a possible alternative to titanium that can match the osseointegration, durability, and strength of the material. A suggested, but understudied, material that can serve as an alternative to titanium is polyether ether ketone (PEEK). Additive nanoparticles can be added to PEEK to increase the known properties of the material. Various amounts of Iron (III) oxide nanoparticles were added to PEEK in solution. The thermal stability of the resulting material was tested using differential scanning calorimetry (DSC). Results show that the polymers coated with the nanoparticles showed heightened melting points, suggesting an increase in bond strength.

Room 104

Portraits Of Lamar: Direct Observation and Applied Techniques

Olivia Cobb, and Dr. Xenia Fedorchenko, Faculty Mentor

Portraits from Direct Observation is a project exploring portraiture by painting live models from direct observation. Portrait painting is a unique view into the artist's perspective of reality. Working from direct observation, the paintings encapsulate time through each brush stroke. The specific use of colors and paint application displays an expressive truth. Lamar students, faculty, staff, and alumni volunteer to sit for their portrait painting. This project aims to deepen the artist's understanding of academic painting. This six-month-long painting project shows a view of progression through various phases. After completing 40 paintings in the studio, A three-week-long mentorship with professional artist Paul Manes in Basalt, Colorado, will give a view into the professional world of painting. Through academic training and exploring philosophical ideas, Portraits from Direct Observation aims to examine the reality of a painting while building a foundation for a future art career.

Session Two

Reaud

Fluorescent Chemosensors for the Detection of ATP/ADP

Kaitlin Ricks, and Dr. Zhifo Guo, Faculty Mentor

This study focused on the development of a highly selective fluorescent chemosensor for the detection of adenosine triphosphate (ATP), with increased production being a common cancer biomarkers. The proposed sensor is based on a novel fluorophore that exhibits significant fluorescence enhancement upon binding to ATP, facilitated by specific interactions such as hydrogen bonding and electrostatic attraction. Using fluorescence spectroscopy, we looked to demonstrate a pronounced increase in emission intensity in the presence of ATP, with minimal response to other nucleotides, ensuring high selectivity. Although the originally proposed sensor was not successful in the selective detection of ATP, going forward we will minimize unwanted chemical binding reactions and adjust parameters for a refined chemosensor. Additionally, preliminary studies indicate its potential for applications in bioimaging and the study of cellular energy dynamics that can provide highly valuable information in the early diagnosis treatment of cancer. After the establishment of a viable chemosensor, future work will focus on optimizing the sensor's performance and testing its efficacy in complex biological environments.

Room 104

Experimental Design of Dystopia: Urban v. Rural

Kenzie Marriott, and Dr. Xenia Fedorchenko, Faculty Mentor

'Experimental Design of Dystopia: Urban v. Rural' is a series of six hand drawn, monochromatic charcoal works contrasting depicted dystopias within rural and urban spaces. Intrusive humanity that's being retaken by nature versus the dense and overbearing weight of humanity represented in structures. The 10" x 18" works placed in 16" x 20" frames convey a cinematographic view that strengthens the conceptual narratives based off the stylistic and conceptual research influences. Principles of form, light, and space implied depict believable environments that place the viewer directly in the scene to highlight the interaction between humanity and structure and connect the two as a single concept.

Session Three

Read

Effect of Zinc Oxide Nanoparticles on the Biosynthesis of Ergosterol in Candida tropicalis

Vicky Longoria, and Dr. T. Thuy Minh Nguyen, Faculty Mentor

This study was done based on how manipulation of lipids can affect cancer cells. Cancer cells are characterized for having excessive amounts of lipids. The fungi *Candida tropicalis* was used as a model organism for its rich sterol content. The main lipid, ergosterol, in *C. tropicalis* mimicked cholesterol in human cells due to their similar chemical structure. The drug zinc oxide nanoparticles were the independent variable, used to manipulate the sterol content in the cells. After an extensive literature review that explained the pathways of how cancerous cells use excess lipids to carry out their functions and maintain a high proliferation rate in adverse environments, the experimental methodology was carried out by exposing the cells to seven different concentrations of zinc oxide and extracting the lipids from the cellular membranes. The cells had a change in morphology, demonstrating less of a hypha form as the zinc oxide concentration increased. Infrared spectroscopy and gas chromatography were used to analyze the lipid content in the cells. The results indicated that the zinc oxide did affect the lipid content in the cells because as the concentration of zinc oxide in each sample increased, the cell count decreased, the lipid structure changed in IR, and the ergosterol content in GC decreased. This supports that zinc oxide can be further investigated as a potential treatment against abnormal or foreign cells.

Room 104

How Southern Gothic Writers Use Genre Tropes to Convey Their Opinions of Racism

Chloe Lopez, and Dr. Sara Hillin, Faculty Mentor

The Southern Gothic genre discusses the more macabre side of Southern literature, which often depicts the South as idyllic, cozy, and fertile for drama and romance to unfold. It, instead, uses the Southern United States often rural landscape and isolated communities to create a more sinister picture of the South, especially considering the legacy of slavery and segregation in the South. Race and the Southern Gothic are both intertwined in many works and, prior to now, there is and was little scholarship discussing their relationship and just how authors use the genre to speak on racism, segregation, and race in general. This paper aims to discuss how authors of the traditional Southern Gothic (1930-1994) use tropes and their subsequent imagery and evocation of fear to discuss the landscape of Civil Rights in the South, whether it be Jim Crow, segregation, the legacy of slavery, or even the aftermath of segregation in a fully integrated society. Authors often use the grotesque or a similar “freak trope” to either promote integration, display the brutality of racism, or create satire and parodies of bigoted figures. This research provides a fill-in to the gap previously discussed between the genre and racial discussions. Therefore, it allows scholars to further touch on the subject more in depth as a whole and in specific works.

Session Four

Reaud

An analysis of Airfoils at Hypersonic Speeds using CFD

Matthew Flores, and Dr. Xianchang Li, Faculty Mentor

This research was done to analyze the design and function of an airfoil operating under hypersonic conditions. This was done by using airfoils designed for both general low speed use and use under super critical conditions, then simulating them in Hypersonic conditions by using ANSYS-Fluent Workbench 24.0. Once these airfoils had been adequately simulated with various angle of attack values, they were analyzed to observe which had higher aerodynamic lift, and lower aerodynamic drag. This directly leads to a decrease in the power needed to fly and thus an improvement in the aircraft's efficiency. ANSYS-Fluent Workbench 24.0 was used for its ability to perform Computational fluid dynamics (CFD) analysis which gave us the lift and drag coefficient values for our simulations. The Mach Number (M) is used to denote how many times faster than sound an object is traveling. The parameters for Hypersonic flight are defined as flight that is 5 times faster than the speed of sound, or 1,715 meters per second (3,836.3 Mph). From the simulations, the shape of the airfoil and the angle of attack were observed to play major roles in the values of the lift and drag coefficients, and thus show what direction future designs should head to make hypersonic flight more efficient and a viable alternative to current forms of travel.

Room 104

The Queer Heroine's Incomplete Journey in First-Wave Lesbian Literature

Maci Simmons, and Dr. Adam Nemmers, Faculty Mentor

Like many women in the late nineteenth and early twentieth centuries, queer women were constantly pressured to fit into society's ideal image of a woman. Their desire for independence and sensual freedom were typically met with scrutiny from their peers, usually harsher compared to heteronormative women. Due to these restrictions, it was nearly impossible for queer women to hint at their internal desires without society finding ways to shun them. This paper explores common plots in different first-wave lesbian texts written by lesbian authors that allude to the negative effects of societal structure at the time. Similar conflicts that the heroines typically face are emotionally distant mothers and excessively invested fathers. This parental dynamic leads the heroine to identify more with her masculinity, with her feminine identity either being weak or nonexistent. A closer examination shows the heroines suffer from low self-esteem, since she does not instantly fit into society's definition of the woman she was predetermined to become. As a result, she rejects any potential male suitors' romantic demands and sets out on a quest to discover how she can become a "real woman." Research shows that the heroines find a woman who was also shunned by society and looks to her as guidance to becoming the ideal woman. The love interests are typically younger or externally feminine women, and therefore, served as a "blueprint" for the heroines to follow. However, this "blueprint" comes with a price, as the love interests are stolen from the heroines by the patriarchy's sudden, strong grasp, with no possible reunion between the two women. Due to society's tightly-bonded expectations, the first-wave queer heroine's journey often ends in incompleteness and tragedy.

Session Five

Reaud

Nanotechnology: Novel Material Structures for Ferroelectrets

Christie Luong, Dr. Robert Kelley Bradley, Faculty Mentor

Ferroelectrets are a class of material that exhibit unique electromechanical properties that are used in scientific research and a wide number of technological applications. A unique property of ferroelectrets is its ability to convert mechanical energy into electrical energy and vice versa. This unique property of ferroelectrets has propelled scientific research within the development of sensors/actuators, energy harvesting, wearable electronics, and similar applications. This presentation will thoroughly explore the electromechanical properties of ferroelectrets, the manufacturing process, and its applications. The work presented will expand upon previous research to develop ferroelectrets out of novel material and capture why the versatile properties of ferroelectrets make them valuable in diverse technologies.

Room 104

Perception of Asian Representation in Shang-Chi and the Legend of the Ten Rings by Asian American Audiences

E.J. McMillen, and Andre Favors, Faculty Mentor

Diversity in mainstream cinema is increasingly recognized as essential for authentic storytelling and cultural inclusivity. Within this broader push for representation, the portrayal of Asian characters and cultures has gained particular prominence, reflecting ongoing societal debates about identity and inclusion. Marvel Studios' *Shang-Chi and the Legend of the Ten Rings* (2021) stands as a significant milestone, heralded for its groundbreaking representation of Asian culture and its predominantly Asian cast. Despite its success and acclaim, questions arise about how Asian American audiences perceive and relate to the film's depiction of Asian and Asian American identities and experiences. This study explores the perception of Asian representation in *Shang-Chi and the Legend of the Ten Rings* by Asian American audiences. Through an analysis of audience reactions and discourse surrounding the film, this research aims to uncover the complexities of Asian American identity and representation in contemporary mainstream cinema. Central to this investigation is the recognition of diverse perspectives within the Asian American community, ranging from expressions of pride and empowerment to critiques of stereotypical portrayals and cultural appropriation. The purpose of this project is to understand how Asian American audiences engage with and interpret representations of Asian identity in

Shang-Chi, considering both the film's potential to challenge stereotypes and its limitations in reflecting the diversity of Asian American experiences. By examining the range of responses to the film, this study seeks to contribute to ongoing discussions about representation, diversity, and cultural authenticity in Hollywood cinema. Through semi-structured interviews with Asian American participants, this research will delve into their perceptions and interpretations of the film's portrayal of Asian identity and culture. By critically examining these perspectives, the study aims to shed light on the complexities of identity construction and representation within the Asian American community.

Session Six

Read

*Exploring Ethnicity and Intimate Partner Violence:
A Study on Latinas' Perceptions*

Natalia Pulido-Gonzalez, Dr. Edythe Kirk, Faculty Mentor

In this study I investigate differences in perceptions of intimate partner violence (IPV) between White women and Latinas, with three hypotheses: White women would identify IPV more frequently than Latinas; participants in an experimental group would recognize IPV more than those in a control group; and ethnicity and group condition would significantly affect IPV perception, hypothesizing that White participants in the experimental group would identify IPV more frequently than Latinas in the same group. While the first and third hypotheses were not supported, the second was confirmed. Data from 32 participants, who completed demographic questionnaires, read IPV or non-IPV vignettes, and filled out perception questionnaires, were analyzed using a two-way factorial ANOVA. Both groups reported greater discomfort after reading IPV vignettes compared to non-IPV scenarios, which supported the second hypothesis. Participants in the IPV group perceived the male partner's response and the overall scenario as more abusive. However, despite recognizing IPV, there was a tendency to assign partial blame to female victims, echoing previous findings that women can identify abuse yet hesitate to fully reprimand male perpetrators and victim-blame. These results highlight the need for further research on how ethnicity influences IPV perception to protect vulnerable populations.

Room 104

*Exploring the Implications of Ubuntu as an Ecophilosophy
in African Businesses*

Drake Rothenberger, and Dr. Amy Smith, Faculty Mentor

In a world where younger generations are gripping with the fact that our planet is becoming less and less hospitable for life, human impact on the environment becomes a more pressing issue

with each passing day. While many sources investigate the complex biogeochemical factors of the Anthropocene (human caused mass extinction), this study seeks to explore the possibility of a moral foundation for environmental preservation by analyzing the impacts that Ubuntu, an African consolidated philosophy, may have in warranting an epistemological call to action in response to unsustainable, profit-seeking actions. This study accomplishes its goal by analyzing environmental case studies related to private, for-profit ventures using a consolidated framework of Ubuntu to determine both its applicability in the situation and determining to what extent, if any, Ubuntu influenced the outcome. This paper utilizes the Systematic Quantitative Assessment Technique (SQAT) method to identify, compile, and summarize literature on the topic by searching databases for certain keywords and matching relevance based on a combination of keyword matches and comparing results to papers already used in the field. The analysis indicates that Ubuntu shows great promise in its moral obligation of people and business entities to protect the environment. The meta-analysis also indicates that Ubuntu's consideration as a serious philosophy can help to correct Eurocentric views within business ethics.

Session Seven

Reaud

Perceptions of Mental Health in the Latinx Community

Magda Soto, Dr. Raymond Doe, Faculty Mentor

This study investigates the perceptions of mental health within the Latinx community in the United States. The Latinx population is rapidly growing and faces unique challenges in accessing mental health services. Stigma, cultural factors, education, and lack of representation in mental health spaces are significant barriers to help-seeking. The research aims to compare the perceptions of mental health between younger and older Latin x individuals. It explores how age influences perceptions of culture, education, and representation as factors affecting help-seeking behavior. A questionnaire was administered to a sample of Latinx participants to assess their attitudes and beliefs about mental health. Preliminary findings suggest that age may not significantly influence perceptions of culture, education, or representation. However, both younger and older Latinx individuals reported personal experiences with mental health and observed family members struggling with mental health issues as well. The study highlights the need for further research to understand the complexities of mental health stigma and barriers to care within the Latinx community. Addressing these challenges requires culturally sensitive interventions, increased access to mental health services, and greater representation of Latinx professionals in the field.

Room 104

Stress and Burnout in Chief Administrative Officers in

Municipal Government: Causes and Effects

Darlene Thomas, and Dr. Ellen Zimmerman, Faculty Mentor

Because modern society is a never-ending cycle of activity and the pace of life is ever increasing, stress and burnout are prevalent issues in the workplace. It is imperative that we as a society find a way to address stress and burnout in every profession. We must find solutions to ensure that the American workforce, which includes the municipal government landscape, finds methods to process and decompress the onslaught of a pressure driven nation. There is very little research regarding stress and burnout in municipal chief administrative officers and their peers. Because every city, town, village, and burgh is led by one of these professionals, it would be meaningful work to discover the causes and effects of stress and burnout on these practitioners. In researching this matter, it was determined that most research about stress and burnout was focused on the medical profession. I have utilized that research to apply to municipal CAO's due to the brevity of specific relative data. There are several causes of stress and burnout for chief administrative officers. Chief administrative officers of municipal government often find themselves sandwiched between demanding groups or factions of stakeholders with little to no support. Political pressure, bullying, lack of longevity (5-7 years on average), job insecurity, and demands that would compromise their integrity often result in overwhelming situations added to already full plates and stressful jobs. While many professions are stressful, the municipal government CAO touches every community. Much more work is needed to determine how to help these professionals to properly and effectively overcome these challenges.

Session Eight

Reaud

Racial Differences in Diabetes Prevention

Jerrica Francisco, Dr. Jeremy Shelton, Faculty Mentor

This study examined the disparities in diabetes treatment efforts between African Americans and whites aged 18 to 50, with an emphasis on type 1 and type 2 diabetes. It contends that the occurrence and development of diabetes in African Americans is much greater than in whites, a disparity attributed to varying cultural philosophies surrounding the disease. By investigating these discrepancies, the study hopes to emphasize the social, cultural, and educational aspects that impact diabetes treatment and health outcomes in both demographics. The findings underscore the need for tailored interventions that address the unique perspectives and challenges faced by African Americans in combating diabetes.

Room 104

Care Intervention in Aphasia Among Nursing

and Speech and Hearing Undergraduates

Harvest Prater, and Dr. Elizabeth Long, Faculty Mentor

This study examined interdisciplinary roles between speech and hearing- and nursing students toward care interventions for aphasia. Previous researchers discovered a significant contrast in competence between nursing and speech-language pathologists when working with patients with aphasia. The objective is to assess a potential need for workplace or educational training for aphasia. Participants were interviewed about their knowledge and experiences with aphasia using a qualitative, structured interpretative phenomenological approach that identified and evaluated shared trends and perspectives on interdisciplinary pre-professional roles among the interviewees. Interviews suggested speech and hearing students (n = 3) possessed limited knowledge of aphasia. Despite the lack of knowledge, the students recognized a nurse's capabilities when aiding aphasia patients. Similarly, nursing students (n = 3) understood speech pathologists' role in care intervention but were more aware of aphasia. When asked about nursing intervention tactics for aphasia, nursing students understood the responsibilities within their field. Their knowledge came from exposure to aphasia in classroom and practicum settings. Overall, participants from both disciplines had various levels of expertise about aphasia, and only nursing students could define care interventions and relate the concept to aphasia. However, both groups recognized the other occupations' role in aphasia. Future directions for this research will be expanding the sample size and academic level of participants and working with those interested in aphasia focusing on care interventions rather than general knowledge of aphasia.

Session Nine

Reaue

The Impact of Air Quality on COVID-19 Symptoms: The Intersection of Temperature, Precipitation, Air Pollution and Wildfires

Nylah Vital-Predium, Dr. Marilyn Kish-Molina, Faculty Mentor

The COVID-19 pandemic has highlighted the critical role of environmental factors in influencing the severity and spread of respiratory diseases. This study explores the intersection of air quality, temperature, precipitation, air pollution, and wildfires, and their collective impact on COVID-19 symptoms. Utilizing a public comprehensive dataset from Beaumont, TX, we analyzed the correlations between these environmental variables and COVID-19 symptom severity and prevalence. Our findings showed that poor air quality, exacerbated by high levels of particulate matter from pollution and wildfire smoke, significantly intensifies COVID-19 symptoms. Higher temperatures and specific patterns of precipitation also modulate the transmission dynamics and symptomatology of the virus. Wildfires contribute to acute spikes in air pollution, leading to increased respiratory distress among COVID-19 patients. The study underscores the necessity for integrated public health strategies that consider environmental factors in mitigating the impacts of pandemics. Improved air quality management, proactive wildfire control, and climate adaptation measures are essential to enhance respiratory health and resilience against future outbreaks.