



**"Welcome SURF fellows to
The 2022 SURF Symposium!"**



CONGRATULATIONS ALL SURF FELLOWS FOR THE JOB WELL DONE!

Welcome to the *2022 SURF Symposium*! This event is the showcase of UG research done at Lamar U. over ten-weeks of summer and is sponsored by the Office of Undergraduate Research. Twelve SURF students worked on various research projects in the STEM or HASBSEB academic areas. The STEM topics include studies of vibrations in electronic connectors, the physics of wet surfaces, the growth of the cellulose-based nanocomposites, the landfill treatment with the removal of heavy metals, and the analysis of solar events which create geomagnetic storms. HASBSEB research includes studies of child speech disorders, causes of hearing loss for college band students, of health issues for rodeo athletes, and the high-tech impact on teacher education. All SURF topics are of great interest for academia and industry. A BIG thank you goes to our Lamar mentors for their commitment to our student success and for offering their guidance for an enriched academic experience to our SURF fellows! O.U.R. is grateful to President Taylor, Provost Brown, and to all Deans and Chairs for their strong and continue support to undergraduate research.

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Dr. Thinesh Selvaratnam
College of Engineering

Dr. Mamta Singh
College of Education & Human Development

Dr. Robert Worley
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SURF 2022 Grant Winners

COLLEGE OF ARTS AND SCIENCES

1 – **Rafael Gutierrez** | Physics / Mechanical Engineering |

Mentor: **Dr. Rafael de la Madrid**

Research in Tribology

Project: *“Dynamical Wetting and Dewetting in Non-Uniform Solid.”*

2 – **David Matherne** | Biology |

Mentors: **Dr. Evgeny Romashets and Dr. Cristian Bahrin**

Research in Space Physics

Project: *“Heliospheric Storms.”*

3 – **Ian Sisson** | Chemistry |

Mentor: **Dr. Paul Bernazzani**

Research in Sustainable Materials Chemistry

Project: *“Developing Cellulose Based Nanocomposite as a Potential Substitute for High Strength Plastics.”*

4 – **Lily Yoder** | Psychology |

Mentor: **Dr. Edythe Kirk**

Research in Human Behavior

Project: *“The Effects of Positive Mood and Stereotype Threat on Memory Recall.”*

COLLEGE OF ENGINEERING

5 – **Kiley Mazdra** | Mechanical Engineering |

Mentors: **Dr. Evgeny Romashets and Dr. Cristian Bahrin**

Research in Solar Physics

Project: *“The Physics of Active Longitudes and Their Impact on Earth Through the Interplanetary Coronal Ejection They Produce.”*

6 – **Melissa Tan** | Civil Engineering |

Mentor: **Dr. Thinesh Selvaratnam**

Research in Bioremediation and Resource Recovery

Project: *“Removal of Heavy Metals from Municipal Landfill Leachate using Galdieria Sulphuraria.”*



7 – **Jacob William Smith** | Mechanical Engineering |

Mentor: **Dr. Sushil Doranga**

Research in Mechanical Vibrations

Project: *“Evaluation of Pin Fretting in the Electronic Connectors Using the Vibration Shake.”*

COLLEGE OF FINE ARTS AND COMMUNICATIONS

8 – **Madeline Doughty** | Speech and Hearing Sciences |

Mentor: **Dr. Lilian Felipe**

Research in Hearing Conservation

Project: *“Awareness of Noise-Induced Hearing Loss Among College Band Students”*

9 – **Chloe Smith** | Speech and Hearing Sciences |

Mentor: **Dr. Lekeitha Morris**

Research in Childhood Speech Sound Disorders

Project: *“Intervention for Child Speech Sound Disorders in YouTube Videos: Parent Perception and Clinical Utility.”*

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

10 – **Chaley Cleckley** | Education |

Mentor: **Dr. Mamta Singh**

Research in Teacher Education

Project: *“Preservice Teachers & Understanding of Genetic Technology”*

11 – **Margo Eugenio** | Education |

Mentor: **Dr. Mamta Singh**

Research in Student Achievement

Project: *“Social-Emotional Learning, Culturally Responsive Learning, & Linguistically Responsive Learning: Do Preservice Teachers have the Skills, Knowledge & Awareness to Support Student Achievement? An Exploratory Study.”*

12 – **Ally Tywater** | Health and Kinesiology |


Mentor: **Dr. Shannon Jordan**

Research in Injuries to Rodeo Athletes

Project: *“Rodeo Athletes: A Survey of Injuries and Accessibility to Strength & Conditioning Specialists and Athletic Trainers.”*



SURF 2022 Winner



Rafael Gutierrez

Major in Physics / Mechanical Engineering

Mentor: Dr. Rafael de la Madrid
Associate Professor of Physics

Lamar University

SURF winner with the STEM Project
"Dynamical Wetting and Dewetting in Non-Uniform Solid"



Testimonials

SURF fellow: The OUR supported program, SURF, has supplied me with the opportunity to experience research to a greater degree that otherwise would have never been possible. This program has been very crucial in my embarkment into research and that is due to the support of the OUR office and my mentor, Dr. Rafael de la Madrid. Through SURF, I was able to experience research responsibilities first-hand and devote more time to learning while still having the ability to ask for guidance from both my mentor and OUR. SURF 2022 has been an amazing experience that I would recommend to anyone interested in research.

Mentor: During Spring 2022, Rafael Gutierrez embarked on a very demanding research project that requires a lot of time and effort. Thanks to the SURF fellowship, Rafael has made great progress on the project, because he has been able to fully focus on it during the summer. We are now confident we can finish the project in the upcoming months, which would not have been possible without OUR support.




The experimental setup.:
A drop centrifuge





SURF 2022 Winner



David Matherne

Major in Biology

Mentors: Dr. Evgeny Romashets and
Dr. Cristian Bahrim
Professor of Physics

*SURF winner with the STEM Project
"Heliospheric Storms"*



Recent snake-like solar filament generated on July 16 at 1:53pm, which impacted the Earth on July 19, 2022 (NASA source).

Testimonials

SURF fellow: Doing research through the SURF program has given me an opportunity to explore my interests. Taking an extra step outside the classroom has enlightened me about the specificities of solar physics, a field that goes much deeper than you might think. SURF supported me in gathering supplies and providing me with a mentor that I can build a personal connection with while giving me advice at a doctoral level. I feel like I'm a more confident speaker and feel prepared to have a professional advantage in the field I want to go into.

Mentor: David used numerical methods in order to model propagation of interplanetary magnetic cloud of April 13-17, 1999, from the Sun to Earth's orbit. From interplanetary in-situ magnetic and plasma measurements. He determined time of arrival of the center of mass, the temperature, density, magnetic field, and speed inside the cloud and in quiet solar wind. With this input and by setting the drag coefficient to 2.6, David achieved the best agreement between theory and measurements (Dr. Romashets)

David impressed me with his willingness to explore physics as soon as his OUR grant on a biology topic has ended. He is that kind of student who shows willingness to broaden his horizon with academic training and get experience in a complementary field of science. This is to be commended. David's speed in capturing novel ideas and generating his own model is remarkable. He is a great role model for his peers (C. Bahrim).



OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

SURF 2022 Winner



Jan Sisson

Major in Chemistry

Mentor: Dr. Paul Bernazzani
Professor of Chemistry

SURF winner with the STEM Project
"Developing Cellulose Based Nanocomposite as a Potential Substitute for High Strength Plastics"



Testimonials

SURF fellow: I have been given a tremendous opportunity, receiving the means and freedom to explore and find my own answers to my own questions. The guidance and support offered to pursue my passion for discovery has been invaluable, and I have thoroughly enjoyed my time in the SURF program.

Mentor: Ian's story is a great example of how undergraduate research can help develop the scientific thought processes in students. Ian started with is a remarkable inquiring mind. In the context of scientific discovery this curiosity led him to develop and expand protocols to produce novel nanocomposites of cellulose with tailored crystallinity. His efforts are leading to potentially transformative future discoveries while his abilities and confidence have reached new levels. It is a pleasure working with him and see him grow.





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SURF 2022 Winner

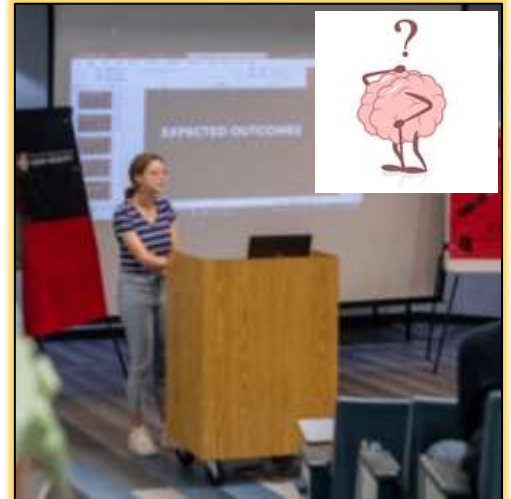

Lily Yoder

Major in Psychology

Mentor: Dr. Edythe Kirk
Associate Professor of Psychology



SURF winner with the STEM Project
"The Effects of Positive Mood and Stereotype
Threat on Memory Recall"




Testimonials

SURF fellow: The SURF program allowed me to dive into the world of research with amazing support and guidance. I had the opportunity to create my own project, plan my experimental design, and put it to action with help from Dr. Bahrim and my mentor Dr. Kirk. The SURF grant is a great way for students from all majors and backgrounds to get research experience

Mentor: *When Lily asked me to serve as her mentor for her SURF grant proposal, I was thrilled. She was taking my Advanced Statistics course at the time, a course about data analysis and writing the results of those analyses. Lily was one of the top scorers and seemed to have a real aptitude for research. She is a hard worker and also a critical thinker. The work she's doing now has great potential to inform researchers about the way memory works and factors that can affect its accuracy. I look forward to her results.*



SURF 2022 Winner



Kiley Mazdra

Major in Mechanical Engineering

Mentors: Dr. Evgeny Romashets and
Dr. Cristian Bahrim
Professor

SURF winner with the STEM Project
"The Physics of Active Longitudes and their Impact on Earth
through the Interplanetary Coronal Ejection they Produce"



Testimonials

SURF fellow: I am interested in the study of geomagnetic storms and their relation to solar activity. My method of research represents the statistical study of Ap index *versus* sunspot number variations with time.


Mentor: Kiley studied severe geomagnetic storms, with daily average $A_p > 50$ nT. She noticed that all 18 storms were not associated with flares or disappearing filaments (AL), but with solar activity outside of the region. In this sense, active longitudes were "turned off" in 2005. The level of solar activity was declining from its maximum in 2000 to its minimum in 2010. The conclusion Kiley made was that AL do not produce geo-effective disturbances in solar wind during declining phase of solar cycle.

Kiley approached this research topic with enthusiasm and commitment to get good results, while enjoying her summer research experience. She seems to be captivated by the topic, which brings the sophistication of solar activities in relationship with geomagnetic storms which can negatively affect the human activities on satellites orbiting the Earth, aircrafts, as well as on the power grid line and infrastructure on the ground (C. Bahrim).

Kiley's search for finding a relationship between solar activities and geomagnetic storms using the variation of the AP index



SURF 2022 Winner



Melissa Tan

Major in Civil Engineering

Mentor: Dr. Thinesh Selvaratnam
Assistant Professor of Civil and
Environmental Engineering

SURF winner with the STEM Project
"Removal of Heavy Metals from Municipal Landfill Leachate
Using *Galdieria sulphuraria*"



Testimonials

SURF fellow: I started my research journey last year and am grateful to be a part of the SURF program. My experiences have all been different, and I have been able to learn and grow from them. The best part about research is being able to work with a team, because everyone offers something different to the table. I wouldn't be where I am today without my mentor, Dr. Thinesh. He has been helpful from the very start until now. I am also grateful for the support of OUR as this project wouldn't have been possible without them.

Mentor: I had the pleasure of having Melissa Tan in my algal research lab for the last 2 years. Melissa has been a great asset to my research team and integral to my algal research lab. She has received 2 undergraduate research scholarships from the office of Undergraduate Research at Lamar. In addition, Melissa successfully secured a summer research fellowship from Lamar University Center for Midstream Management and Science. Melissa's dedication and her involvement in the research activities always impressed me. She is self-driven and passionate about research and acquiring new knowledge. Melissa's current work is focused on developing an algal-based system for the bioremediation of landfill leachate.





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SURF 2022 Winner



Jacob William Smith

Major in Mechanical Engineering

Mentor: Dr. Sushil Doranga
Associate Professor of Mechanical Engineering

**SURF winner with the STEM Project**
"Evaluation of Pin Fretting in the Electronic Connectors using the Vibration Shaker"



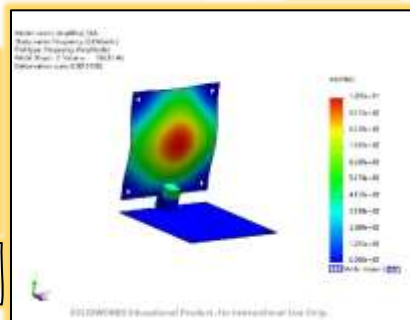
Testimonials

SURF fellow: Doing the Research has been a very interesting experience. I've been able to learn a lot both in and out of the classroom utilizing tools, techniques, and resources that I wouldn't normally have the knowledge about. I feel that this has given me an edge and prepared me for industry, especially in sectors that I am interested in such as R&D and Design.

Mentor: I am very much pleased with the progress that Jacob made for his summer undergraduate research. This is his first experience as a SURF scholar, but he did a great job in designing components for the experiment, developing the test facility and building the prototype model. Jacob has also carried out some theoretical work in the modelling of electrical contacts. I am confident that Jacob's work this summer will be of great value to his industrial and academic career.



Frequency analysis





SURF 2022 Winner



Madeline Doughty

Major in Speech and Hearing Sciences

Mentor: Dr. Lilian Felipe
Associate Professor of Speech
& Hearing Sciences

*SURF winner with the HASBSEB Project
"Awareness of Hearing Conservation Among
College Band Students"*



Testimonials

SURF fellow: As the journey I have had in the SURF program nears its end I am able to reflect on the experience in a positive light! I had never been a part of research before this program. Consequently, there were aspects of the research process that was unknown to me, which made me apprehensive about the success of my research. However, my truly outstanding mentor, Dr. Lillian Felipe was able to allay my fears by giving me guidance with her expertise in research in our field of study. I cannot begin to thank her enough for how much I have been able to learn from her throughout this program. I also want to thank the O.U.R, Dr. Bahrim, and Mrs. Erwin, for their efforts in making SURF an enjoyable experience. Both my mentor and the O.U.R gave me the knowledge and resources I needed to feel confident in my abilities as a researcher that I will use for the rest of my academic years and on into my career.

Mentor: *The LU Summer Undergraduate Research Fellowship (SURF) offered by the Office of Undergraduate Research is a unique experience that impact the future career choices of our undergraduate students. During my career at Lamar University, I have been observing how this process allows the students to pursue other interests, to learn something new, to improve problem-solving skills and how can be a challenge in new ways during their academic life. I hope to continue exciting students and mentoring them to achieve the maximum and best background.*





SURF 2022 Winner



Chloe Smith

Major in Speech and Hearing Sciences

Mentor: Dr. Lekeitha Morris
Associate Professor of Speech and
Hearing Sciences

SURF winner with the HASBSEB Project
"Intervention for Child Speech Sound Disorders in YouTube
Videos: Parent Perceptions and Clinical Utility"



Testimonials


SURF fellow: This year, I was lucky enough to be able to participate in SURF for the second summer in a row. I have been exposed to situations that I would never get to experience as an undergraduate, like getting an inside look into how the Lamar Speech and Hearing Clinic works and interviewing parents about their child's speech disorder. These experiences will be invaluable when I start graduate school. My mentor, Dr. Morris, has been an amazing guide for this research. She has answered all my questions about the project and made sure that I learned about the important details of the research process. I am very grateful to the Office of Undergraduate Research and Dr. Bahrim for giving me another amazing opportunity to do research over the summer!

Mentor: *It has been my pleasure to work with Chloe this summer. She has done a phenomenal job throughout this project. This work will help us better understand how parents use the internet to learn about their children's speech sound disorders. The SURF program has been such a great way for me to be able to further introduce Chloe to research and the research process. I am certain that this experience will be beneficial to Chloe as she continues her studies in speech-language pathology. Her future is bright and I am happy to have had the honor of mentoring her throughout this experience. It has truly been my pleasure.*






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SURF 2022 Winner




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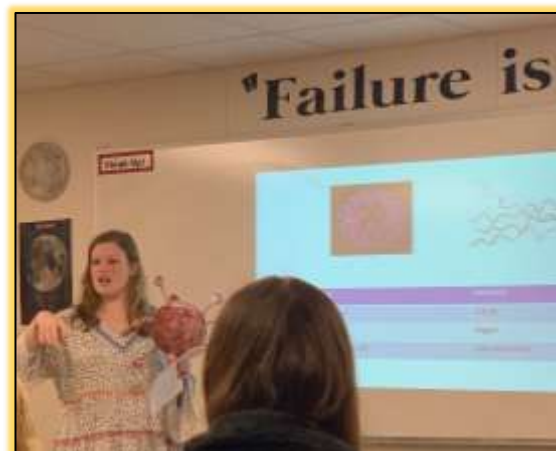
Chaley Cleckley

Major in Education

Mentor: Dr. Mamta Singh
Associate Professor of Education



*SURF winner with the HASBSEB Project
"Preservice Teachers & Understanding of Genetic Technology"*



Testimonials

SURF fellow: I never thought I would conduct research, but I gave it a shot thanks to my wonderful mentor, Dr. Singh, believing in me. During my research, this program provided many helpful workshops and opportunities to ensure success. The leaders never failed to make sure me and my fellow grant recipients felt supported as they generously offered their time, advice, and resources. Dr. Bahrim was always open to questions and constantly willing to assist us in any way possible. Dr. Singh was always inspiring me to do better and there for me every step of the way. These two, along with Mrs. Jenna, were always an email away with a positive attitude and a willingness to help. Thanks to this supportive and academically nourishing environment, I have been able to push myself in numerous ways. I have learned more about the scientific process than what can be taught within a classroom (which shall be beneficial to my future science students). I have also been able to connect with my community via research. I am forever thankful for this opportunity and to this supportive and academically nourishing environment.

Mentor: *It has been a pleasure to work with Ms. Chaley Cleckley on a research study in assessing pre-service teachers & use of oral debate method in the understanding of genetic technology." Ms. Cleckley was one of the 2021 MASON Summer Interns. I had an opportunity to work with her during the five-week - summer intensive - teaching PD program. Since then, to date, I have observed her strong work ethic. She diligently conducted a summer research study and completed all assigned work within a given timeframe. She is one of those students whom you want to work with. She is always seeking professional opportunities for career and professional development in the fields of teaching and research.*



SURF 2022 Winner



Margo Eugenio

Major in Education

Mentor: Dr. Mamta Singh
Associate Professor of Education

SURF winner with the HASSEB Project
"Social-Emotional Learning, Culturally Responsive Learning, & Linguistically Responsive Learning: Do Preservice Teachers have the Skills, Knowledge & Awareness to Support Student Achievement? An Exploratory Study"



Testimonials

SURF fellow: I truly never believed I would participate in research. I always thought it was something exclusive to STEM majors, but I could not have been more wrong. With the help of an amazing mentor, Dr. Mamta Singh, and the support of LU's Office of Undergraduate Research, I fell in love with research. With their support, I was able to dive further into my passion of Education and research a topic I am extremely passionate about. I would be lying if I said I was not nervous going into research. It was daunting and I knew absolutely nothing about what this experience all entailed. However, OUR and Dr. Singh guided me through the entire experience. Both offered their knowledge and advice in genuine hopes of my success. OUR offered plenty of workshops and lectures that not only educated me on all aspects of research, but also allowed me to meet other peers in a similar boat of participating in research for the first time.


Mentor: *It has been a pleasure to work with Ms. Margo Eugenio on conducting a study on "Social-Emotional Learning, Culturally Responsive Learning: Do Preservice Teachers have the Skill, Knowledge, & Awareness to Support Student Achievement? An Exploratory Study!" this summer. I came to know Ms. Margo when she was in my University's Cardinal Community group - Future Educators. She is a winner of the 2022 OUR grant. She presented her research findings at the 2022 EXPO in April 2022. Ms. Margo came up with this research idea and developed the entire research narrative independently with limited supervision, which is exceptionally rare among undergraduate students. The OUR funding opportunity inspired her to apply for SURF. She has worked diligently and has completed the study.*





OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

SURF 2022 Winner



Ally Tywater

Major in Health and Kinesiology

Mentor: Dr. Shannon Jordan
Assistant Professor of Health & Kinesiology

*SURF winner with the HASBSEB Project
"Rodeo Athletes: A Survey of Injuries and Accessibility to Strength & Conditioning Specialists and Athletic Trainers"*



Testimonials

SURF fellow: I'm very grateful to have been given the opportunity to participate in undergraduate research on campus through SURF. I wouldn't be here if it weren't for Dr. Jordan, my mentor, as I didn't even know this was an option for me until talking with her. Through the process thus far I have been able to speak with and learn more about my future profession as an athletic trainer who will work with rodeo athletes. I'm very excited for the future avenues this research opportunity will open for me and my future career.

Mentor: *It is a pleasure to discuss OUR and SURF with students to raise awareness of the fantastic opportunities OUR offers undergraduate students at Lamar University. Ally was talking to me after class one day about athletic training and rodeo athletes. I brought up the SURF program through OUR and encouraged her to apply. We have been able to work as a team to network with various professionals in the field to help refine her project. Not only is she learning the research process, but she is also making professional connections. I am excited to help Ally analyze the data and see what results we get.*





OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

At the 2022 SURF Symposium, each SURF fellow presents a progress report about his or her research experience, findings and results gathered over the summer. However, the last formal step of the SURF program, will be in November, when each SURF team will give an oral presentation and publish a paper in the Proceedings of one of the two OUR sponsored conferences:

- The Texas STEM conference celebrates its 10th edition on November 5, 2022, and
- The HASBSEB conference celebrates its 9th edition on November 19, 2022.

In addition to an exciting SURF session, both conferences will welcome talks and poster presentations given by graduate and undergraduate students from Lamar and other schools from Texas and nearby states. In the last year couple of years, we had graduate and undergraduate student presenters from Rice University, UT Austin, the University of Houston, Texas A&M – College Station, as well as from Auburn University and the University of Alabama. At this moment, we have already confirmed guest speakers from as far as the Northwestern University in Chicago. All interested students and guests are welcome to visit the conference website where the calendar with the preparation of the conferences (such as the dates when informative panel discussions about how to present a poster or give a talk) and the agenda of the conferences will be posted (<https://www.lamar.edu/undergraduate-research/events/index.html>).

This year we have the privilege to welcome two outstanding international recognized speakers: At the Texas STEM conference (on November 5) our keynote speaker will be Dr. Jay Prigmore, an Electrical Engineer Lamar alumnus, now at Google Inc. as an Electrical Quality Engineering and Technical Program Manager, and at the HASBSEB conference (on November 19) our keynote speaker will be Dr. Juan Llopis, Professor (Catedrático) of Business Organization, Director of the Institutional Relations and Projects at the University of Alicante, Spain. Professor Llopis is holding a position as vice-President at the University of Alicante.



Dr. Jay Prigmore
Electrical Quality Engineer
Technical Program Manager at Google Inc.

Dr. Juan Llopis
Professor (Catedrático) of Business Organization
Director of Institutional Relations and Projects
UNIVERSITY of ALICANTE (Spain)



KEYNOTE SPEAKER

The 10th Annual Texas STEM Conference
Archer – Physics Building

Dr. Jay Prigmore

Electrical Quality Engineer
Technical Program Manager
at Google Inc.

Dr. Jay Prigmore received his bachelor's degree in electrical engineering from Lamar University and his M.S. and Ph.D. degrees in electrical engineering from Arizona State University. His research focus for all three degrees was in Power Engineering.

He is presently employed at Google Inc. as an Electrical Quality Engineer - Technical Program Manager (TPM) but began his Google employment as an Electrical Field Reliability - TPM. Prior to his employment at Google Inc., he was employed by Exponent Inc. and performed numerous failure analysis and root cause investigations on electrical power equipment. Upon graduation he was employed at G&W Electric Company where he was responsible for short-circuit protection devices, their manufacture, and applications.

Dr. Prigmore developed a peer-reviewed arc flash mitigation device which won the "product of the year" in electrical safety. He is a founding and principal member of NFPA 78 and 1078 which provide guidance on performing electrical inspections and the qualifications of electrical inspectors, respectively. Dr. Prigmore has published more than 20 peer-reviewed articles and has written two book chapters. He is actively involved in IEEE standards meetings, NFPA committees, and CIGRE workgroups. Dr. Prigmore is a licensed professional engineer in various states, and he is certified to climb wind turbines.



KEYNOTE SPEAKER

The 10th Annual Texas STEM Conference

Archer – Physics Building

November 5, 2022

9:00 – 10:00 a.m.

Dr. Jay Prigmore

**Electrical Quality Engineer
Technical Program Manager
at Google Inc.**



Solid-State Circuit Breakers - An Introduction to Their Technical, Operational and Application Benefits

Solid-state circuit breakers (SSCBs) recently entered the marketplace for certain low-voltage applications and have multiple attractive technical and performance improvements over their mechanical counterparts. These performance improvements are achieved primarily by the SSCB's microsecond switching speed as compared to a mechanical circuit breaker's (MCB's) switching speed in milliseconds. Their speed advantage is due to the solid state circuit breaker breaking the circuit path with a semiconductor switch. However, there are operational trade-offs to utilizing a SSCB instead of a MCB. For example, heat generation through the semiconductor switch is greater than that of mechanical circuit breaker contacts which results in increased power losses. However, in certain applications, the benefits of using a SSCB may outweigh the disadvantages making the SSCB a viable option to consider for industrial applications - especially as the technology matures.



KEYNOTE SPEAKER

The 9th Annual HASBSEB Conference
Landes Auditorium – Galloway Bldg.

Dr. Juan Llopis

Professor (Catedrático) of Business Organization
Director of Institutional Relations and Projects
UNIVERSITY of ALICANTE (Spain)



Dr. Llopis graduated with honors in Business Studies from University of Alicante and received his Ph.D. degree in 1991 from University of Alicante (selected as best Faculty Thesis of year 1991). Dr. Llopis has been full professor of Business Organization at University of Alicante since 2002. From 2006 to 2012, he was the Dean for faculty of Economics and Business, and next, the vice-president of University of Alicante. From 2021, Dr. Llopis holds the director position of the Institutional Relations and Projects.

Dr. Llopis has authored or co-authored 15 books, 32 chapters in books, 160 papers published in academic and professional journals. He is an esteemed member of 15 international research projects, 20 public research projects, and 100 private research projects. Dr. Llopis is in 27 International Editorial Advisory Boards and is referee for 50 International Business Management Journals.

He has 33 years of experience in lecturing at university level. Also, he was member of 25 evaluation committees for PhD dissertations in different universities.

Dr. Llopis hold professional consulting experience for many Private Firms and Public Institutions. He is a prominent member of the Management Board of “Circle of Economy of the Alicante’s Province”, and esteemed member of the Advisory Council of Sabadell East Bank. Dr. Llopis travels broadly and visited more than 80 prestigious universities from UK, Germany, United Arab Emirates, USA, Lithuania, Belgium, China and Hong Kong, Jordan, South Africa, Algeria, South Korea, Chile, Turkey, Argentina, Uruguay, Cuba, Colombia, Vietnam, Japan, Russia, Singapore, Australia, New Zealand, Ireland, Taiwan, Brazil, Peru, Dominican Republic, Poland, and Italy.



KEYNOTE SPEAKER

The 9th Annual HASBSEB Conference
Landes Auditorium – Galloway Bldg.

November 19, 2022

9:00 – 10:00 a.m.

Dr. Juan Llopis

Professor (Catedrático) of Business Organization
Director of Institutional Relations and Projects
UNIVERSITY of ALICANTE (Spain)

International and Competitive Challenges for Business Management

During the last decades, companies, organizations, and institutions are interacting, competing, and surviving in a Global World. Managers must make decisions in an increasingly turbulent business environment. It is crucial/critical/vital/very important to identify and classify the major challenges of globalization, having in mind that businesses are complex. Researching and understanding the “Globalization” variables that affect the business decision-making process would allow the development of effective strategies. Firms that efficiently manage these challenges will have more opportunities in the “International Arena”.

The “Global” challenges can be categorized under three major themes: Environmental, Organizational, and Individual. These challenges have been analyzed from a managerial perspective using real-world examples to discover and better understand their nature. Environmental challenges like rapid change, issues related to the use of the internet, workforce diversity, globalization, international legislation and regulation, new family roles, the rise of the service sector, and global warming have been studied. Within the theme of organizational challenges, the competitive position of the business, decentralization, downsizing, organizational restructuring, self-managed teams, the growth of small businesses, organizational culture, technology, and outsourcing are discussed. Finally, under individual challenges issues of matching people and organizations, ethics and social responsibility, empowerment, brain drain, and job insecurity are addressed.



2021-22 O.U.R. Grant Winners

College of Arts and Sciences

1

Angel Flowers | Biology |

Mentors: **Dr. Matt Hoch (Lamar Univ.)**

Dr. William R. Miller (Baker Univ.)

Research in Ecology

Project: *"Population distribution analysis of tardigrades found on Quercus virginiana."*

2

Arizbeth Lopez Garcia | Biology |

Mentor: **Dr. Maryam Vasefi**

Research in Neurobiology

Project: *"CBD and Alzheimer's disease; Neuroprotection and Desensitization."*

3

Caroline LeBlanc | Biology |

Mentor: **Dr. Maryam Vasefi**

Research in Neurobiology

Project: *"Glutamate receptor crosstalk in Alzheimer's disease."*

4

David Matherne | Biology |

Mentor: **Dr. Ashwini Kucknoor**

Research in Molecular Biology

Project: *"Characterization of drug resistance genes in cattle pathogen, Trichomonas foetus."*

5

Callan Noak | Computer Science |

Mentor: **Dr. Sujing Wang**

Research in Data Science and Analysis

Project: *"Analyze COVID-19 Data using Advanced Machine Learning Techniques."*



6

Silvana Ochoa | Computer Science |

Mentor: **Dr. Sujing Wang**

Research in Computer Science

Project: *"COVID-19 Pandemic's Impact on Education and Students."*

College of Education and Human Behavior

7

Tiya Davi | Humanities and Arts |

Mentor: **Dr. Mamta Singh**

Research in Pre-service Teachers

Project: *"Assessing Preservice Teachers' Understanding of Disease and its Spread using Scientific Illustrations and Virtual Labs."*

8

Margo Eugenio | Interdisciplinary Studies |

Mentor: **Dr. Mamta Singh**

Research in Private Education

Project: *"Impact of Schools of Choice on Standardized Test Scores & the Achievement Gap."*

9

Damaris Thrash | Exercise Science |

Mentor: **Dr. Shannon Jordan**

Research in Exercise Science (Health & Kinesiology)

Project: *"Effects of Motivational Music on Post-Exercise Recovery."*

College of Fine Arts and Communications

10

Corina Mena | American Sign Language Interpretation |

Mentor: **Dr. Zanthia Smith**

Research in Deaf Studies & Deaf Education

Project: *"Hispanic/Latinx Students Perceptions of Diversity in Interpreting."*



College of Engineering

11

Jennifer Arredondo | Industrial and System Engineering |

Mentor: **Dr. Robert Kelley Bradley**

Research in Silicone Nanocomposites Ferroelectrets

Project: *"Exploration of Parameters for Developing a Silicone Nanocomposite Ferroelectrets."*

12

Kalen Baker | Mechanical Engineering and Mathematics |

Mentor: **Dr. Ping He**

Research in Mechanical Engineering

Project: *"Molecular Dynamics Research of Sintering Americium-241 for Compact Nuclear Power Supplies."*

13

Lac Nguyen | Industrial Engineering |

Mentor: **Dr. Robert Kelley Bradley**

Research in Nanocomposites

Project: *"An Investigation of Environmentally Friendly Filler for Polymer Nanocomposites."*

14

Tyler Stuck | Electrical Engineering and Mathematics |

Mentor: **Dr. Yueqing Li**

Research in Driving Safety

Project: *"The Visual Behavior and Performance of Young Drivers in Construction Zones and Nighttime Driving."*

College of Business

15

Taliah Belcher | Accounting & Finance |

Mentor: **Dr. Gevorg Sargsyan**

Research in Finances and Economics

Project: *"Impact of militarization on financial & economic growth of developing and highly militarized countries."*



OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

Angel Flowers

Mentors: Dr. Matt Hoch
Associate Professor of Biology
Dr. William R. Miller
Research Associate Professor
Baker University, Baldwin City, KS



Best OUR project at EXPO 2022



***"Population distribution analysis of tardigrades found on
Quercus virginiana (Southern Live Oak)."***

Testimonial:

The O.U.R. grant has provided me with an amazing opportunity to learn research techniques and practical applications of laboratory methods. The skills that I developed by doing this research as an undergraduate will only serve to prepare me for future endeavors. I plan to build upon the foundation of assets that my research has provided in order to become a better scientist and to build a career from scientific research.

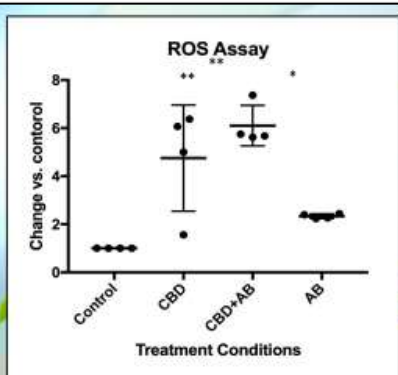




OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

Arizbeth Lopez Garcia

Mentor: Dr. Maryam Vasefi
Assistant Professor of Biology



Acute treatment of CBD increases ROS

Data represent the average and standard error of two independent experiments (each triplicate). * $p < 0.05$ drug treatment vs. vehicle ANOVA analysis with Tukey's post-test.



Cells that were treated with both CBD and A β still showed increased cell viability and these results support our original hypothesis which states that CBD will increase cell viability.



"CBD and Alzheimer's Disease; Neuroprotection and Desensitization."

Testimonial:

As a newly accepted freshman at Lamar University, I attended my first orientation and remember Dr. Terry discussing undergraduate research with my group. Even though I found it fascinating, I never imagined I would be able to participate in it. **This O.U.R grant provided me with the opportunity to obtain lab experience. Despite the fact that my long-term goal is to go medical school and eventually become a doctor, the time I spent in the lab with Dr. Vasefi and graduate students (Anthony Osu, Hy Lai, and Claire Alexander) sparked a new interest in me and encouraged me to continue to pursue research throughout my time at Lamar.** Similarly, this experiment allowed me to see how teamwork can benefit in the execution of a successful experiment.

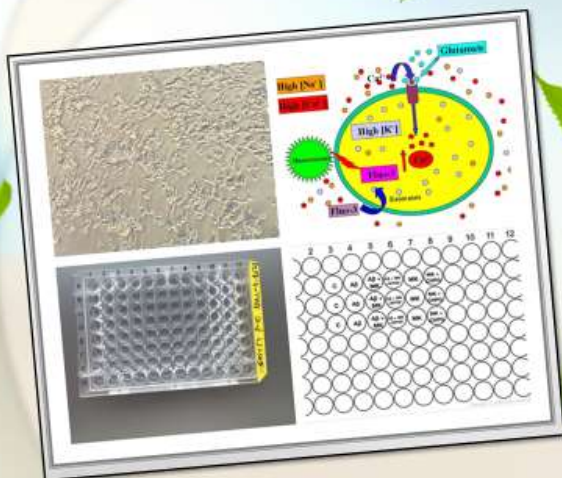




OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

Caroline LeBlanc

Mentor: Dr. Maryam Vasefi
Assistant Professor of Biology



"Glutamate receptor crosstalk Alzheimer's disease."

Testimonial:

As a student already interested in medical school, the opportunity this research provides to take a glimpse into the research that goes into my dream future career is fascinating. The OUR grant allowed me to gain laboratory experience that I otherwise would not have been able to, due to my major being chemical engineering. I received training and guidance in learning the procedure for my experiment. I was also challenged with interpreting the results from the experiment and gained a more in-depth understanding of the research project significance. This process has sparked my interest more into the research side of medicine. While I still want to be a clinician, I hope that in the future I have the opportunity to also incorporate research into my professional career. **While the idea of presenting research in front of a large group of people is incredible nerve racking, my enjoyment of being in the lab and gaining these new experiences makes it worthwhile.** I am thankful for the opportunity and hope that I can continue my research journey here at Lamar University. I am thankful that Lamar offers ample opportunities for undergraduates to get involved in research, especially since the idea of conducting and presenting research seemed improbable to me as a freshman. It is inspiring to look back and see how much I have grown over the years.

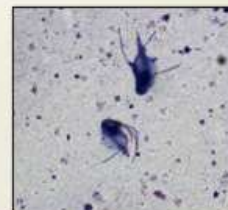
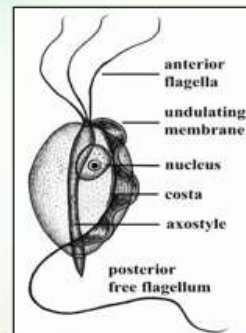
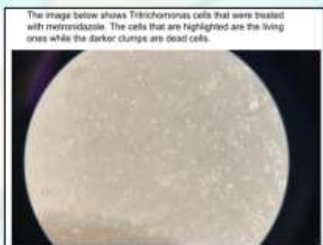




OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

David Matherne

Mentor: Dr. Ashwini Kucknoor
Associate Professor of Biology



"Characterization of drug resistance genes in cattle pathogen, *Tritrichomonas foetus*."

Testimonial:

I, David Matherne, would like to testify about the opportunities that I was given to grow in my knowledge and prosper in the Office of Undergraduate Research program. This program allowed me to learn more about genetics and how to play with DNA in a resourceful way. My faculty mentor, Dr. Ashwini Kucknoor, taught me things that I could not learn in a classroom. By working with her in the lab I was able to learn techniques such as cell growth and cell counting. I was also able to improve my public speaking skills when the chance came to present my findings. **Everything I need for graduate school, or a successful future can be found in the Lamar University's Undergraduate Research program.**





OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

Callan Noak

Mentor: Dr. Sujing Wang
Associate Professor of Computer Science



Special Mention
at EXPO 2022



Dr. Sujing Wang – Best Mentor of 2022

“Analyzing COVID-19 Data using Advance Machine Learning Techniques.”

Testimonial:

My experience doing research as part of the OUR grant has been amazing. I was always super excited to back to work on my research project. I would like to thank the Office of Undergraduate Research and my mentor Dr. Sujing Wang for giving me the opportunity to research an important topic. **Doing research has opened a great number of doors for my future career and has given me multiple skills that I would not have gained otherwise.** I would encourage anyone who is interested in research to apply for the SURF and OUR Grants.



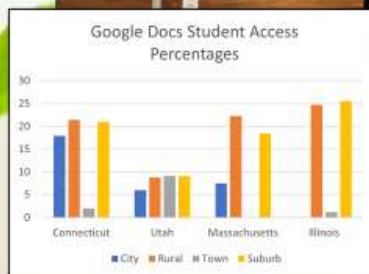
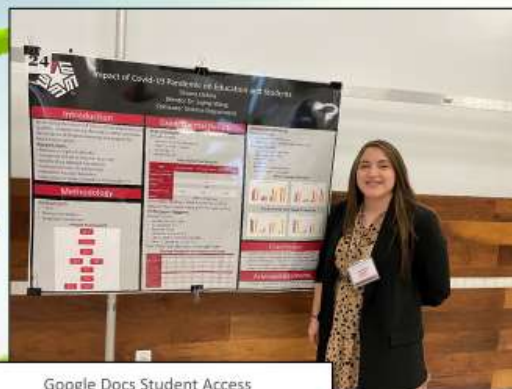
Special mention at EXPO 2022



OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

Silvana Ochoa

Mentor: Dr. Sujing Wang
Associate Professor of Computer Science



"COVID-19 Pandemic's Impact on Education and Students."

Testimonial:

I cannot begin to describe the incredible benefits that come from conducting research. From my experience as an OUR recipient, I managed to expand my social network, learn about new research topics, gain new skills in my area of expertise and even outside of these, and receive opportunities that will help me in my future career path. Without a doubt, **the purpose of the Office of Undergraduate research is not simply to honor students with financial awards from research, but rather, to create a learning environment that welcomes all fields of study from all levels, either professional or as a novice.** That, in fact, is what I obtained from this fulfilling journey.





OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

Tiya Davi

Mentor: Dr. Mamta Singh
Associate Professor of Science Education

1. Explain disease + its spread by drawing. 10-21-21



2. Write about your drawing.

Disease spreads from close contact, sharing drink, etc. Say an infected person works in close proximity to someone else all day. The second is now infected from close contact and goes home after work. They make dinner for their family, laughing and breathing on everything. The whole household is now infected. This continues on and on.



"Assessing Preservice Teachers' Understanding of Disease and its Spread using Scientific Illustrations and Virtual Labs."

Testimonial:

My name is Tiya Davi, and my research project was about assessing preservice teachers' knowledge on disease and its spread by analyzing the scientific illustrations, virtual labs, surveys, and pre-post assessments. Since this was my first research study, I can say that it was quite overwhelming starting the study as a high school student but as I went more in-depth with the research, I understood the work ethic better and took everything step by step. **As an OUR grantee I had the chance to reflect on problem-solving, critical thinking, and public speaking skills which boosted my confidence in those areas.** I can also say it was a nice and properly oriented experience, everything was well organized which also helped me to stay on track and complete the study with many achievements. Lastly, I would like to thank you to The Office of Undergraduate Research for making me a part of this wonderful program and I can say this will prepare me for future success in college and am very thankful for this opportunity.

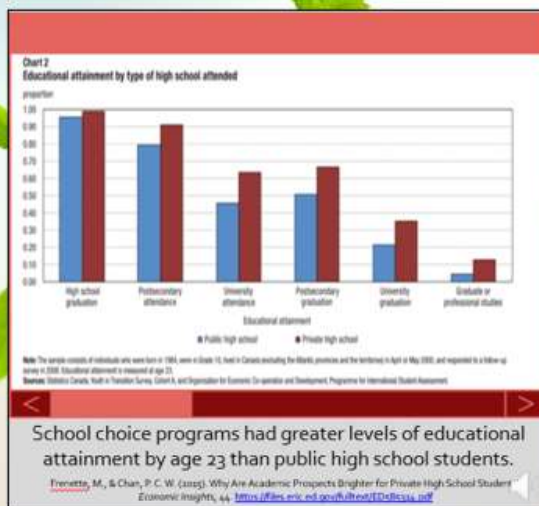




OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

Margo Eugenio

Mentor: Dr. Mamta Singh
Associate Professor of Science Education



"Impact Schools of Choice on Standardized Test Scores and the Achievement Gap."

Testimonial:

Entering college, I had a premonition that research was only for STEM people and subjects. As such, I was convinced I would never complete research. I thought it was not for me; I was not smart enough, research is not for me, etc. However, Dr. Bahrim and Dr. Singh convinced me otherwise, and I applied to research The Impact of School Choice on Standardized Test Scores & the Achievement Gap. Little did I know how I would fall in love with research. The process truly opened my eyes as to the impact I could have on people and my subject (education). The process allowed me to expand on the knowledge I already had in the field and apply it to real-world settings. I truly cannot wait to complete more research in the future.





OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

Damaris Thrash

Mentor: Dr. Shannon Jordan
Assistant Professor of Health and Kinesiology



"Effects of Motivational Music on Post-Exercise Recovery."

Testimonial:

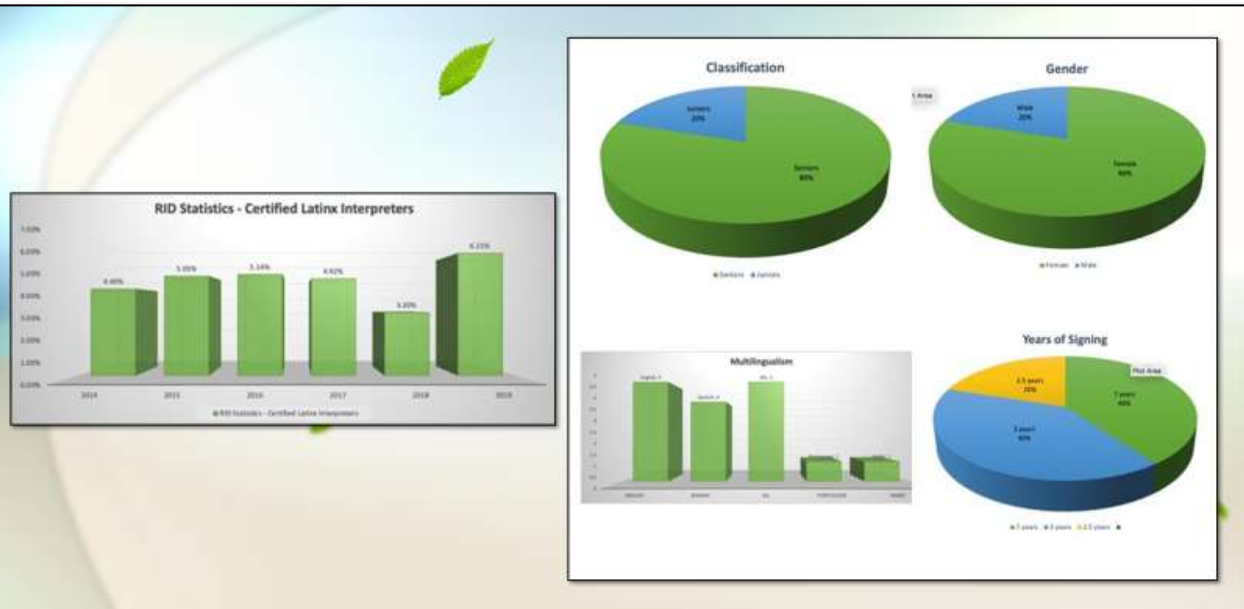
Ever since I was a child, music and exercise have been two things I hold close to my heart. When my mentor told me she was considering conducting an experiment analyzing music's physiological impacts on exercise, it seemed like an opportunity to study my interests. It is an experience that has not disappointed me – I've observed different aspects of exercise, to which all previous exposure was taught inside a classroom and have become confident in skills such as taking blood pressure or using a metabolic cart. **My involvement in this study has also made my love for research grow tremendously.**





Corina Mena

Mentor: Dr. Zanthia Smith
BA-ASL Program Director & Student Counselor



"Hispanic/Latinx Students Perceptions of Diversity in Interpreting."

Testimonial:

Through this study, I was able to see my own cultural knowledge and expectations through the eyes of other Hispanic/Latinx students. Comparing similar experiences allowed me to see their struggles, determine what keeps them motivated, and validate why I chose this field of study. For many people in the Hispanic/Latinx community, sign language interpretation is not a first option, as we tend not to involve ourselves in occupations where we do not see cultural representation. **We have veered from traditional occupations and have begun to seek and build steps toward new careers flourishing and bringing ourselves into new horizons.**





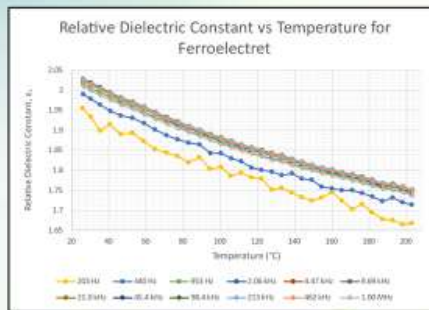
OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

Jennifer Arredondo

Mentor: : Dr. Robert Kelley Bradley
Assistant Professor of Industrial Engineering



Application of DC Corona Treater to engineered foam. This process includes polarization to the foam, creating a ferroelectret.



“Exploration of Parameters for Developing a Silicone Nanocomposite Ferroelectret.”

Testimonial:

This project benefited me as a student by sharpening my critical thinking skills and allowing me to network with those around me in the Engineering department. I collaborated with several different professors, and students, to help make progress throughout this project.

Throughout the research process, I had the chance to enhance my laboratory techniques. I learned how to use multiple machines, including the M2 Epilog Laser Fusion, Lab Oven, ETP BD-20AC corona treater, DC corona treater, and the 3-roll mill. Additionally, I was able to further develop my skills in G-coding and operation of the CNC milling machine. This research made the interest I have in my major increase to an exceptional level. The opportunity to present our research topic at the EXPO for Office of Undergraduate helped me build confidence and find comfort in public speaking.



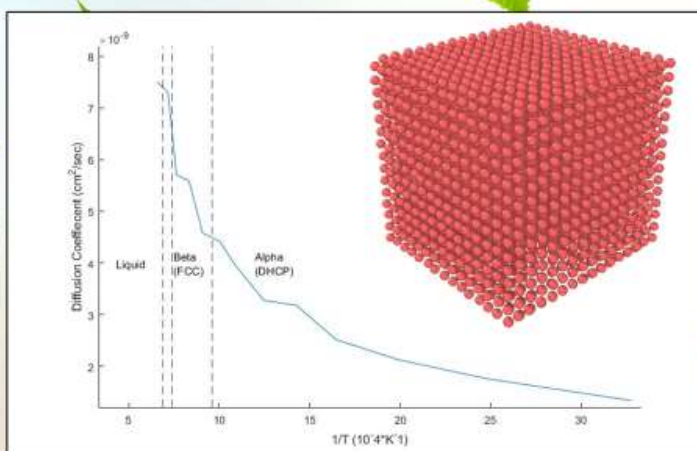


OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

Kalen Baker

Mentor: Dr. Ping He
Assistant Professor of Mechanical Engineering

- Took 650 hours of computer run time
- Generated 34GB of saved data
- Primarily run on a Raspberry Pi cluster



"Molecular Dynamics Research of Sintering Americium-241 for Compact Nuclear Power Supplies."

Testimonial:

The Office of Undergraduate Research has greatly assisted me in advancing my research, much faster than I ever could have by myself and honed skills that can only be used through practice and critical thinking. **More importantly working and presenting with my peers has enriched my education more than my class work ever could. And allowed me to consider new ideas and that I would not have encountered otherwise.** The opportunity afforded me was made even more rewarding by being allowed to share what we've accomplished with the public.



Second place at EXPO 2022



OFFICE OF UNDERGRADUATE RESEARCH
LAMAR UNIVERSITY

Lac Nguyen

Mentor: : Dr. Robert Kelley Bradley
Assistant Professor of Industrial Engineering



"An Investigation of Environmentally Friendly Filler for Polymer Nanocomposites."

Testimonial:

Thanks to the OUR Grant, I had the opportunity to utilize what I have learned at school, apply it to real-life problems and presented my research in OUR Conference. I gained a lot of valuable hands-on experience and grateful to be the OUR Grant recipient for second time again.





OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

Tyler Stuck

Mentor: Dr. Yueqing Li
Associate Professor of Industrial and Systems Engineering



"The Visual Behavior and Performance of Young Drivers in Construction Zones and Nighttime Driving."

Testimonial:

Working with the Office of Undergraduate Research and my mentor, Dr. Yueqing Li, was a very enjoyable experience. Being able to not only conduct research but also present at the 9th Annual Expo 2022 allowed me to improve skills that would be necessary for graduate school. **I would whole-heartedly recommend anyone interested in conducting research to work with the OUR.**



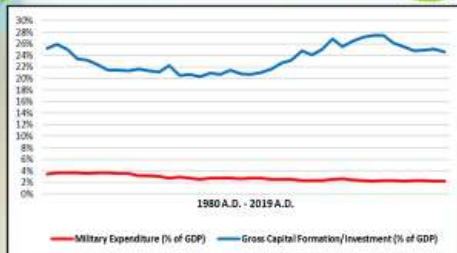


OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

Taliah Belcher

Mentor: Dr. Gevorg Sargsyan
Assistant Professor of Finance

25 Least Developed and Highly Militarized Countries (1980 - 2019)					
Variables' Correlation	GDP Growth (Annual %)	Gross Capital Formation / Investment (% of GDP)	Foreign Direct Investment, Net Inflows (% of GDP)	Military Expenditures (% of GDP)	Import of Goods & Services (% of GDP)
GDP Growth (Annual %)	1				
Gross Capital Formation / Investment (% of GDP)	0.13377841	1			
Foreign Direct Investment, Net Inflows (% of GDP)	0.127333579	0.291767802	1		
Military Expenditures (% of GDP)	0.020256462	0.106742442	-0.163000094	1	
Import of Goods & Services (% of GDP)	0.091698363	0.230717442	0.414162659	0.102506853	1



Further research took place at the Stockholm International Peace Research Institute in Stockholm, Sweden and the Bonn International Centre for Conflict Studies in Bonn, Germany – The 2022 Presidential Fellow of Lamar University

"Impact of Militarization on Financial & Economic Growth of Developing and Highly Militarized Countries."

Testimonial:

This was my first experience conducting research, and while I was nervous and hesitant, I had an amazing support system within OUR. ***This opportunity allowed me to create a solid research foundation and build a great mentoring relationship with my faculty mentor, Dr. Sargsyan.*** OUR provided me with the resources I needed to complete a project that I was very passionate about. This program was the perfect place for me to start my research endeavors and I am grateful to Lamar for offering these opportunities to students. Because of the immense support I received in OUR, I will be taking my research efforts overseas.





O.U.R. Grant recipients presenting at EXPO 2022




EXPO 2022




EXPO 2022



OFFICE OF UNDERGRADUATE RESEARCH
LAMAR UNIVERSITY

College of Arts and Sciences



Congratulations

**Graduates who
earned their
'OUR fellow' stoles**



College of Arts and Sciences

College of Business

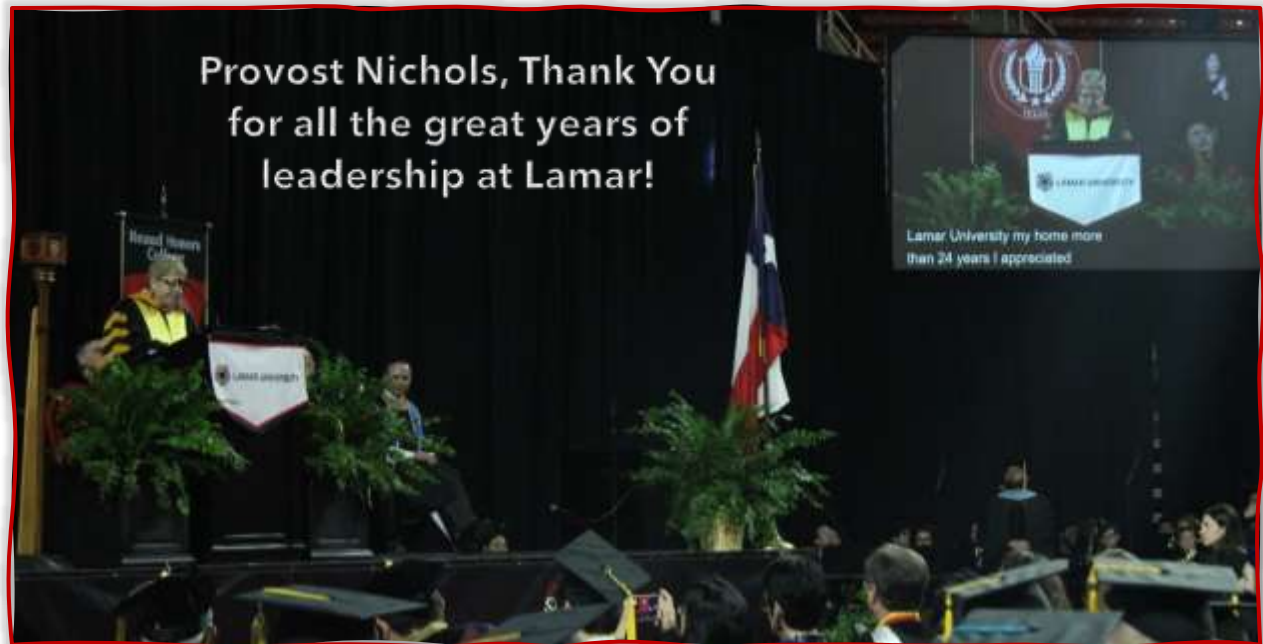


College of Education and Human Development



College of Engineering





Thank you, President Taylor, for your generous support to O.U.R. programs and events!

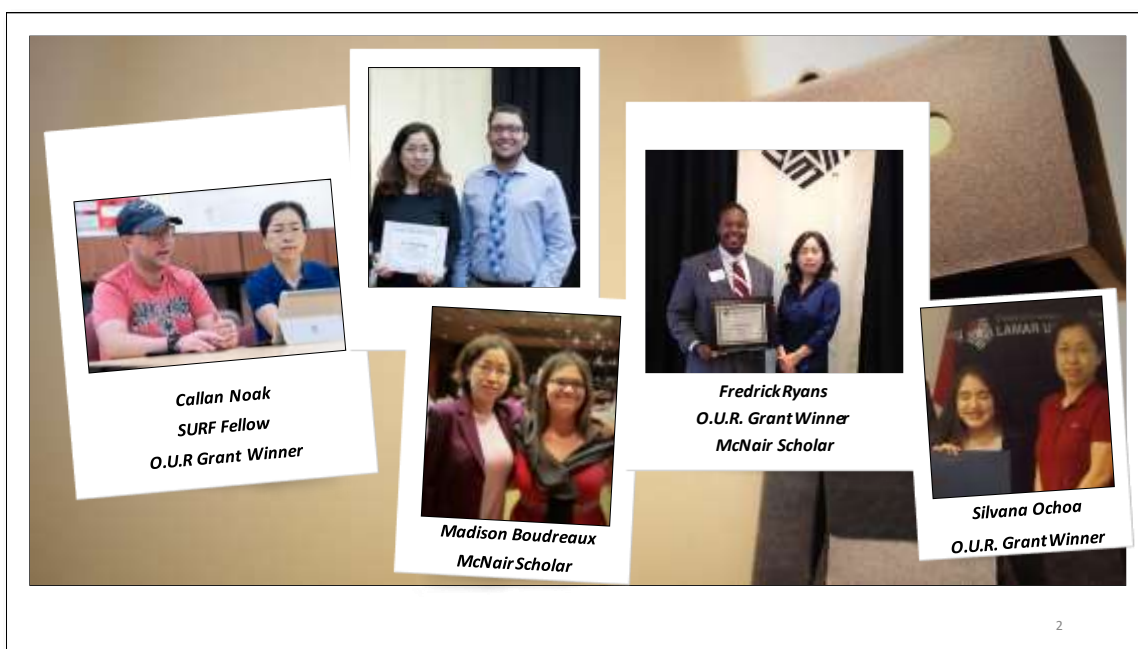


OFFICE OF UNDERGRADUATE RESEARCH
LAMAR UNIVERSITY

2022 FACULTY MENTOR AWARD RECIPIENT



Dr. Sujing Wang
Associate Professor of Computer Science



2022 UNDERGRADUATE RESEARCH EXPO



OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY





Research in Algal-based bioremediation Algal Research Lab (STEM Building)

Dr. Selvaratnam is an Assistant Professor and an Environmental Engineer with a primary focus on developing sustainable energy-positive biological wastewater treatment. His main research focuses on achieving bioremediation of municipal/ industrial wastewaters using an algal-based system. Over the past four years, Dr. Selvaratnam's algal research lab in the Science and Technology building has hosted multiple undergraduate students to conduct research on the bioremediation of wastewaters using microalgae. These undergraduate students were financially supported by: LU Office of Undergraduate Research (OUR), Center for Midstream management and Science, and the Department of Civil and Environmental Engineering. Highlights of undergraduate student research activities from Dr. Selvaratnam's research group include **six SURF grants, three OUR grants**, one McNair scholarship, one research grant, one external outreach grant, three peer-reviewed publications, and multiple student research presentations.



Dr. Thinesh Selvaratnam,
Assistant Professor of Civil
and Environmental
Engineering

Publications with undergraduate students:

- A. Rahman, S. Pan, **C. Houston***, T. Selvaratnam, Evaluation of Galdieria sulphuraria and Chlorella vulgaris for the Bioremediation of Produced Water, Water, 13 (2021) 1183.
- S. Pan, **K.L. Dixon***, T. Nawaz, A. Rahman, T. Selvaratnam, Evaluation of Galdieria sulphuraria for nitrogen removal and biomass production from raw landfill leachate, Algal Research, 54 (2021).
- T. Nawaz, A. Rahman, S. Pan, **K. Dixon***, B. Petri, T. Selvaratnam, A Review of Landfill Leachate Treatment by Microalgae: Current Status and Future Directions, Processes, 8 (2020) 384.

Awards and scholarships for mentored undergraduate students:

- Melissa Tan Lamar University Academic Excellence Scholarship, 2020-2022
- Kyleigh Dixon NASA Texas Space Grant Consortium STEM Scholarship, 2020
- Kyleigh Dixon Dr. Luther A. Beale Memorial Scholarship in Civil Engineering
- Cyndy Rodriguez NASA Texas Space Grant Consortium STEM Scholarship, 2020
- Kyleigh Dixon Third Place Poster Presentation Texas STEM Conference, 2019



Supported Undergraduate Research in Dr. Thinesh Selvaratnam's Laboratory



Cindy Rodriguez

- 2020 SURF Fellow,
- NASA Texas Space Grant Consortium STEM Scholarship,



Mason Wyche

- 2020 SURF Fellow



Melissa Tan

- 2022 SURF Fellow & 2021 SURF Fellow,
- Lamar University Academic Excellence Scholarship, 2020-2022



Kyleigh Dixon

- 2019 SURF Fellow & 2019 OUR Grant Recipient,
- NASA Texas Space Grant Consortium STEM Scholarship, 2020,
- Dr. Luther A. Beale Memorial Scholarship in Civil Engineering,
- Third Place Poster Presentation Texas STEM Conference, 2019



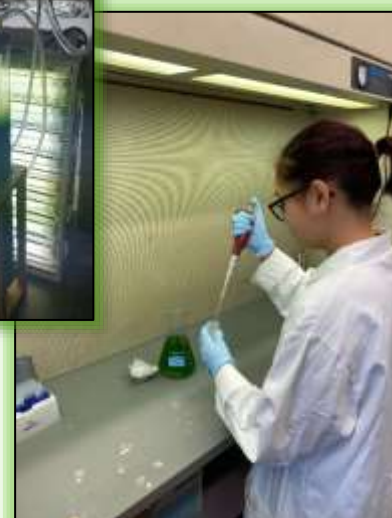
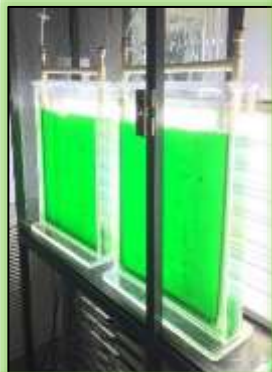
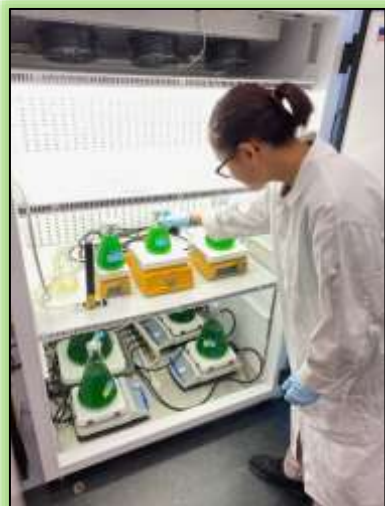
Cymone Houston

- 2021 SURF fellow & 2020 Grant Recipient





OFFICE OF UNDERGRADUATE RESEARCH
LAMAR UNIVERSITY



**Dr. Selvaratnam's Algal
Research Laboratory**





UG research supported by O.U.R. Grants

Ferroelectrets and Environmentally Friendly Plastics:

A story about how two LU Students Explore New Technology

In Fall 2021 **Jennifer Arredondo**, an Industrial Engineering major, was starting her junior year when she decided to pursue an O.U.R. grant with Dr. Robert Kelley Bradley, an Assistant Professor in her department. As the two discussed possible projects Bradley described a type of material called a ferroelectret. But to understand what a ferro-*electret* is, one first must know what an *electret* is. Electrets are materials that hold a permanent electric charge, analogous to the way magnets maintain a permanent magnetic field. You've probably played with two magnets and observed one can cause the other to move. Well, electrets behave similarly when exposed to an electric field. Ferroelectrets are a type of electret made from a compressible elastic material such as polypropylene foam; if it is held in place when an electric field is applied the material will move by expanding or contracting. The material is similar to the more widely known piezoelectric crystals found in applications from earbud speakers to barbeque grill igniters. Ferroelectrets have some advantages over piezoelectric materials in terms of lower cost, but the property that interested Arredondo and Bradley was the ability to engineer the foam-structure to control the response of the ferroelectret. With Bradley's mentorship, Arredondo wrote the O.U.R. grant proposal "*Exploration of Parameters for Developing a Silicone Nanocomposite Ferroelectret.*" For the 2021-22 academic year, Arredondo was among the 18 students who were awarded funding.

To engineer her ferroelectret, Arredondo would need to create a foam-like structure using silicone; the approach was to create a thin silicone sheet, flat on the top side and featuring an array of indentations on the bottom. By stacking multiple sheets on top of each other the indentations would become the foam-like cavities inside of the layered material. An initial challenge was to find a way to permanently bond the silicone layers together, but a relatively simple solution was found through alternating current corona treatment. A corona is a highly energetic plasma that forms during electrical discharge between a high voltage electrode and a grounded anode (see Fig. 1). By placing the silicone sheet on a grounded plate and placing the electrode over it, the corona causes the molecules on the surface to become active so that when a second layer of silicone is placed on top, they bind together.



Figure 1: Corona Discharge used in treating silicone sheets

How to create the silicone sheets turned out to be a more challenging problem. Silicone is a thermoset which means that it undergoes curing, a chemical reaction that turns it from a pourable liquid to an elastic solid. The type of silicone Arredondo was using required heating to 150° C in order to cure. She needed a mold that could hold the silicone while withstanding the heat.



The initial approach was to make the mold using polyimide tape which is extremely thin, durable, and heat resistant. A piece of tape was placed onto an aluminum coupon and cut using the laser cutter in the Bird-House, Lamar's makerspace located in the Science and Technology building. By adding and cutting multiple layers of tape, a micromold could be easily made. This technique allowed Arredondo to design

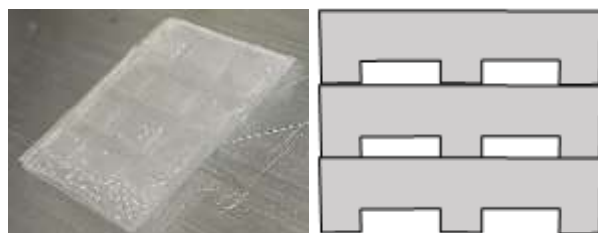


Figure 2: Left: stacked silicone layers, right: cross section illustration showing how cavities are formed.

and build a variety of different mold patterns. Now, the challenge was removing the silicone after it had been cured. The rough edges from the multiple layers of tape caught onto the silicone causing it to tear when being removed from the mold. Ultimately Arredondo and Bradley worked together to create g-code, an instruction file used by computer-controlled equipment, to mill out a mold from Aluminum. With the help of Mr. Acyut Kaneria in the Industrial Engineering machine

shop, Arredondo was able to make a set of Aluminum molds and test several prototypes. She was able to measure the so called "d33" response, a measure of the motion of the ferroelectret, using the piezoelectric meter in Bradley's lab. The d33 results allowed Arredondo to successfully wrapped up her research with a good presentation at EXPO 2022.

Lac Nguyen was an OUR veteran having successfully completed a grant with Bradley the previous year studying alignment of single wall carbon nanotubes. For fall 2021 he wanted to change tracks and pursue an area of interest to him, studying ways to make plastics in food packaging more environmentally friendly. Nguyen was awarded his second OUR grant which involved a collaboration with ExxonMobil's Beaumont Polyethylene Plan. Nguyen's project was to investigate how biodegradable agricultural biproducts, in this case rice hulls, could be added to plastics in order to reduce its negative impact if discarded as waste rather than being recycled. Utilizing the high-energy ball mill in Bradley's Lab Nguyen worked with Mr. Garry Yentzen to develop a procedure for turning heat treated rice hulls into nano-/microscale powder that could be incorporated into silicone test samples. Nguyen's work wasn't just limited to the laboratory, he also worked with Bradley and Mr. Andrew Ortiz, from ExxonMobil, to set up a plant tour for Lamar students.



Figure 3: Rice hulls before and after high-energy

Arredondo and Nguyen experiences are two examples of the great opportunities that the O.U.R. grant program has provided to LU students. The program is open to all students from any major and any level. Grant awards are competitive, but whether you are a freshman or a senior you can win one if you have a good idea and are willing to put in the effort! You can learn more about the program by talking to students and faculty who have participated and by attending the many O.U.R. events that are held each semester. If you have an idea, don't put it off till the future, get involved today! (Dr. Kelley Bradley)

If you are interested in research, please join Lamar Undergraduate Research Association

LURA Mission:

“LURA was founded in fall 2019 to fulfill the need for a community *by and for* undergraduate students to discuss, collaborate, and learn how effectively one can conduct research. The consistent quality and volume of research conducted by undergraduate students at Lamar University has made it clear that there is a need for an organization to act as a vital resource for building young researchers. Thus, LURA provides an academic forum that connects all level students from freshmen to seniors with their professors and mentors, and facilitates communication between Lamar undergraduates and their peers around the nation. “

LURA is a platform for offering panel discussions about

- Research opportunities inside and outside Lamar,
- Better ways to deliver undergraduate research results in poster and oral presentations,
- Ways to perform peer-mentoring,
- Organizing workshops and panel discussions on various topics, including how to successfully apply to graduate schools.

LURA is the premier student organization at Lamar University for any undergraduate student interested in doing research. The Office of Undergraduate Research provides strong support and offers logistics to this student organization.

For info contact URALamar@gmail.com or visit Chemistry 115D.

Lamar Undergraduate Research Association

2022-2023 LURA Officers



President:

Zaid Mohammed

MAJOR: BIOLOGY



Event Coordinator:

Tyler Stuck

MAJOR: PHYSICS AND MATH



Vice President:

Hannah Norwood

MAJOR: BIOLOGY



Recruitment Director:

Tomisin Egbewale

MAJOR: COMPUTER SCIENCE



Treasurer:

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Secretary:

David Matherne

MAJOR: BIOLOGY





OFFICE OF UNDERGRADUATE RESEARCH LAMAR UNIVERSITY

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= A CHANCE TO LEARN, MAKE FRIENDS, AND SEE BEAUTIFUL PLACES =



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Dr. Llopis, UA vice-President welcomes Dean French of Lamar's College of Business and his study abroad students.



UA started from of a military airport...



Learning from great lectures...



Visiting a beautiful campus...



Lamar students cheer near
the UA symbol!...



Meeting exceptional faculty and renown researchers...



Being recognized with
an UA certificate of
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Guided tours offered by
UA's professional staff...



Getting inspired and motivated...



Muchas Gracias, Universidad d'Alicante!



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**LAMAR STUDENTS, FACULTY, AND STAFF IN ALICANTE – SPAIN
.... ENJOYING THE JEWEL OF COSTA BLANCA....**



**Many Thanks
To Dr. Sargsyan, Director of
the Program and his team, for
this wonderful experience!**



**The most beautiful promenade
Lamar students ever walked...**



Muchas Gracias, Alicante!

O.U.R. is grateful to our group photographer Mr. Josh Wilson, *Marketing Coordinator* of the College of Business