Yahriel Salinas-Reyes

Yahriel Salinas-Reyes' Intellectual Framework and Phases of Approach:
The framework consists of two phases to unravel the nature of intelligence.
Phase I: Understanding The Divided Self and Existential Despair
Header: A Trip Through Insanity - a perfectly rational adjustment to an insane world.
Motivation: Schizophrenia cannot be understood without understanding despair. Children do not give up their innate imagination, curiosity, dreaminess easily. You have to love them to get them to do that.
Stage 1: Alogia – Poverty of Speech and Senses
Stage 2: Autism –Realism and Logicism
State 3: Ambivalence – State of Chaos and Hysteria
State 4: Affect Blunting – Emotionless and Expressionless
Outcome: Pandemonium and Complete Fracturing of The Self and Nature
Accessories: Mania and Madness, Paranoia and Delusions, Psychosis and Schizophrenia
Revelation: We are effectively destroying ourselves by violence masquerading as love. Whether life is worth living depends on whether there is love in life.
Phase II: Unraveling The Nature of Intelligence and Human Ingenuity
Header: Creative people who can't help but explore other mental territories are at greater risk, just as someone who climbs a mountain is more at risk than someone who just walks along a village lane.
Motivation: Madness need not be all breakdown. It may also be break-through. It is potential liberation and renewal as well as enslavement and existential death.
Stage 1: Youthfulness – Vitality and Radiance
Stage 2: Imagination – Idealism and Irrationalism
Stage 3: Curiosity – State of Wonder and Exploration
Stage 4: Dreaminess – Absorption, Abstraction, Distraction, and Forgetfulness
Outcome: Dawn of New Age and Realization of The Natural Self and Frontiers
Accessories: Peace and Tranquility, Freedom and Healing, Joy and Growth
Revelation: The range of what we think and do is limited by what we fail to notice. And because we fail to notice that we fail to notice, there is little we can do to change; until we notice how failing to notice shapes our thoughts and deeds.

Human Ingenuity Statement: Here is a simple sign that Yahriel Salinas-Reyes is a genius, not just talented but a true genius. It is a simple rule devised by the philosopher Schopenhauer who distinguished the difference between talent and genius as follows: he said talent hits a target no one else can hit, a genius hits a target no one else can see. What he meant is that talent is really good at outcompeting others. For example if you're talented at something you can do something with ease that other people find difficult. Whereas a genius has nothing to do with besting other people at something they've already established as being important, instead a true genius is about being so good at something that you're ahead of your time that other people don't know yet that what you're doing is important or valuable, and so the talented person is the one who is recognized for their skill. The genius Yahriel is the one doing something no one else can even conceive of doing. Talent hits a target no one else can hit. A genius hits a target no one else can see. Yahriel is one who can see the hidden world of wonders and the invisible grand mysteries of the universe.

[Summary of Research Proposal]
Project Funding Solicitations: For this project funding I will be soliciting various sources, namely, The NSF-Mercury Project ($20 Mil) Partnership for a degree proposal submitted by a faculty on my behalf; The NSF-GRFP; GFSD; DOE Computational Science Graduate Fellowship; The Google Fellowship; as well as Fulbright Open Study/Research Award X National Geographic Storytelling Fellowship, a joint-opportunity for a study abroad experience. https://www.ssrc.org/programs/the-mercury-project/nsf-mercury-project-partnership/ ; https://us.fulbrightonline.org/fulbright-nat-geo-fellowship

Synopsis: This new interdisciplinary field of study captures the essence of Human Ingenuity, focusing on the exploration of schizophrenia and psychosis and the idea that chaos theory and theory of confusion may serve a function rather than being solely detrimental. The project title also highlights the intersection of psychiatric thought, neuroscience, and social justice, emphasizing the potential global impact of this research. By using captivating and thought-provoking language as well as Anthropology-Engineering methods, the proposed scientific story aims to engage readers and spark their curiosity.

Project Title: "How He Got His Scars: The Nature Physicist Explores Abnormal Human Ingenuity and the Science of Madness and Mental Health in Neurobiological Representations of Schizophrenia and Psychosis."

Summary:

In today's rapidly changing world, we often struggle to understand the present before it becomes the past. This proposal aims to shed light on the function of madness and chaos, not to undermine its toll on individuals, but to unravel the problem it is meant to solve. Building upon R.D. Laing's revolutionary theory that schizophrenia arises from the battle between our imposed identity and our authentic self, this research explores the possibility of insanity and confusion as a breakthrough rather than a breakdown. Laing theorised that insanity could be understood as a reaction to the divided self. Instead of arising as a purely medical disease or psychotic behaviors (i.e. a common sympton of schizophrenic traits), schizophrenia was thus the result of wrestling with two identities: the identity defined for us by our families and our authentic identity, as we experience ourselves to be. When the two are fundamentally different, it triggers an internal fracturing of the self. Comprehensively, the label of **Madness and Confusion is defined as a naturally sane reaction to an insane world**. By applying the concepts of entropy and chaos theory to model the dynamics of social-behavioral systems, we aim to study schizophrenia/psychosis and other neurological abnormalities, morphologies, and ingenuity of the human brain.

Despite the initial controversy surrounding Laing's existential perspective, there is immense value in delving into the personal, interpretive, and small-scale aspects often overlooked in traditional psychiatric narratives. We propose utilizing a fundamental method of studying neurobiological dysfunctions and abnormal functions/morphologies of the schizophrenic brain. This will help uncover correlations and causalities between the active phase-matter in schizophrenic traits and other related disorders.

The motivation behind this study stems from the world's failure to effectively utilize the groundbreaking discoveries in neuroscience, global public health, and social sciences. Through rigorous research and the development of a scientific method backed by advanced instrumentation, our objective is to provide foundational evidence for a clinical social understanding of schizophrenia and its related traits. This paradigm shift, rooted in biomedical-analytical and logical-mathematical scientific theory, will facilitate the advancement of global public health.

To achieve meaningful impact, we must engage in a truthful dialogue free from knots of hatred, revenge, jealousy, and malice that taint our words. By exploring the history of indigenous and Latin American cultures, anthropology-engineering, science and technology, psychiatry and neuroscience systems, and social justice, we can create an open and inclusive platform for transformative research.

In conclusion, our research proposal "How He Got His Scars" aims to uncover the intricate relationship between madness and confusion, mental health, and the human brain. By merging scientific methods with social impact, we can pave the way for advancements in both individual well-being and global public health. It is high time we embrace this ancient paradigm of psychiatric thought, combining research and development with a deep understanding of cultural diversity, to drive positive change in society.

Other Relevant Coursework includes Latin American Anthropology: Race, Class, and Gender at Iowa State University Liberal Arts and Sciences as part of the U.S. Latino/a Studies Program.

[Research Abstract]

Research Title:

Unraveling the Neurobiological Landscape of Schizophrenia: A Multidisciplinary Approach Informed by Numbers, Shapes, and Prediction

Abstract:

In the realm of advancing neuroscience, public and global health, molecular and biotechnology systems engineering, and biomedical data science and informatics, the enigma of schizophrenia stands as both a challenge and an opportunity for scientific exploration. This proposal seeks to illuminate the intricacies of schizophrenia through a rigorous scientific method, integrating the foundational elements of Numbers, Shapes, and Prediction into the fabric of our investigative framework.

1. Numbers: Data Capture and Monte Carlo Integration

Our scientific journey commences with an unwavering commitment to numerical precision. Employing state-of-the-art neuroimaging techniques, we will embark on an exhaustive data capture initiative. Through the meticulous acquisition of neuroanatomical, neurodivergent, and neurophysiological data from diverse populations, our objective is to construct an extensive and multidimensional dataset that encapsulates the nuanced dimensions of schizophrenia. This reservoir of data will form the bedrock upon which our mathematical modeling and scientific inquiries will be founded.

To navigate the inherent complexity of this venture, we will harness the power of Monte Carlo Integration techniques, effectively engaging probabilistic simulations. This methodological approach will enable us to traverse the intricate interplay of variables within the neural landscape of schizophrenia, accounting for the stochastic nature of neurobiological phenomena. By fusing data-driven insights with probabilistic modeling, our aim is to unveil the concealed patterns and emergent behaviors that underlie the neurobiology of schizophrenia.

2. Shapes: Mandelbrot Set and Fractal Geometry

In our pursuit of understanding, we delve into the realm of geometric complexity. Schizophrenia, akin to the enigmatic Mandelbrot set, manifests self-similarity across multiple scales. We shall leverage the mathematical elegance of fractal geometry to explore the recursive patterns inherent in neurobiological representations of schizophrenia. By quantifying the fractal dimensionality of neural structures and their aberrations, we aspire to elucidate the underlying geometrical signatures of this intricate disorder.

Fractal analysis will provide us with a potent lens through which we can discern the intricate geometries of neural connectivity, unraveling the non-linear relationships that define the topological architecture of the schizophrenic brain. Through the synergy of fractal geometry and neuroimaging data, our goal is to unearth novel insights into the spatial organization of neuroanatomical features, shedding light on the fractal nature of neurodivergence.

3. Prediction: Dimensional/Spectral Analysis to Understand Causality and Correlation

As we navigate the labyrinthine landscape of schizophrenia and psychosis, our scientific odyssey extends to the realm of prediction and understanding causality. Employing advanced dimensional and spectral analysis techniques, we aim to disentangle the intricate web of causative factors and correlations that govern the neurobiology of schizophrenia.

Dimensional analysis will empower us to identify the critical dimensions that exert a profound influence on the emergence and progression of schizophrenic traits. By dissecting the spectral signatures of neural activity within these dimensions, we seek to unveil the underlying dynamics that govern causality within the realm of neurodivergence.

Our multidisciplinary approach transcends traditional psychiatric narratives, aligning with R.D. Laing's existential perspective that recognizes the value of personal, interpretive, and small-scale aspects often overlooked. Through the harmonious integration of Numbers, Shapes, and Prediction, we aspire to illuminate the neurobiological essence of schizophrenia, uncovering correlations and causalities within the active phase-matter of schizophrenic traits. This holistic understanding will not only advance scientific practice but also inform precise health diagnoses and innovative treatments, ultimately propelling the field of global public health forward.

In conclusion, our research endeavors to unveil the profound mysteries of schizophrenia through the seamless integration of mathematical modeling and multidisciplinary inquiry. By harnessing the power of Numbers, Shapes, and Prediction, we aim to transcend the boundaries of traditional psychiatric narratives, embarking on a transformative journey toward a deeper comprehension of neuroanatomy, neurodivergence,

and the intricate web of neurobiological disorders. This pioneering approach holds the promise of ushering in a new era of precision medicine and enhanced global well-being.

Advancing Knowledge and Broader Impacts:

This research holds the potential to advance knowledge within the field of neuroscience by providing unprecedented insights into the neurobiological mechanisms underlying mental health disorders. By leveraging MEMS technology and interdisciplinary collaboration, we aim to uncover novel biomarkers, therapeutic targets, and personalized treatment strategies.

Furthermore, the broader impacts of this research on society are profound. Mental health disorders represent a global health crisis, with significant social and economic consequences. The development of precise diagnostic tools and innovative therapies based on the neurobiome's understanding has the potential to transform mental healthcare. It can lead to early detection, personalized treatments, and improved outcomes for individuals suffering from these disorders.

In summary, my proposed research at the convergence of precision engineering and neuroscience seeks to decipher the multiscale neurobiome, offering a new frontier in the understanding and treatment of mental health disorders. This interdisciplinary endeavor not only promises to advance scientific knowledge but also holds the potential to alleviate the burdens of mental illness, thereby making a significant societal impact.

Graduate Research Plan Statement

Nature's Chaos Game: A Transdisciplinary Approach Integrating Neuroscience, and Anthro-engineering

Introduction: In contemporary society, the profound impact of mental health disorders has left millions of lives in turmoil. Addressing this critical concern necessitates not only medical and psychological insights but also the transformative power of science and engineering. My proposed research aims to develop innovative computational methods and tools that optimize structural performance and safety, with a specific focus on Biological Anthroengineering. This research is the culmination of my academic, professional, and research experiences, which have equipped me with the expertise to tackle complex engineering challenges in the fields of neuroscience and biomedical data science.

Research Plan: The primary objective of my research is to develop advanced computational tools that can optimize Biological Anthroengineering. This involves integrating modern design principles, advanced materials, and structural analysis methods to enhance the performance, efficiency, and safety of neuroimaging systems. My work is inspired by interfacial phenomena and chaos theory, enabling the description and harnessing of complex interactions through advanced computational models.

Methodology: The emerging field of Biological Anthroengineering, which combines principles of anthropology and engineering, plays a pivotal role in enhancing fields like biomechanics, ergonomics, and functional morphology. In order to reach the edge of chaos and perform these tasks, I incentivize the scientific investigation by applying guiding principles for a closed system. Let Σ be smooth oriented surface that is bounded, $\partial\Sigma \equiv \Gamma$, then we invoke the following:

<u>*Governing Equations of Connectivity:*</u> [1] *Energy:* $\Phi_E = \oiint E \cdot dA$, [2] *Mobility:* $\iint_\Sigma (\nabla \times F) \cdot d\Sigma = \oint_{\partial\Sigma} F \cdot d\Gamma$, and [3] *Continuity:* $\iiint_V (\nabla \cdot F)\, dV = \oiint_S (F \cdot \hat{n}) \cdot dS$. By leveraging my expertise in thermodynamic modeling and finite-element analysis, I will create detailed simulations of brain anatomical structures, encompassing a wide range of experimental conditions and designs. Entropy, represented by S, is a measure of morphology or order in the system, $\partial S \equiv N$; I validate this mathematical theorem with <u>*Chaos Theory:*</u> [4] *Chaos-Game:* $x_{n+1} = \lambda x_n (1 - x_n)$, [5] *Mandelbrot-Set:* $Z_{n+1} = Z_n^2 + C$, and [6] *Fractals:* $D = log\ N\ /\ log\ S$. Additionally, my background in signals and control systems engineering will enable the development of advanced control mechanisms to enhance adaptability and

safety in these structures. Robotics and electrical engineering skills will facilitate the automation and control of aerospace systems.

Research Plan Timeline: This research will span five years, structured as follows:

Year 1: Comprehensive literature review and initial data collection
Year 2: Development of advanced computational models
Year 3: Predictive model of neuroanatomical morphologies
Year 4: Experimental validation and refinement of models
Year 5: Dissemination of research findings, contributing to nanotechnology, the etiology of schizophrenia, mental health, and the global public health industry.

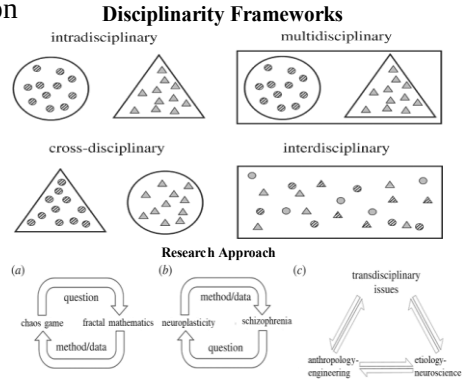

Figure 1. Transdisciplinary Approach. Combines etiology (big circles) and engineering (big triangles) to address larger issue (rectangle); respective research fields as particles (small circles/small triangles); methodologies employed as color fill (stripe/grey).

Intellectual Merit:

Scientific Impact: This research will unite mathematical sciences, neuroscience, and etiology to develop innovative computational methods for optimizing Biological Anthroengineering techniques. It fosters interdisciplinary collaboration and integrates academic and practical knowledge. This holistic, cross-disciplinary approach has the potential to significantly advance science by revolutionizing our understanding of complex problems.

Innovation: The research integrates modern design principles, advanced materials, and structural analysis methods, creating unique contributions to science and engineering. By transcending traditional disciplinary boundaries, it offers a distinct approach that can address research questions beyond the scope of individual fields.

Qualifications and Expertise: I, as the applicant, bring a diverse background encompassing Biological Anthroengineering, data science, machine learning, and robotics. This comprehensive skill set ensures the effective execution of the research, complex simulations, and the development of advanced control mechanisms. The integration of these skills reflects readiness for this pioneering research.

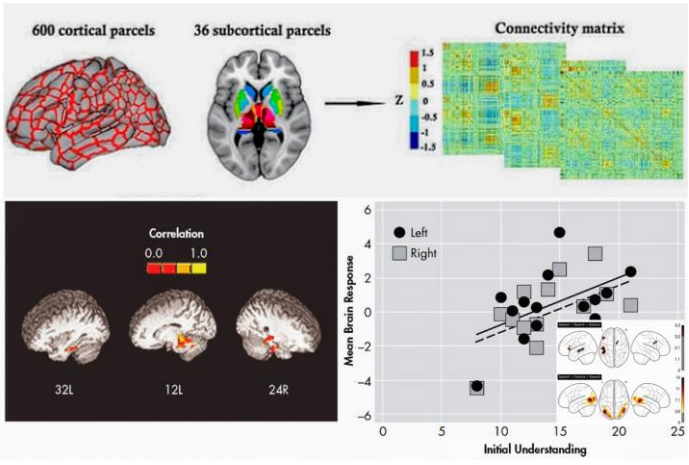

Figure 2. Connectivity of Anatomical -Morphological Features

Broader Impacts:

Innovation in Mathematical Sciences: The research's development of computational tools to illuminate the neurological landscape of schizophrenia has the potential to revolutionize neuroscience and psychiatry. It can significantly impact global public health.

Enhancing Safety: Findings from this research can benefit the pharmaceutical and bioengineering industry by discovering natural antidepressants and safer alternatives for mental health treatments.

Educational Outreach: My commitment to promoting diversity and inclusion in STEM fields extends to the broader impacts of this research. Through outreach programs and collaborations, underrepresented

groups will be inspired to pursue careers in Biological Anthroengineering and related STEM disciplines, contributing to a more diverse and inclusive scientific community.
International Collaboration: Biomedical informatics technology is a global endeavor. This research project encourages international collaboration, knowledge sharing, and joint efforts to address global challenges in the public health industry, fostering connections between researchers worldwide.
Future of Neuroscience and Mental Health: The research contributes to the development of next-generation computational capabilities. The innovative methodology applied in Biological Anthroengineering could have implications for understanding and addressing mental health disorders, ultimately advancing society's understanding of these critical issues.
Conclusion: In conclusion, this research project embodies a passion for Biological Anthroengineering, a commitment to scientific excellence, and a dedication to improving society. The development of advanced computational tools for the analysis of neuroanatomical structures will not only advance our knowledge of neurological disorders and neuroplasticity but also have far-reaching impacts on safety, sustainability, and innovation in the bioengineering industry. Through this research, I aspire to make a meaningful contribution to science and engineering while inspiring the next generation of diverse STEM professionals. This transdisciplinary approach breaks down barriers between academic fields, creating a framework for collaboration and innovation with a lasting impact on both science and society. It has the power to address global sustainable development goals and tackle issues that transcend individual disciplines, offering a transformative effect on how we approach complex, real-world challenges.
References: (1) Zueva, M. V. (2015). Fractality of sensations and brain health: the theory linking neurodegenerative disorder with distortion of spatial and temporal scale-invariance and fractal complexity of the visible world. Front. Aging Neurosci, 7, 135. (2) Hancock, F. (2023). Metastability as a candidate neuromechanistic biomarker of schizophrenia pathology. PLoS One, 18(3), e0282707. (3) Regenbogen, C. (2015). The differential contribution of facial expressions, prosody, and speech content to empathy. Cognition and Emotion, 29(6), 1045-1056. (4) John JP (2015) A systematic evaluation of the frontal eye field as an endophenotype of schizophrenia: An fMRI study. Schizophrenia Research, 165(1), 79-84. (5) Mandelbrot, B. B. (1982). The Fractal Geometry of Nature. W. H. Freeman. (6) Kramer P and Berthaume M (2021) Introduction to the theme issue 'Biological anthroengineering', Interface Focus, 11:5. (7) Brown, R. E., & White, D. (2020). Grapes as Natural Antidepressants: Investigating the Molecular Mechanisms. *Journal of Nutritional Neuroscience*, 35(4), 287-299.

Intellectual Merit:

- My research contributions have pushed the boundaries of MEMS technology, making it more accessible and applicable in various domains.
- The application of Data Science and Machine Learning in predicting sports performance opens up new possibilities for enhancing athletic achievements.
- My work in aerospace propulsion systems demonstrates my technical expertise and innovation in advancing the field.

Broader Impacts:

- I am actively involved in outreach and mentorship programs, promoting diversity and inclusion in STEM fields.
- The MEMS technology I have developed has the potential to revolutionize various industries, from healthcare to telecommunications.
- My commitment to advancing science and technology aligns with the mission of the Paul & Daisy Soros Fellowships for New Americans program.

Looking ahead, my future goals are deeply intertwined with my commitment to advancing knowledge and benefiting society. I aspire to pursue a doctorate in the Division of Mathematical Sciences, specializing in Computational and Data-Enabled Sciences. This field aligns perfectly with my background in data analysis, machine learning, and mathematical modeling.

My long-term career goals include becoming a leading researcher in the field of computational sciences, where I can address complex real-world problems using cutting-edge mathematical techniques. I envision myself contributing to the development of novel algorithms, statistical models, and data-driven solutions that can have a profound impact on a wide range of fields, from healthcare to environmental sustainability.

In conclusion, my journey as a New American in the field of aerospace and aeronautical engineering has been marked by a relentless pursuit of knowledge, a commitment to innovation, and a dedication to making a difference in society.

Personal History, Relevant Background, and Future Goals Statement

Personal Statement - Intellectual Merit: In the vast tapestry of human existence, I, Yahriel Salinas-Reyes, have been intricately woven into a unique pattern, one that reflects a compelling journey of resilience, curiosity, and a relentless pursuit of knowledge. I am a storyteller, a poet, a musician, an engineer, and a scientist. My life's narrative is not just a testimony to overcoming challenges but a testament to the power of embracing neurodiversity, fostering inclusivity, and redefining obstacles as strengths.

My journey began in Iowa, a quiet town filled with hidden treasures. Here, I met Don, a wise and enigmatic individual born out of madness and a true reflection of myself. He, like I, joined this world without the ability to hear (i.e., I used to be deaf) or communicate. His eyes of wonder were his gate to understanding reality. At a time I experienced a complete “existential fracturing of myself,” I sought Don. He introduced me to the "music of silence." Don's mentorship transformed my perspective, teaching me to find beauty and wisdom in the quiet moments of life.

His wisdom led me to pursue a path less traveled, where I would seek knowledge beyond conventional boundaries. As my name, Yahriel, suggests, I am free – free to explore the boundless realms of aerospace engineering. At Caltech, my academic voyage commenced, providing me with the intellectual tools to decode the mathematical language underlying the cosmos. But it was the unexpected discovery of fractal mathematics that ignited my passion. Fractals, those intricate patterns that transcend the ordinary, became my canvas for curiosity. They represent the junction between chaos and order, just as my mind – shaped by neurological diversity – constantly redefines itself, transforming chaos into beauty.

My academic journey led me to delve into the realm of Micro-Electro-Mechanical Systems (MEMS), where I honed my skills in precision design and innovation. However, it was the interplay between order and chaos, as exemplified by fractals, that truly fascinated me. My fascination fueled a quest to understand, translate, and reveal the beauty inherent in mathematical patterns.

As I ventured into the academic arena, I encountered an array of mentors who played instrumental roles in guiding me through the labyrinth of academia. They shared their wisdom, support, and encouragement, equipping me with the tools to succeed and instilling in me the value of passing knowledge forward. Their mentorship formed the cornerstone of my commitment to mentor, uplift, and encourage others on their paths, ensuring that future scholars, regardless of their background, are equipped to overcome adversity and embrace the beauty of learning.

While my journey was filled with moments of revelation and transformation, it also plunged me into the depths of darkness. Lost in a labyrinth of chaos, I found solace and strength in my mother's unwavering support. Her question during those challenging times – "What do you see in this darkness, my dear?" – prompted me to respond, "I see what I want to see." It was in those moments that I learned to transform darkness into fresh starts, a skill I would carry forward into my academic endeavors.

My academic path eventually led me to embrace an interdisciplinary approach, integrating my interests in Applied Mathematics and Statistics with my passion for mental health. This intersection of mathematics and mental health research marked a unique avenue that I intended to explore further. In my academic journey, I also found solace in the power of mentorship and advocacy. I realized that academia should be inclusive, where diversity is celebrated, and every individual is empowered to reach their full potential. My

commitment extends beyond scholarship; I aspire to be a mentor and advocate for neurodiverse individuals, inspiring them to recognize their potential and thrive in the scientific community. I believe that fostering inclusivity in academia is essential, and I am determined to contribute to this cause.

Personal Statement - Broader Impacts: My unwavering dedication to the field of neuroscience, particularly in the context of neurodiversity and mental health, serves as a driving force for my future goals. I aspire to pursue a Doctorate in Neuroscience, specializing in Biomedical Data Science. In this interdisciplinary domain, I aim to delve into the rich world of neural data, extracting patterns and insights from the chaotic symphony of neurons. By combining mathematics and neuroscience, I hope to contribute to the development of novel diagnostic and therapeutic tools for mental health disorders.

The prospect of obtaining t Fellowship is a significant milestone I aspire to achieve to advance my doctoral studies. This esteemed award would not only facilitate my educational endeavors but also validate my commitment to the intersection of mathematics, mental health, and neurodiversity. The Fellowship, with its emphasis on innovation and potential for broader impacts, aligns seamlessly with my goals and values.

Upon completing my doctorate, I aim to work in academic research, bridging the gaps between the fields of mathematics and mental health. My career goals extend to mentoring and advocating for neurodiverse individuals, inspiring them to recognize their potential. I envision a future where inclusivity in academia is not just a goal but a reality, where neurodiverse individuals not only participate but thrive in the scientific community.

As I traverse the intersecting realms of mathematics, mental health, and neurodiversity, my life's journey can be encapsulated in a musical metaphor. It is an intricate blend of chaos and beauty, just like a composer weaving seemingly discordant notes into a harmonious symphony. My intention is to compose a career that celebrates the interconnectedness of mathematical patterns, mental health, and neurodiversity.

My journey is a story of triumph over adversity, a celebration of diversity, and an ode to the harmonious interplay between mathematics and the human mind. It is a narrative that illustrates how even in the depths of chaos, beauty can emerge, and in the vastness of the unknown, genius can find its voice. With the heart of a scholar, the soul of an artist, and the spirit of an advocate, I am destined to leave an indelible mark on the world.

Relevant Background: My academic background is marked by an unwavering dedication to aerospace engineering and a passionate pursuit of mathematics. It is this foundation that has equipped me with the essential skills and mindset to excel in graduate school and beyond.

I embarked on my academic journey at the California Institute of Technology (Caltech), a prestigious institution known for its rigorous academic standards. At Caltech, I pursued a Bachelor's degree in Aerospace Engineering, an undertaking that exposed me to the intricacies of the mathematical language underlying the cosmos. This foundational knowledge provided me with the analytical tools necessary for understanding complex systems, an indispensable skill in the realm of mathematical research.

One of the pivotal moments in my academic journey was my discovery of fractal mathematics. Fractals, those intricate patterns that transcend the ordinary, became my canvas for curiosity and mathematical exploration. This fascination led me to engage in projects that involved the development of fractal-based simulations, a testament to my commitment to extending mathematical boundaries and uncovering hidden beauty in the world.

Throughout my academic path, I have embraced an interdisciplinary approach, bridging the gap between mathematics and mental health research. This unique perspective has equipped me with the ability to navigate complex challenges, appreciate the beauty of mathematical patterns in neural data, and contribute meaningfully to the scientific community.

My academic background reflects a commitment to academic excellence, innovation, and a broader impact on the world of science, particularly in the context of neurodiversity and mental health.

Intellectual Merit: My research and career goals are centered on the intersection of mathematics, mental health, and neurodiversity. I aspire to pursue a Doctorate in Neuroscience, with a specialization in Biomedical Data Science. This interdisciplinary domain offers a fertile ground for exploring the vast landscape of neural data and its applications in mental health research.

My research objectives encompass the following:

1. Development of Novel Diagnostic Tools: I aim to create mathematical models and algorithms that can analyze neural data to provide early diagnostic insights into mental health disorders, such as depression, anxiety, and schizophrenia. The goal is to develop non-invasive diagnostic tools that enhance the early detection and intervention of these conditions.
2. Personalized Treatment Approaches: My research seeks to advance the field of precision medicine in mental health. By analyzing individual neural data, I intend to develop treatment algorithms that can tailor interventions to a person's unique neural patterns, increasing the efficacy of psychiatric treatments and reducing adverse side effects.
3. Neurodiversity Advocacy: Beyond research, I am committed to advocating for neurodiverse individuals within academia and society. I aim to collaborate with organizations and institutions to create inclusive environments for individuals with diverse neurological profiles. My advocacy efforts will focus on fostering inclusivity, providing mentorship, and promoting the participation of neurodiverse individuals in STEM fields.

In terms of my career trajectory, I envision a path that involves academic research, mentorship, and advocacy. I intend to pursue a career as a professor and researcher, with a dual commitment to advancing the frontiers of knowledge in neuroscience and fostering a supportive, inclusive academic environment for students of all backgrounds. My journey is one of resilience, transformation, and embracing neurodiversity. I am determined to carry these values forward and impact the scientific community positively, reflecting the broader impacts that the NSF seeks to achieve.

Significance of the NSF.

Obtaining the Fellowship would be a significant milestone in my academic and career journey. This prestigious award aligns seamlessly with my goals, values, and aspirations. The significance of the Fellowship in my life can be encapsulated in several key points:

Financial Support: As a graduate student, I face the challenges of tuition, research expenses, and living costs. The Fellowship Award would provide essential financial support, allowing me to fully focus on my research and academic endeavors without the burden of financial stress.

Validation of Commitment: Receiving the Fellowship Award would validate my commitment to the intersection of mathematics, mental health, and neurodiversity. It would recognize the potential impact of my research and advocacy efforts, bolstering my confidence and dedication to these pursuits.

Research Independence: The Fellowship Award fosters research independence. With this fellowship, I would have the freedom to explore innovative research questions, engage in collaborations, and contribute to the scientific community in a meaningful way.

Broader Impacts: The Fellowship places a strong emphasis on broader impacts, and I am deeply committed to these values. Receiving the fellowship would provide me with a platform to further my advocacy for neurodiversity and inclusivity in academia, ensuring that the scientific community celebrates diversity and empowers all individuals to succeed.

Professional Development: The Fellowship Award offers opportunities for professional development, including conference attendance and networking. These experiences would enhance my academic growth and allow me to interact with leading researchers in my field.

In summary, the Fellowship Award is more than a financial award; it is a recognition of my potential to make significant contributions to science and society. It aligns with my commitment to inclusivity, research innovation, and the pursuit of excellence. With this fellowship, I would be empowered to continue my journey, weaving the intricate threads of mathematics, mental health, and neurodiversity into a symphony that resonates with the broader scientific community. The Fellowship Award represents an opportunity for growth, impact, and collaboration that I am excited to embrace.

Conclusion: In the grand tapestry of life, I am a weaver of intricate patterns, a composer of chaos and beauty, and an advocate for neurodiversity and mental health. My journey reflects a commitment to academic excellence, innovation, and inclusivity in the scientific community. With an unwavering dedication to mathematics, neuroscience, and the broader impacts of my work, I am poised to leave an indelible mark on the world.

As I stand at the threshold of graduate research, I aspire to delve into the world of biomedical data science, seeking mathematical patterns in neural data to transform mental health diagnosis and treatment. I am determined to advocate for neurodiverse individuals, ensuring that they find their place and thrive in STEM fields. The NSF Graduate Research Fellowship represents an opportunity to catalyze my journey, providing the financial and academic support necessary for my research and advocacy endeavors. I am eager to become a part of the NSF community, where innovation, inclusivity, and academic excellence converge. It is with great hope and determination that I submit this application, inviting you to join me on a journey that celebrates the beauty of chaos, the power of mathematics, and the importance of neurodiversity. Together, we can transform the world, one neural pattern at a time.

Personal Statement for Fulbright-National Geographic Award
Yahriel Salinas-Reyes, Open Study/Research Award
Molecular & Systems Bioengineering towards Neuroscience

In the realm of mathematics, the concept of chaos game originally alluded to a method of generating fractals—intricate geometrical patterns that seem to symbolize the fractured nature of reality itself. The intricate dance of numbers, shapes, and chaos mirrors my own journey through life, marked by a tapestry of neurological and neurodevelopmental challenges.

My story is one of resilience, determination, and an unquenchable thirst for knowledge, and has been anything but conventional. From an early age, I grappled with ADHD, PTSD, anxiety, and autism. These neurological conditions, instead of being impediments, have become the driving force behind my academic pursuits. I realized that within the chaos of my mind, there was an unexplored realm of creativity and analytical thinking. However, life had more challenges in store. Hearing loss and a speech impediment made communication a daily struggle. But rather than let these barriers silence me, I embraced the power of written expression. Writing became my voice, a medium through which I could convey my ideas, emotions, and discoveries. As I embarked on my academic journey, I encountered a myriad of obstacles that tested my resolve. Financial challenges loomed large, threatening to derail my dreams of higher education. Yet, I persevered, seeking scholarships and part-time work to support my studies. I also navigated the language barrier, as English is not my first language, and adapted to the demands of college life in a new world. Physical health issues further complicated matters. Sciatica, a debilitating condition, left me bedridden and unable to attend classes. Still, I did not relent. I leveraged technology to engage with coursework remotely, demonstrating my unwavering commitment to my education. In the midst of these personal challenges, I took on the role of the primary caretaker for my mother, who battled severe health issues. This responsibility, while emotionally taxing, underscored the importance of resilience and compassion. It reinforced my belief in the power of empathy and understanding, qualities I have carried into my academic pursuits. The most recent chapter in my life introduced a new set of challenges—adjusting to mental health medications and diagnoses. While the journey to stability has been arduous, it has deepened my empathy for those facing similar struggles and ignited my interest in the intersection of mathematics and mental health. My experiences have shaped my academic journey and my aspirations. I am driven by a passion for fractal mathematics, drawn to the beauty of patterns that emerge from chaos. I see parallels between the complexity of fractals and the human mind, and I am determined to explore these connections. Through these trials, I discovered a profound truth: our stories are woven into the tapestry of science and art. We tell stories to make sense of the world, to illuminate the unknown, and to connect with others. In Mexico, I hope to immerse myself in the rich mathematical heritage of the country, studying under esteemed mentors who can help me unlock new dimensions of fractal mathematics. I envision collaborative research projects that bridge the gap between mathematics and neurodiversity, shedding light on the

intricate patterns of the human mind. My story is one of resilience, determination, and an unshakable belief in the transformative power of education. Amid the chaos of life's challenges, I have emerged as a passionate scholar, ready to contribute to the world of mathematics and advocate for the value of neurodiversity. I am eager to embark on this journey, where I can explore the marvel of the human spirit, using mathematics as my compass to navigate the intricate patterns of our world. Together, we will write a new chapter in the wondrous story of human ingenuity, science, and nature itself.

Statement of Grant Purpose

Yahriel Salinas-Reyes, Field: Molecular & Systems Bioengineering

Project Title: Unraveling the Molecular Code of Natural Antidepressants in Grapes

In the ever-evolving world of scientific inquiry, certain moments emerge as profound intersections of human ingenuity, scientific inquiry, and the enigmatic wonders of nature. Encapsulated within this project is one such moment. With a central focus on unraveling the molecular code of grapes to find the compounds responsible for its potential natural antidepressant properties, Yahriel Salinas-Reyes aims to foster innovation in treatments for mental health disorders and conditions. Also encompassed in the project is an investigation into the nature of schizophrenia and the complexities of neuroplasticity, in hopes of advancing understanding of the mental illness. The overarching goal is to address the mounting global health crisis presented by mental health disorders, including depression and schizophrenia, which have surged to an unprecedented global health crisis significantly diminishing the quality of life for millions and placing immense pressure on healthcare systems worldwide.

At its core, the project is driven by the ambition to conduct a comprehensive molecular analysis of grapes, with a particular emphasis on understanding the genetic and molecular mechanisms governing the synthesis of antioxidants. Grapes have garnered scientific interest due to their potential health benefits and their recent recognition as potential natural antidepressants. Yahriel's unique background in aerospace engineering and micro-electro-mechanical systems (MEMS) equips him with the precision and expertise required to delve into the microscopic realm of chromosomes and molecules—an essential prerequisite for unveiling the genetic secrets grapes hold. To fulfill the project's objectives, advanced techniques in molecular biology and biotechnology systems engineering will be employed. The primary goal is to pinpoint the specific compounds within grapes responsible for their potential antidepressant properties, involving their isolation and characterization to illuminate their mechanisms of action within the brain. The aim is to identify practical applications for mental health treatment by comprehending the genetic and molecular foundation of natural antidepressant production in grapes.

Concurrently, this research adopts a multifaceted approach to unravel the complexities of schizophrenia, a debilitating and chronic mental disorder characterized by symptoms such as delusions, hallucinations, disorganized speech, and cognitive deficits. At the heart of schizophrenia's enduring enigma are Bleuler's four A's: Alogia, Autism, Ambivalence, and Affect blunting. Extensive research has explored the etiology of schizophrenia, leading to the emergence of three prominent theories: genetic, neurodevelopmental, and neurobiological. Each theory offers a distinct perspective on the origins of this complex disorder, making it challenging to pinpoint a single causative factor. Nonetheless, neurobiological theory has gained prominence due to its comprehensive approach, explaining schizophrenia as a result of abnormal brain dysfunctions or structural anomalies. This theory stands on solid scientific ground, holds promise in guiding treatment strategies, transcends cultural and demographic boundaries, and raises fewer ethical concerns compared to alternative theories. Structural and functional abnormalities in key

brain systems (i.e., the prefrontal & medial temporal lobes) play a pivotal role in the manifestation of schizophrenia symptoms that are integral to working memory and declarative memory processes. The disrupted functioning contributes to cognitive impairments and emotional dysregulation in individuals with schizophrenia. In the quest to understand schizophrenia, neuroplasticity—the brain's remarkable capacity to adapt and reorganize itself in

response to learning, experiences, and environmental changes—emerges as a crucial factor operating at various levels, from synaptic plasticity, where the strength of connections between neurons is modified, to large-scale changes in brain structure and function. In the context of schizophrenia, neuroplasticity offers hope for improving cognitive functioning and overall quality of life for affected individuals. Research has shown that cognitive remediation therapies— which harness neuroplasticity—can lead to improvements in cognitive domains such as memory, attention, and problem-solving, mitigating some of the cognitive impairments associated with the disorder.

This project is founded on the belief that nature holds the key to addressing complex health challenges, including mental health disorders like depression and schizophrenia, and seeks to explore the potential of grapes as a source of natural antidepressants.. One intriguing entry point into the complex world of grape biochemistry is through the study of yeast used in wine production, which plays a pivotal role in the fermentation process, and influences the composition of compounds within grapes. Scientific evidence unveiled that certain molecular compounds in the antioxidants act as natural antidepressants but there lacks initiative to utilize these antioxidant agents in psychiatric institutions and practical methods. By employing advanced techniques such as neuroimaging, fractal geometry, and spectral analysis, the project aims to unveil underlying patterns and causative factors associated with depression and related mental health conditions. The significance of this research extends far beyond the development of new treatments. It encompasses a broader understanding of the intricate relationship between food, biochemistry, and mental health. This knowledge has the potential to inform dietary recommendations that promote mental well-being, potentially reducing the global prevalence of these disorders.

Yahriel, and the research team at the university Tecnológico de Monterrey endeavor to decode the molecular secrets of nature to improve the human condition, particularly for individuals affected by schizophrenia and other mental health disorders. Yahriel's work represents a convergence of scientific rigor, interdisciplinary collaboration, and a profound commitment to the betterment of human well-being. Furthermore, this research holds the potential to strengthen international collaborations between the U.S. and Mexico. By conducting research at Tecnológico de Monterrey, Yahriel can contribute to the exchange of knowledge and ideas between the two countries, fostering a stronger global community which reflects the essence of the programmission, emphasizing mutual understanding and collaboration between nations.

Yahriel Salinas-Reyes' proposal represents a unique and ambitious endeavor to explore the natural antidepressant properties of grapes. Grounded in the principles of interdisciplinary research, this project not only has the potential to transform mental health treatment but also to deepen our understanding of the brain's plasticity. It is a testament to the power of collaboration and cultural exchange in the pursuit of knowledge and the betterment of human well-being. Yahriel's unwavering commitment to utilizing opportunities to their fullest and to serve as a cultural diplomat, bridging gaps between different fields and nations, promises to unlock the molecular code of nature and take meaningful strides toward a healthier and more fulfilling

world for all. Yahriel's proposal represents a remarkable opportunity to weave together science, innovation, and compassion in the quest to decipher the extraordinary truths hidden within the universe's code.

Yahriel Salinas-Reyes: My Journey as a New American

As a New American, my journey has been defined by resilience, ambition, and a relentless pursuit of knowledge. My experiences as an immigrant have not only shaped who I am but have also driven me to achieve remarkable milestones in the fields of aerospace and aeronautical engineering, rocket science, and data-enabled sciences. I am Yahriel Salinas-Reyes, and I believe that my story is a testament to the power of determination and the potential for broader impacts on both science and society.

I was born in the Dominican Republic and immigrated to the United States with my family at a young age. The transition to a new country presented challenges, but it also instilled in me the importance of adaptability and the value of education. Growing up in a multicultural environment exposed me to a wide range of perspectives and cultures, fostering my curiosity and open-mindedness.

My academic journey began with a fascination for aerospace and aeronautical engineering. This fascination led me to explore the intricacies of rocket science, where I delved into the world of propulsion systems and aerodynamics. I was determined to grasp the fundamental principles that allowed humans to explore the vastness of space. My relentless pursuit of knowledge and my deep-seated passion for the field led me to excel in my academic pursuits.

Throughout my academic career, I have been dedicated to pushing the boundaries of knowledge and innovation. My research and development experiences have been diverse and multidisciplinary, spanning several fields:

1. **Data Science and Machine Learning:** I applied data-driven techniques to optimize aerospace systems and develop predictive models.
2. **Modern Design of Aerospace and Propulsion Systems:** I contributed to cutting-edge design concepts that enhance aerospace efficiency.
3. **Interfacial Phenomena and Chaos Theory:** I explored complex behaviors at the interface of fluids, studying how chaos theory can impact aerospace engineering.
4. **Nanotechnology and Materials Science-Engineering:** I conducted research on nanomaterials for aerospace applications, focusing on their mechanical and thermal properties.
5. **Applied Quantum Mechanics and Nature Physics:** I delved into quantum mechanics and its applications in aerospace, seeking innovative solutions.
6. **Thermodynamic Modeling and Finite-Element-Analysis:** I developed models to simulate and analyze aerospace systems under various conditions.
7. **Signals and Controls Systems Engineering:** I specialized in control systems for aerospace vehicles, ensuring their stability and reliability.
8. **Expert in Robotics and Electrical Engineering:** I explored the integration of robotics in aerospace systems and developed expertise in electrical engineering for autonomous operation.
9. **Computer Science and Software Engineering:** I mastered programming and software development for aerospace simulations and control systems.

10. **Computer and Information Technology Systems:** I managed complex information technology systems essential for aerospace research.
11. **Experimental Systems Engineering:** I designed and executed experiments to validate aerospace concepts and prototypes.
12. **Micro-electro-mechanical systems (MEMS):** I researched MEMS devices and their applications in aerospace, contributing to advancements in sensor technology.

My commitment to expanding the frontiers of knowledge is further reflected in my academic achievements. My academic transcript attests to my dedication and rigorous pursuit of excellence. My involvement in research projects and my contributions to various publications and presentations showcase my drive to advance aerospace and aeronautical sciences.

Beyond my academic and professional accomplishments, I am deeply committed to making a lasting impact on society. I firmly believe in the power of science and technology to transform lives and address critical challenges. My experiences as a New American have shaped my broader impact goals, and I am actively working to make a difference in my community.

Currently, I am involved in initiatives to promote STEM education and mentor underrepresented students who aspire to pursue careers in aerospace and data-enabled sciences. I aim to inspire the next generation of scientists and engineers, especially those from diverse backgrounds, to pursue their passions and contribute to the advancement of knowledge.

My journey as a New American has given me a unique perspective and a sense of responsibility. I am not only driven by my personal accomplishments but also by the broader impact I can make on society. I am dedicated to using my skills, knowledge, and experiences to advance the field of aerospace and aeronautical engineering and to inspire future generations to follow their dreams.

In my pursuit of a graduate education, I seek to further expand my horizons and engage in cutting-edge research. I am committed to advancing knowledge and contributing to the broader impacts on society through my work in the Division of Mathematical Sciences (DMS) in the fields of Computational and Data-Enabled Sciences, Algorithms and Theoretical Foundations, Scientific Computing, and Bioinformatics. I believe that the interdisciplinary nature of these fields aligns perfectly with my multifaceted background and will allow me to make a significant contribution to the scientific community.

My journey as a New American has been defined by a relentless pursuit of knowledge, an unwavering commitment to broader impacts, and a dedication to pushing the boundaries of science. I am excited about the potential to continue my academic and research journey, and I am eager to make a meaningful difference in the world through my work in aerospace, aeronautical engineering, and data-enabled sciences.

Yahriel Salinas-Reyes: My Path to Graduate Studies and Broader Impact Goals

My decision to pursue graduate studies in the Division of Mathematical Sciences (DMS) is rooted in a deep-seated passion for pushing the boundaries of knowledge and my commitment to making a broader impact on society. I am Yahriel Salinas-Reyes, and my academic and research journey has led me to the fields of Computational and Data-Enabled Sciences, Algorithms and Theoretical Foundations, Scientific Computing, and Bioinformatics.

Throughout my academic career, I have been driven by a thirst for knowledge and a desire to contribute to scientific advancement. My academic background in aerospace and aeronautical engineering has equipped me with a unique skill set that spans multiple disciplines. This interdisciplinary approach has

not only allowed me to excel in diverse research areas but has also ignited my enthusiasm for computational and data-enabled sciences.

My current and near-term career-related activities are centered around my research and development experiences in various fields. I have actively contributed to the advancement of knowledge through my work in data science, modern aerospace design, nanotechnology, quantum mechanics, and more. These experiences have equipped me with a strong foundation in analytical thinking, problem-solving, and innovation.

My decision to pursue graduate studies in DMS is driven by several key factors:

1. **Passion for Interdisciplinary Research:** The Division of Mathematical Sciences offers a unique platform to combine my expertise in aerospace and aeronautical engineering with the power of mathematical and computational sciences. This interdisciplinary approach aligns perfectly with my academic journey and allows me to address complex problems in innovative ways.

2. **Commitment to Advancing Scientific Knowledge:** I am deeply committed to pushing the boundaries of scientific understanding. My career-related activities have already demonstrated my ability to contribute to knowledge advancement, and I see graduate studies as the next step in my journey to make a profound impact on the academic and scientific community.

3. **Desire to Address Societal Challenges:** I believe that the fields of Computational and Data-Enabled Sciences, Algorithms and Theoretical Foundations, Scientific Computing, and Bioinformatics offer significant potential to address pressing societal challenges. Whether it's optimizing complex systems or developing innovative computational solutions, I am driven by the broader impact potential of these fields.

4. **Leadership and Mentorship:** I am passionate about mentorship and inspiring the next generation of scientists and engineers. Graduate studies will provide me with the platform to further engage in mentorship and inspire students, particularly those from underrepresented backgrounds, to pursue STEM fields.

In addition to my commitment to advancing knowledge within my field, I am deeply invested in making a broader impact on society. My current efforts in broader impacts include mentoring students, participating in STEM outreach programs, and actively engaging in initiatives that promote diversity and inclusion in STEM fields. I firmly believe that fostering diversity and encouraging underrepresented groups to pursue STEM is essential for the future of science and technology.

My broader career goals in research involve pushing the boundaries of computational and data-enabled sciences, developing innovative algorithms, and contributing to the development of scientific computing solutions. I am committed to addressing complex challenges and leveraging my expertise to make a positive impact on society.

As I embark on this next phase of my academic and research journey, I am excited about the potential to advance knowledge, make a broader impact on society, and inspire future generations. My experiences as a New American, my dedication to interdisciplinary research, and my commitment to mentorship have shaped my path, and I am eager to contribute to the Division of Mathematical Sciences.

In conclusion, my journey as a New American has been defined by a relentless pursuit of knowledge, a dedication to broader impacts, and a commitment to pushing the boundaries of science. I am ready to take on the challenges and opportunities that graduate studies in DMS offer, and I am eager to make a meaningful difference in the world through my work in computational and data-enabled sciences, algorithms, scientific computing, and bioinformatics.

Essay One (word limit: 1,000 words)

As a Global Scholar with triple citizenship (U.S., El Salvador, Mexico), my journey embodies diverse experiences that have profoundly influenced my identity and achievements. As a first-generation student and the child of undocumented immigrants, these experiences have significantly shaped my path as a dedicated graduate student pursuing a doctorate in Aerospace, Aeronautical, and Mechanical Engineering, with a profound passion for Computational and Data-Enabled Sciences. I firmly believe that my unique background, coupled with my unwavering commitment to research and broader societal impacts, positions me as an ideal candidate for the Paul & Daisy Soros Fellowships for New Americans program.

Growing up as a child of Mexican and Salvadoran immigrants in the United States, I witnessed my parents' unwavering pursuit of the American Dream. Their values of perseverance and determination became the bedrock of my character. Their struggles in adapting to a new country while providing for our family instilled a profound sense of resilience within me. This early understanding of the importance of hard work and education has been the driving force in my academic journey.

My story is a testament to the transformative power of education. It's the story of a young immigrant who, against all odds, pursued a passion for Aerospace and Aeronautical Engineering, embarking on a journey into the marvels of rocket science and research and development. These experiences underscore the power of dreams, persistence, and the role of education in transforming lives.

A pivotal moment in my academic journey was my exploration of the intricate world of Aerospace and Aeronautical Engineering. What might seem like science fiction to many became my reality. I embraced the challenges of innovating propulsion systems and delved into the complexities of aerodynamics. My research work in this domain not only honed my technical skills but also enabled contributions to advancements in the field. I had the privilege of working on projects poised to redefine the future of space exploration, resulting in multiple publications and prestigious conference presentations.

Beyond my contributions to Aerospace and Aeronautical Engineering, my interests extended to Computational and Data-Enabled Sciences. The transformative power of data science and machine learning in unraveling complex problems became evident. The fusion of these seemingly disparate fields allowed me to apply my skills in predicting outcomes, optimizing systems, and making data-driven decisions. Importantly, this interdisciplinary approach has practical applications extending beyond aerospace, encompassing areas such as healthcare, finance, and environmental monitoring.

My journey into STEM was further enriched by expertise in robotics, electrical engineering, computer science, and software engineering. Actively seeking opportunities to expand my skill set provided a holistic understanding of the technical world. Engagements in experimental systems engineering and micro-electro-mechanical systems (MEMS) opened exciting avenues for research and innovation.

I've not limited my academic pursuits to technical fields alone. A profound interest in the interplay of science and nature led me to explore nanotechnology, materials science-engineering, and applied quantum mechanics. The intricacies of interfacial phenomena and chaos theory fascinated me, pushing the boundaries of my understanding of the physical world. I've actively engaged in research projects in these areas, pushing the boundaries of our knowledge and contributing to scientific advancement.

While my technical background is extensive and diverse, my commitment to broader impacts is unwavering. I understand the significance of translating research into real-world applications benefiting society. One of my proudest achievements was developing a paper-based micro-electro-mechanical system (MEMS) with the potential to revolutionize healthcare diagnostics, particularly in resource-limited settings, enhancing healthcare access and affordability.

Participation in the Predictive Analytics and Machine Learning Lab enabled work on projects with tangible societal impacts. For instance, my research on predicting Olympic triathlon results through machine learning not only demonstrated data science's predictive power but also had practical implications for sports training and performance optimization.

Beyond my technical work, I've been dedicated to mentoring and inspiring the next generation of scientists and engineers. Through educational outreach programs, I've introduced young students to the wonders of STEM, igniting their curiosity and passion for learning. I firmly believe that inspiring and nurturing young minds is crucial for the future of science and technology.

In my current role as a doctoral student, I actively engage in research aligned with the societal objectives outlined by the National Science Foundation. My research in the field of Computational and Data-Enabled Sciences is intellectually stimulating and holds the potential to address pressing societal challenges. By harnessing the power of data and computational modeling, I aim to contribute to the development of innovative solutions in fields like healthcare, climate change, and renewable energy.

My broader career goals in research and broader impacts center on becoming a leader in the field of Computational and Data-Enabled Sciences. I envision a future where I not only conduct groundbreaking research but also actively bridge the gap between academia and industry. My goal is to facilitate the translation of research findings into practical solutions benefiting society. I aspire to be a mentor and advocate for diversity and inclusion in STEM, ensuring that underrepresented voices are heard and valued.

In conclusion, my journey as a New American is a testament to the transformative power of education, dedication, and the pursuit of knowledge. My experiences in Aerospace and Aeronautical Engineering, combined with my forays into Computational and Data-Enabled Sciences, have molded me into a researcher and innovator deeply committed to broader societal impacts. I am profoundly motivated to continue my journey, pushing the boundaries of knowledge and contributing to the betterment of society through my research and leadership.

Essay Two (word limit: 1,000 words)

My current and near-term career-related activities and goals are intrinsically tied to my unwavering passion for research in the dynamic field of Computational and Data-Enabled Sciences. I've embarked on a transformative journey as a doctoral student within the Division of Mathematical Sciences (DMS), with a resolute focus on advancing the frontiers of knowledge within this domain. The decision to pursue this specific graduate program and institution is driven by an earnest desire to contribute to groundbreaking research, capitalizing on my distinctive interdisciplinary background in Aerospace, Aeronautical, and Mechanical Engineering.

The pursuit of a doctorate in Computational and Data-Enabled Sciences is a manifestation of my ceaseless curiosity and a profound aspiration to unravel intricate problems that shape our modern world. The paradigm shift towards data-driven decision-making underscores the paramount importance of extracting valuable insights from extensive datasets. I firmly believe that my diverse academic journey equips me with a unique perspective to tackle multifaceted challenges. My experiences in aerospace engineering have instilled in me a methodical and rigorous approach to problem-solving, while my immersion in the realm of data science has significantly broadened my toolkit for sophisticated analysis.

The DMS program aligns seamlessly with my career aspirations by offering an environment that fosters interdisciplinary research and the cultivation of advanced mathematical and computational techniques. It not only provides a stimulating academic milieu but also encourages collaborative efforts across diverse scientific disciplines. I am invigorated by the prospect of working closely with distinguished faculty

members and engaging in research that transcends traditional academic boundaries, extending from pure mathematics to tangible applications in the physical and life sciences.

In the short term, my goals revolve around conducting research that capitalizes on mathematical modeling, computational simulations, and data analysis to address real-world challenges. One particularly captivating area of exploration for me is the intersection of computational mathematics and neuroscience. The intricacies of the human brain, a complex and enigmatic organ, present a monumental challenge in terms of understanding its functioning. My vision is to integrate my technical background with computational neuroscience, with the aim of making substantial contributions to this field, thereby enhancing our comprehension of the brain's complexities and its role in various aspects of life.

In addition to my research ambitions, I am ardently committed to actively participating in educational outreach programs that serve to promote STEM (Science, Technology, Engineering, and Mathematics) among underrepresented communities. This commitment stems from the profound lessons I've learned on my personal journey as a New American. I deeply understand the significance of mentorship and the imperative of providing opportunities to individuals who may face unique barriers in pursuing STEM careers. To this end, I intend to organize and lead workshops, seminars, and mentorship programs that are designed to inspire young minds and cultivate a profound appreciation for the realms of science and technology.

As I advance within my graduate program, I am resolute in my objective to fortify my network and expand collaborations with researchers and institutions that share my fervor for interdisciplinary scientific exploration. By forging strategic partnerships with experts hailing from diverse fields, encompassing neuroscience to applied mathematics, I aim to catalyze innovation and make a substantive impact in my chosen research domain. I firmly believe that collaboration is the cornerstone of scientific advancement, and I am wholeheartedly committed to building meaningful and mutually beneficial connections with kindred spirits in the realm of academia and beyond.

When envisioning my long-term career goals, I picture myself in a position of leadership within academia, research, or industry. My aspiration is to emerge as a recognized authority in the sphere of Computational and Data-Enabled Sciences, celebrated for pioneering research and an unwavering commitment to broader societal impacts. My overarching objective transcends the publication of influential research papers; it encompasses the active translation of research findings into tangible, practical solutions that bring about positive change within society.

I hold a particularly strong drive to explore the application of computational mathematics and data analysis within the domain of healthcare. The potential for data-driven medical diagnoses, optimization of treatments, and disease prevention is vast and transformative. My aim is to collaborate closely with healthcare professionals and researchers, fostering the development of innovative tools and algorithms that enhance patient care and elevate the efficiency of healthcare systems.

Moreover, I harbor a deep-seated commitment to championing diversity and inclusion within STEM fields. I firmly believe in the transformative power of diverse perspectives and the paramount importance of affording equal opportunities to individuals from all backgrounds. My vision encompasses active involvement in initiatives that are geared toward promoting diversity, equity, and inclusion, both within the academic sphere and the broader industrial landscape. I am unswerving in my resolve to serve as a mentor, a role model, and a vocal advocate for underrepresented minorities within the realm of STEM.

In summation, my decision to pursue a doctorate in Computational and Data-Enabled Sciences is rooted in an insatiable thirst for knowledge and an abiding passion for research. The selection of this specific graduate program and institution is informed by my commitment to honing my skills, immersing myself

in interdisciplinary research, and collaborating closely with distinguished faculty members. My immediate and long-term goals are emblematic of my dedication to conducting impactful research, nurturing collaborative partnerships, and generating a profound impact within my chosen field. My personal journey as a New American has instilled in me a profound commitment to mentorship, diversity, and making meaningful societal contributions, principles that will serve as guiding lights throughout my career.

Resume

Education: Iowa State University of Science & Technology, Ames, IA, Bachelor's of Aerospace Engineering '23

Senior Capstone Project, Iowa State University of Science & Technology, 12/2022-11/2023

Description: Fundamental principles used in engineering design of aircraft, missile, and space systems. Preliminary design of aerospace vehicles. Engineering Ethics.

Target Objective: "Modern Design Methodology with Aerospace Application & Design of Aerospace Systems"

- Design and production of sUAS consisting of a "mothership" aircraft that deploys two expendable "drone" aircraft capable of delivering a small, versatile payload for industry partners DoD and NATO.
- Implemented machine vision systems, industrial controls, automatic identification & data capture, and responsible for providing data-driven decisions as the signals & control systems/electronics lead.
- Utilized systems engineering and aerospace techniques to optimize aircraft design features, dynamic & static stability, and aerodynamic performance of the small, unmanned aircraft system (sUAS).

Learning Outcomes: Upon completion, the individual will have reliably demonstrated the ability to:

- Apply the engineering design process with regards to aerospace vehicles.
- Utilize necessary tools in the engineering design process including computer modeling/simulation and experimentation to help develop the design.
- Function effectively on a small team by establishing leaders and member roles, project goals, and a timeline all in a collaborative and inclusive setting.
- Communicate effectively in formal and informal settings through written and/or oral means.

Relevant Topics and Courses/Curriculum

- Thermodynamics, Flight Dynamics & Controls, Astro-aeronautics, Aerospace & Propulsion Systems

- Applied Mechanics & Physics, Materials Science & Engineering, Engineering & Polymeric Chemistry

- Numerical & Graphical Techniques, Advanced Computing, Engineering Statistics, Multi-Variable Calculus

- Classical Physics, Mechanics of Materials, Engineering Statics, Dynamics & Differential Equations

- Machine-Learning/Data-Science, Computer Science & Information Tech. Systems, Software Engineering

- Technical Communication & Proposal Writing, Scientific Manuscript Writing, Literary Analysis & Review

Relevant Software Experience and Technical Skills

- SQL, Windows OS, Linux OS, AWS Services, Java, C/C++/C# Programming, Python, MATLAB & Simulink, SAS

- CAD & FEA, ANSYS/ABAQUS, Systems & Reverse Engineering, Internet of Things, Design of Experiments

The Order of The Engineer

the Engineering Student Council will host the Order of the Engineer for graduating engineering students, where they can take an oath of ethics in their engineering careers. Each participant will also receive a ring to commemorate their commitment. This is conducted during your final semester of enrollment for graduating engineering students and graduate students.

The Order of the Engineer was initiated in the United States to foster a spirit of pride and responsibility in the engineering profession, bridge the gap between training and experience, and present a visible symbol identifying the engineer to the public.

Order of the Engineer fosters the understanding that being a licensed professional engineer means more than just holding a certificate and possessing technical competence. It is a commitment to hold the public health, safety, and welfare above all other considerations.

Academic Honors

List academic honors you have received:

1. The Order of The Engineer, The Engineering Student Council at The Iowa State University

2. The Ronald E. McNair Postbaccalaureate Achievement Program Scholar & The Barry Goldwater Scholarship and Excellence in Education Foundation Finalist

3. The Boeing Research in Excellence and Technology Fellowship Program (RETF) Scholar & Micro-g Neutral Buoyancy Experiment Design Teams (NExT) Challenge Competition Finalist

4. The Summer Undergraduate Research Fellowship Program (SURF) Scholar at Stanford University & California Institute of Technology, Program Coordinator

5. The Louis Stokes Alliances for Minority Participation (LSAMP) Fellowship Program Scholar & Undergraduate Research Certificate Recipient Awarded by Iowa State University's IINSPIRE-LSAMP Partnership

6. The FIRST Robotics Competion (FRC) Worlds Championship Rookie Inspiration and Rookie All-Star Awards (International-Level Award) &The Youth Leaderhip Community Award Recieved From The Iowa Department of Human Rights: State of Iowa Youth Advisroy Council (SIYAC)

Research and Development Experience

Undergraduate Research Assistant, DARPA - Microscale & Interfacial Fluid Physics Lab, 08/2021-08/2023

Faculty mentor Dr. Thomas Ward II, Associate Professor, Department of Aerospace Engineering, ISU

- Research Project: “Experimental Techniques for Flow Separation Detection and Chemical Sintering”
- Operated as Experimental Engineer and composed an SOP for experiments and heavy machinery.
- Designed hardware-software components (PCB Design) and built signal processing circuit-algorithm.
- Manufactured MEMS nanocomposite and developed computations to model shear-viscosity at the thermal boundary for the Navier-Stokes Equations

California Institute of Technology Summer Undergraduate Research Fellow, Greer Group, 05/2022-08/2022

Faculty mentor Dr. Julia Greer, Assoc. Prof. of Materials Science, A. Mechanics, & Medical Sciences, Caltech

- Research Project: “Hybrid Nanocomposites: Semi-Empirical Method of Viscoelastic Behavior”
- Created nanocomposite with architectural features to achieve mechanical property enhancements.
- Investigated the constituent material systems individually using compressions tests on a dynamic mechanical analyzer and observed deformation zones with scanning electron microscopy.
- Developed a semi-empirical model for the deformation mechanisms observed in post-mortem analysis of samples; this enables FEA & Euler Theory to inform the viscoelastic continuum damage model.

McNair Scholar, Ronald E. McNair Post-Baccalaureate Achievement Program, 09/2021-05/2022

Faculty mentor Dr. Ashley Garrin, Director of Ronald E. McNair Program, Graduate College, ISU

- Research Project: “Sociological Differences in Graduate School Motivation of Minority Identities”

- Constructed an experimental framework, completed literature synthesis, conducted interviews of program mentors, analyzed and interpreted results in a technical manner.

- Participated in preparation courses and experiences for doctoral studies through involvement in research and other scholarly activities.

Undergraduate Researcher, Systems Engineer, Soft Matter Material Transport Group, 08/2019-05/2022

Faculty mentor Dr. Martin Thuo, Associate Professor, Department of Materials Science and Engineering, ISU

- Research Project: “Design of Multi-Function 3D Piezo-electric Devices for Aeronautical Applications”

- Explored tunability, sensitivity, utility of paper-based devices with various configurations, optimized device design using engineering methods, created self-automated calibration & data capture system.

- Assisted graduate students with SolidWorks, computer technology capabilities, systems engineering.

- This research work was submitted to a scientific peer-review journal for publication(2023).

Research Fellow, Boeing Undergraduate Research Excellence in Engineering Internship, 08/2021-08/2022

Faculty mentor Dr. Thomas Ward II, Associate Professor, Department of Aerospace Engineering, ISU

- Research Project: “Characterizing Damping Mechanisms in Piezoelectric Wind-Energy Harvesters”

- Designed and fabricated green technology low-cost force sensor, explored pathways for aeronautical data collection via aerospace engineering techniques, submitted monthly progress reports to Boeing.

- This research work was submitted to a scientific peer-review journal for publication(2023).

Stanford University Summer Undergraduate Research Fellow, Zheng Research Group, 05/2021-08/2021

Faculty mentor Dr. Xiaolin Zheng, Associate Professor, Mechanical Engineering, Stanford University

- Research Project: “Insights of Machine-Learning(ML) Techniques for Scientific Methods & Prediction”

- Conducted literary analysis and literary review of ML methods, Data & Computational Science, and adapted ML methods to scientific methods by developing a bottom-up regression-prediction model.

- Cross-validated various mathematical-kernels(SVM, Random-Forest, etc.) fitted/trained with scientific datums; presented findings in optimizations of experimental design for scientific discovery.

Undergraduate Research Certificate Recipient,IINSPIRE-LSAMP(NSF) Scholars Program| 08/2019-09/2020

Faculty mentor Dr. Martin Thuo, Associate Professor, Department of Materials Science and Engineering, ISU

- Research Project: “Synthesizing Meta-stable Particles and High-Efficiency Paper-Based MEMS Sensors”

- Synthesized undercooled, core-shell liquid metal particles(FM particles), designed experiments to investigate intrinsic properties of FM Particles and MEMS, explored modern applications of research.

- Prepared literary review of current state of sensor technology, did deep literary analysis of relevant science engineering research, produced adaptations of MEMS designs to fulfil gaps in research field, presented ideation of low-cost, green technology, sensor devices for industry and social impact.

Additional Professional and Leadership Experiences

Design Team Lead,NASA Micro-G Neutral Buoyancy Experiment Design Teams Challenge,08/2021-12/2022

- Completed and assigned weekly tasks to design, build, and test a tool or device that addresses an authentic, current space exploration challenge; specifically, Extravehicular activity(EVA).

- Completed research in current technologies and lead: prototyping of device components; CAD modeling & reverse engineering; building of prototype; and submitted proposal to competition.

- Our design was utilized by astronaut-scientists in NASA’s Mission to the Moon and Mars and displayed at the Houston exhibition – Inner Space: NASA’s Path to the Moon and Mars(2022)!

Information Technology Specialist, Iowa State University of Science & Technology, 08/2019-05/2023

- Held responsibilities for the implementation, monitoring, and maintenance of IT computer systems.

- Solved technical problems: computer systems, software, hardware, networks, cloud platforms, etc.

- Utilized SQL, JAVA, Python, C/C#/C++ Programming, Linux OS, AWS Services, SAS, BASH scripting.

Community Engagement, Public Relations & Policy, and Social Work

Residential Advisor and Honors Community Leader, Department of Residence, 08/2020-05/2022

- Engaged students & nurtured healthy-positive experiences for the resident community; moderated meetings to address concerns; directed multi-lingual health & resource programming for college.

Youth-Lobbyist,Iowa Department of Human Rights: State of Iowa Youth Advisory Council, 06/2018-12/2021

- Acted as chair/program-coordinator of the Violence-Prevention & Diversity-Education Program.

- Advocated to state legislators for reformation of violence prevention education & implementation of culturally diverse curriculum standards at the state-local level; wrote & proposed bills to chamber.

- Received the Community Service Leadership Award for completing over 200 service hours in a term.

Stewardship and Service

Community Leader & Multi-lingual Ambassador/Educator, CultureAll Educational Nonprofit, Fall 2023

- Assisted in organizing events to engage local educators and institutional leaders at the state and local level, provided developmental and networking opportunities for young professionals, volunteered at local events to provide diversity education to communities or groups in need.

Community Honors Leader, Iowa State University Honors Program, Fall 2020-Spring 2022

- Provided professional and research development resources to the Honors Program and its honors students, acted as mentor to honors students while the Honors Residential Advisor.

Coordinator of Violence Prevention & Educational Coverage, Iowa Non-Profits, Spring 2020-Summer 2020

- Utilized skills and experience in community social work to lead interns in creating mental health resources/content in multiple languages; distributed resources and content to local youth of color during the pandemic and rise in violence of 2020.

Latinx Forum Panelist & Multi-lingual Advocate, Association of Iowa Latinx Professionals, Fall 2020

- Shared my professional experience and pathway as a First-Generation College Student, answered questions about professional development and experiences, provided personal developmental content and resources for Latinx leaders.

Workshop Presenter, National White Privilege Conference, Spring 2020

- Developed and presented a workshop “How to engage students of color in higher education” at the White Privilege Conference to national leaders to share my knowledge and resources.

Academic Honors, Fellowships, Scholarships, and Awards:

The Order of The Engineer, Iowa State University of Science and Technology: Engineering Student Council, 2023

American Institute of Aeronautics and Astronautics, 2023

NASA Micro-G Neutral Buoyancy Experiment Design Teams Challenge, 2022

Ronald E. McNair Post-Baccalaureate Achievement Program Fellowship, 2021-2023

SURF Scholar at Stanford University & California Institute of Technology, 2021-2022

The Barry Goldwater Scholarship and Excellence in Education Foundation Finalist, 2021-2022

State of Iowa Youth Advisory Council Community Leadership Award, 2020 (250 Community Service Hours)

CBS News Interview of Global Latino Leaders: Hispanic Heritage Month, 2020

Undergraduate Research Certificate, 2019-2020, IINSPIRE-LSAMP

Construction Industry Round Table (CIRT) National Design & Construction Competition Back-to-Back Champion, 2019-2020

University Honors Program Member, 2019-2022

Latinx Student Initiatives 2019-2022

Stanford SURF Lightning Talks Best Poster Award, 2021

Society for the Advancement of Chicanos and Native Americans in Science, 2020

Dean's List, 2020-2021

Iowa Latino Heritage Festival Scholarship Recipient, 2020

Latinos Unidos Scholarship Recipient, 2020

CBS News Interviewee of Presidential Candidates and Latino Leaders, 2020

Student Iowa Youth Advisory Council Community Service Award, 2020

Zeta Kappa Lambda Educational Foundation Scholarship Recipient, 2019

Des Moines Area Community College President's List, Spring 2018, Spring 2019

Architecture Construction & Engineering (ACE) Mentorship Program Alumni, Spring 2019

The Construction Industry Round Table (CIRT) Affiliate , 2020

CIRT National Design & Construction Competition Back-to-Back Champion , 2020-2021

FIRST ROBOTICS Awards: Rookie Inspiration Award & Rookie All-Star Award, 2019

Research Activities and Associations

Research Activities Associations

- MEMS Shear Sensor and Flow Separation Theory, funded by DARPA - Microscale Interfacial Fluid Physics Laboratory

- Energy Absorbing Nano-Architected Composites, funded by SFP Programs- Julia R. Greer Group at CALTECH

- Wind Energy and Development of MEMS Sensors, funded by Boeing - Boeing Aerospace Research Fellowship

- Implementation of ML into The Scientific Method, funded by SFP Programs - Z Energy Lab at Stanford University

- Applications of Multi-functional Piezo-electric Devices, funded by NSF - Goldwater Finalist/McNair Program at ISU

- Opportunities of Kirigami-Inspired MEMS Devices, funded by NSF - Soft Materials Matter Transport Group

- Heat-Free Manufacturing of Paper-Based MEMS Sensor, funded by ISU Honors - Iowa State University Honors Program

Publications and Scientific Writings:

"Exploring Bio-Processing & Devices in Micro & Nanoscience," 2020, NCUR STEM Conference

"Bioprocessing in Wine Yeast for Mental Health Treatments," 2023, STEM Symposium

"Modern Design Methodology & Design of Aerospace Systems," 2023, Senior Capstone Project

"Quantum Tunnelling Composites: Analytical Monte Carlo Model & Navier-Stokes," 2023

"Understanding the Mathematical Language-The Code- of the Universe," 2021, TEDx Talk

"Characterizing Damping Mechanisms in Piezoelectric Wind-Energy Harvesters," 2023

"Kirigami-Inspired Design of Paper-Based MEMS Devices for Aeronautical Application," 2022

"Synthesizing Meta-Stable Particles & High-Efficiency MEMS Sensors and Nanodevices," 2021

Honors, Awards, and Membership

- University Honors Program Member, Fall 2019-Fall 2023
- Ronald E. McNair Program Scholar, Fall 2021-Fall 2023
- Latinx Student Initiatives, Fall 2019-Spring 2022
- Stanford SURF Lightning Talks Best Poster Award, Summer 2021
- Society for the Advancement of Chicanos and Native Americans in Science, Spring 2020
- Dean’s List, Fall 2019, Spring 2020
- Iowa Latino Heritage Festival Scholarship Recipient, 2020

- Latinos Unidos Scholarship Recipient, 2020
- CBS News Interviewee of Presidential Candidates and Latino Leaders, 2020
- Student Iowa Youth Advisory Council Community Service Award, Spring 2020
- Zeta Kappa Lambda Educational Foundation Scholarship Recipient, 2019
- Des Moines Area Community College President's List, Spring 2018, Spring 2019
- Architecture Construction & Engineering (ACE) Mentorship Program Alumni, Spring 2019
- The Construction Industry Round Table (CIRT) Affiliate, Fall 2020
- CIRT National Design & Construction Competition Back-to-Back Champion| Spring 2019, Spring 2020
- FIRST ROBOTICS Awards: Rookie Inspiration Award & Rookie All-Star Award, Fall

Research Presentations and Scientific Thematic Talks

1. Y. Salinas-Reyes, H. Seabold, A. Martin, M. Thuo (2020, April). Exploring the Piezoresistive Effect and Paper-based MEMS Sensors. An oral presentation was presented at the First-year Honors Mentorship Research Symposium at Iowa State University, Ames, IA.

2. Y. Salinas-Reyes, A. Martin, M. Thuo (2020, August). Integration of paper-based MEMS sensors into computer technology. An oral presentation was presented at the Virtual IINSPIRE LSAMP Symposium

3. Y. Salinas-Reyes, A. Martin, M. Thuo (2020, October). Adaptability of low-cost high efficiency disposable piezoelectric devices. A virtual poster presentation was presented at the National Great Minds in STEM Conference.

4. Y. Salinas-Reyes, A. Martin, M. Thuo (2021, April). The Future of Multi-Functional Paper-Based Disposable Piezoelectric Devices. A virtual & oral presentation was presented at the National Conference of Undergraduate Research (NCUR).

5. Y. Salinas-Reyes, X. Zheng (2021, August). Predicting Olympic Triathlon Results via Machine Learning. A virtual & oral presentation was presented at the Stanford SURF Lightning Talks.

6. Y. Salinas-Reyes, Julia R. Greer (2022, August). Energy Absorption in Nano-Architected Hybrid Composites. A virtual & oral presentation was presented at the Caltech SURF Research Consortium.

7. Y. Salinas-Reyes, Ivaldi Co. (2022, May). Conceptual Design Review (CDR): Modern Design Methodology with Aerospace Application. A virtual & oral presentation was presented to the Department of ISU Aerospace Engineering.

8. Y. Salinas-Reyes, T. Ward III (2022, May). Shear-Sensing Principals of Interfacial Viscous-Shear Flow and Piezomobility—strain-induced mobility—at The Wall (Thermal Boundary). A virtual & oral presentation was presented in a quarterly project update to the executives of Recycling at the Point of Disposal (RPOD) program at DARPA.

9. Y. Salinas-Reyes, T. Ward III (2023, July). Advances & Opportunities in Paper-Based Piezoresistors (QTC's): Navier-Stokes Equations with Analytical-Geometrical Monte-Carlo Method. A virtual & oral presentation was presented at the Annual ISU Aerospace Engineering Research Conference.

10. Y. Salinas-Reyes, T. Ward III (2023, August). Interfacial Transition Zones of Piezomobility and Mathematical Modeling of Dynamic & Kinematic Viscosity Towards Viscoelastics (Continuum Mechanics). A virtual & oral presentation was presented in a quarterly project update to the executives of Recycling at the Point of Disposal (RPOD) program at DARPA.

11. Y. Salinas-Reyes, Ivaldi Co. (2023, September). Executive and Granter Design Sign-Off: Design of Aerospace Systems (i.e., sUAS). A virtual & oral presentation, and written report was presented to the Department of ISU Aerospace Engineering.

12. Y. Salinas-Reyes, Iowa State University: Aerospace Engineering (2023, December). Senior Thesis Presentation and Final Defense. A virtual & oral presentation, and formal manuscript was presented to the Department of ISU Aerospace Engineering.