Yahriel Salinas-Reyes

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Education: Iowa State University, Ames, IA | Bachelor's in Aerospace Engineering '23 | GPA 3.3

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

University Activities & Written Works

Role: Undergraduate Researcher | Aerospace Systems & Exploratory-Applied Mathematics | Fall 2019-2023
Advisor 1: Dr. Martin Thuo, Associate Professor, Department of Materials Science and Engineering, ISU
Advisor 2: Dr. Thomas Ward III, Associate Professor, Department of Aerospace Engineering, ISU

"Experimental Techniques for Flow Separation Detection of Paper-based MEMS Device" (2023)

- *keywords : Systems Analysis, Interfacial Phenomena, Quantum Tunnelling Composites, Design*

- Built hardware-software components and signal processing circuit-algorithm for experiment.
- Manufactured MEMS nanocomposite and developed computations to model shear-viscosity.
- Goal: Detect flow instabilities and simulate viscosity measurements at the thermal boundary.
- ***This research is currently in the process of writing (as first author) for peer-review (2023)***.

"Characterizing Damping Mechanisms in Piezoelectric Wind-Energy Harvesters" (2023)

- *keywords : Aerodynamics Analysis, Harmonic Response, Computational Methods, Energy Storage*

- Designed experimental set-up and measurement-calibration system of flexible piezoelectric.
- Collaborated on solution algorithm and shared findings on continuum mechanics of conductivity.
- Goal: Apply dimensional analysis on wind-tunnel experiments and define thermodynamic properties.
- ***This research has been submitted for scientific review (2023)***.

"Hybrid Nanocomposites: Semi-Empirical Method of Viscoelastic Behavior" (2022)

- *keywords : Analytical Mathematics, System Modeling, Continuum Mechanics, Energy Dissipation*

- Performed DMA experiments on samples then conducted SEM investigations on deformed regions.
- Applied Euler-Buckling to model deformation mechanisms in the mechanical hysteresis cycle.
- Goal: Develop a framework to understand hybridization and viscoelastic effects in nanocomposites.
- ***This research is still in progress (2022)***.

"Insights of Computational Data-Science (ML) Techniques for Scientific Methods" (2021)

- *keywords : Data-Driven Methods, Classification-Regression, Performance Analysis, Deep Learning*

- Conducted literature review of exploratory data-learning (ML) methods in various studies.
- Tested multiple ML models on scientific data and cross-evaluated the system performance.
- Goal: Present opportunities of utilizing ML methods to aid in data-driven scientific discovery.
- ***This research was completed (2021)***.

Senior Project: "Modern Design Methodology with Aerospace Application & Design of Aerospace Systems"

- *keywords : Aerospace Operations, Manufacturing-Development, Optimization, Implementation*

- Applied aerospace techniques to engineer a solution to the assigned aero-industry challenge.
- Collaborated in cross-functional teams to implement system-optimizations for the mission objective.
- Goal: Produce unique UAV aircraft design and mission operation to complete the degree program.
- ***This research was complete (2023)***.

Additional Professional and Leadership Experiences

Design Team Lead | NASA Micro-G Neutral Buoyancy Experiment Design Teams Challenge | Fall 2021

- Completed and assigned weekly tasks to design, build, and test a tool or device that addresses an authentic, current space exploration challenge.
- Completed research in current technologies, designed device components, CAD modeling, fabricating device components, building a prototype, submitting a design competition proposal.
- Result: Our design was chosen as a finalist and put on display Houston exhibition – Inner Space: NASA's Path to the Moon and Mars!

IT Specialist | Iowa State University | Fall 2019-Spring 2021

- Held responsibilities for the implementation, monitoring, and maintenance of IT systems, etc.
- Solved technical problems, such as computer systems, software, hardware, networks, cloud platforms.

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 developed computational model of various interfacial phenomenon.

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 | 05/202-08/2021
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.

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***.