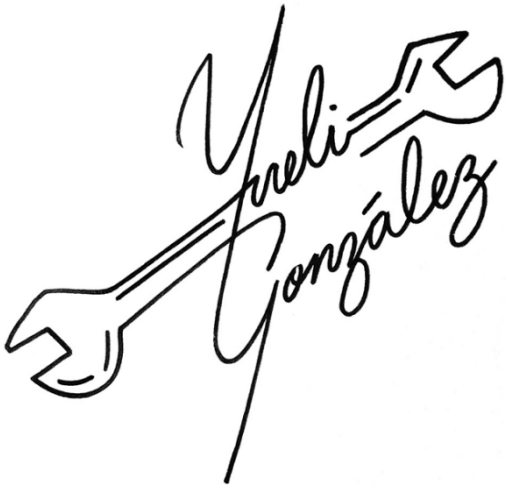
September 2025



Yareli Gonzalez |
yareligonzalez.github.io

Metallurgical and Materials
Engineering Student
University of Texas at El Paso

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U.S. Citizen

EDUCATION

University of Texas at El Paso | El Paso, TX *Expected May 2027*
Bachelor of Science, Metallurgical and Materials Engineering
Relevant Coursework: *Computation/Graphing in Materials Science, Material & Energy Balance, Applied Chemical Thermodynamics, Nanofunctional Physical Metallurgy, Materials Characterization, Polymer Engineering, Non-Destructive Examination*

INDUSTRY WORK EXPERIENCE

Quality Metallurgy Co-Op, Nucor Steel | Jewett, TX *Jan 2025 – Aug 2025*
At Nucor's bar mill, I conducted failure analysis and quality improvement initiatives impacting production efficiency and customer satisfaction. Using SEM/EDS, I analyzed 22 failed steel heats to trace inclusion sources, preventing over $900,000 in customer claims. I developed Python automation tools to reduce weekly scrap data processing from 2 hours to 20 minutes while improving accuracy. My tensile test failure investigations correlated mechanical properties with upstream processing conditions (rolling mill data, weight distributions, heat variations) to identify root causes. I performed microstructural analysis interpreting grain structures, inclusion morphologies, and phase distributions to diagnose failure mechanisms. I also maintained SEM calibration protocols and equipment per ISO quality standards.

Intern, National Mining Association | Washington, D.C. *June 2024 – Aug 2024*
At the National Mining Association, I supported advocacy efforts on critical minerals and environmental regulations. I analyzed 15+ critical minerals patents and legislation to identify technical and policy implications for domestic supply chain security, directly supporting congressional testimony preparation. I compiled regulatory compliance cost estimates totaling $2.3 million across 8 member companies to quantify EPA regulation impacts on the mining sector. I researched environmental fate and toxicity data for the 6PPD tire additive to inform regulatory strategy. I created fact sheets translating complex mining processes and technologies for policymakers and congressional staff. I monitored federal rulemaking,

distilling stakeholder comments into concise summaries for leadership decision-making, and attended Congressional hearings to provide technical support on environmental and minerals policy issues.

RESEARCH EXPERIENCE

Research Assistant, UTEP Polymer Extrusion Lab | El Paso, TX *Feb 2023 – June 2024*

I developed shape memory polymer blends for 3D printing applications with biomedical potential. I optimized thermoplastic polyurethane and polycaprolactone blend compositions achieving 10% tensile strength increase and 99.9% shape recovery rate. Operating twin-screw extruders, I produced consistent filaments by controlling temperature profiles, screw speed, and feed rates to ensure reliable printability. I characterized material properties using SEM, DMA, and XRD to verify thermal transitions, mechanical performance, and crystalline structure critical for shape memory behavior. I developed Python automation workflows to extract mechanical properties from tensile test data, reducing processing time and eliminating manual errors. I engaged K-12 students through Polymer Pathways Program demonstrations with hands-on materials science activities. This work resulted in a co-authored paper published in the Journal of Materials Science.

Summer Research Student, SMU BAST Lab | Dallas, TX *July 2019 – Aug 2019*

I explored magnetically actuated millirobots for minimally invasive medical procedures, designing 3D-printed PLA structures with embedded permanent magnets for controlled millimeter-scale locomotion. Through systematic testing of three locomotion modes (pivot walking, tumbling, rolling), I determined pivot walking achieved 40% faster speeds with better navigation control. Fabricating prototypes using fused deposition modeling required maintaining 0.1mm dimensional tolerances for precise magnet placement and consistent magnetic response. I validated navigation capabilities by guiding robots through maze environments using electromagnetic coil control systems, demonstrating feasibility for applications like targeted drug delivery. I collaborated with graduate students to integrate experimental findings into the lab's medical robotics research program.

PUBLICATIONS

Published Carrillo, L.E.L., ***Gonzalez, Y.O.***, Parga, M. et al. Development of binary and ternary polyester shape memory blends for additive manufacturing. Journal of Materials Science 59, 8040–8057 (2024). https://doi.org/10.1007/s10853-024-09657-7

LICENSES & CERTIFICATIONS

OSHA 10-Hour General Industry | CareerSafe (ID 14-702040932) *Issued Aug 2020*

SKILLS

Materials Characterization	Scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), metallography, dynamic mechanical analysis (DMA), X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), tensile testing, hardness testing; Microstructural analysis and interpretation; Failure analysis methodologies

Software	Python (data analysis, automation, visualization), MATLAB (numerical analysis), SolidWorks (CAD modeling), ANSYS Workbench (finite element analysis), Git (version control), Power BI (data visualization and reporting)
Manufacturing & Processing	Twin-screw extrusion (temperature control, screw speed optimization, feed rate management), heat treatment protocols, fused deposition modeling (FDM) 3D printing, injection molding processes; Process optimization and quality control
Laboratory	ISO quality standards compliance, equipment calibration and maintenance, experimental design and data collection, technical documentation

OUTREACH & ENGAGEMENT

Polymer Pathways Program Demonstrator | El Paso, TX

I conducted hands-on demonstrations of polymer science and materials engineering concepts for K-12 students, designing interactive activities to inspire interest in STEM fields and materials science careers.