

Aida Yoguely CORTÉS-PEÑA

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EDUCATION

Georgia Institute of Technology, Atlanta, GA

2015-2017	M.S. MECHANICAL ENGINEERING ENGINEER IN TRAINING (EIT) NCEES, LICENSE EIT026640, 2015	GPA: 3.70
2010-2015	B.S. MECHANICAL ENGINEERING SYSTEMS ENGINEERING FUNDAMENTALS TRAINING CERTIFICATE, 2013 NASA STUDENT AMBASSADOR VIRTUAL COMMUNITY COHORT V, 2012 Study Abroad Georgia Tech Lorraine, Metz, France, Fall 2012	GPA: 3.67

EXPERIENCE

Nondestructive Testing Mechanical Engineering Co-op, NASA Johnson Space Center, Houston, TX SUMMER 2017 JSC:ES411 Structural Engineering Division, Materials and Processes Branch

- Studied the ultrasonic attenuation of electron beam freeform fabricated (EBF3) materials for space applications.
- Performed metallography by macroetching and obtaining micrographs to study the grain structure of EBF3.
- Inspected materials for flaws through contact and immersion ultrasonic testing using 0 degree single element, linear phased array ultrasonic testing (PAUT), and PAUT dual matrix array (DMA) probe scans at multiple frequencies.
- Executed computed tomography (CT) reconstruction and analysis. Conducted infrared (IR) thermography analysis of 60+ Orion Multi-Purpose Crew Vehicle composite specimens. Accompanied borescope visual inspection.

Materials and Processes Mechanical Engineering Co-op, NASA Johnson Space Center, Houston, TX FALL 2016 JSC:ES411 Structural Engineering Division, Materials and Processes Branch

- Collaborated with a team of 25+ engineers to determine the safe-life cycles before failure and max operating pressure of the Morpheus Lander pressure vessels. Results satisfied safety requirements and enabled field testing of the spacecraft.
- Modelled 5 Morpheus Lander propellant tanks and analyzed stress using SALOME finite element modeling.
- Analyzed worst-case defects in the welds from borescope, ultrasound, and x-rays reports. Performed damage tolerance analysis using NASGRO fracture mechanics and fatigue crack growth software.
- Designed and implemented a time-stamp system that monitors a 3.5 year-long creep test and captures the rupture of 30 acrylic window material specimens from the Orion Multi-Purpose Crew Vehicle.
- Performed impact tests on 10 composites for the Orion spacecraft and characterized defects using infrared thermography.

Graduate and Undergraduate Research Assistant, Georgia Institute of Technology, Atlanta, GA 2011-2015 Smart Materials' Advanced Research and Technology Laboratory

- Investigated the effects of high-energy radiation exposure on the dielectric and piezoelectric response of relaxor-ferroelectric single crystals for micro-electromechanical systems (MEMS) in nuclear and space applications.
- Processed piezoelectric thin films using cleanroom tools for photolithography: mask aligner, spincoater, rapid thermal annealer (RTP), and unifilm sputterer. Characterized thin films using a profilometer and x-ray diffractometer (XRD).
- Characterized low field and non-linear dielectric permittivity: loss, and Rayleigh analysis, piezoelectric: d33,f and e31,f.
- Conducted piezoelectric force microscopy (PFM) and near-field microwave impedance microscopy (NF-MIM) on polycrystalline lead zirconate titanate (PZT) at the Oak Ridge National Laboratory.

Materials Science and Engineering Intern, NASA Ames Research Center, Mountain View, CA SUMMER 2014 ARC:D Advanced Space Science and Technology Laboratory

- Researched high specific surface area electrode materials for an electrochemical double layer capacitor (EDLC).
- Synthesized graphene oxide (GO) and multi-walled carbon nanotubes (MWCNT) using a chemical solution method.
- Modified an electrophoretic deposition (EPD) method and thermal reduction process to control the materials properties.
- Performed cyclic voltammetry, Raman spectroscopy, and Fourier transform infrared spectroscopy (FTIR). Accompanied atomic force microscopy (AFM), transmission electron microscopy (TEM), and scanning electron microscopy (SEM).
- Mentored 3 high school students in supercapacitor development and 3D printing.

Micro and Nano Engineering Intern, NASA Marshall Space Flight Center, Huntsville, AL SUMMER 2013
MSFC:ES43 Electrical, Electronic, Electromechanical (EEE) Parts Engineering and Analysis Team

- Researched novel dielectric materials to create the internal barrier layer capacitor (IBLC) effect for a solid state ultracapacitor to replace batteries. Developed a synthesis profile that significantly increased energy storage.
- Synthesized film-coated nano-particle dielectrics and characterized permittivity, loss, and equivalent series resistance.
- Conducted optical microscopy and accompanied scanning electron microscopy (SEM) inspection.
- Built ultracapacitors test-cells through 3D additive manufacturing by performing screen printing and sintering.
- First author on technical memorandum and collaborator in the realization of U.S. Patent No. 9,745,481 B2 “High performance composite dielectric ink for ultracapacitors”. Issued Aug 29, 2017.

Nondestructive Evaluation Engineering Intern, NASA Goddard Space Flight Center, Greenbelt, MD SUMMER 2012
GSFC:5410 Mechanical Systems Division, Materials Engineering Branch, Microscale Testing and Analysis laboratory

- Developed an infrared technique for materials characterization of thermal diffusivity and thermal conductivity.
- Inspected composite subsurface defects by programming tools in MATLAB for non-destructive evaluation (NDE): derivative image analysis, and thermographic signal reconstruction.
- Quantified metal brazing, adhesion debonding, and delamination of ceramic matrix composites by area fraction measurement and line temperature profiles using Image-Pro Plus.

SKILLS

AutoCAD	LabVIEW	COMSOL Multiphysics	VPython	Adobe Photoshop/Premiere Pro
Inventor	MATLAB	Siemens NX	ImageJ/Image-Pro Plus	Native English/Spanish
SALOME	NASGRO	PBASIC	PHP/HTML/CSS	Competent French

SELECTED PROJECTS

Optimization of Moth Bipectinate Antennae SUMMER 2016

- Worked in a team of two to create a 3D assembly model of a moth and its antennae using Siemens NX surface modeling.
- Performed 3D static analysis of the effect of wind speed on the deflection, stress, and fracture of the moth antennae using finite element method (FEM).
- Designed a fluid dynamics parametric study to maximize drag while minimizing structure volume using 2D COMSOL simulations. Found the antennae orientation and geometrical features that optimizes pheromone plume collection.

Piezoelectric Micro-electromechanical Systems (MEMS) Microphone SPRING 2016

- Lead a team of four to design a micro-sized microphone that can be implanted inside the ear and serve as a hearing aid for the hearing impaired.
- Designed the device packaging for a piezoelectric pressure sensitive diaphragm. Modeled the acoustic to mechanical to electrical response using finite element method (FEM). Simulated the piezoelectric response using COMSOL.
- Determined the optimal geometry that maximizes membrane deflection and voltage generation.

AWARDS

- Woodruff Fellowship 2015
- 1st place Live Action NASA Humans in Space Art Video Challenge 2014
- 2nd place Air Products Undergraduate Research Symposium Poster Expo 2014
- 2nd place NASA Marshall Space Flight Center Intern Poster Expo 2013
- Northrop Grumman and Society of Hispanic Professional Engineers Academic Scholar 2012
- NASA Motivating Undergraduates in Science and Technology Scholar 2011-2015

ACTIVITIES/HOBBIES

- **Memberships:** American Ceramic Society, Society of Woman Engineers, Society of Hispanic Professional Engineers, Women in Engineering, Robojackets FIRST Robotics, Hispanic Scholarship Fund, and Hispanic Recruitment Team.
- **Hobbies:** YouTube content creator, web developer, server administrator, DSLR photographer, blogger, traveler.

PUBLICATIONS

- [1] A.Y. Cortés-Peña, T.D. Rolin, S.M. Strickland, and C.W. Hill. “A Novel Solid State Ultracapacitor”. In: *NASA/TM 2017-219686* (2017).
- [2] Y. Bastani, A.Y. Cortés-Peña, A.D. Wilson, S. Gerardin, M. Bagatin, A. Paccagnella, and N. Bassiri-Gharb. “Effects of high energy x ray and proton irradiation on lead zirconate titanate thin films’ dielectric and piezoelectric response”. In: *Applied Physics Letters* 102.19 (2013), p. 192906.