

# Aida Yoguely CORTÉS-PEÑA

<http://www.Yoguely.com>  
aida@yoguely.com

## EDUCATION

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### Georgia Institute of Technology, Atlanta, GA

2015-2017	M.S. MECHANICAL ENGINEERING ENGINEER IN TRAINING (EIT) NCEES, LICENSE EIT026640, 2015	GPA: 3.75
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

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### 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
• Honorable Mention Air Products Undergraduate Research Symposium Poster Expo	2015
• Air Products ME Undergraduate Researcher Award	2015
• 1st place Live Action NASA Humans in Space Art Video Challenge	2014
• 2nd place Air Products Undergraduate Research Symposium Poster Expo	2014
• President’s Undergraduate Research Award (PURA)	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
• General Electric Hispanic Success! Hispanic Scholarship Fund at Georgia Tech Scholar	2011
• Hispanic American Commitment to Educational Resources Scholar	2010
• League of United Latin American Citizens Scholar	2010
• Society of Hispanic Professional Engineers Scholar	2010
• Georgia Business in Aviation Association Scholar	2010
• Goizueta Foundation Scholar	2010-2014

## COMMUNITY OUTREACH AND ENGAGEMENT

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- NASA High School Aerospace Scholars (HAS) closing ceremony 2017: Supported the NASA office of education in speaking to 40+ students about STEM education to increase interest and actions to advancing human space exploration.
- Texas Association for Bilingual Education (TABE) Conference 2016: Supported the office of education NASA booth by speaking about NASA STEM bilingual education programs for teachers and K-12 students to over 45+ visitors.
- Find Your Career Path Expo 2016: Supported the NASA booth as part of the Hispanic Employee Resource Group (HERG). Shared my career path and my work at the Johnson Space Center with over 1000+ visiting high school juniors and seniors.
- ZeroRobotics Field Day 2016: Spoke to 40+ middle school minority students on my experiences as a NASA engineer.
- SHPE Link with a Leader Program 2016: Spoke to 25 9th grade hispanic students at the Riverwood International Charter Middle School on the topic “My career and how to choose yours.”
- SHPE Link with a Leader Program 2015: Spoke to 75+ hispanic students at the Sandy Springs Charter Middle School on the topic “How do you choose a career that you will enjoy?”

## ACTIVITIES/HOBBIES

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- **Membership:** 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

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- [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.

## PRESENTATIONS

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- [1] A.Y. Cortés-Peña, A. Koshti, and D. Stanley “Ultrasonic inspectability of electron beam freeform fabricated material”. In: *NASA Johnson Space Center Talk*. July 2017.
- [2] A.Y. Cortés-Peña, N. Greene, and J. Jacobs “Morpheus spacecraft pressure system”. In: *NASA Johnson Space Center Talk*. Dec. 2016.
- [3] A.Y. Cortés-Peña and N. Bassiri-Gharb. “Effects of high-energy radiation exposure of the dielectric and piezoelectric response of relaxor ferroelectric single crystals”. In: *Air Products Undergraduate Research Symposium*. Poster. Apr. 2015.
- [4] A.Y. Cortés-Peña, D.H. Gutierrez, K. Tang, and B. Chen “Electrophoretically deposited graphene oxide and carbon nanotube composite for supercapacitors”. In: *NASA Ames Research Center Intern Poster Exposition*. Poster. Aug. 2014.
- [5] A.Y. Cortés-Peña, Y. Bastani, 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: *American Ceramic Society Electronic Materials and Applications*. Poster. Jan. 2014.
- [6] A.Y. Cortés-Peña, T.D. Rolin, S.M. Strickland, and C.W. Hill. “Solid state ultracapacitor to replace batteries”. In: *NASA Marshall Space Flight Center Intern Poster Exposition*. Poster. Aug. 2013.
- [7] A.Y. Cortés-Peña, J. Jones, and M. Viens. “Infrared flash method for non-destructive evaluation of materials”. In: *NASA Goddard Space Flight Center Intern Poster Exposition*. Poster. July 2012.
- [8] A.Y. Cortés-Peña, Y. Bastani, A.D. Wilson, S. Gerardin, M. Bagatin, A. Paccagnella, and N. Bassiri-Gharb. “Effects of high energy x ray and proton irradiation on ferroelectric thin films”. In: *International Workshop on Acoustic Transduction Materials and Devices*. Talk and Poster. May 2012.