
CURRICULUM VITAE

NAME: Maria D. Cortes Delgado, PhD.

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SUMMARY OF EXPERTISE

Dr. Maria D. Cortes-Delgado has been involved in analytical and experimental testing research projects to evaluate the dynamic response of structures. Her expertise comprises the application of two of the methods used for measuring response and simulation of dynamic loads: shaking tables and hybrid simulation. Her research project “Hybrid Simulation with Distributed Substructures Including Overlapping Domains” utilized hybrid simulation with substructuring to evaluate structural collapse and simulate complex structural systems on the under the guidance of Dr. Gilberto Mosqueda and with international collaborators in China (Dr. Wang Tao) and Japan (Dr. Nakashima). She developed, with the advice of Dr. Daniel Wendichansky, the UPRM Earthquake Simulator Facility located at the Department of Civil Engineering and Surveying to investigate the behavior of small-scaled model structures under dynamic loading. At present, Dr. Cortes-Delgado is a tenure-track Assistant Professor since 2016 at the University of Puerto Rico at Mayaguez, at the Department of Engineering Sciences and Materials. She has taught: Creative Design I (first year course for Mechanical Engineer students), Mechanics of Materials (third year course for Industrial, Mechanical and Civil Engineers), Undergraduate Research for Mechanical and Civil Engineers students and a new graduate level course she developed titled “Introduction to Experimental Methods for the Dynamic Response of Structures: Civil and Aerospace Applications”. Dr. Cortes-Delgado has also remained active on research and was awarded in 2015 a Faculty Development Award by the Nuclear Regulatory Commission to develop hybrid simulation facilities at the University of Puerto Rico at Mayaguez. On February 2019, Dr. Cortes-Delgado was awarded the PR NASA EPSCoR Seed grant to establish research collaborations with NASA Langley and Glenn Research Center. Her current research focuses on the development of better experimental and computational methods for structural dynamic analysis/physical testing and the application of these methods to complex dynamic systems.

EDUCATIONAL/PROFESSIONAL BACKGROUND

1999	B.S.	Civil Engineering (Magna Cum Laude), University of Puerto Rico, Mayagüez, PR
2005	M.S.	Civil Engineering (Structural Engineering) GPA: 4.0 , University of Puerto Rico, Mayagüez, PR
2014	Ph.D.	Civil Engineering (Structural & Earthquake Engineering), University at Buffalo (SUNY), NY, US

RESEARCH AND PROFESSIONAL EXPERIENCE

09/2016-Present Assistant Professor of the Department of Engineering Science and Materials (Tenure track)

Created the Experimental Dynamic Simulation Research (ExDSR) and ExDSRA. Our research focuses on two of the experimental methods used to test structures under dynamic loads: shaking table and hybrid simulation. This research can be accessed through: www.uprm.edu/exdsr. ExDSRA is focused on the applications of current methods to aerospace structures and systems. This project was funded by the United States Nuclear Regulatory Commission (NRC). Grant No: NRC-HQ-84-15-G-0032. The University of Puerto Rico at Mayaguez Faculty Development Program: Structural Engineering for Nuclear Facilities – Experimental Research Initiative.

08/2014-06/2016 Assistant Professor of the Department of Engineering Science and Materials

Taught undergraduate courses (INGE3011, INGE3012 and INGE3809) and proposal writing.

02/2009-06/2013 Graduate Research Assistant, Department of Civil, Structural and Environmental Engineering, UB

Conducted analytical and experimental research to implement a hybrid simulation platform developed for the evaluation of the performance of steel structures through collapse, specifically moment resisting frames. An *internationally distributed hybrid simulation (between Japan and US)* test was performed to examine the dynamic response of a steel frame building to collapse and was validated by comparison to *E-Defense* tests in 2007.

08/2001-05/2005 Graduate Research Assistant, Department of Civil and Environmental Engineering, UPRM

Developed and built a “*shaking table*” to investigate the behavior of small-scaled model structures under dynamic loading. The dynamic characteristics of the reaction frame, simulator platform and oil column were examined along with the possible interactions effects with a test structure. The “shake table” performance was also studied to measure the quality of shake table motion reproduction.

RELEVANT PUBLICATIONS

Journals and proceedings:

1. Wang, T., Mosqueda, G., Jacobsen, A. and **Cortes-Delgado, M.** (2012), “Performance evaluation of a distributed hybrid test framework to reproduce the collapse behavior of a structure.” *Earthquake Engineering & Structural Dynamics*, Volume 41, Issue 2, February 2012, Pages: 295–313.
2. Mosqueda, G., **Cortes-Delgado, M.** and Wang, T. (2010), “Substructuring techniques for hybrid simulation of complex structural systems.” *9th US National and 10th Canadian Conference on Earthquake Engineering*, July 2010.
3. Wang, T., Jacobsen, A., **Cortes-Delgado, M.**, and Mosqueda, G. (2010), “Distributed online hybrid tests of a four-story steel moment frame using flexible test scheme.” *9th US National and 10th Canadian Conference on Earthquake Engineering*, July 2010.
4. **Cortes-Delgado, M.** and Gonzalez-Hernandez, L. (2018), “Development of the UPRM Hybrid Simulation Facilities: Substructuring Techniques Coupled Numerical Simulations.” *International Conference on Experimental Vibration Analysis for Civil Engineering Structures*, July 2017.

Other Significant Publications

1. **Cortes-Delgado, M.** (2014), Hybrid Simulation with Distributed Substructures Including Overlapping Domains, *Ph.D. Dissertation*, Department of Civil, Structural and Environmental Engineering, UB, February 2014.
2. **Cortes-Delgado, M.** (2005). Development of the UPRM Earthquake Simulator Facility for Dynamic Model Analysis. *M.S. Thesis*, Department of Civil and Environmental Engineering, UPRM. June 2005.

AWARDS AND HONORS

1. 2009-2012 – **NSF-Graduate Research Diversity Supplement** for doctoral engineering students
2. 2008-2012 - **Schomburg Fellowship** - offered by New York State for students with outstanding academic credentials and who are also historically underrepresented students in graduate programs across the university
3. 2008-20011 – **NSF- AGEP Fellowship**

EXTERNAL FUNDING FOR RESEARCH/EDUCATION:

- (1) “The University of Puerto Rico at Mayaguez Faculty Development Program in Structural Engineering for Nuclear Facilities: Experimental Research Initiative”, Nuclear Regulatory Commission, 2015, **\$359,717**.
- (2) “A Proposal to Establish Research Collaborations with NASA LANGLEY, NASA GLENN Research Centers and TEXAS A&M Department of Aerospace Engineering - A look into Substructuring Techniques and Real

Time Hybrid Simulation for Aerospace Structures- Astronautics”, PR NASA EPSCoR Seed Funds, 2019, **\$19,650.00.**

STUDENT MENTORING

Thesis Advisor

- 1) Lemuel Gonzalez Hernandez, “*Development of UPRM hybrid simulation facilities for dynamic analysis*” MS Civil Engineering (Structural) (Spring 2019).

Undergraduate Research Projects

1. Christian Flores Carreras, *Design of Test Setup for Hybrid Testing*, Undergraduate Research, Civil Engineering, BS Civil Engineering (2017).
2. Andres Matos, *Design of Instrumentation Plan and Setup of Hydraulics for Hybrid Testing*, Undergraduate Research, BS Civil Engineering (2017).
3. Richard Rodriguez, *Calibration of 22 and 55kip actuator LVDT and Load Cell for Hybrid Testing*, Undergraduate Research, BS Mechanical Engineering (2020).
4. Jonathan Badillo, *Shaking Table calibration and setup for experimental course*, Undergraduate research, BS Mechanical Engineering (2022).
5. Sebastian Rivera Mongil, *Seismic Chair – Experiential Education and Outreach Module for the community of Puerto Rico*, Undergraduate research, BS Mechanical Engineering (2022).
6. Samuel Montalvo Perez, *Development of UPRM hybrid simulation facilities: Substructuring techniques coupled numerical simulations for concrete columns*, BS Civil Engineering (2020), PhD Mechanical Engineering (Aerospace-Structural) (Fall-2020).
7. Steven Aviles Rivera, *Development of UPRM hybrid simulation facilities: Substructuring techniques coupled numerical simulations for concrete columns*, BS Civil Engineering (2020), PhD Mechanical Engineering (Aerospace-Structural) (Fall-2020).
8. Elmer Irizarry Rosario, *Development of UPRM hybrid simulation facilities: Substructuring techniques coupled numerical simulations for concrete columns*, BS Civil Engineering (2022).
9. Ana Pineda Velez, *Development of UPRM hybrid simulation facilities: Substructuring techniques coupled numerical simulations for concrete columns*, BS Civil Engineering (2023).
10. Austin Vega Pagan, *Development of UPRM hybrid simulation facilities: Substructuring techniques*
11. Kelvin Filippetti, *Shaking Table Dynamics*, BS Civil Engineering (2024).
12. Aldo Morales, *Shaking Table Dynamics*, Undergraduate research, BS Mechanical Engineering (2024).

SYNERGISTICS ACTIVITIES

- Led in the development and application of a novel Education module
UB-NEES Site
Summer 2013

In collaboration with the UB-NEES site, led in the development and application of a novel Education module geared towards high-school students that demonstrated the effects of seismic activity (a simulated earthquake) on subscale 3-story structures with and without damping. This new EOT module was judged as a best practice across the entire U.S. NEES consortium of universities by the National Science Foundation’s CMMI Director of NEES.

- Led in the development of the **1st Department of Engineering Science and Materials Open House**
UPRM
March 30, 2017

In collaboration with the UPRM-Department of Engineering Science and Materials, led in the development of the Open House activity. The Open House objectives were to give undergraduate and graduate students

the opportunity to present their research in a technical poster competition and high-school an overview of the Department areas and research (laboratories).

- Developed the **Dr. Daniel Wendichansky Dynamics Experiential Module**
UPRM
November 17, 2018

In collaboration with the UPRM-Department of Engineering Science and Materials and Department of Civil Engineering and Surveying, led in the development of the dynamics experiential module named after her MS Thesis Advisor Dr. Daniel Wendichansky. The experiential module objective is to give undergraduate and graduate students the opportunity to learn about dynamics basics through their own experience. Furthermore, the module also targets and is developed to serve the Puerto Rican community. For more information visit: www.uprm.edu/exdsr

CONFERENCES

1. 2018 Worldwide Aerospace Users Group, MTS Systems, Minneapolis, Minnesota, US, September 10-14, 2018.
2. Sandia National Laboratory Visit- UPRM collaboration, Sandia National Laboratory, New Mexico, US, May 21-25, 2018.
3. Hybrid Simulation Technologies & Methods for Civil Engineering, Pacific Earthquake Engineering Research Center (PEER) in Richmond, University of California at Berkeley, California, US, March 20-21, 2018.
4. National Science Foundation-Natural Hazards Engineering Research Institute (NSF-NHERI), University of Texas at San Antonio, August 2017. To discuss possible research collaborations at NHERI facilities and NSF Career Proposals.
5. 7th International Conference on Experimental Vibration Analysis for Civil Engineering Structures, EVACES2017, University of California at San Diego, July 2017 (to present research findings)

SERVICE

1. Member, Committee to Develop Graduate Program, Department of Engineering Science and Materials, 2015-2017.
2. Member, Committee Graphics Design and Applied Mechanics, 2015-2018.
3. Rehabilitation and updating of Structures Laboratory (Hydraulics and Infrastructure), Department of Civil Engineering and Surveying, 2015-2018.