

Herta P. Montoya

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EDUCATIONAL BACKGROUND

Ph.D. Civil Engineering | Expected Graduation: 2023

Purdue University, West Lafayette, IN

- **Concentration Area:** Structural Engineering
- **Related Coursework:** Structural Dynamics, Theory and Design of Control Systems, Numerical Methods, Uncertainty Quantification, Digital Signal Processing, Earthquake Engineering.

B.S. Civil Engineering – *Summa Cum Laude* | 2018

The University of Texas at San Antonio, San Antonio, TX

PROFESSIONAL EXPERIENCE

A. Research Related Experience

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| Fall 2018 - Present | Doctoral Graduate Research Assistant
<i>Lyles School of Civil Engineering, Purdue University</i> <ul style="list-style-type: none">▪ The extension of a dynamic nonlinear system to a multiple degree-of-freedom physical specimen coupled with servo-hydraulic actuators▪ Develop the technologies needed to establish resilient extra-terrestrial habitats in a NASA-funded Space Technology Research Institute.▪ The implementation of real-time hybrid simulation to assess different structural systems (buildings, bridges, etc.) |
| Fall 2017 – Spring 2018 | Undergraduate Research Assistant
<i>Dept. of Civil and Environmental Engineering, The University of Texas at San Antonio</i> <ul style="list-style-type: none">▪ Develop a model optimization-based solution for the detection of cyber-attacks in water distribution networks. |
| Summer 2017 | Summer Undergraduate Research Fellow
<i>Lyles School of Civil Engineering, Purdue University</i> <ul style="list-style-type: none">▪ Probabilistic analysis of lunar meteoroid impact data to provide a risk assessment framework for the design of resilient lunar habitat systems. |
| Fall 2016 | Undergraduate Research Assistant
<i>Dept. of Civil and Environmental Engineering, The University of Texas at San Antonio</i> <ul style="list-style-type: none">▪ Evaluation of existing security technologies for surveillance and monitoring systems in transportation networks. |

B. Teaching Related Experience

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| Fall 2018 – Spring 2019 | Graduate Teaching Assistant
<i>Lyles School of Civil Engineering, Purdue University</i> <p>Develop homework material, grade exams and assignments, hold weekly office hours to provide tutoring, monitor student activity in class, and provide guidance in course development.</p> <ul style="list-style-type: none">▪ Spring 2019 – Basic Mechanics I: Dynamics (CE 298)▪ Fall 2018 – Basic Mechanics I: Statics (CE 297) |
| Fall 2016 – Spring 2018 | Student Reader/Grader I
<i>College of Engineering, The University of Texas at San Antonio</i> <ul style="list-style-type: none">▪ Prepare homework solutions and grade assignments for the undergraduate Numerical Methods course. |

- Spring 2015 – **Senior Tutor II**
 Summer 2016 *Tutoring Services, The University of Texas at San Antonio*
- Provided tutoring to college students in the areas of math, physics, and engineering.
 - Collaborated with supervisors and colleagues, as a peer leader tutor, to discuss student progress and the need of students.

C. Service Experience

- Fall 2019 - **Tour Committee Chair: Bowen Laboratory Student Advisory Council (BSAC)**
 Present *Bowen Laboratory, Purdue University, West Lafayette, IN*
- Assist Bowen Laboratory in activities, events, and services targeted to students, professionals, community, and alumni in the structural engineering field and related disciplines.
- Fall 2018 – **Co-secretariat: Asia Europe Pacific Smart Structures Summer School - 2020**
 Summer 2020 *July 11-July 31, 2021, Purdue University, West Lafayette, IN*
- This international summer school for graduate students is designed to immerse students from around the world in the knowledge and skills needed to conduct successful research toward realizing smart structures.
- Fall 2018 – **Co-secretariat: ANCRISST Conference - 2020**
 Summer 2020 *July 23-26, 2021, Purdue University, West Lafayette, IN*
- A 2.5-day international conference focused on smart structures applications and technologies, to be held at the Stewart Center at Purdue University.
- Fall 2016 – **College of Engineering Ambassador**
 Spring 2018 *College of Engineering, The University of Texas at San Antonio, San Antonio, TX*
- Assist the College of Engineering in activities, events, and services targeted to students, professionals, community, and alumni.

D. Industry Experience

- Summer 2018 **Junior Transportation Engineer**
Asociación de Consultores en Ingeniería, Tegucigalpa, Honduras
- Assisted in data collection and field investigation efforts for multiple transportation studies, determined road levels of service, and provided design recommendations on traffic improvements.

RESEARCH PRESENTATIONS AND PUBLICATIONS

- Journal Papers:** **Montoya, H.**, Maghareh, A., Li, H., Condori-Urbe, J., and Dyke, S. J. (*under preparation*). Stochastic Controllable Canonical Model of a Servo-Hydraulic Actuator.
- Fu, Y., Maghareh, A., **Montoya, H.**, Krishnan-R, M., and Dyke, S. J. (*under preparation*). A Real-time Modular Coupled Virtual Testbed [MCVT] of SmartHab.
- Li, H., Maghareh, A., Condoribe-Urbe, J., **Montoya, H.**, Dyke, S. J., and Xu, Z. Advancing real-time hybrid simulation for coupled nonlinear soil-isolator-structure system. *Smart Structures and Systems*, Volume 28.1, 2021.
<http://doi.org/10.12989/sss.2021.28.1.105>
- Maghareh, A., Fu, Y., **Montoya, H.**, Condoribe-Urbe, J., Wang, Z., Dyke, S. J., and Montoya, A. A Reflective Framework for Performance Management (REFORM) of Real-Time Hybrid Simulation. *Frontiers in Built Environment*, Volume 6, 2020.
<https://doi.org/10.3389/fbuil.2020.568742>

Condori, J., Maghareh, A., Orr, J., Li, H., **Montoya, H.**, Dyke, S.J., Gill, C., and Prakash, A. Exploiting Parallel Computing to Control Uncertain Nonlinear Systems in Real-Time. *Experimental Techniques*, 1-15., 2020.
<https://doi.org/10.1007/s40799-020-00373-w>

Conference Papers: **Montoya, H.**, Maghareh, A., Condori-Urbe, J., and Dyke, S. J. (June 2019). Development of a Servo-Hydraulic Actuator Model for Real-Time Hybrid Simulation of a Multi-Degree-of-Freedom System. Dynamics Committee Student Paper Competition at the Engineering Mechanics Institute Conference (EMI), Pasadena, CA.

Dyke, S.J., Condori, J., Maghareh, A., and **Montoya, H.** (March 2019). RTHS with Nonlinear Systems Using Bayesian Methods. New Frontiers and Innovative Methods for Hybrid Simulation Workshop – ETH. Zurich, Switzerland

Montoya, H., Giacomoni, M. H., Gatsis, N., and Taha, A. (June 2018) Optimization Routine to Identify Cyber-Attacks on Water Distribution Systems. World Environmental & Water Resources Congress – American Society of Civil Engineering. Minneapolis, MN.

Oral Presentations: **Montoya, H.**, Fu, Y., Maghareh, A., and Dyke, S. J. (2021, September). The Role of Digital Twins for Cyber-Physical Testing. Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology (MMLDT-CSET), San Diego, CA.

Montoya, H., Dyke, S. J., Johnson, D., and Ramirez, J. (2020, April). How can governments mitigate killer buildings before a disaster? – Webinar. Purdue Systems Thinkers and Purdue Systems Collaboratory Research Colloquium Series.

Montoya, H., Dyke, S. J., Johnson, D., and Ramirez, J. (2019, October). Killer Buildings: Vulnerabilities at the Core of our Communities. Indiana Structural Engineers Association Meeting – Bowen Laboratory. West Lafayette, IN.

Montoya, H., Dyke, S. J., Johnson, D., and Ramirez, J. (2019, October). Killer Buildings Hazard Mitigation. Research Bytes – Lyles School of Civil Engineering, West Lafayette, IN.

Montoya, H., Maghareh, A., Condori-Urbe, J., and Dyke, S. J. (2019, June). Development of a Servo-Hydraulic Actuator Model for Real-Time Hybrid Simulation of a Multi-Degree-of-Freedom System. Engineering Mechanics Institute Conference (EMI), Pasadena, CA.

Montoya, H., Gatsis, N., and Giacomoni, M. (2018, June). Sensitivity Analysis of an Optimization Approach to Identify Cyber Attacks on Water Distribution Networks. World Environmental and Water Resources Congress, Minneapolis, MN.

Montoya, H., Dyke, S.J., Ramirez, J. A., Bobet, A., Melosh, H. J., and Gomez, D. (2017, August). Hazard Assessment of Meteoroid Impact for the Design of Lunar Habitats. The Summer Undergraduate Research Fellowship Symposium (SURF), West Lafayette, IN.

Posters: **Montoya, H.**, and Dyke, S.J. (2019, January). Use of Hybrid Simulation for Assessing Transportation Infrastructure. 2019 Transportation Research Board Conference, FHWA, Washington, D.C.

Montoya, H., Beck, C., Gomez, D., Dyke, S.J., Bobet, A., Melosh, J., and Ramirez, J. (2018, October). Hazard Assessment of Meteoroid Impact for the Design of Lunar Habitats. RETH International Workshop, West Lafayette, IN.

Montoya, H., Perry, D., Eidi, S., Tallichet, J., and Giacomoni, M. (2018, January). Assessing the Impacts and Flood Defenses to Climate Change Induced Super Storms. 2018 Transportation Research Board Conference, FHWA, Washington, D.C.

Montoya, H., and Diaz, M. (2017, January). Bridge and Tunnel Monitoring to Mitigate Incidents and Natural Catastrophes. 2017 Transportation Research Board Conference, FHWA, Washington, D.C.

- Technical Reports:** **Montoya, H.,** and Dyke, S. J. (2019). Use of Hybrid Simulation for Assessing Transportation Infrastructure, Purdue University, Final Technical Report, December 2019. (Dwight D. Eisenhower Transportation Fellowship – funded by Federal Highway Association: Universities and Grants Program).
- Montoya, H.,** and Giacomoni, M. (2018). Sensitivity Analysis of an Optimization Approach to Identify Anomalies on Water Distribution Networks due to Super Storms, The University of Texas at San Antonio, Final Technical Report, August 2018. (Dwight D. Eisenhower Transportation Fellowship – funded by Federal Highway Association: Universities and Grants Program).
- Montoya, H.** (2017). Meteoroid Impact, Purdue University, Resilient ExtraTerrestrial Habitats Technical Report 01, Chapter 4, August 2017.
- Montoya, H.,** and Giacomoni, M. (2017). Bridge and Tunnel Monitoring to Mitigate Incidents and Natural Catastrophes, The University of Texas at San Antonio, Final Technical Report, August 2017. (Dwight D. Eisenhower Transportation Fellowship – funded by Federal Highway Association: Universities and Grants Program).

AWARDS AND HONORS

2019 – 2021	Purdue Systems Collaboratory Fellowship Program – <i>Purdue University</i>
June 2019	2nd Place Dynamics Committee Paper Competition – <i>Engineering Mechanics Institute 2019 Conference (EMI 2019), Caltech, Pasadena, CA</i>
2016 – 2019	Dwight David Eisenhower Transportation Fellowship Program – <i>Annual Fellowship Purdue University: 2018-2019, Graduate level \$5,000 The University of Texas at San Antonio: 2016-2017, 2017-2018, Undergraduate Level \$10,000</i>
2018 – 2019	John E. Goldberg Fellowship – <i>Lyles School of Civil Engineering, Purdue University</i>
May 2018	Institutional Academic Honor: Summa Cum Laude – <i>The University of Texas at San Antonio, San Antonio, TX</i>
Fall 2017	Office of Undergraduate Research Scholarship – <i>The University of Texas at San Antonio</i>
Summer 2017	Summer Undergraduate Research Fellowship – <i>Purdue University</i>
Fall 2016	Charles Lundy Memorial Award – <i>Structural Engineering Association of Texas, San Antonio Chapter</i>
June 2018	2018 EWRI Hispanic Student Travel Scholarship – <i>American Society of Civil Engineering – Environmental and Water Resources Institute Education Council</i>
2016 – 2018	College of Engineering Advisory Council Scholarship – <i>College of Engineering, The University of Texas at San Antonio</i>
2015 – 2018	Good Neighbor Scholarship Program – <i>Texas Higher Education Coordinating Board, U.S. State of Texas Government</i>
2015 – 2016	College of Engineering Presidential Scholarship – <i>College of Engineering, The University of Texas at San Antonio</i>
Fall 2015	Big Red Dog Engineering Scholarship - <i>College of Engineering, The University of Texas at San Antonio</i>

Skills

Computer: *Programming:* MATLAB, Python, C, C++, VBA
 Modeling Software: Simulink, Abaqus, AutoCAD, LabVIEW, SAP2000, HDM-4
 Statistics Software: MathCAD

Languages: Fluent in both Spanish and English.

Certifications: Engineer-in-Training
 Texas Board of Professional Engineers License # 64751