# JOSE RAUL RINCON GARCIA

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Spring, 2021

# **EDUCATION**

Ph.D. in Civil Engineering, Rice University		Houston, TX, USA
Thesis: "Smart and equitable resilience modeling of dynamic		Degree expected June 2025
infrastructure systems." Advisor: Jamie E. Padgett, PhD.		/
Committee members:	C C	
Pol D. Spanos, PhD.	Leonardo Duenas-Osorio, PhD.	
Vaibhav Unhelkar, PhD.	Mauricio Sanchez-Silva, PhD.	
M.Sc. in Civil Engineering, Universidad de los Andes		Bogotá, Colombia
Thesis: "Seismic vulnerability assessment of reinforced concrete buildings using non-linear dynamic analysis." <i>Advisor</i> : Luis E. Yamin, PhD.		July, 2013 – June, 2015
B.S. in Civil Engineering, Universidad de los Andes		Bogotá, Colombia
Thesis: "Design guide for buildings with steel plate shear walls and experimental test." <i>Advisor</i> : Juan C. Reyes, PhD.		July, 2009 – June, 2013
Honors/Awards		
<ul> <li>Future Faculty Fellow, George R. Brown School of Engineering</li> </ul>		July, 2024
• 1 <sup>st</sup> Place EMI Objective Resilience Student Paper/Presentation Competition,		petition, May, 2024
Engineering Mechanics Institu	te Conference and Probabilistic Mech	anics &
Reliability Conference (EMI/PN	AC 2024)	
Robert P. and Eleanor Warden Shubinski Awardee, Rice University		Spring, 2023

- H. W. Reeves Endowed Scholarship Awardee, Rice University
   Outstanding Journal Paper Award for 2018 ASCE Journal of E
- Outstanding Journal Paper Award for 2018, ASCE Journal of Performance of Constructed Facilities
   Fulbright Scholar, Fulbright-Minciencias (Colombia)
   Innovative Teacher Recognition, Universidad de los Andes, Colombia
   June 20<sup>th</sup>, 2019
- Mario Galan Gomez Scholarship, granted by ECOPETROL, Colombia
   2009 2013
   2 best students selected per department, a total 70 countrywide

# PUBLICATIONS

# Journal Articles Published

- 1. Padgett JE, **Rincon R**, Panakkal P. (2024). "Future cities demand smart and equitable infrastructure resilience modeling perspectives." *Npj Natural Hazards* 1, 28. <u>https://doi.org/10.1038/s44304-024-00028-5</u>.
- 2. **Rincon R**, Padgett JE. (2024) "Fragility modeling practices and their implications on risk and resilience analysis: from the structure to the network scale." *Earthquake Spectra*, 40(1), 647–673. DOI:10.1177/87552930231219220.
- Makhoul N, Roohi M, van de Lindt JW, Sousa H, Santos LO, Argyroudis S, Barbosa A, Derras B, Gardoni P, Lee JS, Mitoulis S, Moffett B, Navarro C, Padgett JE, Rincon R, Schmidt F, Shaban N, Stefanidou S, Tubaldi E, Xenidis Y, Zmigrodzki S. (2024) "Seismic resilience modelling of an interdependent built environment for integrating SHM and emerging technologies in decision-making." *Structural Engineering International*, 34:1,19-33, DOI:10.1080/10168664.2023.2295901.

- 4. Miura H, Matsuoka M, Reyes JC, Pulido N, Hashimoto M, Riaño AC, Hurtado A, **Rincon R**, García H, Lozano C. (2023) "Quick estimation model for mapping earthquake impacts in Bogotá, Colombia." *ISPRS International Journal of Geo-Information*. 2023; 12(12):471. <u>https://doi.org/10.3390/ijgi12120471</u>.
- Rincon R, Reyes JC, Carrillo J, Clavijo-Tocasuchyl A. (2022) "Empirical fragility assessment of adobe and rammed earth walls subjected to seismic actions." *Earthquake Engineering & Structural Dynamics*, 51, no. 5 (2022): 1133–57. <u>https://doi.org/10.1002/eqe.3608</u>.
- 6. Buitrago-Flórez F, Reyes JC, **Rincon R**, Hernández C, Galvis FA, Ángel C. (2020). Engaging in homework development: TARSIS platform as an innovative learning methodology. *Australasian Journal of Educational Technology*, 36(3), 147-162. https://doi.org/10.14742/ajet.5865
- Reyes JC, Rincon R, Yamin LE, Correal JF, Martínez JG, Sandoval JD, Gonzalez CD, Ángel CC. (2019).
   "Seismic retrofitting of existing earthen structures using steel plates." *Construction and Building Materials*, 230, 117039. Elsevier. <u>https://doi.org/10.1016/j.conbuildmat.2019.117039</u>
- 8. Yamin LE, Reyes JC, Rueda R, Prada E, **Rincon R**, Herrera C, Daza J, Riaño AC. (2018). "Practical seismic microzonation in complex geological environments." *Soil Dynamics and Earthquake Engineering*, 114, 480–494. Elsevier. <u>https://doi.org/10.1016/j.soildyn.2018.07.030</u>
- 9. Medina JM, Villate C, Caicedo B, Yamin LE, Correal JF, Estrada N, **Rincon R**. (2018). "Riesgo sísmico, geotécnico y estructural. El caso de estudio de los edificios San Jerónimo de Yuste en Bogotá." *Informes de la Construcción*, 70(550): e251. https://doi.org/10.3989/ic.16.131 (in Spanish)
- 10. Yamin LE, Correal JF, Reyes JC, Ramírez F, Rincon R, Hurtado AI, Dorado JF. (2018). "Sudden collapse of the 27-story space building in Medellin, Colombia." *Journal of Performance of Constructed Facilities*, 32(3), 1–13. <u>https://doi.org/10.1061/(ASCE)CF.1943-5509.0001148</u> <sup>(2)</sup>[Article Editor's Choice] Q [Outstanding Journal Paper Award for 2018]
- 11. Yamin LE, Hurtado AI, **Rincon R**, Dorado JF, Reyes JC. (2017). "Probabilistic seismic vulnerability assessment of buildings in terms of economic losses." *Engineering Structures*, 138, 308–323. Elsevier. https://doi.org/10.1016/j.engstruct.2017.02.013

#### Journal Articles in Review

12. **Rincon R**, Padgett JE. (2024). "Bias-based comparison of sub-model fidelity and its compounded effect on infrastructure resilience estimates." *Journal of Engineering Mechanics*, In Review, November 2024. *[Special Collection by invitation-only for the EMI 2024 Conference Student Competition Winners and Finalists]* 

#### Conference Papers (\* denotes presenter)

- 1. **Rincon R**\*, Padgett JE. (2024). "Intelligent learning paradigms to enable adaptable seismic fragility and restoration models." *18th World Conference on Earthquake Engineering*, Milan, Italy.
- Rincon R\*, Padgett JE. (2024) "Coupling effects of fragility fidelity and network resolution in infrastructure resilience." Engineering Mechanics Institute Conference and Probabilistic Mechanics & Reliability Conference, Chicago, IL. & [1<sup>st</sup> Place EMI Objective Resilience Student Paper/Presentation Competition].
- Rincon R\*, Padgett JE. (2023). "Smart resilience: capturing dynamic, uncertain and evolving lifecycle conditions." 8<sup>th</sup> International Symposium on Life-Cycle Civil Engineering, Milan, Italy. In F. Biondini & D.M. Frangopol, Life-Cycle of Structures and Infrastructure Systems (1st ed., pp. 341–348). CRC Press. https://doi.org/10.1201/9781003323020-39.
- 4. **Rincon R**\*, Padgett JE. (2022) "Seismic reliability analysis of complex structural systems using system-level surrogate models." *Proceedings of the 12<sup>th</sup> National Conference in Earthquake Engineering*, Earthquake Engineering Research Institute, Salt Lake City, UT.
- 5. **Rincon R**, Reyes JC, Carrillo J, Clavijo-Tocasuchyl A\*. (2022) "Towards fragility surfaces and data-driven capacity curves for earthen walls." *10<sup>th</sup> Colombian National Conf. on Earthq.* Bogotá, Colombia (in Spanish).
- 6. Castaño M\*, Correal JF, **Rincon R**. (2022) "Collapse fragility analysis of large prefabricated industrial moment resisting frame structures." *10<sup>th</sup> Colombian National Conf. on Earthq.* Bogotá, Colombia (in Spanish).

- 7. Reyes JC\*, Yamin LE, Rueda R, Prada E, **Rincon R**, Herrera C, Daza J, Riaño AC. (2019). "Seismic microzonation of the Medellin area using a probabilistic approach." *VII International Conference on Earthquake Geotechnical Engineering*. Rome, Italy.
- 8. **Rincon R**, Yamin LE, Arboleda C, Oliveros C\*, García AP, Galvis F. (2019) "Repair/replacement costs evaluation of post-earthquake affected bridges methodology." *9<sup>th</sup> Colombian Natl Conf. on Earthq.* Cali, Colombia (in Spanish).
- 9. Yamin LE, Reyes JC, Echeverry J\*, Correal J, Ramirez F, **Rincon R**, Galvis F, Prada E. (2019) "Seismic risk mitigation strategies for urban bridges." 9<sup>th</sup> Colombian National Conf. on Earthq. Cali, Colombia (in Spanish).
- 10. Rueda M\*, **Rincon R**, Yamin LE. (2019) "Assessment of the seismic response of RC moment frames as a function of the intensity measure." 9<sup>th</sup> Colombian National Conf. on Earthq. Cali, Colombia (in Spanish).
- 11. Spinel J\*, Reyes JC, **Rincon R**, Yamin LE. (2019) "Estimation of seismic demand parameters in existing unreinforced masonry housing units." 9<sup>th</sup> Colombian National Conf. on Earthq. Cali, Colombia (in Spanish).
- 12. Fernández R\*, **Rincon R**, Yamin LE. (2019) "Uncertainty in the obtained benefits for different retrofitting alternatives." *9<sup>th</sup> Colombian National Conf. on Earthq. Eng.*. Cali, Colombia (in Spanish).
- 13. Aguirre L\*, **Rincon R**. (2019) "Correlation between damage states of elements and their impact on seismic vulnerability." 9<sup>th</sup> Colombian National Conf. on Earthq. Cali, Colombia (in Spanish).
- 14. Yamin LE, **Rincon R**\*, Fernández RI, García AP, Reyes JC. (2018) "Repair cost and downtime seismic vulnerability assessment for RC school buildings." 11<sup>th</sup> U.S. National Conference on Earthquake Engineering. Integrating Science, Engineering and Policy. Los Angeles, CA, USA.
- 15. García A\*, Yamin LE, **Rincon R**. (2017) "Topographic amplification effects in slope zones and its integration in seismic microzonation." 8<sup>th</sup> Colombian Natl Conf. on Earthq. Bogotá, Colombia (in Spanish).
- 16. Prada E\*, Yamin LE, Rueda R, **Rincon R**. (2017) "Uncertainty in the one-dimensional dynamic response of soil basins for seismic microzonation." 8<sup>th</sup> Colombian Natl Conf. on Earthq. Bogotá, Colombia (in Spanish).
- 17. Aroquipa H\*, **Rincon R**, Fernández R, Yamin LE. (2017) "Eval. of incremental seismic retrof. techniques for typical school buildings in Peru." 8<sup>th</sup> Colombian Natl Conf. on Earthq. Bogotá, Colombia (in Spanish).
- 18. **Rincon R**<sup>\*</sup>, Yamin LE, Becerra AF. (2017) "Seismic risk assessment of public schools and prioritization strategy for risk mitigation." *16<sup>th</sup> World Conference on Earthquake Engineering*. Santiago de Chile, Chile.
- 19. Yamin LE\*, Hurtado AI, **Rincon R**. (2017) "Controlling parameters in the assessment of the seismic vulnerability of buildings." *16<sup>th</sup> World Conference on Earthquake Engineering*. Santiago de Chile, Chile.
- 20. **Rincon R**<sup>\*</sup>, Yamin LE, Hurtado AI, Pulido JF. (2015) "Seismic evaluation and performance of nonconventional structures: silos." 7<sup>th</sup> Colombian Natl Conf. on Earthq. Bogotá, Colombia (in Spanish).
- 21. Hurtado A\*, Yamin LE, **Rincon R**, Pulido JF, Dorado JF, Reyes JC. (2015) "Incremental dynamic analysis, a tool for seismic vulnerability assessment of buildings." 7<sup>th</sup> Colombian National Conf. on Earthq. Bogotá, Colombia (in Spanish).
- 22. Dorado JF\*, Yamin LE, Hurtado AI, **Rincon R**, Torres ID. (2015) "Cost model of structural and nonstructural elements for the evaluation of the seismic vulnerability of reinforced concrete buildings." 7<sup>th</sup> *Colombian National Conf. on Earthq.* Bogotá, Colombia (in Spanish).
- 23. Pulido JF\*, Yamin LE, **Rincon R**. (2015) "Seismic risk assessment of the main cities of Colombia." 7<sup>th</sup> Colombian National Conf. on Earthq. Bogotá, Colombia (in Spanish).
- 24. Yamin LE, Hurtado AI, **Rincon R**, Barbat AH, Reyes JC<sup>\*</sup>. (2014) "Use of non-linear dynamic analysis in the assessment of the seismic vulnerability of buildings." <sup>2nd</sup> European Conference on Earthquake Engineering and Seismology. Istanbul, Turkey.
- 25. Yamin LE, Hurtado AI, **Rincon R**, Pulido JF, Reyes JC, Barbat AH. (2014) "Evaluation of seismic code specifications using static nonlinear analyses of archetype buildings." 10<sup>th</sup> U.S. National Conference on Earthquake Engineering. Anchorage, Alaska, USA. Poster presentation.

#### **Book Chapters and Book Sections**

Rincon R, Camacho R, Zuluaga S, Avalo A, Ramírez A. (2021) Section 2, Study Case Nº 4. "Statics, a case
of cross-sectional design of the evaluation system by Big Ideas theory" (Galvis A, Editor) *In Course design
by Big Ideas, using active pedagogy and digital technologies.* In Spanish. (Ebook, ISBN: 978-958-798-039-4).
Ediciones Uniandes-Universidad de los Andes.

#### **Technical reports**

1. Yamin L, **Rincon R**, Reyes J, Hurtado A, Tristancho J, Becerra J, Lopez L, Estrada J, Ramirez F, Atoche J, Daza L (2017). Technical note: "Seismic risk reduction strategy for public school buildings in Peru". in *Repository for Global Program for Safer Schools projects* from the Global Facility for Disaster Reduction and Recovery (GFDRR). [Link]

#### Datasets, algorithms, and others

- 1. **Rincon R.**, Padgett JE. (2024) "Illustrative example of a hypothetical bridge network subjected to an earthquake hazard." in *IN-CORE on DesignSafe*. DesignSafe-CI. <u>https://doi.org/10.17603/ds2-cx62-ve21</u>
- 2. Padgett JE, **Rincon R**, Tafur A. (2024) "Reconnaissance of wind damage to buildings in downtown Houston, Texas." in *Reconnaissance of Wind Damage to Buildings in Downtown Houston*, Texas. DesignSafe-CI. <u>https://doi.org/10.17603/ds2-b36k-tf53</u>
- 3. Rincon R, Del-Castillo-Negrete C, Padgett JE. (2023) "ASCE INSPIRE 2023 DesignSafe Workshop." DesignSafe-CI. <u>https://doi.org/10.17603/ds2-cejj-cx33</u>.
- 4. **Rincon R**, Padgett JE. (2023) "Jupyter Notebook for visualization of spatially distributed data in risk and resilience analysis." DesignSafe-CI. <u>https://doi.org/10.17603/ds2-a74m-g031</u>.

#### LECTURES, SEMINARS, AND OTHER PRESENTATIONS

#### **Conferences, Symposiums, and Poster presentations** (\* denotes presenters)

- Rincon R\*, Padgett JE. (2024). "Toward conceptualization and evaluation of equitable resilience modeling." Spring National Institute of Standards and Technology (NIST) Community Resilience Center of Excellence Semi-annual Meeting, Fort Collins, CO.
- Rincon R\*, Padgett JE. (2023). "Exploration of biasedness and inequities in infrastructure resilience modeling." ASCE INSPIRE Conference 2023, Arlington, VA. Slides available at https://doi.org/10.26226/m.65562ab611e6250019bbac80.
- **Rincon R\***, Padgett JE (2022). "Traditional and surrogate-based procedures for fragility functions derivation and their influence on network analysis." *2022 SimCenter Symposium*. Austin, TX.
- Reyes JC\*, Rincon R, Yamin LE, Correal J, Echeverry J. (2019). "Behavior of adobe and rammed earth buildings and possible options for vulnerability mitigation." *Jornadas XVIII Geotécnicas y XXI Estructurales*. Bucaramanga, Colombia.

#### Lectures, Seminars, Workshops, and Invited Talks (\* denotes presenters)

- Padgett JE\*, Rincon R\*, Del-Castillo-Negrete C.\* (2023). "Part II: Supporting infrastructure risk and resilience research through NHERI DesignSafe resources," Workshop: IN-CORE and DesignSafe at ASCE INSPIRE Conference 2023, Arlington, VA.
- Padgett JE\*, Rincon R. (2022). "Facilitating seismic risk and resilience analysis in heterogenous and multiscale systems," 4th Kenji Ishihara Colloquium Series on Earthquake Engineering: "Artificial Intelligence Applications in Earthquake Engineering." San Diego, CA.
- Reyes JC\*, Rincon R\*. (2019). "Innovation in the structural systems analysis course for civil engineers," Workshop on New Alternatives in Engineering Education. School of Engineering, Universidad de los Andes. Bogotá, Colombia (in Spanish).

- Reyes JC\*, Rincon R\*. (2019). "Active engagement of students in developing assignments using the TARSIS platform." *Cycle of Webinars - Exchange of experiences in blended and virtual courses*. Academic Vice-Presidency, Universidad de los Andes. Bogotá, Colombia (in Spanish).
- Rincon R\*, Camacho R\*. (2018). "Innovation processes for the Statics course supported by Conecta-Te." Dialogues on Participation in Innovation with Conecta-TE. Department of Civil and Environmental Engineering, Universidad de los Andes. Bogotá, Colombia (in Spanish).
- Camacho R\*, Rincon R\*. (2018). "Innovation processes for the Statics course supported by Conecta-Te." Dialogues on participation in innovation with Conecta-TE. Department of Mechanical Engineering, Universidad de los Andes. Bogotá, Colombia (in Spanish).
- Rincon R\*, Camacho R\*. (2017). "Innovation for the Statics course using information and communication technology." *Innovation in Education with Information and Communication technology (ICT)*. School of Education and *Conecta-TE*, Universidad de los Andes. Bogotá, Colombia. Poster presentation.

# **Research & Work Experience**

<b>Ph.D. Research Assistant</b> , <i>Rice University</i> . Houston, TX, USA Padgett Research Group. PI: Jamie E. Padgett, PhD.	2020 - Present
<b>Research Assistant</b> , <i>Universidad de los Andes</i> . Bogotá, Colombia Material and Civil Works Research Center (CIMOC). PI: Luis E. Yamin, PhD.	2015 - 2017
<b>M.Sc. Research Assistant</b> , <i>Universidad de los Andes</i> . Bogotá, Colombia Material and Civil Works Research Center (CIMOC). PI: Luis E. Yamin, PhD.	2013 - 2015
<b>Co-founder</b> , <i>CIVECO S.A.S</i> , Bogotá, Colombia Vulnerability assessment and design of residential and commercial buildings	2016 - 2019
<b>Structural Engineer, Project Specialist,</b> <i>Ingeniería Técnica y Científica</i> , Bogotá, Colombia Technical projects on risk analysis at structural, portfolio, and regional scales.	2013 - 2017
TEACHING EXPERIENCE	
<b>Guest Lecturer,</b> Rice University, Houston, TX, USA CEVE 325 – Structural Analysis	Fall 2024
<b>Coordinator of the Resilience Seminar of the GSP,</b> <i>Rice University</i> , Houston, TX, USA <i>Co-led the inaugural Resilience Seminar for the Gulf Scholars Program GSP@RICE</i>	Fall 2022
<b>Full-time Lecturer (Instructor),</b> <i>Universidad de los Andes,</i> Bogotá, Colombia Undergraduate courses:	2017 - 2020
<ul> <li>Structural Design: Theoretical reinforced concrete behavior, analysis and design Au of reinforced concrete elements (beams, columns, foundations), seismic design of structural systems (moment resisting frames), and reinforcement detailing.</li> </ul>	ıg. 2019 – Jul. 2020
<ul> <li>Mechanics of Materials: Stress-strain in materials, materials' behavior in the linear Ja and non-linear range, serviceability and safety concepts, and evaluation of failure in simple elements or structures such as columns, beams, and frames.</li> </ul>	n. 2018 – Jul. 2020
<ul> <li>Structural Analysis: Displacements and internal forces in determined and Au undetermined structures when subjected to different loads (e.g., seismic, wind,</li> </ul>	ıg. 2017 – Jul. 2020

2019

2018

self-weight, or temperature), types of structural systems, and computational analysis of structures such as buildings and bridges.

Statics: Classical mechanics focusing on bodies in equilibrium, study of external and internal forces on simple elements, probabilistic capacity and demand 2019 concepts, and development of internal forces diagrams.

# MENTORING EXPERIENCE

Member of examining committee of 9 Master's degree students Thesis Defense, 2016 – 2024 Universidad de los Andes

### Research project advisor of undergraduate students, Universidad de los Andes

- Cristian Yesid Bula Peña. "Non-linear perf. analysis of tall buildings under seismic hazards."
- Juan Camilo Vanegas Cañon. "Variation in design outcomes of tall buildings given the existing approximate fundamental vibration period equations."
   2020
- Alejandra Clavijo Tocasuchyl. "Analysis of collapse risk considering the uncertainties in the fundamental vibration period."
- Daniel Castrillón Campo and Astrid Natalia Gutiérrez Bernal. "Tool for approximation of bridge's super and substructure material quantities."
- Angie Paola Oviedo Castaño and Luis Felipe Huertas Medina. "Preliminary investigation of new seismic design paradigms in Colombia: structural design using uniform collapse risk."
- María Alejandra Ortiz Bernal. "Reinforced concrete frames subjected to tsunami loads."
- Juan Sebastián Parra Tarache. "Indirect losses in a simplified bridge netw. under seismic events."
- María Claudia González Clavijo. "Impact of existing approximate fundamental vibration period equations in the nonlinear dynamic analysis of combined systems."
- Andrés Felipe Jiménez Caro. "Linear perf. analysis of tall buildings under seismic hazards."
- Gustavo Turriago Méndez. "Preliminary fragility function for adobe and rammed earth walls."
- Laura Cristina Aguirre García. "Components' damage correlation and its impact to vulnerability."
- María Paula Delgado Enríquez. "Seismic community resilience: preliminary evaluation of two existing methodologies applied to school buildings."
- Karen Lorena Domínguez Tarazona. "Nonlinear dynamic analysis of isolated buildings".
- Juan Sebastián López Bello. "Design of isolated buildings with concentrically braced steel frames."
- Nicolás Parra Montaño. "Design of isolated buildings with reinforced concrete frames."

# **PROFESSIONAL SERVICE**

# Reviewer for Indexed Journals

Earthquake Spectra Journal of Performance of Constructed Facilities Journal of Forecasting Journal of Building Engineering

#### **Professional Technical Committees**

ASCE Civil Infrastructure and Lifeline Systems Committee (member since 07/2021) ASCE Risk and Resilience Measurements Committee (member since 07/2021)

#### Additional Professional Affiliations

Earthquake Engineering Research Institute (EERI), Member American Society of Civil Engineers, Member Colombian Association of Earthquake Engineering (Colombia), Member

# **UNIVERSITY SERVICE AND CONTRIBUTIONS**

University Service, Rice University

- Selected as <u>Graduate Student Representative for the 15-member Strategic Planning Committee</u>: "Articulation of Rice's vision for the next ten years" (2023-2024)
- President, Earthquake Engineering Research Institute Rice University (2021 2025)
- President, Colombian Owls Student Association (2024 2025)
- President, Civil and Environmental Engineering Graduate Student Association (2023 2024)
- Officer, Civil and Environmental Engineering Graduate Student Association (2021 2023)
- Officer, Colombian Owls Student Association (2023 present)
- Officer, Latin American Graduate Student Association (2022 2023)
- Leader of 'The Fulbright Ring' Fulbright at Rice (2022 2023)
- Departmental Liaison Center for Teaching Excellence Graduate Advisory Board (2022 2023)