FERNANDO MOREU, PhD, PE

Assistant Professor Civil, Construction and Environmental Engineering Department
Assistant Professor Electrical and Computer Engineering Department (cross-appointed)
Assistant Professor Mechanical Engineering Department (cross-appointed)
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RESEARCH INTERESTS

Structural dynamics, structural health monitoring, wireless smart sensor networks, railroad engineering, infrastructure management, performance monitoring, unmanned aerial vehicles, machine learning, remote sensing technologies, cyber-physical systems, augmented reality.

EDUCATION

Ph.D. Civil and Environmental Engineering May 2015
University of Illinois at Urbana-Champaign
Dissertation: *"Framework for Risk-based Management of Railroad Bridge Infrastructure; an Application of Structural Health Monitoring (SHM) using Wireless Smart Sensor Networks (WSSNs)"*
Adviser: Professor B. F. Spencer, Jr.

M. S. Civil and Environmental Engineering May 2005
University of Illinois at Urbana-Champaign
Sponsored by ESCA Consultants, Inc. (Urbana, IL)
Adviser: Professor Doug A. Foutch

B. S. Civil and Environmental Engineering August 1999
University of Granada (Spain)
Senior Project: "Pedestrian Bridge over C/Méndez Núñez at Granada, Spain"
With excellence award from the University of Granada for outstanding students

PROFESSIONAL EXPERIENCE

Los Alamos National Laboratory June 2018-August 2018
May 2016-August 2016

Los Alamos, New Mexico
Research Scientist

- Collaborated with the Los Alamos Dynamics Summer School (LADSS) mentoring and advising of students for 10 weeks
- Developed experiments and validation in remote sensing technologies
- Prepared research grants and journal and conference publications summarizing this research

ESCA Consultants, Inc. November 2000-April 2011
Urbana, Illinois
Structural engineer

- Designed, checked, and constructed diverse structural systems
- Expert in highway and railroad bridges, University laboratories, diverse industry buildings, cooling towers and special foundations
- Diverse specialized services such as concrete ready-mix plant management and mix design, and design, fabrication, and evaluation of pre-stressed concrete beams

REFEREED JOURNAL PUBLICATIONS

Total citations 601, with h-index=14, i10-index=19
Ten papers published in 2021 to date

1. Yuan, X., Smith, A., Sarlo, R., Lippitt, C. D., & **Moreu, F.** (2021). Automatic evaluation of rebar spacing using LiDAR data. *Automation in Construction*, *131*, 103890. https://doi.org/10.1016/j.autcon.2021.103890
2. Nasimi, R., & **Moreu, F**. (2021). Development and implementation of a laser–camera–UAV System to measure total dynamic transverse displacement. *Journal of Engineering Mechanics*, *147*(8), 04021045. https://doi.org/10.1061/(ASCE)EM.1943-7889.0001939
3. Maji A, **Moreu F**, Woodall J, Hossain M. Error analyses of a Multi-Input-Multi-Output cantilever beam test. *Journal of Vibration and Control*. July 2021. https://doi.org/10.1177/10775463211033733
4. Woodall, J., Hossain, M., Maji, A., **Moreu, F.**; Transforming a Simple Structure Model to Represent a Complex Dynamic System with Unknown Boundary Restraints. *Exp Tech* (2021). https://doi.org/10.1007/s40799-021-00494-w
5. Reda Taha, M.; Ayyub, B. M.; Soga, K.; Daghash, S.; Heras Murcia, D.; **Moreu, F.**; and Soliman, E. (2021). "Emerging Technologies for Resilient Infrastructure: Conspectus and Roadmap" *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering* Vol 7, No 2 https://doi.org/10.1061/AJRUA6.0001134
6. Nasimi, R., and **Moreu, F.** "A methodology for measuring the total displacements of structures using a laser–camera system." *Computer-Aided Civil and Infrastructure Engineering* 36, no. 4 (2021): 421-437. https://doi.org/10.1111/mice.12652
7. Robbins, E., Cobo, N,, Diaz J. and **Moreu, F.** (2021) "Development of a low-cost efficient wireless intelligent sensor for strain measurements (LEWIS-S)" *Measurement Science and Technology*, February 5th, 2021 https://doi.org/10.1088/1361-6501/abe339
8. Cardona Huerta, R., **Moreu, F.**, & Lozano Galant, J. A. (2021). Aerial Tramway Sustainable Monitoring with an Outdoor Low-Cost Efficient Wireless Intelligent Sensor. *Sustainability*, *13*(11), 6340. https://doi.org/10.3390/su13116340
9. Chen L-K, Liu P, Zhu L-M, Ding J-B, Feng Y-L, **Moreu F.** (2021) "A simplified iterative approach for testing the pulse derailment of light rail vehicles across a viaduct to near-fault earthquake scenarios". *Proceedings of the Institution of Mechanical Engineers, Part F: Journal of Rail and Rapid Transit.* February 2021. https://doi.org/10.1177%2F0954409720987410
10. Jiaqi, X. and **Moreu, F.** (2021). "A Review of Augmented Reality Applications in Civil Infrastructure during the 4th Industrial Revolution." *Frontiers in Built Environment* 7 (2021): 28. https://doi.org/10.3389/fbuil.2021.640732
11. Maharjan, D., Agüero, M., Mascarenas, D., Fierro, R., & **Moreu, F.** (2020). Enabling human–

infrastructure interfaces for inspection using augmented reality. *Structural Health Monitoring*, 1475921720977017. https://doi.org/10.1177/1475921720977017

12. Montoya, A., Habtour, E., & **Moreu, F.** (2020). Quantifying Information without Entropy: Identifying Intermittent Disturbances in Dynamical Systems. *Entropy*, 22(11), 1199. https://doi.org/10.3390/e22111199
13. Garg, P., Nasimi, R., Ozdagli, A., Zhang, S., Mascarenas, D. D. L., Reda Taha, M., & **Moreu, F.** (2020). Measuring Transverse Displacements Using Unmanned Aerial Systems Laser Doppler Vibrometer (UAS-LDV): Development and Field Validation. *Sensors*, 20(21), 6051. https://doi.org/10.3390/s20216051
14. Mascareñas, D. D., Ballor, J. P., McClain, O. L., Mellor, M. A., Shen, C. Y., Bleck, B., ... & **Moreu, F.** (2020). Augmented reality for next generation infrastructure inspections. Structural Health Monitoring, 1475921720953846. https://journals.sagepub.com/doi/full/10.1177/1475921720953846
15. **Moreu, F.**, Maharjan, D., Wyckoff, E., & Zhu, C. (2020). Monitoring Human Induced Floor Vibrations for Quantifying Dance Moves. *Frontiers in Built Environment*, 6, 36. https://www.frontiersin.org/articles/10.3389/fbuil.2020.00036/full
16. Taylor, R.M., Maharjan, D., **Moreu, F.** et al. (2020); Parametric study of 3D printed microneedle (MN) holders for interstitial fluid (ISF) extraction. Microsyst. Technol. https://doi.org/10.1007/s00542-020-04758-0
17. Aguero, M., Maharjan, D., Rodriguez, M. D. P., Mascarenas, D. D. L., & **Moreu, F.** (2020). Design and Implementation of a Connection between Augmented Reality and Sensors. *Robotics*, *9*(1), 3. https://doi.org/10.3390/robotics9010003
18. Ozdagli, A. I., **Moreu, F.**, Xu, D., & Wang, T. (2020). Experimental Analysis on Effectiveness of Crash Beams for Impact Attenuation of Overheight Vehicle Collisions on Railroad Bridges. *Journal of Bridge Engineering*, *25*(1), 04019133. https://doi.org/10.1061/(ASCE)BE.1943-5592.0001503
19. Garg, P., **Moreu, F.**, Ozdagli, A., Taha, M. R., & Mascareñas, D. (2019). Noncontact Dynamic Displacement Measurement of Structures Using a Moving Laser Doppler Vibrometer. *Journal of Bridge Engineering*, *24*(9), 04019089. https://doi.org/10.1061/(ASCE)BE.1943-5592.0001472
20. Mascarenas, David Dennis Lee, Harden, Troy Anthony, Morales Garcia, John Evan, Boardman, Beth Leigh, Sosebee, Erin Marie, Blackhart, Craig, Cattaneo, Alessandro, Krebs, Matthew Scott, Tockstein, Jameson John, Green, Andre Walter, Dasari, Sudeep Rao, Bleck, Brian Mark, Katko, Benjamin Joseph, **Moreu, Fernando**, Maharjan, Dilendra, Aguero, Marlon, Fernandez, Ricardo, Trujillo, Julio B., and Wysong, Andrew Russell. *Augmented Reality for Enabling Smart Nuclear Infrastructure*. United States: N. p., 2019. https://www.frontiersin.org/articles/10.3389/fbuil.2019.00082/full
21. Liu, B., Ozdagli, A. I., **Moreu, F.**, & Chi, Q. (2019). Hybrid reference-free total displacement for railroad bridge campaign monitoring. *Measurement Science and Technology*. https://doi.org/10.1088/1361-6501/ab2091
22. Gomez, J. A., Ozdagli, A. I., & **Moreu, F.** (2019). Reference-free dynamic displacements of railroad bridges using low-cost sensors. *Journal of Intelligent Material Systems and Structures*, *30*(9), 1291-1305. https://doi.org/10.1177/1045389X17721375
23. Aguero, M., Ozdagli, A., & **Moreu, F.** (2019). Measuring Reference-Free Total Displacements of Piles and Columns Using Low-Cost, Battery-Powered, Efficient Wireless Intelligent Sensors (LEWIS2). *Sensors*, *19*(7), 1549. https://doi.org/10.3390/s19071549
24. **Moreu, F.**, Li, X., Li, S., & Zhang, D. (2018). Technical specifications of structural health monitoring

for highway bridges: new Chinese structural health monitoring code. *Frontiers in Built Environment*, *4*, 10. https://www.frontiersin.org/articles/10.3389/fbuil.2018.00010/full

25. Liu, B.; Ozdagli, A.; **Moreu, F.** (2018); "Direct reference-free measurement of displacements for railroad bridge management"; *Structural Control and Health Monitoring*. https://doi.org/10.1002/stc.2241
26. Ozdagli, A. I., Liu, B., & **Moreu, F.** (2018). "Measuring Total Transverse Reference-Free Displacements for Condition Assessment of Timber Railroad Bridges: Experimental Validation." *Journal of Structural Engineering*, *144*(6), 04018047. https://doi.org/10.1061/(ASCE)ST.1943-541X.0002041
27. Ozdagli, Ali I.; Liu, Bideng; **Moreu, F.**; (2018); "Low-cost, efficient wireless intelligent sensors (LEWIS) measuring real-time reference-free dynamic displacements." *Mechanical Systems and Signal Processing* Volume 107, July, Pg. 343–356. https://doi.org/10.1016/j.ymssp.2018.01.034
28. **Moreu, F.**; Ayorinde, E.; Mason, J.; Farrar, C.; and Mascarenas, D.D.L. (2017); "Remote Railroad Bridge Structural Tap Testing Using Aerial Robots"; *International Journal of Intelligent Robotics and Applications*, 1-14. https://doi.org/10.1007/s41315-017-0041-7
29. D. D. L. Mascarenas, **F. Moreu**, P. Cantu, D. Shields, J. Wadden, M. El Hadedy, C. Farrar (2017) "A compliant mechanism for inspecting extremely confined spaces". *Smart Materials and Structures*, 26(11), 115028. https://doi.org/10.1088/1361-665X/aa9195
30. Ozdagli, Ali I.; Gomez, Jose A.; **Moreu, F.**; (2017); "Total reference-free displacements for condition assessment of timber railroad bridges using tilt"; *Smart Structures and Systems*; Volume 20, Number 5, November; pages 549-562. https://doi.org/10.12989/sss.2017.20.5.549
31. Ozdagli, A. I., Gomez, J. A., & **Moreu, F.** (2017). "Real-Time Reference-Free Displacement of Railroad Bridges during Train-Crossing Events". *Journal of Bridge Engineering*, 22 (10), 04017073. https://doi.org/10.1061/(ASCE)BE.1943-5592.0001113
32. Hoag, A., Hoult, N., Take, A., **Moreu, F.**, Le, H. and Tolikonda, V. (2017); "Measuring displacements of a railroad bridge using DIC and accelerometers"; Smart Structures and Systems *Smart Structures and Systems*; Volume 19, Number 2, February 2017. https://doi.org/10.12989/sss.2017.19.2.225
33. **Moreu, F.**, Spencer Jr, B. F., Foutch, D. A., & Scola, S. (2017). Consequence-based management of railroad bridge networks. *Structure and Infrastructure Engineering*, 1-14. https://doi.org/10.1080/15732479.2016.1162817
34. **Moreu, F.**; Kim, R. E.; and Spencer, Jr., B. F. (2017); "Railroad Bridge Monitoring Using Wireless Smart Sensors"; *Structural Control and Health Monitoring*. https://doi.org/10.1061/(ASCE)ST.1943-541X.0001530
35. Kim, R. E.; **Moreu, F.**; and Spencer, Jr., B. F. (2016); "Hybrid Model for Railroad Bridge Dynamics"; Journal of Structural Engineering Volume 142 Issue 10 – October 2016. https://doi.org/10.1061/(ASCE)ST.1943-541X.0001530
36. **Moreu, F.**; Jo, H.; Li, J.; Kim, R. E., Scola, S.; Spencer, Jr., B. F.; and LaFave, J. M. (2016); "Reference-Free Displacement Estimation and Assessment for Railroad Bridges using Wireless Smart Sensors"; ASCE Journal of Bridge Engineering. Volume 21 Issue 2 - February 2016 https://doi.org/10.1061/(ASCE)BE.1943-5592.0000805
37. Kim, R. E.; **Moreu, F.**; and Spencer, Jr., B. F. (2015); "System identification of an in-service

railroad bridge using wireless smart sensors"; *Smart Structures and Systems*, 15(3), 683-698. https://doi.org/10.12989/sss.2015.15.3.683

38. **Moreu, F.**; Jo, H.; Li, J.; Kim, R.; Cho, S.; Kimmle, A.; Scola, S.; Le, H.; Spencer, Jr., B. F.; and LaFave, J. M. (2015); "Dynamic Assessment of Timber Railroad Bridges using Displacements"; ASCE Journal of Bridge Engineering, Volume 20 Issue 10 - October 2015. https://doi.org/10.1061/(ASCE)BE.1943-5592.0000726

PUBLICATIONS IN CONFERENCE PROCEEDINGS

1. Hossain, M., Hanson, J. W., & **Moreu, F.** (2021). Real-Time Theoretical and Experimental Dynamic Mode Shapes for Structural Analysis Using Augmented Reality. In *Topics in Modal Analysis & Testing, Volume 8* (pp. 351-356). Springer, Cham.
2. Woodall, J., Hossain, M., Maji, A., Pott, J., & **Moreu, F.** (2021). Exploring Uncertainties in Multi-Input-Multi-Output (MIMO) Testing. In *Special Topics in Structural Dynamics & Experimental Techniques, Volume 5* (pp. 197-204). Springer, Cham.
3. Murillo, Joshua S.; **Moreu**, Fernando; Ball, Marlan (2021); "Invited Student Paper - 5th Generation Low-cost Efficient Wireless Intelligent Sensors (LEWIS 5) for Transportation", Transportation Research Board 100th Annual Meeting, Washington, DC, January 2021.
4. Martins, C., Ghanbari, L., Wang, C., & **Moreu, F.** (2019, April). Development of a Conceptual Model for Accelerated Project Prioritization after Disaster Event. In *MATEC Web of Conferences* (Vol. 271, p. 08001). EDP Sciences.
5. Agüero, M., Ozdagli, A., & **Moreu, F.** (2019, April). Low-cost, Battery-Powered, Efficient Wireless Intelligent Sensor (LEWIS2): Outdoors and Remote Sensing Applications. In *MATEC Web of Conferences* (Vol. 271, p. 01007). EDP Sciences.
6. Maharjan, D., Wyckoff, E., Agüero, M., Martinez, S., Zhou, L., & **Moreu, F.** (2019, March). Monitoring induced floor vibrations: dance performance and bridge engineering. In *Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2019* (Vol. 10970, p. 109701E). International Society for Optics and Photonics.
7. Maharjan, D., Agüero, M., Lippitt, C., & **Moreu, F.** (2019). Infrastructure Stakeholders' Perspective in Development and Implementation of New Structural Health Monitoring (SHM) Technologies for Maintenance and Management of Transportation Infrastructure. In *MATEC Web of Conferences* (Vol. 271, p. 01010). EDP Sciences.
8. Pirayesh, R., Naseri, A., **Moreu, F.**, Stochaj, S., Shah, N., & Krizmanic, J. (2019). Attitude Control Optimization of a Two-CubeSat Virtual Telescope in a Highly Elliptical Orbit. In *Space Operations: Inspiring Humankind's Future* (pp. 233-258). Springer, Cham.
9. Ballor, J. P., McClain, O. L., Mellor, M. A., Cattaneo, A., Harden, T. A., Shelton, P., Martinez, E., Narushof, B., Moreu, F. & Mascareñas, D. D. (2019). Augmented Reality for Next Generation Infrastructure Inspections. In *Model Validation and Uncertainty Quantification, Volume 3* (pp. 185-192). Springer, Cham.
10. Liu, B., Ozdagli, A., & **Moreu, F.** (2018, May). Direct Reference-Free Dynamic Deflection Measurement of Railroad Bridge under Service Load. In *Sensors and Instrumentation, Aircraft/Aerospace and Energy Harvesting, Volume 8: Proceedings of the 36th IMAC, A Conference and Exposition on Structural Dynamics 2018* (p. 83). Springer.
11. Ozdagli, A., Liu, B., & **Moreu, F.** (2018, May). Real-Time Low-Cost Wireless Reference-Free

Displacement Sensing of Railroad Bridges. In *Sensors and Instrumentation, Aircraft/Aerospace and Energy Harvesting, Volume 8: Proceedings of the 36th IMAC, A Conference and Exposition on Structural Dynamics 2018* (p. 103). Springer.

12. Ozdagli, A., Liu, B., & **Moreu, F.** (2018). Low-cost wireless smart sensors for measuring real-time reference-free dynamic displacements of railroad bridges. *The 7th World Conference on Structural Control and Monitoring*, Qingdao, China, July 22-25.

13. **Moreu, F.**, Garg, P, Ozdagli, A. (2018). Transverse bridge displacement measurement using a laser carried by unmanned aerial system. *The 7th World Conference on Structural Control and Monitoring*, Qingdao, China, July 22-25.

14. Ayorinde, E., Benjamin, I., **Moreu, F.** (2018); "Investigating the Use of Wireless Sensors to Measure the Performance of Launch Vehicles". 2018 American Institute of Aeronautics and Astronautics Region IV Student Paper Conference, Albuquerque, NM, April 13-14.

15. **Moreu, F.**, Lippitt, C., Soni, R., Ozdagli, A., Liu, B., Li, X., Ayorinde, E., Zhang, S. (2018); "High School Students Building and Using Sensors Towards Smart Management of Transportation Systems". 2018 Tran-SET Conference, New Orleans, LA, April 3-4.

16. Ozdagli, A. I., Vemuganti, S., Liu, B., **Moreu, F**. "Impact Rating of Semi-Trailer Truck – Railway Through Plate Girder (TPG) Bridge". AREMA 2017 Annual Conference & Exposition, Indianapolis, IN, September.

17. **Moreu, F**. Bleck, B., Vemuganti, S., Mascarenas, D. "Enhancing Structural Visual Inspection of Railroad Bridges Using HoloLens". AREMA 2017 Annual Conference & Exposition, Indianapolis, IN, September.

18. Liu, B., Gomez, J., Ozdagli, A.I., **Moreu, F.** (2017); "Cost-Effective Monitoring of Railroad Bridge Performance", In ASME 2017 Conference on Smart Materials, Adaptive Structures and Intelligent Systems, September.

19. Ozdagli, A., Gomez, J., **Moreu, F.** (2017). Measuring lateral displacements of railroad bridges susceptible to asymmetric loading; 3rd Huixian International Forum on Earthquake Engineering for Young Researchers. Champaign, Illinois, August 11-12, 2017.

20. **Moreu, F.**, Liu, B., Ozdagli, A. I. (2017). Observation and monitoring of total reference-free displacements; 3rd Huixian International Forum on Earthquake Engineering for Young Researchers. Champaign, Illinois, August 11-12, 2017.

21. Liu, B., Ozdagli, A. I., **Moreu, F.** (2017). Measurement of direct reference-free dynamic displacements of railroad bridges under train-crossing and ground motion excitations; 3rd Huixian International Forum on Earthquake Engineering for Young Researchers. Champaign, Illinois, August 11-12, 2017.

22. Jafari, A., Pérez, G., **Moreu, F.**, & Valentin, V. *Optimizing Railroad Bridge Networks Management Using Mixed Integer Linear Programming and Genetic Algorithm*. In Computing in Civil Engineering 2017 (pp. 1-9).

23. **Moreu, F.**, Bleck, B., Vemuganti, S., Rogers, D., & Mascarenas, D. (2017). Augmented Reality Tools for Enhanced Structural Inspection. *Structural Health Monitoring 2017*.

24. Mascarenas, D., **Moreu, F.**, Cantu, P., Shields, D., Wadden, J., El Hadedy, Mohamed, & Farrar, C. (2017). A Steerable-Needle Inspired Mechanism for Inspecting Extremely Confined Spaces. *Structural Health Monitoring 2017*.

25. Vemuganti, S., **Moreu, F**., Ozdagli, O., Bajric, A., Liu, B., Brake, M., Troyer, K., *Sensing and Rating of vehicle-bridge collisions*, IMAC XXXV conference by Society of Experimental Mechanics (SEM). Garden Grove, CA, USA, January 30-February 2 2017.

26. Garg, P., Ozdagli, A., **Moreu, F**. (2017). *Optimal Bridge Displacement Controlled by Train Speed on Real-Time*. IMAC XXXV conference by Society of Experimental Mechanics (SEM). Garden Grove, CA, USA, January 30-February 2 2017

27. Vemuganti, S., Ozdagli, A., **Moreu F.**, Survey Bottom Surface Abrasion of Concrete Crossties, TRB 96th Annual Meeting, 2017.

28. Lauren G., Shreya V., **Moreu, F.** (2017, January). Cyber-physical systems related to historic infrastructure maintenance, TRB 96th Annual Meeting, 2017.

29. **Moreu, F.**; Altwood, T. J.; Jo, H.; Kim, R.; Cho, S.; LaFave, J.M.; and Spencer Jr., B.F. (2016, August). Displacements of Steel Railroad Bridges under Revenue Service Traffic for Performance-Based Assessment. In Proc., AREMA 2016 Annual Conf. and Exposition (pp. 1- 20). Lanham, MD: American Railway Engineering and Maintenance-of-Way Association (AREMA).

30. Gomez, J. A., Ozdagli, A. I., & **Moreu, F.** (2016, September). Application of Low-Cost Sensors for Estimation of Reference-Free Displacements Under Dynamic Loading for Railroad Bridges Safety. In ASME 2016 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (pp. V001T05A021-V001T05A021). American Society of Mechanical Engineers (click here)

31. Garg, P., Gomez, J., Ozdagli, A., **Moreu, F**. (2016). Non-Contact, Reference-Free Measurement of Bridge Displacement Using Viberometer. 2nd Huixian International Forum on Earthquake Engineering for Young Researchers. Beijing, China, August 19-21 2016

32. **Moreu, F.**, and Spencer Jr, B. F. (2015). *Consequence-Based Management of Railroad Bridge Infrastructure enabled by Structural Health Monitoring*. 2015 World Congress on Advances in Structural Engineering and Mechanics (ASEM15). Incheon, South Korea, August 25-29 2015.

33. Spencer, Jr., B.F., **Moreu, F.**, Kim, R. (2014); "Structural Health Monitoring of Railroad Bridges Using Wireless Smart Sensors (WSSs): Recent Real-world Experiences in North America"; Fourth International Symposium on Life-Cycle Civil Engineering (IALCEE 2014); Waseda University, Tokyo, Japan, November 16-19 (click here)

34. **Moreu, F.**; Jo, H.; Li, J. Cho, S.; Kim, R.; Spencer, B.; and LaFave, J.; (2012); "Reference-free displacement estimation for structural health monitoring of railroad bridges"; AREMA 2012 Annual Conference & Exposition, Chicago, IL, September (click here)

35. **Moreu, F.**; LaFave, J.; Spencer, B. (2012); "Structural health monitoring of railroad bridges – research needs and preliminary results"; Structures Congress (ASCE-SEI 2012), Chicago, IL, March (click here)

36. **Moreu, F.**; LaFave, J.; Spencer, B. (2012); "New regulations on railroad bridge safety: opportunities and challenges for railroad bridge monitoring"; SPIE, Smart Structures and Nondestructive Evaluation and Health Monitoring, San Diego, CA, March (click here)

37. Ren, J. J.; Wang, P.; Xiang, R.; **Moreu, F.** (2011); "Rub-plate length influence on longitudinal coupled slab track forces and displacements in railroad bridges turnouts", Transportation Research Board (TRB) Annual Meeting, Washington, DC, January (click here)

38. **Moreu, F.** (2008); "Young Structural Engineers Building Structures for the Poor"; Proceedings of the 17th Congress of IABSE (International Association for Bridge and Structural Engineering): "Creating and Renewing Urban Structures. Tall Buildings, Bridges and Infrastructure", Chicago, IL,

September (click here)

39. **Moreu, F.**, Nagayama, T., Zeman, J., Rus, G., Lee, S.Y., and Park, T. (2008); "Railroad Bridge Replacement in the US Today: Current Technology and Future Possibilities"; Proceedings of the Fourth International Conference on Bridge Maintenance, Safety and Management, IABMAS (International Association for Bridge Maintenance and Safety), Seoul, South Korea, July (click here)
40. **Moreu, F.** (2008); "Upgrading Railroads Infrastructure with Prestressed Concrete Bridges"; Proceedings of the 2008 Concrete Bridge Conference. HPC – Safe, Affordable and Efficient. NCBC (National Concrete Bridge Council), Saint Louis, MO, April
41. **Moreu, F.** and Nagayama, T. (2008); "Use of Wireless Sensors for Timber Trestle Railroad Bridges Health Monitoring Assessment"; ASCE Conf. Proc. 314, 36; Proceedings of the 2008 Structures Congress: Crossing Borders; DOI:10.1061/41016 (314) 36, April (click here)
42. **Moreu, F.** and Nagayama, T. (2007); "Possibilities of Using Sensing Technology For Railroad Bridges Maintenance and Repair"; Proceedings of the IABSE Symposium 'Improving Infrastructure Worldwide – Bringing People Closer'; Weimar, Germany, September 19-21. ISBN: 978-385748-116-1 (click here)
43. **Moreu, F.** (2007); "Building US Railroad Bridges Within Hours a.k.a. "Railroad Bridge Change-Outs"; Proceedings of the IABSE Symposium 'Improving Infrastructure Worldwide – Bringing People Closer'; Weimar, Germany, September 19-21. ISBN: 978-385748-116-1 (click here)
44. **Moreu, F.** (2007); "Consulting Engineering, Research and Innovation in Civil Engineering in the United Status. Potential Applications to Engineering Practice in Spain". Proceedings of the II Nacional Consulting Engineering Congress. Madrid, Spain. April 23, 24 [In Spanish]
45. **Moreu, F.** (2006); "Construction of a New 80'– 0" Steel Girder Span. Mile U5.6 Edgewood Subdivision, Cruse, IL"; Proceedings of the 7th International Conference on Short and Medium Span Bridges 2006, Montreal, Canada, August
46. **Moreu, F.** (2006); "New Memphis Super Terminal (MST) Intermodal Railroad. Bridge over Horn Lake Cut-off Ditch Design and Construction"; Proceedings of the 7th International Conference on Short and Medium Span Bridges 2006, Montreal, Canada, August
47. **Moreu, F**.; Gagnon, E.; Edwards, R. (2006); "Railroad Bridges in the Service of Society"; Fernando Moreu, Eric Gagnon, Riley Edwards. Proceedings of the 3rd National Congress of Civil Engineering, Zaragoza, Spain, October
48. **Moreu, F.** (2005); "Prestressed Concrete Railroad Bridges on Driven H-Piles: The Mile Bridge, KY (USA)"; Proceedings of the Structural Engineering Seminar 2004-2005. Seminario José Antonio García García. University of Granada (Spain), May

TECHNICAL REPORTS

1. **Moreu, F.**, Lippitt, C., & Yuan, X. (2020). Bridge Construction Monitoring using LIDAR for Quantified, Objective Quality-Control Quality-Assurance (QOQCQA). https://digitalcommons.lsu.edu/transet_pubs/76/
2. Spencer, B. F., Gomez, F., Park, J., Yoon, H., & **Moreu, F.** (2020). *Reference-Free Estimates of Railroad Bridge Displacement Under Revenue Service Traffic* (No. DOT/FRA/ORD-20/21). United States. Department of Transportation. Federal Railroad Administration.
3. Mascarenas, D. D. L., Harden, T. A., Morales Garcia, J. E., Boardman, B. L., Sosebee, E. M., Blackhart, C., **Moreu, F.**, ... & Dasari, S. R. (2019). Augmented Reality for Enabling Smart Nuclear

Infrastructure. *Frontiers in Built Environment*, *5*(LA-UR-18-30914).

4. **Moreu, F.**, Lippitt, C., Maharjan, D., Aguero, M., & Yuan, X. (2019). Augmented Reality Enhancing the Inspections of Transportation Infrastructure: Research, Education, and Industry Implementation. https://digitalcommons.lsu.edu/transet_pubs/55/
5. **Moreu, F.**, Wang, C., Yuan, X., Ghanbari, L., & Garrido, C. (2019). Strategies for Prioritizing Needs for Accelerated Construction after Hazard Events. https://digitalcommons.lsu.edu/transet_pubs/49/
6. **Moreu, F.**, Lippitt, C., Maharjan, D., Aguero, M., & Nasimi, R. (2018). Development, Training, Education, and Implementation of Low-Cost Sensing Technologies for Bridge Structural Health Monitoring (SHM). https://digitalcommons.lsu.edu/transet_pubs/16/
7. **Moreu, F.**, Kim, R., Mechitov, K., and Spencer Jr, B. F. (2016). *Railroad Bridge Monitoring Case Study: Little Calumet River Bridge*. Structural Health Monitoring Applications Case Studies Archive, Tufts University, School of Engineering, ASCE SEI (click here)
8. **Moreu, F.**, and Spencer Jr, B. F. (2015). *Framework for Consequence-based Management and Safety of Railroad Bridge Infrastructure Using Wireless Smart Sensors (WSS)*. Newmark Structural Engineering Laboratory. University of Illinois at Urbana-Champaign.
9. Spencer Jr, B. F., **Moreu, F.**, and Kim, R. E. (2015). *Campaign Monitoring of Railroad Bridges in High-Speed Rail Shared Corridors using Wireless Smart Sensors*. Newmark Structural Engineering Laboratory. University of Illinois at Urbana-Champaign.
10. **Moreu, F.** and LaFave, J. (2012); "Current Research Topics: Railroad Bridges and Structural Engineering"; Newmark Structural Engineering Laboratory (NSEL) Report Series 032; University of Illinois at Urbana-Champaign (UIUC), Urbana, IL (click here)

MAGAZINE ARTICLES

1. **Moreu, F.**, Nasimi, R., Taha, M.R, Garg, P., Basemera-Fitzpatrick, V., Mascarenas, D., Mullen, M. (2020) "Rail Safety IDEA Project 32: Drones and Lasers Enable Safe Railroad Bridges Operations" TR News, 326m pp 38-39. May.
2. **Moreu, F.** (2020); "Ralph B. Peck, PhD, PE, NAE, Hon.M.ASCE" *Geo-Strata —Geo Institute of ASCE*, 2020, Vol. 24, Issue 2, Pg. 16-18, 20-22, 24-27
3. **Moreu, F.** (2014); "China Ministry OKs Code for Structural Health Monitoring Systems for Large Bridges"; ASCE Technical Notes (October) (click here)
4. **Moreu, F.** and LaFave, J. (2011); "Survey of current research topics-Railroad Bridges and Structural Engineering"; Railway Track & Structures, September, pgs. 65-70 (click here)
5. **Moreu, F.** (2007); "Seminar by Martita Mullen in the Civil Engineering College at the University of Granada". The engineer's activity. "Young & Engineer". Revista de Obras Públicas. Number 3480. Colegio de Ingenieros de Caminos, Canales y Puertos. September [In Spanish] (click here)

BOOK CHAPTERS

1. **American Railway Engineering and Maintenance-of-way Association (AREMA)** (2022); Manual of Railroad Bridge Maintenance; Chapter in Railway Bridge Monitoring; several authors; (in preparation).
2. **World Scientific Publishing Company: Recent developments in structural health monitoring**

and assessment (2022); Chapter 14; "Augmented Reality for Cradle-to-Grave Infrastructure Monitoring, and Inspection"; Mascarenas, D.; **Moreu, F.**, Wyckoff, E., Mustari, S. (2022) (in review)

3. **American Society of Civil Engineering (ASCE), Engineering Mechanics Institute (EMI)** (2021); Manual of Objective Resilience; Chapter 4: Objective Resilience Monitoring for Railroad Systems; Flanigan, K.; Aguero, M.; Nasimi, R.; **Moreu, F.**; Lynch, J.; Ettouney, M. (in review)

BOOK

1. **Moreu, F.** (2001); Seismic Performance of the non-linear new element 08 for DRAIN-2DX, analysis software for non-linear elements under seismic demands; University of Granada, Granada (Spain) [In Spanish] (click here)

GUEST EDITOR

1. **Moreu, F.**; "Structural Sensing and Sustainable Infrastructure Maintenance"; Journal of Sustainability (Submission closes December 2021) (click here)
2. **Moreu, F.**, Noh, Haeyoung, Mascarenas, D., Zhang, P. "Understanding Human-Infrastructure Interactions: Context-Aware Structures and Interfaces", Frontiers in Built Environment, Structural Sensing, Control and Asset Management ((submission closed Spring 2020) (click here)

OTHER PUBLICATIONS

1.**Moreu, F.**, Noh, H. Y., Zhang, P., & Mascarenas, D. (2021). Editorial: Understanding Human-Infrastructure Interactions: Context-Aware Structures and Interfaces. *Frontiers in Built Environment*, *7*, 87. https://doi.org/10.3389/fbuil.2021.698620

2.Spencer Jr, B. F., **Moreu, F.**, and Kim, R. E. (2015). *Campaign Monitoring of Railroad Bridges in High-Speed Rail Shared Corridors using Wireless Smart Sensors*. Newmark Structural Engineering Laboratory. University of Illinois at Urbana-Champaign.

3. **Moreu, F.** and LaFave, J. (2012); "Current Research Topics: Railroad Bridges and Structural Engineering"; Newmark Structural Engineering Laboratory (NSEL) Report Series 032; University of Illinois at Urbana-Champaign (UIUC), Urbana, IL (click here)

OTHER PAPERS AND POSTERS PRESENTED AT PROFESSIONAL MEETINGS

1. Yuan, X.., Lippitt, C., & **Moreu, F.** (2021.) "LIDAR for rebar spacing determination using structural indexes" SHMII, Lisbon, Portugal (July 29) (presented in Zoom.)
2. **Moreu, F.**, "Augmented Human-Infrastructure Interfaces for Monitoring Critical Structures" Remote Sensing Techniques for Track Condition and Performance, Standing Committee on Railroad Track Structure System Design (AR050), TRB 99th Annual Meeting.
3. **Moreu, F.**, "Using Artificial Intelligence to Unlock the Hidden Value of Asset Management Data: Transforming Data into Advanced Decision Making". Panel Discussion: Transforming Data into Advanced Decision Making, TRB 99th Annual Meeting.
4. **Moreu, F.**, Nasimi, R. and Mullen, M. (2019); "3D Displacement Measurement of Railroad Bridges Using Drones: Implementation" AREMA annual Conference, Minneapolis, Minnesota, September 24, 2019.

5. Maharjan, D., Aguero, M., and **Moreu, F.** (2019) "Augmented Reality for Structural Inspections", Annual Structures Congress Conference of the American Society of Civil Engineers, Orlando, Florida (April).
6. **Moreu, F.** (2019) "Inspection of Bridges Using Augmented Reality", Annual Structures Congress Conference of the American Society of Civil Engineers, Orlando, Florida (April).
7. Maharjan, D., Garg, P., and **Moreu, F.** (2018) "Dynamic Displacement of Railroad Bridges Using UAV and Lasers", Annual Engineering Mechanics Institute Conference of the American Society of Civil Engineers, Massachusetts Institute of Technology (M.I.T.) Cambridge, Massachusetts (May).
8. Diaz, S., Garg, P., Aguero, M., and **Moreu, F.** (2018) "Dancing and Engineering: real-time visualization of data for dancers' performance", Annual Engineering Mechanics Institute Conference of the American Society of Civil Engineers, Massachusetts Institute of Technology (M.I.T.) Cambridge, Massachusetts (May.)
9. **Moreu, F.**, Mascarenas, D. (2018) "Human-infrastructure Interfaces using Augmented Reality", Annual Engineering Mechanics Institute Conference of the American Society of Civil Engineers, Massachusetts Institute of Technology (M.I.T.) Cambridge, Massachusetts (May.)
10. **Moreu, F.**, Ayorinde, E., Benjamin, (2018) "Selecting, Designing and Testing of Low-Cost Sensing of Commercial Space Launch Vehicles", Annual Engineering Mechanics Institute Conference of the American Society of Civil Engineers, Massachusetts Institute of Technology (M.I.T.) Cambridge, Massachusetts (May.)
11. **Moreu, F.**, Garg, P. (2018) "P18-20231 - Rail Safety IDEA Project 32: Railroad Bridge Inspections for Maintenance and Replacement Prioritization Using Unmanned Aerial Vehicles (UAVs) with Laser Scanning Capabilities" TRB 97th Annual Meeting (poster).
12. Garg, P., **Moreu, F.** (2018) "Railroad Bridge Inspections for Maintenance and Replacement Prioritization Using Unmanned Aerial Vehicles (UAVs) with Laser" TRB 97th Annual Meeting.
13. **Moreu, F.** Li, X. (2017); "New Chinese SHM code for large bridges monitoring and safety and USA implications" 7th International Conference on Experimental Vibration Analysis for Civil Engineering Structures, July 12-14. San Diego, University of San Diego, California.
14. **Moreu, F.** Ozdagli, Ali I.; Gomez, Jose A. (2017); "Total Reference-free Displacement of Bridges under Train Crossings" 2017 Rail Infrastructure and Vehicle Inspection Technology Conference. University of Illinois at Urbana-Champaign, June 20-21.
15. Bleck, B., **Moreu, F.** (2017); "New Augmented Reality for Change Detection of Railroad Infrastructure" 2017 Rail Infrastructure and Vehicle Inspection Technology Conference. University of Illinois at Urbana-Champaign, June 20-21.
16. **Moreu, F.**, Lynch, J., and Ettourney, M. (2017); "Objective Resiliency Framework for Ensuring Railroad Network Safety and Efficiency". American Society of Civil Engineers, Engineering Mechanics Institute Conference, June 4-7, 2017.
17. Bleck, B., Vemuganti, S., Farrar, C., Polli, A. & Mascarenas, D., **Moreu, F.** (2017). "Enhancing Structural Visual Inspection Using HoloLens". American Society of Civil Engineers, Engineering Mechanics Institute Conference, June 4-7, 2017.
18. **Moreu, F.**, Ozdagli, A.I., Gomez, J. "Experimental assessment of railroad bridge critical infrastructure

using shake tables". American Society of Civil Engineers, Engineering Mechanics Institute Conference, June 4-7, 2017.

19. **Moreu, F**., Garg, P., Vemuganti, S., Ozdagli, A., (2017) "Real-time Displacements of Railroad Bridges Under Train Crossing Events Using Non-contact Reference-free Vibrometers" Mini-symposium, chair, structural performance monitoring of railroad infrastructure, ASCE-SEI Annual Congress, Denver, Colorado, April 6-8.
20. **Moreu, F.**, Ayorinde, E., Mason, J., Mascarenas, D. "Remote Railroad Bridge Structural Tap Testing using Aerial Robots", Los Alamos Summer Symposium (winners of the student poster competition).
21. Vemuganti, S., Ozdagli, A., **Moreu F.**, Survey Bottom Surface Abrasion of Concrete Crossties, AREMA Annual Conference, Orlando, Florida (2nd place in the student competition).
22. **Moreu, F.**; Spencer, Jr., B. F.; Foutch, D. A.; and Scola, S. (2015); "Consequence-Based Management of Railroad Bridges"; 6th International Conference on Advances in Experimental Structural Engineering, 11th International Workshop on Advanced Smart Materials and Smart Structures Technology, University of Illinois, Urbana-Champaign, Urbana, Illinois. August 1-2
23. **Moreu, F.**, Li, J., Jo, H., Kim, R. E., Scola, S., Spencer Jr., B.F., LaFave, J.M. (2015); "Reference-free Displacements for Condition Assessment of Railroad Bridges"; 6th International Conference on Advances in Experimental Structural Engineering, 11th International Workshop on Advanced Smart Materials and Smart Structures Technology, University of Illinois, Urbana- Champaign, Urbana, Illinois. August 1-2
24. Kim, R. and **Moreu, F.** (2014): "Model Development and Identification for a Railroad Bridge using Wireless Smart Sensors"; Computational Science and Engineering Annual Meeting, National Center for Super Computer Applications (NCSA), Urbana, IL, April 7
25. **Moreu, F.** (2014): "Campaign Monitoring of Railroad Bridges using Wireless Smart Sensors: Past, Present, and Future"; EKS Research Retreat, Allerton Conference Center, University of Illinois, Monticello, IL, February
26. **Moreu, F.** (2013): "Structural Health Monitoring of Railroad Bridges"; EKS Research Retreat, Allerton Conference Center, University of Illinois, Monticello, IL, February
27. **Moreu, F.** and LaFave, J. M. (2012): "Wireless Sensing Technology to Enhance Safety and Reliability for Railroad Bridges"; Association of American Railroads (AAR) Annual Research Review, Pueblo, CO, March
28. **Moreu, F.** (2012): "Railroad Bridge Replacement Prioritization"; EKS Research Retreat, Allerton Conference Center, University of Illinois, Monticello, IL, February
29. **Moreu, F.** (2012); "Structural Health Monitoring of Timber Railroad Bridges"; AREMA Committee 10 meeting, Burlington, IA, June 18-20
30. **Moreu, F.** and LaFave, J. M. (2010): "Bridge Performance Assessment using Simplified Field Monitoring"; Association of American Railroads (AAR) Annual Research Review, Pueblo, CO, February

PATENTS

One patent awarded:

Moreu, F. & Taha, M. R. (2020). *U.S. Patent No. 10,641,898*. Washington, DC: U.S. Patent and Trademark Office.

Four patents under review and marketing:

1. **Moreu, F.**, Aguero, M., Maharjan, D. Rodriguez, P., Mascarenas, D. (2018);"Augmented Sensing for Real-time Inspections" (marketing)
2. **Moreu, F.**, Mascarenas, D. (2017); "Remote Structural Tap Testing using Aerial Robots"; (marketing)
3. **Moreu, F.**, Taha, M., Garg, P. (2016); "Assessing the condition of railroad bridges enabled by reference-free, non-contact displacement under revenue service train loads using Unmanned Aerial Vehicles (UAVs) and laser cameras" (marketing)
4. **Moreu, F.**, Taha, M., Chirstodoulou, C. (2016); "Assessing the condition of railroad bridges enabled by reference-free, non-contact displacement under revenue service train loads using Unmanned Aerial Vehicles (UAVs) and laser cameras" (marketing)

AWARDS AND HONOR SOCIETIES

UNM Department of Civil Engineering Stamm Excellence in Research	2021
ASCE EXCEED, Excellence in Civil Engineering Education	June 2-9 2019
UNM Department of Civil Engineering Stamm Excellence in Education	2019
Center for East Asian and Pacific Studies (CEAPS) Graduate Fellow	2014-2015
Foreign Language and Area Studies (FLAS) Graduate Fellow (click here)	Summer 2014
ASCE SEI Structures Congress Poster Selected as "Best of the Best Voting"	April 2012
Graduate College Dissertation Travel Grant, University of Illinois	2011-2012
Talentia Graduate Fellow, Spanish Government	2010-2011
O. H. Ammann Research Fellow, ASCE (click here)	2010
ASCE Young Engineer of the Year Award Central Illinois Section (click here)	2010
Spanish Society of Civil Engineers Young Engineer of the Year Award (click here)	2010
Max Zar Scholarship, Structural Engineering Foundation	Fall 2009
National Science Foundation (NSF) Scholarship	July 2009

STUDENTS AWARDS

AFRL Summer Outstanding Scholar Award, Elyjah Wyckoff (Graduate Student)	2021

Nationwide Solar Splash Student competition (3rd place), Jennifer Restrepo (Graduate Student) 2021

ASCE EMI, SHM Paper Competition (2nd place), Roya Nasimi (Graduate Student) 2020

Sandia National Lab Critical Skills Part-Time Program, Angela Montoya (Graduate Student) 2020

AFRL Summer Outstanding Scholar Award, Maimuna Hossain (Graduate Student) 2019

OTHER RECOGNITIONS

Guest speaker at UNM Lighting Round Fall 2020

Guest speaker at SOE Engineering in Action (LoboDrome Proposal) (click here) Fall 2020
TV link (click here)

First Smart Management of Infrastructure Laboratory (click here) Summer 2020

PROFESSIONAL SERVICE

UNM, School of Engineering

- Mentor of 2-3 minority students each summer supported by Engineering Student Success Center (ESSC) (2019- present)
- World Engineering Deans Conference, Civil Engineering Research, booth, November 13, 2018.
- Coordinator, Shake Out day, October 18, 2018.
- Congressional Challenge, Design an App, expert panel at Explora, October 13th 2017.
- Dean Search committee, member (October 2016-January 2017.)

UNM, Prince of Asturias Chair Endowment

- Advisory Board, member (December 2015- present.)

UNM, Department of Civil, Construction and Environmental Engineering

- One new faculty search committee, member (August 2020- March 2021.)
- Four new faculty search committee, member (August 2019 –March 2020.)
- Structures faculty search committee, member (August 2018-March 2019.)
- Structures Area: faculty coordinator
- Graduate Committee, member (August 2015- present.)
- Graduate recruitment week: organized CCEE seminar and tours for prospective CCEE applicants.
- Collaborate with CE160 with lectures, or those of my graduate students and postdocs (since 2020.)
- American Society of Civil Engineers (ASCE) student chapter, faculty mentor (August 2021-present)
- Earthquake Engineering Research Institute (EERI) student chapter, faculty mentor: organized seminars including: Dr. Nakai and the Fukushima Daiichi Nuclear Plant (click here)

UNM, Outreach

- Summer Transportation Institute 2016 to present (click here)
- Smart Management of Infrastructure Summer Camp, 2016 to present (click here)
- Visiting local high school and middle schools throughout the year (two-three per semester.)
- Mentoring 1-2 high school students throughout the year for their senior project (2016-present.)
- UNM SOE Booth at the 7th World Conference on Structural Control and Monitoring (WCSCM), Qingdao, China, July 22-25 2018.
- UNM SOE Engineering Open House 2015 to present.

Symposium/Session Chair

- Session chair, Mini-symposium, "Machine Learning and Hybrid Simulation for Civil Infrastructure", Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology, San Diego, CA, September 26-29, 2021.
- Session chair, Mini-symposium, "Computer Vision and Structural Health Monitoring", ASCE-EMI Annual Conference, Columbia, NY, May 25-28 2021.
- Session chair, Mini-symposium, "Augmented Reality and Human-structure Interfaces", ASCE-EMI Annual Conference, Columbia, NY, May 25-28 2021.
- Session chair, Session Civil Engineering SHM, International Modal Analysis Conference, February 8-11, 2021.
- Fall Conference Structures Chair; ASCE New Mexico Fall Conference, Socorro, NM. October 18, 2019.
- Session Chair, "Augmented Reality and Structural Health Monitoring" International Workshop in Structural Health Monitoring, Stanford, CA, September 10-12 2019.
- Session Chair; Mini-symposium, "human and structures interfaces and machine learning", ASCE-EMI Annual Conferences, Pasadena, CA, June 18-21 2019.
- Session Chair; Industry Applications of SHM; 9th International Conference on Structural Health Monitoring of Intelligent Structures", Saint Louis, MO. August 4-7, 2019.
- Session chair, Mini-symposium, "Human-structures interfaces", ASCE-EMI Annual Conference, Boston, MA, May 27-30 2018.
- Session chair, Innovation in displacement measurement: 3rd Huixian International Forum on Earthquake Engineering for Young Researchers. Champaign, Illinois, August 11-12, 2017.
- Session chair, 7th International Conference on Experimental Vibration Analysis for Civil Engineering Structures, July 12-14, 2017. San Diego, University of San Diego, California.
- Session chair: Panel review, structural performance monitoring of railroad infrastructure: an stakeholder point of view, ASCE-SEI Annual Congress, Fort Worth, Texas, April 19-21 2018.
- Mini-symposium, chair, structural performance monitoring of railroad infrastructure, ASCE-SEI Annual Congress, Denver, Colorado, April 6-8 2017.

- Mini-symposium, chair, structural health monitoring for bridges, European Workshop for Structural Health Monitoring, Bilbao, Spain, July 7, 2016.
- Mini-symposium, co-chair, structural health monitoring, 6th International Conference on Advances in Experimental Structural Engineering, 11th International Workshop on Advanced Smart Materials and Smart Structures Technology, University of Illinois, Urbana-Champaign, Urbana, Illinois. August 1-2, 2015.
- Mini-symposium, co-chair, afternoon session, EKS retreat, Allerton Park Retreat Center, Monticello, IL, February 1-2 2014.
- Chairman, Second Meeting of Civil Engineers from Spain in the US, Illini Center, Chicago, IL November 10-11, 2012.
- Chairman, First Meeting of Civil Engineers from Spain in the US, Urbana Country Club, Urbana, IL, April 27, 2012.

Professional committee memberships:

- ASCE-SEI Structural Health Monitoring and System Identification Committee.
- UAS/Remote Sensing Cluster of the NM CRDC.
- NU Rail faculty member representative (UNM.)
- AREMA Committee 7: Guest participant on railroad steel bridge design and rating committees.
- AREMA Committee 10: Construction, Management and Maintenance of Railroad Bridges.
- AREMA Committee 10, Research and Advancement Subcommittee: Assistant to the Chairman.

Technical reviewer for (in the last two years):

- Journal of Structural Health Monitoring.
- Journal of Mechanical Systems and System Processing.
- Journal of Measurement.
- Journal of Building Engineering.
- Journal of Computer-Aided Civil and Infrastructure Engineering.
- Journal of Civil Structural Health Monitoring.
- Journal of Vibration and Acoustics (ASME.)
- Journal of Sensors.
- Journal of Engineering Computations.
- Journal of Vibration and Control.
- Journal of Control and Health Monitoring.
- Journal of Smart Structures and Systems.
- Journal of Performance of Constructed Facilities, ASCE.
- Journal of Bridge Engineering, ASCE.
- Journal of Engineering Structures, ASCE.

- Journal of Engineering Mechanics, ASCE.

Service at professional venues:

- American Society of Civil Engineers, Engineering Mechanics Institute, EMI Structural Control and Health Monitoring Committee Student Competition (SCHM-SC) 2021. Sponsored by: The EMI Structural Control and Health Monitoring Committee. Student paper competition, chair (June 2020-May 2021.)
- Fall Conference Chair and Masters of Ceremonies; ASCE New Mexico Fall Conference, Albuquerque, NM. October 16, 2020 (Zoom, over 100 participants.)
- AREMA Committee 10: Construction, Management and Maintenance of Railroad Bridges. Spring 2020 National Meeting, Host at UNM SOE (supported by CCEE Department) (30 attendants from railroad industry hosted in Stamm Room for 1 day.)
- American Society of Civil Engineers Fly-In: Representing New Mexico with the Legislators at Washington DC, March 12-13, 2019.
- Super STEM AFRL Outreach, Smart Sensors and Technology Booth (February 23rd 2019.)
- Fall Conference Chair and Masters of Ceremonies; ASCE New Mexico Fall Conference, Albuquerque, NM. September 28, 2018 (in person, over 100 participants.)
- Technical reviewer of multiple programs and panel reviews at the National Science Foundation related to the core research areas of Cyber-Physical Systems, Civil Infrastructure Monitoring, and Controls (2017 to present.)
- American Society of Civil Engineers, Engineering Mechanics Institute, EMI Objective Resilience Committee Student Competition (ORC-SC) 2017. Sponsored by: The EMI Objective Resilience Committee (ORC.) Student best-paper competition, judge (June 2017.)
- American Society of Civil Engineers State Leaders: Representing New Mexico with ASCE Headquarters for leadership positions, meeting at Washington DC, June 13, 2017.
- American Society of Civil Engineers Fly-In: Representing New Mexico with the Legislators at Washington DC, March 13-14, 2017.
- American Society of Civil Engineers Fly-In: Representing New Mexico with the Legislators at Washington DC, March 14-18, 2016.
- Fulbright Scholarship Candidates Interview Committee, University of Illinois at Urbana-Champaign, September 2014.
- Delegate of the Spanish Society of Civil Engineers, International Meeting with Board of Directors, ASCE Annual Conference, Charlotte, NC, October 15-17, 2013.
- Delegate of the Spanish Society of Civil Engineers, International Agreement with the Canadian Society of Civil Engineers (CSCE), International Heritage Landmark in Civil Engineering, Niagara Falls, ON (Canada), September 28-30, 2010.
- Host from the Spanish Society of Civil Engineers to Stefan Jaeger (ASCE), ASCE 2025 Vision presentation to the Spanish Civil Engineering Associations, Madrid (Spain) June 21-23, 2010.
- Delegate of the Spanish Society of Civil Engineers, International Heritage Landmark in Civil

Engineering, with ASCE President Blaine Leonard and Washington State Governor Christine Gregoire, Port Townsend, WA (US), April 20-23, 2010 (click here)

INVITED WORKSHOP PARTICIPATION

1. Transportation Research Board (2020) Artificial Intelligence for Infrastructure Management, 99th Annual TRB Conference, Washington DC, January.
2. Resilience Infrastructure, Universidad de Sonora, Mexico, Hermosillo, Mexico, November 23-27, 2019.
3. TRANSET Webinar Series: "Innovative Technology, Techniques, and Processes in Transportation Infrastructure Inspection" (Section 2): "Augmented Reality for Infrastructure Inspections" September 26.
4. TRANSET Webinar Series: "Innovative Technology, Techniques, and Processes in Transportation Infrastructure Inspection" (Section 1): "Cyber Physical Systems for Maintenance of Critical Infrastruture", June 27.
5. Artificial Intelligence and Machine Learning for Civil Infrastructure; South East University, Nanjing, China, September 4-6, 2019.
6. National Science Foundation, funded workshop, NSF ENG CAREER Workshop, Arlington, VA, April 1-2, 2019.
7. National Science Foundation, funded workshop, Aspiring PI CPS Workshop, Arlington, VA, August 3-4, 2017.
8. National Science Foundation -funded workshop NHERI@UC San Diego User Training Workshop, Dec 12-13, 2016.
9. National Science Foundation -funded workshop NHERI Wall of Wind Experimental Facility User Workshop, November 18, 2016.
10. National Science Foundation NSF-funded workshop on teaching 'structural art', University of Massachusetts (UMass Amherst), June 13-14 2016.
11. Young Researchers Symposium in Earthquake Engineering, Chinese Earthquake Administration, Institute of Engineering Mechanics. August 17-18 2016.
12. New Mexico Collaborative Research and Development Council, February 26th 2016, Albuquerque, New Mexico." Unmanned Aerial Systems (UAS) and Remote Sensing (RS) Cluster."
13. New Mexico Collaborative Research and Development Council, December 11th 2015, Santa Ana Pueblo, New Mexico." Unmanned Aerial Systems (UAS) and Remote Sensing (RS) Cluster."
14. Bridge Weigh-in-Motion (BWIM); University of Connecticut, FHWA and Connecticut Department of Transportation, Storrs, CT, October 26-27, 2015.
15. UNM COSMIAC Region Technical Workforce Study, Albuquerque, NM. September 18, 2015.

INVITED ORAL PRESENTATIONS / TECHNICAL SEMINARS

1. "New Human-Infrastructure Solutions for Augmented Inspection and Maintenance of Structures" HNTB Technology Group, August 27th

2. "Augmented Reality Enabling New Human-Infrastructure Interfaces" IABMAS International Society, July 21st, 2021.
3. "The Future of Work for Resilient Management of Disasters"; Department of Civil and Environmental Engineering. Florida State University, Tallahassee, FL, May 24th 2021.
4. "Human-Infrastructure Interfaces for Critical Infrastructure and Disasters"; Department of Civil and Environmental Engineering. Florida State University, Tallahassee, FL, November 8, 2019.
5. "Human-Infrastructure Interfaces for Engineering Inspections"; Department of Civil and Environmental Engineering. University of Minnesota, Minneapolis, September 23, 2019.
6. "Structural Health Monitoring of Civil Infrastructure"; Southern East University, Department of Civil Engineering, Nanjing, China, September 6th 2019.
7. "Augmented Reality for Structural Health Monitoring"; APEES 2019 Summer School, University of La Sapienza, Rome, Italy, July 31st 2019.
8. "Structural Health Monitoring New Technologies and Paradigms"; American Institute of Aeronautics and Astronautics NM Chapter; April 19, 2019.
9. "Human-Infrastructure Interfaces and Augmented Reality"; Department of Civil, Environmental and Infrastructure Engineering, Mason University, April 4th 2019, Fairfax, VA.
10. "Augmented Reality for Transportation Infrastructure"; 56th Pavement and Transportation Conference, UNM and NMDOT, January 10, 2019, Albuquerque, NM.
11. "Structural Dynamics and Structural Health Monitoring." Yangzhou University, China. November 18-22, 2018.
12. "Human-Infrastructure Interfaces for Civil Engineering", September 19th 2018. Department of Civil and Environmental Engineering. University of Michigan, Ann Arbor, MI.
13. "Structural Health Monitoring of Critical Infrastructure", July 26th 2018. Nanjing Forestry University and South East University, Nanjing, China.
14. "Advanced Systems for Infrastructure Inspection through Machine Learning, Artificial Intelligence, and Augmented Reality", May 29th, 2018. Tuffs University, Department of Civil and Environmental Engineering, Boston, Massachusetts.
15. "Protection of bridge spans against lateral impact by truck vehicles" (2018) TRB Subcommittee AHD 35(1) Safety and Security of Bridges and Structures, January 9, TRB 97th Annual Meeting, Washington DC.
16. "Augmented Reality Tools for Enhanced Structural Inspections" Committee AFF40 "Testing and Evaluation of Transportation Structures", January 9, TRB 97th Annual Meeting, Washington DC.
17. "Wireless Smart Sensors for Structural Health Monitoring". Department of Civil and Environmental Engineering, Institute of Disaster Prevention, Yanjiao, Hefei Province, China. December 29, 2017.
18. "Advanced Sensing for Structural Safety, Smart Cities, and Connected Communities". Institute of Engineering Mechanics, Chinese Earthquake Administration. Yanjiao, Hefei Province, China. November 20-25, 2017.
19. "Augmented Sensing and Augmented Reality for Structural Health Monitoring". Department of Civil and Environmental Engineering, Institute of Disaster Prevention, Yanjiao, Hefei Province, China. November 24, 2017.
20. New Mexico Society of Professional Engineers; November 10, 2017; Albuquerque, New Mexico; "2017 NMSPE Issues Conference"
21. STEM: SIPI Community College, Albuquerque. "Augmented Reality and Low-cost sensors for

Infrastructure", November 2nd 2017 (20 students).

22. STEM: CNM, Albuquerque. "Structural Health Monitoring for Transportation Infrastructure and engineering studies." Both class seminar and laboratory demonstration.
23. BD Spokes: PLANNING: MIDWEST: Big Data Innovations for Bridge Health: Omaha, Nebraska: "Using Unmanned Aerial Systems (UAS) with Lasers to Assess Structural Performance", October 4th, 2017.
24. STEM: Menaul School, Albuquerque. "Augmented Reality for Safer Infrastructure", September 5th (200 students).
25. Department of Civil and Environmental Engineering, University of Omaha, Nebraska: "Structural Health Monitoring of Railroad Bridges", July 31st, 2017.
26. Department of Civil Engineering, Lanzhou University of Technology, Lanzhou, Gansu Province, China. Wireless Smart Sensors for Structural Health Monitoring. July 20, 2017.
27. STEAM: Dream Builders at the National Hispanic Cultural Center; Augmented Reality for the Future Engineers; April 13, 2017.
28. Native American Community Academy; Technology and Engineering Applications Using Augmented Reality; March 27, 2017.
29. Transportation Research Board Committee AFF40 Nugget Presentation: Railroad Bridge Monitoring and Inspection under Live Loads: Current State of the Art and Future Trends; Washington DC, January 11, 2017.
30. American Society of Civil Engineers, Engineering of Mechanics Institute, Objective Resilience Group: Performance Monitoring of Railroad Infrastructure; Washington DC, January 10, 2017.
31. New Mexico Department of Transportation (NMDOT) Annual Transportation and Paving Conference: "Consequence-based management of complex bridge networks using wireless smart sensors"; January 5, 2017.
32. New Mexico Tech, Department of Mechanical Engineering (seminar): "Cost-effective Remote Sensing and Rating of Critical Infrastructure", October 4, 2016.
33. University of Tennessee at Knoxville, Department of Civil and Environmental Engineering (seminar); "Structural Health Monitoring of Railroad Bridges in North America" May 27, 2016
34. American Society of Civil Engineers, Engineering Mechanics Institute (EMI); "wireless smart sensors monitoring railroad bridge networks" Annual Conference, Nashville, Tennessee, May 23-26.
35. American Society of Civil Engineers New Mexico Section Annual Conference, Socorro, New Mexico, April 29, 2016;" Consequence-based Monitoring of Infrastructure for Decision-making"
36. University of Kansas, Department of Civil, Environmental and Architectural Engineering (seminar), April 15, 2016; "Structural Health Monitoring Using Wireless Smart Sensors (WSSs): Performance Assessment and Decision Tools Applications"
37. University of New Mexico, Department of Mechanical Engineering (seminar); March 25, 2016; Albuquerque, New Mexico; "Hybrid Sensing for Structural Health Monitoring"
38. New Mexico Collaborative Research and Development Council, February 26, 2016, Albuquerque, New Mexico. Unmanned Aerial Systems (UAS) and Remote Sensing (RS) Cluster. "UNM Research Opportunities for UAS and Infrastructure Consequence-Based Assessment"
39. American Society of Civil Engineers, Annual Structural Congress, February 17, 2016, Phoenix,

Arizona; Committee in System Identification; Southwest panel in Structural Health Monitoring, representing UNM: "SHM in the Southwest: State of the Art and Future Opportunities"

40. University of New Mexico. Department of Civil Engineering Graduate Seminar; February 3, 2016; "Structural Health Monitoring Using Wireless Smart Sensors"
41. Computational Sustainability at the University of New Mexico (guest lecturer); November 16, 2015; Albuquerque, New Mexico; "Wireless Smart Sensors for Structural Health Monitoring"
42. New Mexico Society of Professional Engineers; November 13, 2015; Albuquerque, New Mexico; "2015 NMSPE Issues Conference"
43. West Point US Military Academy; October 28; "Railroad Bridge Maintenance, Repairs, and Replacement Prioritization Using Wireless Smart Sensors"
44. Department of Civil and Environmental Engineering, University of Arizona, October 23, 2015; Tucson, Arizona; "Management of Railroad Bridges Using Wireless Smart Sensors"
45. Department of Civil Engineering, University of New Mexico, March 26, 2015; "Critical Infrastructure Management using Wireless Smart Sensors"
46. Institute of Disaster Prevention, Beijing (China), August 4, 2014: "Structural Health Monitoring (SHM) of Railroad Bridges"
47. Institute of Engineering Mechanics, China Earthquake Administration, Harbin (China), July 14, 2014: "Structural Health Monitoring (SHM) for Railroad Bridges using Wireless Smart Sensor (WSSs) in North America"
48. Department of Transportation Engineering, Harbin Institute of Technology (HIT), Harbin (China), July 9, 2014: "Railroad Bridges Replacement Projects in North America (Change Outs): Why, What, and How?"
49. Department of Civil Engineering, Northeast Forestry University, Harbin (China), July 7, 2014: "New Smart Technologies for Safely Designing and Maintaining Civil Engineering Structures: The Illinois Approach" (click here)
50. Department of Civil Engineering, Harbin Institute of Technology, Harbin (China), July 4, 2014: "Campaign Monitoring of Railroad Bridges using Wireless Smart Sensors: Past, Present, and Future" (click here)
51. Society of Civil Engineers of Spain, Granada (Spain), December 30, 2011: "Civil Engineering Professional Developments in United States"
52. University of Granada and Society of Civil Engineers of Spain, Granada, Spain, December 30, 2010: "Civil Engineering Education in United States"
53. Engineering Week, LaSalle Bajío University, León (Mexico), Teleconference, October 12, 2010: "Young and Engineer: Is there any Future?"
54. Institute of Engineering Mechanics, China Earthquake Administration, Beijing (China), August 2, 2010: "Railroad Bridges and Structural Health Monitoring"
55. Employment Fair Expo, University of Granada, Granada (Spain), May 20, 2010: "Engineering Education in the Global Market"
56. Maintenance of Way Club of Chicago, Chicago, IL, January 18, 2010: "Railroad Bridges Maintenance"
57. Department of Structural Engineering and Mechanics, University of Granada, Granada (Spain),

January 12, 2010: “Railroad Bridges and Structural Health Monitoring”

58. Society of Civil Engineers of Spain, Granada (Spain), December 31, 2009: “Young & Engineering, the American Experience”
59. ASCE Eastern Illinois Professional Chapter, Champaign, IL, December 15, 2009: “Railroad Bridges in the US inspection, maintenance and management”
60. Institute of Engineering Mechanics, China Earthquake Administration (Harbin, China), August 6, 2007: “US Midwest bridges and other structures”
61. Bridges and Structures Laboratory, Department of Civil Engineering, University of Tokyo, Tokyo (Japan), August 2, 2007: “Bridges Connecting Society”
62. Department of Civil and Environmental Engineering, Christian Brothers University, Memphis, TN, March 2007: “Structural Engineering: Projects and Examples”
63. Ecole Nationale des Ponts et Chaussées, Paris (France), May 2006: “USA railroad intermodal facilities”
64. Maintenance of Way Club of Chicago, Chicago, IL, May 2006: “Edgewood Railroad Bridge Design and Construction Particularities”
65. ASCE student chapter, Civil Engineering Department, Santa Clara University, Santa Clara, CA, May 2005: “Midwest Structures Design and Construction”
66. Department of Structural Engineering and Mechanics, University of Granada, Granada (Spain), December 2004: “Prestressed Concrete Railroad Bridges on Driven H-piles: The Mile Bridge, Ky (USA)”
67. Bridges and Structures Laboratory, Department of Civil Engineering, University of Tokyo, Tokyo (Japan), May 2004: “USA Structures throughout their Design”

WORKSHOP PARTICIPATION

- National Science Foundation, NHERI RAPID Worskshop for Users, Seattle, Washington, July 26-30, 2021 (24 selected participants.)
- Workshop in Augmented Reality for Bridge Inspection, March 1st 2019, Albuquerque, New Mexico, for NMDOT Bridge Inspectors (15 attendees) (instructor and host)
- Presenter/coordinator: AFRL Technological Showcase for Industry and National Laboratories, February 28th 2018 (over 100 attendees), STC UNM, Albuquerque, NM
- Workshop in Augmented Sensing of Critical Energy and Industrial Facilities, May 9th 2018, Albuquerque, New Mexico, for Electric Power Research Institute (EPRI) (45 attendees) (instructor and host)
- Workshop in industry acceptance of new technologies in decisions, April 18th, ASCE SEI, Forth Worth, Texas (25 attendees) (instructor and host)
- Workshop in low-costs sensors, human-machine interfaces, machine learning, International Modal Analysis Conference (IMAC), Orlando, Florida, February 10, 2018 (12 attendees) (instructor and host).
- Workshop on Cyber-Physical Co-Design of Wireless Monitoring and Control for Civil Infrastructure, Thomas M. Siebel Center for Computer Science, University of Illinois, Urbana, IL,

February 17-18 2011

- Interactive Workshop on Bridge Inspection and Rating, University of Illinois, Urbana, IL, February 24, 2010
- Design of Deep Foundations, Ensoft, Inc. Austin, TX, November 11-13, 2003.
- Bridge Construction Inspection, Technology Transfer Program, Illinois Department of Transportation (IDOT), 2003.

OTHER MENTORING / CERTIFICATION

Air Force Research Laboratory 2019, 2020,2021
Albuquerque, New Mexico Faculty Mentor

- Collaborated with the AFRL Scholars Program as a lead faculty mentor for three students (PhD, Undergraduate, and Community College Levels.)
- Developed the research project and coordinated with external industry throughout the project.
- Selected students to participate in the project.

Sandia National Laboratory 2016, 2020
Albuquerque, New Mexico Faculty Mentor

- Collaborated with the Non Linear Mechanics and Dynamics (NOMAD) as faculty mentor.
- Developed the research project and coordinated with external industry throughout the project.
- Selected students to participate in the project.

Professional Development Certificate May 2015
Department of Civil and Environmental Engineering University of Illinois at Urbana-Champaign

- Three years program.
- Assisting senior undergraduate students and junior graduate students to grow academically and professionally through mentoring.
- Involves at least meeting once a month to monitor students' progress towards their academic program.
- Includes regular service to the community through regular service hours.

Certificate in Foundations of Teaching April 2015
Center for Innovation in Teaching and Learning (CITL)
University of Illinois at Urbana-Champaign

- Attending and evaluating the teaching of a professor and discussing teaching methodology after the lecture.
- Reading one textbook about teaching philosophy and presenting results to a consultant in teaching.
- Attending more than 8 hours of workshops in teaching
- Preparing teaching materials for a large audience of students, being evaluated by a teaching consultant, and receiving feedback and implementing lessons learned for a second lecture.

PROFESSIONAL MEMBERSHIP

- American Society of Mechanical Engineers (ASME.)
- ASME Structural Engineering Mechanics (SEM.)
- American Railway Engineering and Maintenance-of-Way Association (AREMA.)
- American Society of Civil Engineers (ASCE.)
- ASCE NM Section; Chair of structures at the New Mexico Section.
- ASCE Engineering Mechanics Institute (EMI.)
- National Society of Professional Engineers (NSPE.)
- Transportation Research Board (TRB.)
- New Mexico Society of Professional Engineers (NMSPE.)
- Chi Epsilon, Civil Engineering Honor Society.

GRANTS, CONTRACTS

Extramural funded grants and projects to date at UNM (all awarded), total: $5,399,296.

(PI in all projects unless noted otherwise)

1. Federal Railway Administration BAA; Research Initiatives in Support of Making Railroading a Career of Choice: "The Railroader of the Mid-Century". (Co-PI Haeyoung Noh, Stanford University, and Sungmoon Jung, Florida State University) (September 23, 2021-September 22, 2024) ($475,375.)
2. National Science Foundation; SCC-CIVIC-FA Track B: Low-Cost Efficient Wireless Intelligent Sensors (LEWIS) for Greater Preparedness and Resilience to Post-Wildfire Flooding in Native American Communities (Co-PI: Mark Stone, CCEE; Su Zhang, EDAC; Yolanda Lin, Geography; Carolyn Hushman, Educational Psychology.) (October 15, 2021-October 14, 2022) ($1,000,000.)
3. Office of Naval Research, "Measuring Damage Outdoors while Flying (MDOF)" (September 13, 2021- September 12, 2022) (Co-PI Rafael Fierro) ($425,365.)
4. National Science Foundation (PI: Rebekah Napolitano, PSU), "Collaborative Research: HDR DSC: Infusing community-centered data science into undergraduate engineering curricula"; (October 1st 2021-September 30th 2024.) ($130,000.)
5. Sandia National Laboratories; Sandia UNM ENGR 2019 NMSBA; "Wearable Fall Protection Sensor Market Feasibility"; (August 20th 2021-December 31st 2021) ($8,500.)
6. Department of Energy (Florida International University, PI): MSIPP WIPP: "Time Machine for underground inspection using Augmented Reality"; (October 1st 2021 -September 30th 2022) (Co-PI John Stormont) ($75,000.)
7. Tran-SET Program, Louisiana State University U.S. Department of Transportation (USDOT), "TranSET 5: Increasing Bridge Durability and Service Life with LIDAR Enhanced Unmanned Aerial Systems (UAS)", (Co-PI Chris Lippitt, Geography) (August 2021-February 2023) ($100,000.)
8. Department of Energy BENEFIT (PI: Rebekah Napolitano, PSU): (July 1st 2021 -June 30th 2023) ($12,500.)

9. Tetra Tech Inc.: “Crash Beam Attenuation”; (March 23th 2021– October 31st 2021) ($40,657.)

10. National Science Foundation; SCC-CIVIC-PG Track B: Low-Cost Efficient Wireless Intelligent Sensors (LEWIS) for Greater Preparedness and Resilience to Post-Wildfire Flooding in Native American Communities (Co-PI: Mark Stone, CCEE; Su Zhang, EDAC; Yolanda Lin, Geography; Carolyn Hushman, Educational Psychology.) (January 15, 2021-June 30 2021) ($50,000.)

11. National Academy of Sciences, NCHRP IDEA (University of Kansas): “Fatigue crack monitoring using AR” (February 1st 2021-January 31st 2023.) ($60,000.)

12. Federal Railway Administration BAA; Research Initiatives in Support of Rail Safety; FRA-HF-004, Research Initiatives in Support of Rail Safety: “Automation and the Human-Machine Interface” (Co-PI Victor Law, OILS) (July 1, 2020-June 30 2021) ($209,258.)

13. National Academy of Sciences, Transportation Research Board (TRB) IDEA Safety: “Augmenting Reality for Safer Inspections of Railroad Infrastructure and Operations” (Co-PI Victor Law, OILS) (January 2021-November 2022) ($99,000.)

14. National Aeronautics and Space Administration (NASA) and New Mexico Space Grant Consortium (NMSGC); “Safe and Augmented Human-Robotic Interaction for Space (SAHRIS)." (April 8, 2020-February 28, 2021) ($30,000.)

15. Office of Naval Research; “Engaging University of New Mexico ROTC Cadets in Cybersecurity Research” (Co-PI Francesco Sorrentino, ME) (January 1, 2020-December 31, 2021) ($500,000.)

16. New Mexico Consortium, Los Alamos National Laboratory “Cybersecurity of Cyber-physical Systems Using Wireless Smart Sensors” (Fall 2020-Fall 2021) ($32,824.)

17. Air Force Research Laboratory: “Agile Manufacturing for High Value, Low Volume Production” (PI Rafael Fierro, ECE) (April 2018-April 2023) ($194,891 allocated to date.)

18. Tran-SET Program, Louisiana State University U.S. Department of Transportation (USDOT), “20GTUNM31 - An automated system for inspecting rock faces and detecting potential rock falls using machine learning” (PI John Stormont, CCEE) (Summer 2020-Fall 2021) ($100,000.)

19. Tran-SET Program, Louisiana State University U.S. Department of Transportation (USDOT), "20STUNM04 - Bridge Cracks Monitoring: Detection, Measurement, and Comparison using Augmented Reality ", Summer 2020-Fall 2021 ($120,000.)

20. National Academy of Sciences, Transportation Research Board (TRB) IDEA Safety: “Measuring Behavior of Railroad Bridges under Revenue Traffic using Lasers and Unmanned Aerial Vehicles (UAVs) for Safer Operations: Implementation” (Nov 2018-August 2020) ($99,187.)

21. Sandia National Laboratories, “Investigation of the Multi-Input Dynamic Testing” (October 2018-present) ($840,000 allocated to date.)

22. Sandia National Laboratories, “Control of Nonlinear Dynamical Structures under Extreme Normal Environments” (October 2019-September 2022) ($220,500.)

23. New Mexico Consortium, Los Alamos National Laboratory “Smart management of infrastructure using human-infrastructure interfaces” (Spring 2019-Spring 2020) ($47,590.)

24. Tran-SET Program, Louisiana State University U.S. Department of Transportation (USDOT), “TranSET 3: Bridge Construction Monitoring using LIDAR for Quantified, Objective Quality-Control Quality-Assurance (QOQCQA)”, (Co-PI Chris Lippitt, Geography) (Summer 2019-Spring

2021) ($120,000.)

25. Tran-SET Program, Louisiana State University U.S. Department of Transportation (USDOT), "TranSET 2: Strategies for Prioritizing Needs for Accelerated Construction after Hazard Events", (PI Vanessa Valentin) (Spring 2018-Summer 2019) ($50,000.)
26. Los Alamos County, "Augmented inspection to assist existing design and maintenance of infrastructure" (Summer 2017-Spring 2020) ($65,000.)
27. Los Alamos National Laboratory, "Augmented Reality for inspections" (May 2018-September 2018) ($81,318.)
28. New Mexico Consortium, Los Alamos National Laboratory "Augmenting Human Assessment of Infrastructures Performance Through New Technologies" (Spring 2017-Spring 2018) ($31,944.)
29. Tran-SET Program, Louisiana State University U.S. Department of Transportation (USDOT), "Tran-SET 17STUNM02: Development, Training, Education, and Implementation of Low-cost Sensing Technologies for Bridge Structural Health Monitoring (SHM)", (Co-PI Chris Lippitt, Geography) (Summer 2017-Fall 2018) ($150,000.)
30. National Aeronautics and Space Administration (NASA) and New Mexico Space Grant Consortium (NMSGC); "Structural Performance Monitoring Using Wireless Sensors (WSW) for Cost-Efficient Management and Development of Commercial Space Vehicles" (Spring 2017- Spring 2018) ($25,000.)
31. National Academy of Sciences, Transportation Research Board (TRB) IDEA Safety: "Railroad Bridge Inspections for Replacement Prioritization Using Unmanned Aerial Vehicles (UAVs) with 3D Laser Scanning Capabilities" (Co-PI Mahmoud Taha, CCEE) (November 2016-March 2018) ($99,400.)
32. New Mexico Consortium, Los Alamos National Laboratory "Ensuring the Sustainability and Resilience of Timber Bridge Railroad Infrastructure Using Remotely Deployed Sensor Nodes", Summer 2016 ($38,811.)

Internally funded grants and projects to date at UNM (all awarded), <u>total: $120,831.36</u>.

1. Fall 2021 Program for Enhancing Research Capacity (PERC): Light Detection and Ranging (LiDAR) for Terrain and Vegetation analysis; PI Chris Lippitt, Co-PI Moreu ($35,931.36)
2. UNM Summer 2021 WeR1 Investing in Faculty Success Program: PhD support ($4,400.)
3. OVPR UNM Sandia Alliance, LDRD-ACORN: "Nonlinear Dynamic Vibrations Instrumentation"; (December 2020) ($40,000).
4. Department of Civil Engineering at UNM, Major Teaching Instrumentation (MTI) Proposal, "Shake Table repair" Spring 2017 ($30,000.)
5. UNM Center for Teaching Excellence. Teaching Allocation Grant. Fall 2016. "Augmented Reality for Structural Inspection: Teleportation" ($2,500.)
6. Department of Civil Engineering at UNM, Curriculum Committee and Chair. Spring 2016. "Shake Table for Research of Dynamic Loads" ($5,000.)
7. UNM Center for Teaching Excellence. Teaching Allocation Grant. Fall 2015. "Shake Table for Teaching Experimental Structural Dynamics" ($2,000.)

8. UNM Chair Competition on Innovative Educational Tools. Fall 2015. "UAV for Infrastructure Monitoring" ($1,000.)

Grants and contracts I formulated and wrote proposals for on behalf of the PIs prior to UNM (all awarded), total: $486,737.

1. Federal Railroad Administration (FRA): Condition Assessment of Railroad Bridges using Reference-free Estimates of Bridge Displacement under In-service Train Loads (PI B. F. Spencer, Jr.), May 2015-May 2016. Research and Demonstration Projects Supporting the Development of Reference-free Displacement Estimations under Live Loads, FRA BAA-2014-2 ($144,281.)
2. Association of American Railroads (AAR), Technology Scanning Program: Structural Health Monitoring of Railroad Bridges for Impact Detection (PI B. F. Spencer, Jr.), January 2015-December 2015 ($30,000.)
3. Federal Railroad Administration (FRA): Campaign Monitoring of Railroad Bridges in High- Speed Rail Shared Corridors using Wireless Smart Sensors (PI B. F. Spencer, Jr.), February 2013-February 2014. Research and Demonstration Projects Supporting the Development of High Speed and Intercity Passenger Rail Service, FRA BAA-2010-1 ($164,456.)
4. Association of American Railroads (AAR), Technology Scanning Program: Structural Health Monitoring of Railroad Bridges for Impact Detection (PI B. F. Spencer, Jr.), January 2014-December 2014 ($30,000.)
5. Association of American Railroads (AAR), Technology Scanning Program: Wireless Sensing Technology to Enhance Safety and Reliability for Railroad Bridges (PI James M. LaFave), January 2013-December 2013 ($39,000.)
6. Association of American Railroads (AAR), Technology Scanning Program: Wireless Sensing Technology to Enhance Safety and Reliability for Railroad Bridges (PI James M. LaFave), January 2012-December 2012 ($34,000.)
7. Association of American Railroads (AAR), Technology Scanning Program: Bridge Performance Assessment using Simplified Field Monitoring (PI James M. LaFave), January 2011-December 2011 ($45,000.)

UNM STUDENT MENTORING (current)

Post-doctorate students

Roya Nasimi	*PhD in Civil, Construction and Environmental Engineering* *(post-doctoral appointment will start after the PhD defense)*	2022

PhD students

Roya Nasimi	*PhD in Civil, Construction and Environmental Engineering* *Proposal defended December 2020* *Thesis Tittle: "Condition Monitoring of Structures Enabled with Vision-based Sensor Fusion on Cyber Physical Systems"*	2021
Xinxing Yuan	*PhD in Civil, Construction and Environmental Engineering* *Proposal defended May 2021*	2021

	Thesis Tittle: "Monitoring of Structural Health and Quality Using 3D Point Cloud Data"	
Angela Montoya	*PhD in Civil, Construction and Environmental Engineering* *Proposal defended November 2020* *Thesis Tittle: "Detection of Transient Pulses in the Response of Single Degree of Freedom Harmonic Systems Subject to Random Excitation"*	2021
Eric Robbins	*PhD in Civil, Construction and Environmental Engineering* *Qualifier planned for October 2021*	2022
Saiqa Mutari	*PhD in Civil, Construction and Environmental Engineering* *Qualifier planned for October 2021*	2023
James Woodall	*PhD in Civil, Construction and Environmental Engineering* *Qualifier planned for Spring 2022*	2023
Maimuna Hossain	*PhD in Mechanical Engineering* *Qualifier passed*	2023
Ali Khorasani	*PhD in Civil, Construction and Environmental Engineering* *Qualifier planned for Spring 2022*	2024
Kaveh Malek	*PhD in Mechanical Engineering* *Qualifier planned for Spring 2022*	2024
Masha Sanei	*PhD in Civil, Construction and Environmental Engineering* *Qualifier planned for Spring 2022*	2025

Masters students

Odey Yousef	*MS in Civil, Construction and Environmental Engineering* *"Event-based Sensing for Augmented Structural Control"*	2022
Joshua Murillo	*Masters in National and Global Security* *"ROTC Cybersecurity Training in Cyber Physical Systems"*	2022
Elijah Wyckoff	*MS in Mechanical Engineering* *"Augmented Reality for Robotics Control"*	2022
Jennifer Restrepo	*MS in Civil, Construction and Environmental Engineering* *"Transfer Function Fusion with Heterogeneous Sensing"*	2023

Undergraduate students

Jack Hanson (*CS, 2023*); Dalton Berry *(CS, 2023);* Solomon Actitty *(ME, 2022);* Dominic Thompson *(ME, 2022.)*

Visiting Scholars

None at this moment.

High school students

None at this moment.

UNM STUDENT (former)

Post-doctorate students

Jiaqi Xu — January 2020-April 2021

Ali I. Ozdagli — December 2015-May 2018

Visiting Scholars

Xiang Xu, MS student in Structural Engineering — September 2019-August 2020
Yangzhou University, Jiangsu Province, China

Marlan Ballard, Post-CNM student in Computer Science — January 2020-June 2021

Bideng Liu, Institute of Disaster Prevention, Beijing, China — December 2016-January 2018
Associate Professor

Ronny Moreano, ESPE, Quito, Ecuador — October 2017-December 2017
Senior, Civil Engineering

Graduate students

Six MS thesis total to date

Eric Robbins — Summer 2019- May 2021
"Non-linear Dynamics Control Using Wireless Smart Sensors"
(CCEE student)

James Woodall — January 2019-May 2021
"Multiple-Input Multiple-Output Uncertainties Quantification"
(CCEE student)

Marlon Aguero — January 2018-Dec 2020
"Real-time Displacement with Augmented Reality for Structural Health Monitoring"
(CCEE student)

Dilendra Maharjan — January 2018-Dec 2019
"Augmented Reality for Structural Health Monitoring"
(CCEE student)

Piyush Garg — December 2015-Dec 2017
"Non-contact monitoring of railroad bridge performance using UAS"
(ECE student)

Jose A. Gomez — August 2015-May 2017
"Cost-effective monitoring of railroad bridge performance"
(CCEE student) (click here)

Other graduate students supervised without MS Thesis

Maimuna Hossain	*Masters (no thesis) in Mechanical Engineering*	2021
Adam Baros	*MEng in Civil, Construction and Environmental Engineering*	2020
Jason Aldaz	*MEng in Civil, Construction and Environmental Engineering*	2020
Tony Lampert	*MEng in Civil, Construction and Environmental Engineering*	2019

Three MS thesis defended in other institutions as main director of research

Rafa Cardona

"Low Cost Sensors for Long-term deployment Monitoring" January 2019-June 2019
(CCEE student in Exchange with University of Castilla La Mancha in Spain)

Can Zhu

"Total Displacement Monitoring of Railroad Bridges using 2DOF" June 2018-June 2019
(CCEE student in Exchange with Yangzhou University, China)

Undergraduate students

(CCEE unless noted otherwise)

Jennifer Restrepo *(graduated May 2021) (ME student)*

Casie Elizondo *(graduated May 2021) (ROTC, ECE student)*

Joshua Murillo *(graduated May 2021) (ROTC, NGS student)*

Odey Yousef *(graduated December 2020)*

Somie Chavez (*graduated May 2020*)

Benjamin Narushof *(graduated May 2020)*

Emmanuel Ayorinde *(graduated May 2020) (ME student)*

Brian Bleck *(graduated May 2020) (CS student)*

Laura Gomez *(graduated May 2018)*

Cassy Mcclintock *(graduated May 2018)*

Sharon Shen *(graduated May 2018) (CS student)*

Ian Benjamin *(graduated May 2018) (ME student)*

Emily Scrimshaw *(graduated May 2018) (ME student)*

Michael Schuh *(graduated May 2018) (ME student)*

High school students

Selene Diaz, senior, Menaul School	October 2017-May 2018
Selene Diaz, senior, Menaul School	October 2017-May 2018
Selene Diaz, senior, Menaul School	October 2017-May 2018

Douglas Natseway, Native American Community Academy, junior	November 2016-July 2017
Valentino Pettis, Native American Community Academy, junior	November 2016-July 2017
Erik Moreno, Los Lunas Academy of Dreams, junior	May 2017-July 2017
Sunjeev Salomon, La Cueva High School, senior	January 2016-May 2016
Clayon Bliss, Saint Pius the 10th, senior	June 2016-July 2016
Manny Rivas, South Valley Academy, junior	June 2016-July 2016

STUDENT COMMITTEE SERVICE

PhD students

Krishna Chaitanya Jagadeesh Simma (adviser Dr. Susan Bogus) — May 2021
"Monitoring of Energy Efficient Buildings"

Razieh Nadafianshahamabadi (adviser Dr. Greg Rowangould) — June 2019
"Is Transportation Planning Effective? A Critical Review of Long-range Regional Transportation Planning in the United States"

Gauhar Sabih (adviser Dr. Rafi Tarefder) — May 2019
"Effects of Coefficient of Thermal Expansion on Unbonded Concrete Overlay Design and Performance"

Darren Luke (advisor Dr. Percy Ng) — May 2018
"Elevated Temperature Progressive Damage and Failure of Duplex Stainless Steel"

MS students

Ryan Dow (adviser Dr. Susan Bogus) — April 2019
"Drivable Space Datasets Created by Airborne LiDAR and Aerial Images"

Cheikhna Sy (adviser Dr. Rafael Fierro) — May 2019
"UAS Control with Heterogenous Communication"

Anima Bista (adviser Dr. Walter Gerstle) — February 2019
"Validation of the state based peridynamic lattice model"

Bipesh Shrestha (adviser Dr. Walter Gerstle) — April 2018
"Study of building vibrations caused by machinery"

Siavash Kazeroni (advisor Dr. Walter Gerstle) — December 2017
"State-based Peridynamic Particle Method"

Sushil Ghimire (advisor Dr. Walter Gerstle) May 2017
"Nuclear plants vibration analysis using non-contact sensors"

Mojgan Maadandar (advisor Dr. Mahmoud R. Taha) May 2017
"Composite materials for resilient structures"

Jaime Adroher (advisor Rafael Palacios, ICAI, Madrid, Spain) June 2017
"Analysis of railroad bridge data using advanced wavelet sensors"

Guillermo Perez (advisor Vanesa Valentin, University of Valencia, Spain) June 2017
"Optimizing Railroad Bridge Networks Management Using Mixed Integer Linear Programming and Genetic Algorithm"

TEACHING

Engineering Statics Spring 2020
CE202, University of New Mexico
- New interactive lectures with Polls and Kahoot
- Half of the semester was offered online due to COVID-19
- Students were able to participate in tutoring sessions with Zoom

Design of Metal Fall 2018, 2019, 2020
CE424, University of New Mexico
- Offered for both seniors and graduate students
- Incorporated a real bridge design
- Students have to present their bridge design to state, city and county engineers

Structural Dynamics Spring 2017, 2018, 2021
CE521, University of New Mexico
- New course adapted for the Civil Engineering Department
- Directed to seniors and graduate students

Biodesign Fall 2016
ME 561 section 001, University of New Mexico
- New multi-disciplinary course developed at UNM
- To provide experience in innovating medical technologies
- Combines concepts of both engineering and medicine
- Directed to seniors and graduate students

Structural Design Fall 2017, 2016, 2015
CE410, University of New Mexico
- New course developed for the Civil Engineering Department
- Combines concepts of both concrete and steel design
- Includes 3D printing
- Directed to senior students

Advanced Structural Dynamics Spring 2019, 2016

CE598, University of New Mexico

- New course developed for the Civil Engineering Department
- Combines concepts of both theory and experimental dynamics
- Directed to graduate students
- First time this course is offered

Introduction to Remote Shake Table Experiments Spring 2016

STEM, University of New Mexico

- New course developed for the STEM School of Engineering
- Combines creating a website, running experiments, drone technology
- Directed to freshmen and sophomore students
- First time this course is offered

Teaching evaluations by students in UNM (12 semesters total)

Year	Semester	Course	Description	Teaching	Instruction	Total
2015	Fall	CE410	Structural Design	3.29	4.71	**4.00**
2016	Spring	CE598	Experimental Dynamics	1.50	2.75	**2.12**
2016	Fall	CE410	Structural Design	3.67	4.67	**4.17**
2017	Spring	CE521	Structural Dynamics	3.00	4.00	**3.50**
2017	Fall	CE410	Structural Design	4.60	4.80	**4.70**
2018	Spring	CE521	Structural Dynamics	3.64	4.45	**4.05**
2018	Fall	CE424	Design of Metals	3.90	4.90	**4.40**
2019	Spring	CE598	Structural Dynamics	4.13	4.75	**4.44**
2019	Fall	CE424	Design of Metals	3.00	4.17	**3.59**
2020	Spring	CE202	Engineering Statics	4.18	4.64	**4.41**
2020	Fall	CE424	Design of Metals	4.40	4.75	**4.58**
2021	Spring	CE521	Structural Dynamics	4.09	4.55	**4.32**