Jaime Hernandez

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PROFESSIONAL EXPERIENCE

2019-Present Assistant Professor, Department of Civil, Construction, and Environmental Engineering, Marquette University

2016-2019 Postdoctoral Research Associate, Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign

EDUCATION

Ph.D. Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign, 2015

Dissertation: *Development of Deformable Tire-Pavement Interaction: Contact Stresses and Rolling Resistance Prediction under Various Driving Conditions*

Committee: Imad Al-Qadi (chair), Dallas Little, Arif Masud, Hasan Ozer, Robert Radulescu, Marshall Thompson

M.S. Department of Civil Engineering, Ohio University, 2010

B.S. Department of Civil Engineering, National University of Colombia, 2006

PUBLICATIONS

Peer Reviewed Journal Articles

2021 Said, I., Okte, O., **Hernandez, J.**, and Al-Qadi, I. L. Impact of new-generation wide-base tires on fuel consumption. *Journal of Transportation Engineering, Part B: Pavements (ASCE)*. 147(2), 04021011. DOI: 10.1061/JPEODX.0000266

2020 **Hernandez, J.** and Al-Qadi, I. L. Effect of joint rotation on curling responses in airfield rigid pavements. *International Journal of Pavement Engineering*. DOI: 10.1080/10298436.2020.1825710

2019 Said, I., **Hernandez, J.**, Kang, S., and Al-Qadi, I. L. Structural and environmental impact of new-generation wide-base tires in New Brunswick, Canada. *Road Materials and Pavement Design*. DOI: 10.1080/14680629.2019.1590219

2018 **Hernandez, J.**, Sawalha, M., Rivera-Perez J., Ozer, H., and Al-Qadi, I. L. Micromechanical Modeling of I-FIT Asphalt Concrete Specimens. *Engineering Fracture Mechanics*. 200(2018), 234-250

2018 **Hernandez, J.** and Al-Qadi, I. L. A Closed-form Solution for Curling Responses in Rigid Pavement. *Journal of Engineering Mechanics (ASCE)*. 145(2), 04018133

2018 **Hernandez, J.** and Al-Qadi, I. L. Concrete Pavement Blowup Considering Generalized Boundary Conditions. *Journal of Transportation Engineering, Part B: Pavements (ASCE)*. 144(3), 04018038

2018 Al-Qadi, I. L., **Hernandez, J.**, Gamez, A. M., Ziyadi, M, Gungor, E., Kang, S. Impact of Wide-Base Tires on Pavements - A National Study. *Transportation Research Record, Journal of the Transportation Research Board*. DOI: 10.1177/0361198118757969

2018 Gamez, A. M., **Hernandez, J.**, Ozer, H., and Al-Qadi, I. L. Development of Domain Analysis for Determining Potential Pavement Damage. *Journal of Transportation Engineering, Part B: Pavement (ASCE)*. 144(3), 04018030

2018 Gamez, A. M., **Hernandez, J.**, and Al-Qadi, I. L. Development of Domain Analysis to Predict Multi-axial Airfield Pavement Responses Due to Gear and Environmental Loadings. *Transportation Research Record, Journal of the Transportation Research Board*. DOI: 10.1177/0361198118758025

2017 **Hernandez, J.** and Al-Qadi, I. L. Semicoupled Modeling of Interaction between Deformable Tires and Pavements. *Journal of Transportation Engineering, Part A: Systems (ASCE)*, 143(4), 04016015

2017 **Hernandez, J.**, Al-Qadi, I. L., and Ozer, H. Baseline Rolling Resistance for Tires' On-Road Fuel Efficiency Using Finite Element Modeling. *International Journal of Pavement Engineering*, 18(5), 424-432

2017 **Hernandez, J.** and Al-Qadi, I. L. Tire-Pavement Interaction Modeling: Hyperelastic Tire and Elastic Pavement. *Road Materials and Pavement Design*, 18(5), 1067-1083

2017 Gungor, E., Al-Qadi, I. L., Gamez, A. M., and **Hernandez, J.** Development of Adjustment Factors for MEPDG Pavement Responses Utilizing Finite Element Analysis. *Journal of Transportation Engineering, Part A: Systems (ASCE)*, 143(7), 04017022

2016 **Hernandez, J.** and Al-Qadi, I. L. Contact Phenomenon of Free-Rolling Wide-Base Tires: Effect of Speed and Temperature. *Journal of Transportation Engineering (ASCE)*, 142(12), 04016060

2016 **Hernandez, J.** and Al-Qadi, I. L. Hyperelastic Modeling of Wide-Base Tire and Prediction of Its Contact Stresses. *Journal of Engineering Mechanics (ASCE)*, 142(2), 04015084

2016 **Hernandez, J.**, Gamez, A. M, and Al-Qadi, I. L. Effect of Wide-Base Tires on Nationwide Flexible Pavement Systems - Numerical Modeling. *Transportation Research Record, Journal of the Transportation Research Board*, 2590, 104-112

2016 Gungor, E., **Hernandez, J.**, Gamez, A. M., and Al-Qadi, I. L. Quantitative Assessment of the Effect of Wide-Base Tires on Pavement Response Using Finite Element Analysis. *Transportation Research Record, Journal of the Transportation Research Board*, 2590, 37-43

2015 **Hernandez, J.** and Al-Qadi, I. L. Airfield Pavement Response Due to Heavy Aircraft Takeoff: Advanced Modeling for Consideration of Wheel Interaction. *Transportation Research Record, Journal of the Transportation Research Board*, 2471, 40-47

2015 Bai, Y., Gungor, E., **Hernandez, J.**, Ouyang, Y., and Al-Qadi, I. L. Optimal Pavement Design and Rehabilitation Planning Using a Mechanistic-Empirical Approach. *EURO Journal on Transportation and Logistics*, 4(1), 57-73

2014 **Hernandez, J.**, Gamez, A. M., Al-Qadi, I. L., and De Beer, M. Analytical Approach for Predicting Three-Dimensional Tire-Pavement Contact Load. *Transportation Research Record, Journal of the Transportation Research Board*, 2456, 75-84

2014 **Hernandez, J.**, Uribe-Henao, A. F., and Aristizabal-Ochoa, J. D. Stability and Free Vibration Analyses of Cantilever Shear Buildings with Semi-Rigid Support Conditions and Multiple Masses. *Journal of Sound and Vibration*, 333(5), 1390-1407

2008 **Hernandez, J.** and Aristizabal, J. D. Static and Dynamic Stability of an Elastically Restrained Beck Column with an Attached End Mass. *Journal of Sound and Vibration*, 312(4-5), 789-800

Conference Publications

2018 Said, I. M., **Hernandez, J.**, Kang, S., and Al-Qadi, I. L. Impact and Life-Cycle Assessment of New-Generation Wide-Base Tires in New Brunswick, Canada. *The Transportation Research Board 97th Annual Meeting*

2017 **Hernandez, J.**, Gamez, A. M., and Al-Qadi, I. L. Domain Analysis for Airfield Pavement: Moving Forward from Point Responses. *BCRRA 2017 - Tenth International Conference on the Bearing Capacity of Roads, Railways and Airfields*, Athens, Greece

2016 Gungor, O. E., Al-Qadi, I. L., Gamez, A. M., and **Hernandez, J.** In-Situ Validation of Three-Dimensional Pavement Finite Element Models. *The Roles of Accelerated Pavement Testing in Pavement Sustainability*, San Jose, Costa Rica, 145-159

2014 **Hernandez, J.** and Al-Qadi, I. L. Airfield Pavement Response Due to Heavy Aircraft Takeoff: Advanced Modeling Comparing Single-Tire and Dual-Tandem Gear. *FAA Worldwide Airport Technology Transfer Conference*, Galloway, NJ, 1-15

2014 **Hernandez, J.**, Al-Qadi, I. L., Ozer, H., Green, J., Choubane, B., Wu, R., Harvey, J., and Weaver, E. Pavement Responses as Function of Truck Tire Type. *12th ISAP Conference on Asphalt Pavements. Raleigh*, NC, 1125-1134

2013 **Hernandez, J.**, Al-Qadi, I. L., and De Beer, M. Impact of Tire Loading and Tire Pressure on Measured 3D Contact Stresses. *Transportation and Development Institute Conference (ASCE)*. Los Angeles, CA, 551-560

Technical Reports

2021 Al-Qadi, I. L. and **Hernandez, J.**. Temperature Responses of Partially Restrained Airfield Rigid Pavement. DOT/FAA/TC-21/31. Atlantic, NJ

2020 Al-Qadi, I. L., Said, I. M., **Hernandez, J.**, and Okte, E. Impact of New-Generation Wide-Base Tires on Pavement Structure and Fuel Consumption. ICT-20-001. Urbana, IL

2018 Mohamed-Ali, U., **Hernandez, J.**, and Al-Qadi, I. L. Baseline for Performance Assessment of Engineered Binder. ICT-18-017. Urbana, IL

2017 Ozer, H., Al-Qadi, I. L., **Hernandez, J.**, Sawalha, M., and Rivera-Perez, J. Micromechanical Fracture Modeling for Mechanistic Design of Thin Overlay. ICT-18-004. Urbana, IL.

2017 Al-Qadi, I. L., Said, I., **Hernandez, J.**, and Kang, S. Impact and Life Cycle Assessment of New-Generation Wide-Base Tires in New Brunswick, Canada. ICT-17-018, Urbana, IL.

2016 Al-Qadi, I. L., **Hernandez, J.**, Gamez, A., Ziyadi, M., Gungor, E., Kang, S. G., Harvey, J., Wu, R., Greene, J., Choubane, B., De Beer, M., and Scarpas, A. The Impact of Wide-Base Tires on Pavement - A National Study. DTFH61-11-C-00025. Urbana, IL. Submitted

2016 Al-Qadi, I. L., Ozer, H., Gamez, A. M., and **Hernandez, J.** Influence of Tire Parameters on Roadway Structures. ICT-16-017. Urbana, IL

2015 **Hernandez, J.**, Gamez, A. M., Shakiba, M., and Al-Qadi, I. L. Numerical Prediction of Three-Dimensional Tire-Pavement Contact Stresses. ICT-17-004. Urbana, IL.

2010 Kim, S. S., Sargand, S., Masada, T., and **Hernandez, J.** Determination of Mechanical Properties of Materials Used in WAY-30 Test Pavements. FHWA/OH-2010/9. Athens, OH

ACADEMIC HONORS AND AWARDS

2013 Graduate Research Award Program on Public Sector Aviation Issues, Airport Cooperative Research Program

2013 First Place, Younger Member Paper Contest, ASCE Transportation and Development Institute, 2013 Airfield and Highway Pavement Conference

2012 Academic General Scholarship, Society of Hispanic Professional Engineers (SHPE)

2012 Best Paper Award, Harbin Institute of Technology Doctoral Annual Symposium on Transportation Science and Engineering

2012 Chicago Chapter Fellowship, Society of Hispanic Professional Engineers

2007 Young Researcher, COLCIENCIAS

CONFERENCE ACTIVITY

Presentations

2018 Gamez, A. M., **Hernandez, J.**, and Al-Qadi, I. L. Development of Domain Analysis to Predict Multi-axial Airfield Pavement Response due to Gear and Environmental Loadings. *Pavement Structural Modeling and Evaluation Committee Meeting, Transportation Research Board Annual Meeting*, Washington, DC, January 7-11

2017 **Hernandez, J.**, Al-Qadi, I. L., and Ozer, H. Development of Baseline Rolling Resistance for Tires. *Pavement Life-Cycle Assessment Symposium*, Champaign, IL, April 11-13

2017 **Hernandez, J.** and Al-Qadi, I. L. Impact of New-Generation Wide-Base Tires on Pavements. *Innovations in Construction, Asphalt, and Transportation*, Peoria, IL, April 3-5

2017 **Hernandez, J.**, Ozer, H., and Al-Qadi, I. L. Fracture Micromechanical Modeling for Thin Overlay Mechanistic Design. *Advanced Models to Understand Behavior and Performance of Asphalt Mixtures Committee Meeting, Transportation Research Board Annual Meeting*, Washington, DC, January 8-12

2016 **Hernandez, J.** and Al-Qadi, I. L. Critical Pavement Responses Resulting from Deformable-Deformable Tire-Pavement Interaction. *Flexible Pavement Design Committee Meeting, Transportation Research Board Annual Meeting*, Washington, DC, January 10-14

2016 Gamez, A. M., **Hernandez, J.**, Ozer, H., and Al-Qadi, I. L. Three-Dimensional Stress and Strain Domain Analysis of Pavement Response to Tires. *Advanced Models to Understand Behavior and Performance of Asphalt Mixtures Subcommittee Meeting, Transportation Research Board Annual Meeting*, Washington, DC, January 10-14

2015 Gamez, A. M., **Hernandez, J.**, and Al-Qadi, I. L. Effect of Tire Design Parameters on Pavement Responses. *Advanced Models to Understand Behavior and Performance of Asphalt Mixtures Subcommittee Meeting, Transportation Research Board Annual Meeting*, Washington, DC, January 11-15

2014 Gamez, A. M., **Hernandez, J.**, and Al-Qadi, I. L. Effect of Load Input on Pavement Responses. *Flexible Pavement Design - Young Professionals Subcommittee Meeting, Transportation Research Board Annual Meeting*, Washington, DC, January 12-16

2014 Gamez, A. M., **Hernandez, J.**, and Al-Qadi, I. L. Effect of Tire Parameters and Contact Stresses on Pavement Responses. *Third International Transportation Ph.D. Student Symposium*, Stockholm, Sweden, August 29-30

2013 Al-Qadi, I. L., De Beer, M., and **Hernandez, J.** Impact of Tire Loading and Tire Pressure on Measured 3-D Contact Stresses. *Flexible Pavement Design Committee Meeting, Transportation Research Board Annual Meeting*, Washington, DC, January 13-17

2013 **Hernandez, J.**, Gamez, A. M., Ziyadi, M., Coenen, A., and Al-Qadi, I. L. The Impact of Wide-Base Tires on Pavement Damage - A National Study. *Second International Transportation Ph.D. Student Symposium*, Champaign, IL, September 3-4

2012 Sargand, S., Nazzal, M., and **Hernandez, J.** Evaluating the Response of Perpetual Pavements Using Full Scale Accelerated Loading Tests. *Transportation Research Board Annual Meeting*, Washington, DC, January 22-26

2012 **Hernandez, J.** and Al-Qadi, I. L. Impact of Wide-Base Tires on Pavements. *First International Transportation Ph.D. Student Symposium*, Harbin, China, December 16-18

2011 Wang, H., Al-Qadi, I. L., and **Hernandez, J.** Variation in Moduli of Unbound Layer of Flexible Pavement with Moisture. *Toward Long Term Pavement Performance Prediction - Engineering Mechanics Institute (ASCE)*, Boston, MA, June 2-4

2011 Al-Qadi, I. L., Wang, Hao, and **Hernandez, J.** Quantification of the Effect of Tire Contact Stresses on Runway Pavement Responses. *XXIV World Road Congress*, Mexico City, September 26-30

2009 Bendana, J., Sargand, S., and **Hernandez, J.** Comparison between Perpetual and Standard Asphalt Concrete Pavement Sections on NY-I86. *International Conference on Perpetual Pavement*, Columbus, OH, September 30 - October 2

Webinars

2015 Al-Qadi, I. L., **Hernandez, J.**, and Weaver, E. Impact of Wide-Base Tires on Pavement Damage - A National Study, Part II. *Transportation Research Board Webinar*

2013 Al-Qadi, I. L., **Hernandez, J.**, Wang, H., and Weaver, E. Impact of Wide-Base Tires on Pavement Performance. *Transportation Research Board Webinar*

RESEARCH EXPERIENCE (select)

2018-2019	Co-principal Investigator: Material Parameters for Extended-life Asphalt Concrete, U.S. Army Engineer Research and Development Center
2018-2019	Additional Pavement Cost Associated with the Use of New-Generation Wide-Base Tires in New Brunswick, Canada. Department of Transportation and Infrastructure of New Brunswick, Canada.
2016-2018	Instrumentation and Analysis of Airfield Pavement Response, Federal Aviation Administration Studied static responses and stability of airfield rigid pavement section at John F. Kennedy International Airport
2016-2017	Co-principal investigator: Damage and Life-Cycle Assessment of New-Generation Wide-Base Tires in New Brunswick, Canada. Department of Transportation and Infrastructure of New Brunswick, Canada.
2016-2017	Prediction of Service Life of Thin Asphalt Overlays for Pavement Preservation Using Pavement Deterioration Models, Michigan State University Developed micromechanical models for asphalt concrete
2011-2016	The Impact of Wide-Base Tires on Pavement Damage. Federal Highway Administration Supervised team of students, modeled flexible pavements using Abaqus and Python, and processed measurements of contact stresses
2014-2016	Influence of Tire Parameters on Roadway Structures. Michelin North America, Inc.
2014-2015	Numerical Prediction of Three-Dimensional Tire-Pavement Contact Stresses, Texas A&M University Developed validated finite element model of truck tires using finite element method for predicting tire-pavement contact stresses
2015	Integration of Hollow Thick Drainage Layer in Pavement Structure
2013-2014	Airfield Pavement Response Due to Heavy-Aircraft Takeoff: Advanced Modeling for Gear Interaction Consideration. Airport Cooperative Research Program

CAMPUS TALKS

2015 Deformable Tire-Pavement Contact Stress Prediction at Various Operating Conditions Using Validated Finite Element Model, Kent Seminar, University of Illinois at Urbana-Champaign

2014 The Impact of Wide-Base Tires on Pavement Damage - A National Study: Experimental Tire-Pavement Contact Stresses, Kent Seminar, University of Illinois at Urbana-Champaign

TEACHING EXPERIENCE

Marquette University, Sole Instructor
Geotechnical Engineering (Fall 2019, Fall 2020)

Marquette University, Sole Instructor
Materials in Civil Engineering (Spring 2020)

University of Illinois at Urbana-Champaign, Sole Instructor
Pavement Design I (Fall 2016)

PROFESSIONAL SERVICE

Peer Review

Transportation Research Record, Journal of the Transportation Research Board
Journal of Transportation Engineering, Part B: Pavements (ASCE)
Journal of Engineering Mechanics (ASCE)
Road Materials and Pavement Design
International Journal of Pavement Engineering
5th International Conference on Accelerated Pavement Testing

To Profession

Highway Pavements Committee, Transportation and Development Institute ASCE
Mechanics of Pavements Committee, Engineering Mechanics Institute ASCE
Flexible Pavement Design Committee, Transportation Research Board
Characteristics of Asphalt Materials Committee, Transportation Research Board
Full-Scale Accelerated Pavement Testing Committee, Transportation Research Board

To the University

Kent Seminar Series, University of Illinois at Urbana-Champaign, 2018
Search committee member, position "Senior Communication Coordinator," Illinois Center for Transportation, 2018
Research Experience for Undergraduates Program, University of Illinois at Urbana-Champaign, 2018
Search committee member, position "Research Engineer," Illinois Center for Transportation, 2017
Search committee member, position "Technical Communications Specialist," Illinois Center for Transportation, 2017
Search committee member, position "Research Projects Coordinator," Illinois Center for Transportation, 2017
Master committee Jacob Adedayo Adedeji, Central University of Technology, Free State - Bloemfontein, South Africa, 2015

PROFESSIONAL ASSOCIATIONS

American Society of Civil Engineers, 2016-present
Academy for Pavement Science and Engineering, 2017-2019

RELATED SKILLS

Certificate: Foundations of Teaching, Center for Innovation in Teaching and Learning, University of Illinois

Abaqus 6.14, Python, MatLab, AutoCad, Latex, Mathematica, MathCad, Visual Basic and Macros in Microsoft Excel

LANGUAGES

English: Advanced reading, writing, speaking
Spanish: Native speaker