

# 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.**

- 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

- 2023 Lukanus, G. and **Hernandez, J.**. Laboratory Characterization of the Dynamic Response of Truck Tires. *2023 International Conference of Airfield and Highway Pavements*
- 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 97<sup>th</sup> 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 Takeo : 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

- 2023 Lukanus, G. and **Hernandez, J.**. Laboratory Characterization of the Dynamic Response of Truck Tires. *2023 International Conference of Airfield and Highway Pavements*
- 2022 Han, S. and **Hernandez, J.**. Effect of Shear Deformation on the Deflection of Dowel Bars. *The Transportation Research Board 101<sup>st</sup> Annual Meeting*
- 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

- 2009 Bendana, J., Sargand, S., and **Hernandez, J.** Comparison between Perpetual and Standard Asphalt Concrete Pavement Sections on NY-186. *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*

### **CAMPUS TALKS**

- 2023 Frequency-dependent Tire Properties and Their Effect on Energy Consumption and Dynamic Loading, Kent Seminar, University of Illinois at Urbana-Champaign
- 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, Fall 2021, Fall 2022, Fall 2023)

#### **Marquette University, Sole Instructor**

Materials in Civil Engineering (Spring 2020, Spring 2021, Spring 2022, Spring 2023)

#### **Marquette University, Sole Instructor**

Pavement Design (Fall 2020, Fall 2021, Fall 2022)

#### **Marquette University, Sole Instructor**

Pavement Management (Spring 2021, Spring 2022, Spring 2023)

#### **University of Illinois at Urbana-Champaign, Sole Instructor**

Pavement Design I (Fall 2016)

## **PROFESSIONAL SERVICE**

### **Editorial Board Membership**

*International Journal of Pavement Engineering*

### **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*

*5<sup>th</sup> International Conference on Accelerated Pavement Testing*

*2022 Advances in Materials and Pavement Performance Prediction*

*2023 International Conference of Airfield and Highway Pavements*

### **Proposal Review**

Wisconsin Highway Research Program

National Cooperative Highway Research Program

### **To Profession**

2022-Present *Chair, Highway Pavements Committee, Transportation and Development Institute, American Society of Civil Engineers*

2021-Present *Secretary, Standing Committee on Design and Rehabilitation of Asphalt Pavements, Transportation Research Board*

2022-Present *Member, Standing Committee on Asphalt Mixture Evaluation and Performance, Transportation Research Board*

2017-Present *Associate Member, Mechanics of Pavements Committee, Engineering Mechanics Institute, American Society of Civil Engineers*

### **Student Advising**

Gabby Lukanus, M.S. Researcher, anticipated graduation date May 2022

Alondra Gonzalez, Undergraduate Researcher, Fall 2021 - Spring 2022

### **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