

# JAIME A. HERNANDEZ

609 W. Healey St. Apt 11 ◊ Champaign, Illinois 61820  
(740) · 416 · 8038 ◊ hrndzr2@illinois.edu

## EDUCATION

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### University of Illinois at Urbana-Champaign

Expected December 2015

*Ph.D. in Civil and Environmental Engineering*

- Dissertation Title: Contact stress prediction between deformable tires and pavements at various operating conditions using a validated finite element model
- Advisor: Dr. Imad L. Al-Qadi
- Overall GPA: 3.85/4.00

### Ohio University

July 2010

*M.S. in Civil and Environmental Engineering*

- Thesis Title: Evaluation of the response of perpetual pavement at accelerated pavement loading facility: finite element analysis and experimental investigation
- Advisor: Dr. Shad Sargand
- Overall GPA: 3.80/4.00

### National University of Colombia

February 2006

*B.S. in Civil Engineering*

- Thesis Title: Design of structures with seismic isolation: effect of flexibility of reinforcement
- Advisor: Dr. Jose D. Aristizabal
- Overall GPA: 4.20/5.00

## RESEARCH EXPERIENCE

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### University of Illinois at Urbana-Champaign

August 2010 - Present

*Graduate Research Assistant*

*Urbana, IL*

- Leading role in the projects “The Impact of Wide-Base Tires on Pavement Damage – A National Study”, “Influence of Tire Parameters on Roadway Structures”, and “Numerical Prediction of Three-Dimensional Tire-Pavement Contact Stresses”
- Perform advanced finite element simulation of flexible pavements and truck tires
- Analyzed tire-pavement contact stresses from numerical models and experimental measurements to be used in advanced numerical modeling of flexible pavements
- Prepared an awarded proposal for the Airport Cooperative Research Program (ACRP)
- Developed a python scripts to automate the generation of input files and post-processing of results for the finite element analysis of flexible pavements

### Ohio University

June 2008 - July 2010

*Graduate Research Assistant*

*Athens, OH*

- Investigated the effect of thickness on perpetual pavements based on accelerated pavement testing data of four instrumented sections
- Analyzed collected data from instrumented pavement section in Angelica, NY, including Environmental and falling weight deflectometer data
- Participated in the crew that instrumented three pavement sections: one Perpetual Pavement in Angelica, NY, and the other two Rigid Pavements in Syracuse, NY

**National University of Colombia***Undergraduate Research Assistant*

January 2006 - May 2008

*Medellin, Colombia*

- Studied special topics in structural engineering including dynamic and static stability
- Prepared an awarded proposal for COLCIENCIAS (Colombian equivalent to National Science Foundation)

**TEACHING EXPERIENCE**

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**University of Illinois at Urbana-Champaign***Teaching Assistant*

August 2014 - December 2014

*Urbana, IL*

- Taught basic topics in pavement engineering such as: classification of pavement systems, pavement design variables, and pavement design methods
- Refined lectures, held office hours, and graded assignments and exams
- Conducted four class sessions
- Used Compass 2G, a course management system at University of Illinois, to facilitate the instructor-student relationship

**National University of Colombia***Teaching Assistant*

March 2003 - December 2005

*Medellin, Colombia*

- Taught topics in advanced mathematics for engineers such as: Fourier Analysis, Partial Differential Equations and Complex Variables
- Conducted workshops twice a week to enforce classroom concepts
- Graded assignments and exams
- Substituted for various professors

**National University of Colombia***Instructor*

April 2005 - June 2005

*Medellin, Colombia*

- Prepared lectures and taught topics in elemental algebra, mathematics, geometry, and calculus to senior high school students
- Developed quizzes and exams to evaluate student's performance

**ACADEMIC HONORS AND AWARDS**

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- 2013-2014 Graduate Research Award Program on Public-Sector Aviation Issues from the ACRP.
- First Place Winner in the Younger Member Paper Contest. ASCE Transportation and Development Institute – 2013 Airfield and Highway Pavement Conference
- 2012-2013 Academic General Scholarship from the Society of Hispanic Professional Engineers (SHPE)
- Best Paper Award, 2012 Harbin Institute of Technology Doctoral Annual Symposium on Transportation Science and Engineering
- Society of Hispanic Professional Engineers, 2012 Chicago Chapter Fellowship
- Young Researcher, awarded by COLCIENCIAS

**PUBLICATIONS**

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***Journal Publications***

1. **Hernandez, J. A.** and Al-Qadi, I. L. (2015). Hyperelastic Modeling of Wide-Base Tire and Prediction of its Contact Stresses. *Journal of Engineering Mechanics, (ASCE)*. Accepted for publication
2. **Hernandez, J. A.**, Al-Qadi, I. L., and Ozer, H. (2015). Baseline Rolling Resistance for Tires' On-Road Fuel Efficiency Using Finite Element Modeling. *International Journal of Pavement Engineering*. Accepted for publication

3. **Hernandez, J. A.** and Al-Qadi, I. L. (2015). Airfield Pavement Response Due to Heavy Aircraft Takeoff: Advanced Modeling for Wheel Interaction Consideration. *Transportation Research Record, Journal of the Transportation Research Board*. 2471, 40-47
4. Bai, Y., Gungor, E., **Hernandez, J. A.**, Ouyang, Y., and Al-Qadi, I. L. (2015). Optimal Pavement Design and Rehabilitation Planning Using a Mechanistic-Empirical Approach. *EURO Journal on Transportation and Logistics*, 4(1), 57-73
5. **Hernandez, J. A.**, Gamez, A., Al-Qadi, I. L., and De Beer, M. (2014). Analytical Approach for Predicting Three-Dimensional Tire-Pavement Contact Load. *Transportation Research Record, Journal of the Transportation Research Board*. 2456, 75-84
6. **Hernandez, J. A.**, Uribe-Henao, A. F., and Aristizabal-Ochoa, J. D. (2014) Stability and Free Vibration Analyses of Cantilever Shear Buildings with Semi-Rigid Support Conditions and Multiple Masses. *Journal of Science and Vibration*, 333(5), 1390-1407
7. **Hernandez, J. A.** and Aristizabal, J. D. (2008). Static and Dynamic Stability of an Elastically Restrained Beck Column with an Attached End Mass. *Journal of Sound and Vibration*, 312(4), 789-800

### ***Publications in Progress***

1. **Hernandez, J. A.** and Al-Qadi, I. L. (2015). Tire-Pavement Interaction Modeling: Hyperelastic Tire And Elastic Pavement. *Road Materials and Pavement Design*. Submitted for Publication
2. **Hernandez, J. A.** and Al-Qadi, I. L. (2015). Contact Stresses Of Free-Rolling Wide-Base Tires: Effect of Speed and Temperature. *Journal of Transportation Engineering, (ASCE)*. Submitted for Publication

### ***Conference Publications***

1. **Hernandez, J. A.** and Al-Qadi, I. L. (2014). 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
2. **Hernandez, J. A.**, Al-Qadi, I. L., Ozer, H., Green, J., Choubane, B., Wu, R., Harvey, J., and Weaver, E. (2014). *12th ISAP Conference on Asphalt Pavements*. Raleigh, NC
3. **Hernandez, J. A.**, Al-Qadi, I. L., and De Beer, M. (2013). Impact of Tire Loading and Tire Pressure on Measured 3D Contact Stresses. *Transportation and Development Institute Conference (ASCE)*. Los Angeles, CA
4. Sargand, S., Nazzal, M., and **Hernandez, J. A.** (2012). Evaluating the Response of Perpetual Pavements Using Full Scale Accelerated Loading Tests. *Transportation Research Board 2012 Annual Meeting*, Washington, DC

### ***Technical Reports***

1. Al-Qadi, I. L., **Hernandez, J. A.**, Gamez, A., Ziyadi, M., and Gungor, E. (2015). The Impact of Wide-Base Tires on Pavement – A National Study. DTFH61-11-C-00025. Urbana, IL. In preparation
2. Gamez, A., Shakiba, M., **Hernandez, J. A.**, and Al-Qadi, I. L. (2015). Numerical Prediction of Three-Dimensional Tire-Pavement Contact Stresses (2015). Urbana, IL.
3. Kim, S. S., Sargand, S., Masada, T., and **Hernandez, J. A.** (2010). Determination of Mechanical Properties of Materials Used in WAY-30 Test Pavements. FHWA/OH-2010/9. Athens, OH

### ***Presentations***

1. Gamez, A., **Hernandez, J. A.**, and Al-Qadi, I. L. (2015). Effect of Tire Design Parameters on Pavement Responses. *Advanced Models to Understand Behavior and Performance of Asphalt Mixtures Sub-Committee Meeting, Transportation Research Board 2015 Annual Meeting*, Washington, DC
2. Gamez, A., **Hernandez, J. A.**, and Al-Qadi, I. L. (2014). Effect of Load Input on Pavement Responses. *Flexible Pavement Design - Young Professionals Sub-Committee Meeting, Transportation Research Board 2014 Annual Meeting*, Washington, DC

3. Gamez, A., **Hernandez, J. A.**, and Al-Qadi, I. L. (2014). Effect of Tire Parameters and Contact Stresses on Pavement Responses. *Third International Transportation Ph.D. Student Symposium*, Stockholm, Sweden
4. Al-Qadi, I. L., **Hernandez, J. A.**, Wang, H., and Weaver, E. (2013). Impact of Wide-Base Tires on Pavement Performance. *Transportation Research Board Webminar*
5. Al-Qadi, I. L., De Beer, M., and **Hernandez, J. A.** (2013). Impact of Tire Loading and Tire Pressure on Measured 3-D Contact Stresses. *Flexible Pavement Design Committee Meeting, Transportation Research Board 2013 Annual Meeting*, Washington, DC
6. **Hernandez, J. A.**, Gamez, A., Ziyadi, M., Coenen, A., and Al-Qadi, I. L. (2012). The Impact of Wide-Base Tires on Pavement Damage – A National Study. *Second International Transportation Ph.D. Student Symposium*, Champaign, IL
7. **Hernandez, J. A.** and Al-Qadi, I. L. (2012). Impact of Wide-Base Tires on Pavements. *First International Transportation Ph.D. Student Symposium*, Harbin, China
8. Wang, H., Al-Qadi, I. L., and **Hernandez, J. A.** (2011). Variation in Moduli of Unbound Layer of Flexible Pavement with Moisture: Toward Long Term Pavement Performance Prediction. *Engineering Mechanics Institute (ASCE)*, Boston, MA
9. Al-Qadi, I. L., Wang, Hao, and **Hernandez, J. A.** (2011). Quantification of the Effect of Tire Contact Stresses on Runway Pavement Responses. *XXIV World Road Congress*, Mexico City
10. Bendana, J., Sargand, S., and **Hernandez, J. A.** (2009). Comparison between Perpetual and Standard Asphalt Concrete Pavement Sections on NY-186. *International Conference on Perpetual Pavement*, Columbus, OH

## PROFESSIONAL SERVICE

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### Journal Reviewer

August 2013 - Present

- Transportation Research Record, Journal of the Transportation Research Board
- Road Materials and Pavement Design
- International Journal of Pavement Engineering

### Committee Membership

January 2014 - Present

- AFD60 - Flexible Pavement Design for Young Professionals, Transportation Research Board Committee

## COMMUNITY SERVICE

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### Transportation and Development Institute, GSO - ASCE

August 2014 - May 2015

*Vice-President*

*Urbana, IL*

- Collaborated with the department head to established the organization
- Led informal discussion session with presenters of a weekly Seminar
- Assisted in the planning and participation of the organization in the engineering open house

## RELATED SKILLS

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- Certificate in Foundations of Teaching
- Abaqus 6.13, Python, MatLab 2012, AutoCad 2013, Latex, Mathematica 7, MathCad, SAP 2000, Visual Basic and Macros in Microsoft Excel
- Academic and communicative fluency in English and Spanish