Johann J. **Cardenas**

MS IN CIVIL ENGINEERING · PHD STUDENT

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Summary

PhD student in Civil Engineering and Research Assistant at the Illinois Center for Transportation. Specializes in computational mechanics, with a focus on finite element modeling and numerical methods to advance highway and airfield pavement design. Experience across IDOT and FAA research projects, plus industry work including planning, design, construction, maintenance, and operations of road networks.

Education

University of Illinois, Urbana-Champaign — *Illinois, USA*

Doctor of Philosophy in Civil Engineering, Ph.D. — *May. 2023 - May. 2027*

- Research emphasis on mechanistic modeling and data analytics for pavement design and evaluation (GPA: 3.97).

University of Illinois, Urbana-Champaign — *Illinois, USA*

Master of Science in Civil Engineering, M.S. — *Aug. 2021 - May. 2023*

- Fulbright Foreign Scholar selected among top-tier professionals (GPA: 4.00).

National University of San Marcos (UNMSM) — *Lima, Peru*

Bachelor of Science in Civil Engineering, B.S. — *Mar. 2011 - Jul. 2016*

- Graduated ranked #1 out of 39 students in cohort.

Professional Development

University of Engineering and Technology (UTEC) — *Lima, Peru*

Specialization Program in Pavement Engineering — *Nov. 2020 - Jul. 2021*

- Received the Academic Excellence Award for graduating top of class | GPA: 19.0/20.0
- Completed advanced coursework in pavement materials characterization, mechanistic-empirical design, and asset management

ESAN Graduate School of Business — *Lima, Peru*

International Diploma in Project Management — *Feb. 2020 - Set. 2020*

- Graduated #1 out of 62 students (1/62) | GPA: 17.6/20.0
- Gained strong cross-functional leadership and planning skills applicable to engineering projects execution

Skills

Coursework	CEE 407 Airport Design, CEE 506 Pavement Design II, CEE 416 Traffic Capacity Analysis, CEE 598 Advanced Bituminous Materials, CEE 508 Pavement Evaluation and Rehabilitation, CEE 570 Finite Element Methods, CS 547 Deep Learning
Software	ABAQUS, AutoCAD, Civil 3D, Power BI, Primavera P6, MS Project, SAP2000, ETABS
Programming	Python, Matlab, R, HTML, CSS, JavaScript, Java and LaTeX
Languages	Spanish (Native), English (Proficient), Portuguese (Basic)

Research Experience

Illinois Center for Transportation (ICT) — *Illinois, USA*

Graduate Research Assistant — *Aug. 2021 - Present*

- Developed a mechanistic framework to integrate emerging loading conditions into highway flexible pavement design.
- Conducted numerical simulations to predict the response of airfield flexible pavement structures using advanced FEM Modeling.
- Analyzed the influence of tire geometry, load, inflation pressure and rolling condition on tire-pavement contact stress prediction.
- Performed laboratory testing to characterize asphalt mix behavior, including Dynamic Modulus measurements.
- Led documentation, progress tracking, and team coordination for the following research projects:

Update Traffic Factor Equations for IDOT Mechanistic-Empirical Pavement Design Guide	*Jan. 2026 - Present*
Improving Traffic Safety Through Quantification of Road Network Hydroplaning Risks	*Jan. 2026 - Present*
Impact of Commercial Electric Vehicles on Flexible Pavement Performance	*Aug. 2022 - Mar. 2025*
Building Machine-learning-based Prediction Models for Computationally Efficient Airfield Pavement Analysis	*Aug. 2021 - Jun. 2024*

Technical Reports

Illinois Center for Transportation (ICT)

University of Illinois, Urbana-Champaign

- **Jayme A., Hernandez J., Al-Qadi I., Cardenas J., Hafeez M., and Villamil W. (2025)** Impact of Heavy Commercial Electric Vehicles on Flexible Pavements. *ICT Project R27-252*. Illinois Center for Transportation. *ISSN:0197-9191*. `https://doi.org/10.36501/0197-9191/25-003`.

- **Jayme, A., Zhou, Q., Cardenas J., Liu, F., Singh, A. and Al-Qadi I. (2026)** Building Machine-learning-based Prediction Models for Computationally Efficient Airfield Pavement Analysis. Volume II. *ICT-R27-246*. Illinois Center for Transportation. Accepted **[Under Review]**.

Journal Articles and Proceedings

- **Al-Qadi I., Cardenas J., Villamil W., Yang S., and Garg N. (2026)** Translating Advanced Modeling into Simplified Design Corrections for Flexible and Composite Airfield Pavements. *Transportation Research Record*. Submitted, *Under Review*.
- **Cardenas J., and Al-Qadi I. (2026)** Mechanistic Overload Permitting Approach for Flexible Airfield Pavements via Deterministic Damage Factors. *Transportation Research Record*. Submitted, *Under Review*.
- **Al-Qadi I., Diab L., Cardenas J. and Hafeez M. (2026)** Innovative Flexible Pavements: Energy-Efficient and Resilient for Future Mobility. *Proceedings of the 12th International Conference on Bearing Capacity of Roads, Railways, and Airfields; 12th BCRRA 26*. `https://doi.org/10.1016/j.trpro.2026.07.027`
- **Hafeez M., Al-Qadi I., Cardenas J., Jayme, A. and Hernandez, J. (2026)** Electric Truck Adoption: Infrastructure Energy Burden and Economic Impacts. *ASCE Journal of Transportation Engineering: Part B, Pavements*. `https://doi.org/10.1061/JPEODX.PVENG-2138`
- **Cardenas J., Jayme, A., Hernandez, J. and Al-Qadi I. (2026)** Quantification of Truck Electrification Damage to Flexible Pavements. *Transportation Research Record*. `https://doi.org/10.1177/03611981261473504`
- **Jayme, A., Cardenas J., Hernandez, J. and Al-Qadi I. (2025)** Relative Flexible Pavement Distress due to Heavy-Duty Electric Trucks. *Transportation Research Record*, *0*(0) `https://doi.org/10.1177/03611981251404350`
- **Cardenas J., Jayme, A., Hernandez J., and Al-Qadi I. (2025)** Flexible Pavement Damage Quantification for Heavy-Duty Electric Trucks. *ASCE Proceedings of the International Airfield and Highway Pavements Conference 2025: Design, Construction, Condition Evaluation, and Management of Pavements*. `https://doi.org/10.1061/9780784486214.059`
- **Singh, A., Khan, A., Cardenas J.,and Al-Qadi I. (2025)** Effect of Road Roughness on E-Truck Energy Consumption. *International Journal of Pavement Engineering*, *151*(1) `https://doi.org/10.1080/10298436.2025.2528982`
- **Cardenas J., and Al-Qadi I. (2024)** Impact of Road Roughness on Tire-Pavement Contact Stresses During Vehicle Maneuvering. *ASCE Journal of Engineering Mechanics*, *151*(2). `https://doi.org/10.1061/JENMDT.EMENG-7900`
- **Hernandez J., Jayme, A., Cardenas J., and Al-Qadi I. (2024)** Effect of Heavy-Duty Electric Vehicles on Tire-Pavement Contact Forces. *ASCE Journal of Engineering Mechanics*, *151*(1). `https://doi.org/10.1061/JENMDT.EMENG-7835`
- **Castro Perez J., Roesler, J., Sakulneya A., and Cardenas J. (2024)** Effect of Fibers in Compaction Energy and Mechanical Properties of Fiber-Reinforced Roller Compacted Concrete. *Proceedings of the 13th International Conference on Concrete Pavements*. `https://doi.org/10.33593/kf815023`
- **Cardenas J., and Al-Qadi I. (2024)** Impact of Dynamic Wheel Loading on Flexible Pavement Responses for Non-Free Rolling Conditions. *Transportation Research Record*, *2678*(11) `https://doi.org/10.1177/03611981241242378`

Honors & Awards

2025	**Recipient**, ACRP Graduate Research Award Program on Public-Sector Aviation Issues	*DC, USA*
2025	**Recipient**, Illinois Asphalt Pavement Association (IAPA) Scholarship	*Illinois, USA*
2025	**Audience Choice Award**, Transportation Research Board: Three-Minute Thesis Competition	*DC, USA*
2024	**Recipient**, San Diego Supercomputer Center's CIML Summer Institute 2024 Scholarship	*California, USA*
2024	**3rd Place**, Ashby Prize in Computational Science, National Center for Supercomputing Applications	*Illinois, USA*
2021	**Grantee**, Fulbright Foreign Student Scholarship	*Lima, PERU*
2021	**Recipient**, UTEC Academic Excellence Certificate	*Lima, PERU*
2020	**Grantee**, UTEC Pavement Engineering Scholarship	*Lima, PERU*
2020	**Recipient**, ESAN Academic Excellence Certificate	*Lima, PERU*
2016	**Recipient**, UNMSM Academic Excellence Certificate	*Lima, PERU*

Industry Experience

CONCAR S.A - Grupo Graña y Montero

Lima, Peru

Project Engineer | Project Control — *Jan. 2019 - Mar. 2021*

- Project Type: Road Construction, Management & Operation
- Managed formulation, approval and execution of additional work with the client.
- Issued monthly project operational and performance reports. Elaborated annual budget plan and annual planning dossier.
- Selected, hired, monitored and dealt with subcontractors and suppliers.

FLESAN DEL PERU S.A.C

Lima, Peru

Junior Engineer | Project Control — *Jul. 2018 - Dec. 2018*

- Project Type: Foundations and Anchored Walls Construction for a Retail Store.
- Reviewed engineering drawings and issued requests for information reports (RFI's) to the Project Management Office.
- Formulated project additional and deductive budgets. Issued weekly progress reports ("S" Curve) to the client.

CONCAR S.A. - Grupo Graña y Montero *Apurimac, Peru*

Junior Engineer | Project Control *Aug. 2017 - Jun. 2018*

- Project Type: Management and Conservation by Service Levels of a Road Corridor
- Controlled and monitored productivity rates. Reported daily project cost status to the Project Manager.
- Elaborated progress reports (“S” Curve) and aggregate cost reports.

CONCAR S.A. - Grupo Graña y Montero *Apurimac, Peru*

Trainee Engineer | Talent Development Program *Jan. 2017 - Jul. 2017*

- Project Type: Management and Conservation by Service Levels of a Road Corridor
- Processed field-collected productivity data and kept track of planning schedule. Controlled productivity rates.
- Generated and issued project service orders to subcontractors and suppliers.
- Identified bottlenecks in the road construction process. Presented a solution to the Top Management as the final deliverable of the program.

Extracurricular Activity

ASCE Transportation & Development Institute, Graduate Student Organization *Illinois, USA*

Vice President / Membership Director / Internal Communications Chair *Aug. 2021 - Present*

- Oversaw and coordinated internal communication strategies, disseminated information about academic and social events.
- Oversaw recruitment, retention and engagement of members.

Fulbright Association *Illinois, USA*

Campus Coordinator, University of Illinois *Jan. 2025 - Dec. 2025*

- Expanding campus Fulbright presence to ensure students and faculty are aware of available resources and events.
- Strengthening local Chapter ties to brige institutional programming with the Fulbright community.

CEE Graduate Student Advisory Committee *Illinois, USA*

Transportation Representative *Dec. 2024 - July 2026*

- Served as a link between graduate students and department leadership, organizing socials, information sessions, and workshops.
- Led tours and graduate student panels during departmental recruitment events.

Peruvian Student Association at the University of Illinois *Illinois, USA*

Treasurer *Aug. 2022 - May 2025*

- Managed budgets, secured grants, and oversaw financial planning, expense tracking, and income reporting for the association.
- Developed engagement strategies to involve the Champaign-Urbana community in cultural activities to spread the Peruvian traditions.

Fulbright Student Association at the University of Illinois *Illinois, USA*

President *May. 2022 - Jul. 2023*

- Organized networking, professional and social activities for the Fulbright grantess.

Project Management Institute (PMI), Lima Chapter *Lima, Peru*

Member *Aug. 2020 - Aug. 2021*

- Volunteered to organize professional events. Participated in the mentoring program as a mentee.

Colegio de Ingenieros del Peru (Peruvian Association of Engineers) *Lima, Peru*

Member *Nov. 2020 - Present*

- Registered Engineer, CIP N°252041.

Estructuras UNMSM *Lima, Peru*

President/Founder *Mar. 2014 - Jul. 2020*

- Inititated and led an undergraduate research organization focused on social projects, academic events, and intercollege activities.

Teaching Experience

University of Illinois, Urbana-Champaign *Department of Civil Engineering*

Teaching Assistant *Aug. 2026 - Dic. 2026*

- CEE407 Pavement Design I

National University of San Marcos (UNMSM) *Department of Civil Engineering*

Teaching Assistant *Aug. 2013 - Dic. 2014*

- CIV167018 Strength of Materials (Fall 2014)
- CIV167018 Strength of Materials (Spring 2014)
- CIV167008 Statics (Fall 2013).