Johann J. **Cardenas**

MS IN CIVIL ENGINEERING · PHD STUDENT

(+1) 217-953-1311 | johannc2@illinois.edu | https://www.johanncardenas.com | Johann-Cardenas | /in/johanncardenas/

Summary

Current Research Graduate Assistant at the Illinois Center for Transportation. Pursuing a Ph.D. in Civil Engineering at the University of Illinois, Urbana-Champaign. Specializing in computational mechanics, with a focus on finite element modeling and numerical methods to advance highway and airfield infrastructure design. Proficient at integrating data-driven methodologies for predictive modeling of pavement performance. Industry experience in design, planning, construction, maintenance, and operations across highway and low-volume 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.

Profesional 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 (GPA: 17.6/20.0).
- Gained strong cross-functional leadership and planning skills applicable to engineering projects execution.

Journal Articles

- **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*. Accepted, *Under Review*.
- **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*. Accepted, *Under Review*.
- **Cardenas J., Jayme, A., Hernandez, J. and Al-Qadi I. (2026)** Quantification of Truck Electrification Damage to Flexible Pavements. *Transportation Research Record*. Accepted, *Under Review*.
- **Jayme, A., Cardenas J., Hernandez, J. and Al-Qadi I. (2026)** 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`
- **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`

Presentations

- **Al-Qadi I., Diab L., Cardenas J. and Hafeez M. (2026)** Innovative Flexible Pavements: Energy-Efficient and Resilient for Future Mobility. *12th International Conference on Bearing Capacity of Roads, Railways, and Airfields; 12th BCRRA 26*. Keynote Session. Date: Jun. 2026.
- **Cardenas J., Jayme A., Hernandez J. and Al-Qadi I. (2026)** Quantification of Truck Electrification Damage to Flexible Pavements. *Transportation Research Board 2026*. Poster Session. Event Title: Accelerated Pavement Testing. Event Number: 4082. Date: Jan. 2026.

- **Hafeez M., Al-Qadi I., Cardenas J., Jayme A. and Hernandez J. (2026)** Infrastructure Energy Burden and Economic Impacts due to Electric Truck Adoption. *Transportation Research Board 2026*. Poster Session. Title: Pavement Rehabilitation. Event Number: 4085. Date: Jan. 2026.
- **Cardenas J., Jayme A., Hernandez J. and Al-Qadi I. (2025)** Flexible Pavement Damage Quantification for Heavy-Duty Electric Trucks. *ASCE International Conference on Transportation & Development, and International Airfield & Highway Pavements Conference*. Date: Jun. 2025.
- **Hafeez M., Jayme A., Cardenas J., Hernandez J. and Al-Qadi I. (2025)** Environmental Impact of Commercial E-Trucks on Flexible Pavement. *ASCE International Conference on Transportation & Development, and International Airfield & Highway Pavements Conference*. Date: Jun. 2025.
- **Jayme A., Cardenas J., Hernandez J. and Al-Qadi I. (2025)** Flexible Pavement Damage Quantification due to Heavy-Duty Electric Trucks. *Transportation Research Board 2025*. Lectern Session. Event Title: From Top to Bottom: The Impact of Heavy Truck Loads and Flexible Pavement Foundations. Event Number: 2137. Date: Jan. 2025.
- **Singh A., Khan A., Cardenas J. and Al-Qadi I. (2025)** Effect of Road Roughness on E-Truck Energy Consumption. *Transportation Research Board 2025*. Poster Session. Event Title: Current Issues in Trucking Industry Research. Event Number: 4048. Date: Jan. 2025
- **Hernandez J., Jayme A., Cardenas J., and Al-Qadi I. (2024)** Electric Heavy Trucks - Impact on Pavement Damage. *65th Illinois Bituminous Paving Conference*. Date: December 2024.
- **Cardenas J., and Al-Qadi I. (2024)** Impact of Vehicular Maneuvering and Dynamic Loading on Flexible Pavements. *International Conference on Asphalt Pavement ISAP 2024*. Date: June 2024.
- **Singh A., Cardenas J. and Al-Qadi I. (2024)** Numerical Modeling of Truck-Electrification-Induced Energy Loss in Highway Flexible Pavements. *ASCE Engineering Mechanics Institute 2024 Conference*. Date: May 2024.
- **Hernandez J., Jayme, A., Cardenas J., and Al-Qadi I. (2024)** Effect of Heavy-Duty Electric Vehicles on Pavement Contact Forces. *Transportation Research Board 2024*. Lectern Session: Asphalt Pavement Network Evaluation for Heavy Loads. Event Number: 2020. Date: Jan. 2024.
- **Cardenas J., and Al-Qadi I. (2024)** Impact of Dynamic Wheel Loading on Flexible Pavement Responses for Non-Free Rolling Conditions. *Transportation Research Board 2024*. Lectern Session: Asphalt Pavement Network Evaluation for Heavy Loads. Event Number: 2020. Date: Jan. 2024.
- **Cardenas J., and Al-Qadi I. (2024)** The Impact of Road Roughness on Tire-Pavement Contact Stresses During Vehicle Maneuvering. *Transportation Research Board 2024*. Poster Session. Date: Jan. 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. (2024)** Building Machine-learning-based Prediction Models for Computationally Efficient Airfield Pavement Analysis. Volume II. *ICT-R27-246*. Illinois Center for Transportation. *Under Review*.

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 flexible pavement design.
- Conducted numerical simulations to predict the response of flexible pavement structures using advanced FEM modeling.
- Analyzed the influence of tire geometry, load, inflation pressure and rolling condition on contact stresses through parametric modeling.
- Calibrated dynamic vehicle models for semi-trailer trucks and heavy-duty electric vehicles (HDEV).
- Performed laboratory testing to characterize asphalt mix behavior, including Dynamic Modulus measurements.
- Led documentation, progress tracking, and team coordination of assigned research projects.

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*

Extracurricular Activity

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 - Present*

- Served as a link between graduate students and department leadership, organizing socials, information sessions, and workshops.

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.

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.

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

Membership Director/Internal Communications Chair *Aug. 2021 - May. 2023*

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

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.

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)

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.
- Generated and issued project services orders to subcontractors and suppliers.

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. Prepared and proposed a solution to the Top Management as the final deliverable of the program. Shortly after, I was invited to join the company.