Javier A. Avecillas-Leon

2113 Newmark Civil Engineering Laboratory
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EDUCATION

University of Illinois Urbana-Champaign, USA *2020 - present*
PhD Candidate in Civil Engineering — Current GPA: 4/4
Major: Structural Engineering

Virginia Tech, USA *2017 - 2018*
MSc in Civil Engineering — Overall GPA: 4/4
Major: Structural Engineering

Universidad de Cuenca, Ecuador *2009 - 2014*
BS in Civil Engineering — Graduation Grade: 90.94/100
Major: Civil Engineering

ACADEMIC RESEARCH

PhD Thesis *2020 - 2026*
"A Multiscale Simulation Framework for Fatigue Life Prediction of Structural Components"
Advisor: C. Armando Duarte, PhD
Skills: Enriched Finite Elements, Programming, Technical Writing, Self-learning.

MS Thesis *2017 - 2018*
"Topology Optimization of Steel Shear Fuses to Resist Buckling"
Advisor: Matthew Eatherton, PhD
Skills: FEAP FE Models, Abaqus FE Models, Programming, Genetic Algorithms, Technical Writing, Self-learning.

BS Thesis *2015*
"Implementing Buckling-Restrained Braces as Energy Dissipation Devices"
Advisor: Juan Carrion, PhD
Skills: Designing and manufacturing low-cost small-scale buckling-restrained braces.

RESEARCH PUBLICATIONS

Journals

- **Avecillas-Leon, J.**, de Oliveira Miranda, A. C., Duarte, C. A. (2026). "A Multiscale Framework for Estimating the Fatigue Endurance Limit of Notched Components." In preparation.
- **Avecillas-Leon, J.**, Bento, M. H. C., Duarte, C. A. (2026). "A three-scale generalized finite element method for the simulation of three-dimensional crack propagation." Accepted for publication in *Computer Methods in Applied Mechanics and Engineering*
- **Avecillas-Leon, J.**, Singh, I., Duarte, C. A. (2025). "Validation and Improvements of a Generalized/eXtended Finite Element Method for 3-D Fatigue Crack Propagation." *International Journal of Fracture*, 249(4), 71. doi:10.1007/s10704-025-00888-6
- Li, H., **Avecillas-Leon, J.**, Shauer, N., Duarte, C. A. (2022). "A non-intrusive iterative generalized finite element method for multiscale coupling of 3-D solid and shell models." *Computer Methods in Applied Mechanics and Engineering*, 402, 115408. doi:10.1016/j.cma.2022.115408
- **Avecillas, J. A.**, Eatherton, M. R. (2020). "Controlling out-of-plane buckling in shear-acting structural fuses through topology optimization." *Journal of Structural Engineering*, 146(7), 04020132. doi:10.1061/(ASCE)ST.1943-541X.0002692

Conferences

- **Avecillas, J.**, Eatherton, M. (2019). "Topology optimization of steel shear fuses to resist buckling." *SSRC Annual Stability Conference, St. Louis, USA.*
- Nguyen, T., **Avecillas, J.**, Eatherton, M. (2019). "Developing design procedures for optimized buckling-resisting structural fuses." *12th Canadian Conference on Earthquake Engineering, Quebec, Canada.*

PRESENTATIONS

Conference Presentations

- "A Multi-Scale Simulation Framework for Predicting the Fatigue Endurance Limit of Notched Specimens". Accepted for presentation at the *18th U.S. National Congress on Computational Mechanics.* Chicago, Illinois, July 2025.
- "On the Computational Performance of a Generalized Finite Element Method for Phase-Field Fracture Models". *17th U.S. National Congress on Computational Mechanics.* Albuquerque, New Mexico, July 2023.
- "Coupling 3-D Solid and Shell Models with a Non-Intrusive Iterative Global-Local Algorithm". *Engineering Mechanics Institute Conference.* Baltimore, Maryland, May 2022.
- "Iterative Global-Local Algorithm for Coupling 3D Solid and Shell Models". *16th U.S. National Congress on Computational Mechanics.* Online, July 2021.
- "Topology optimization of steel shear fuses to resist buckling". *SSRC Annual Stability Conference.* St. Louis, Missouri, April 2019.

FELLOWSHIPS

Karol Fellowship, UIUC *2020*

- Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign, USA.

Graduate Fellowship, SENESCYT-Ecuador *2015*

- National Secretariat for Higher Education, Science, Technology and Innovation - SENESCYT, Ecuador. "Open Summons 2015 - Second Stage".

AWARDS AND HONORS

Travel Awards

- USNCCM18 Travel Award, U.S. National Congress on Computational Mechanics. *2025*
- Conference Travel Award, Department of Civil and Environmental Engineering, UIUC. *2025*
- Conference Travel Award, Department of Civil and Environmental Engineering, UIUC. *2022*
- Conference Travel Award, Department of Civil and Environmental Engineering, UIUC. *2021*

Academic Honors

- Best Academic Record, Colegio Hermano Miguel La Salle (High School), Ecuador. *2004 – 2009*
- Best Academic Record, Escuela Superior Luis Cordero (Elementary School), Ecuador. *1997 – 2003*

TECHNICAL STRENGTHS

Computer Languages	C++, MATLAB, Pyhton
Technical Software	ABAQUS, LS-DYNA, FEAP, OpenSees, SAP2000, ETABS
Software & Tools	LaTeX, Mathematica, Mathcad, Microsoft Office

RELEVANT COURSES

Core Courses
Fracture Mechanics
Computational Fracture Mechanics
Finite Element Analysis
Nonlinear Finite Elements
Computational Inelasticity
Generalized Finite Element Method

Other Courses
Advanced Mechanics of Materials
Theory of Elasticity
Computational Plates and Shells

WORK EXPERIENCE

University of Illinois Urbana-Champaign, USA *January 2020 - present*
Graduate Research Assistant

- Conducting research on multiscale modeling and fatigue life prediction of notched structural components using the Generalized Finite Element Method (GFEM).

University of Illinois Urbana-Champaign, USA *Spring 2026*
Teaching Assistant

- Teaching Assistant for CEE 470: Structural Analysis (upper-level undergraduate).
- Supported students with structural analysis theory, grading, and weekly office hours.

University of Illinois Urbana-Champaign, USA *Spring 2025*
Teaching Assistant

- Teaching Assistant for CEE 570: Finite Element Methods (graduate level).
- Supported students with FEM theory, assisted with coding, grading, and weekly office hours.

CONSULTBIM, Ecuador *April 2019 - December 2019*
Civil Engineer

- Member of the Structural Engineering Department. Structural design and seismic evaluation of existing buildings.

CONSULTBIM, Ecuador *December 2015 - November 2016*
Civil Engineer

- Member of the Structural Engineering Department. Structural design and seismic evaluation of existing buildings. Guarantee quality standards and technical contract conditions required for the projects.

COMMUNITY INVOLVEMENT

Ministry of Urban Development and Housing, Ecuador *April 2016*
Civil Engineer

- Technical volunteer at the post-earthquake structural evaluation of buildings at Bahia de Caraquez, Ecuador.

San Francisco Rural Community, Ecuador *January 2016*
Civil Engineer

- Technical volunteer in the construction of a water irrigation channel to improve the quality of the community's water resources.