Exponent®
Engineering & Scientific Consulting

Juan Meriles, Ph.D.

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Professional Profile

Dr. Juan Meriles specializes in earthquake engineering, risk assessment and structural analysis of steel, aluminum, and reinforced concrete structures. He uses high-fidelity finite element modeling to simulate the complex interaction of fluid flow and heat transfer, and deformation of structures under extreme loads. He has expertise in structural testing of subassemblies in quasi-static environments and also in using more advanced methodologies such as hybrid simulation. In this capacity, Dr. Meriles has programmed engineering software using Python and C++ in order to reduce the cost of running structural tests by orders of magnitude.

Prior to joining Exponent, Dr. Meriles worked at Lawrence Livermore National Laboratory (LLNL), where he used finite element analysis software to simulate the response of aluminum structural components and assemblies to loads including that of laser impulses. Additionally, he conducted coupled fluid dynamics – heat transfer analyses for an insulated system. At LLNL, Dr. Meriles also used deep neural networks to model the response of a reinforced concrete wall to blast loading. Whereas typical fast-running neural network models only provide maximum responses, Dr. Meriles' work provides high fidelity output across both time and space. Moreover, his model was able to successfully predict structural response in seconds, where previously such high-fidelity analyses would take days.

Dr. Meriles earned his Ph.D. in Structural Engineering, Mechanics, and Materials at the University of California, Berkeley. As a graduate student, he developed a cost-effective hardware-software platform for hybrid simulation. This platform allows researchers to perform hybrid simulations using hardware that is two orders of magnitude less expensive than traditional methodologies. The platform is built on commonly used coding languages, increasing the accessibility of this esoteric analysis method. In testing this platform, Dr. Meriles conducted structural tests on a new innovative bridge subsystem that shows promise for the construction of resilient bridges.

Academic Credentials & Professional Honors

Ph.D., Civil and Environmental Engineering, University of California, Berkeley, 2023

M.S., Civil and Environmental Engineering, University of California, Berkeley, 2019

B.S., Civil Engineering, Cornell University, 2018

Professional Affiliations

Structural Extreme Events Reconnaissance (StEER) Network, member

Earthquake Engineering Research Institute (EERI), member

American Society of Civil Engineers (ASCE), member

Publications

Henry L. Teng, Juan I. Meriles, Gaofeng Su, & Khalid M. Mosalam (2024). Development of a Vision-Based Embedded System for Monitoring of Bridge Settlement. Journal of Infrastructure Systems, 30(2), 04024003.

Presentations

Meriles Juan, Revisiting Hybrid Simulation with a Cost-Effective Hardware-Software Platform, Presentation, ASCE Engineering Mechanics Institute 2023 Conference, Atlanta, GA, 2023