

Amory Martin, Ph.D.

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Professional Profile

Dr. Martin specializes in evaluation of structural failures, disaster risk management, and earthquake engineering. He has expertise in dynamic analysis of complex structural systems, computational simulation of structures subject to extreme loads, and design of innovative seismic protective systems. His specialized expertise includes optimization, statistical analysis and data-driven techniques related to hazard analysis and design of steel and concrete structures. His work on developing optimization algorithms for earthquake-resistant structures has been published in peer-reviewed engineering journals.

Dr. Martin developed seismic capacity design methods for steel rocking braced frames and validated them through nonlinear response history analysis. He developed structural topology optimization algorithms for buildings under seismic excitation and implemented the procedure for large-scale 3D structures using high-performance computing. He also developed optimization algorithms for nonlinear dampers of stacked rocking systems using finite-element analysis and a novel ground motion selection procedure.

Prior to joining Exponent, Dr. Martin worked as a consultant for the World Bank in disaster economics and risk management, specifically on the economic impact of COVID-19 and natural disasters on poverty and inequality as well as compounded effects from multiple hazards.

Academic Credentials & Professional Honors

Ph.D., Civil and Environmental Engineering, Stanford University, 2020

M.S., Civil and Environmental Engineering, Stanford University, 2016

B.S., Civil Engineering, Johns Hopkins University, 2014

B.S., Mathematics, Johns Hopkins University, 2014

Achievement Rewards for College Scientists Fellowship, 2018

National Science Foundation Graduate Research Fellowship, 2015-2018

Stanford School of Engineering Fellowship, 2014

Johns Hopkins Civil Engineering Award, 2014

Prior Experience

Consultant, World Bank, Disaster Risk Management Economics, 2020

Engineer Intern, Thornton Tomasetti, New York, 2015

Professional Affiliations

Earthquake Engineering Research Institute (EERI)

American Society of Civil Engineers (ASCE)

Languages

French

Patents

US Patent 9,132, 016: Implantable Shoulder Prostheses, September 2015 (Flaherty J.C., Fenton P.V., Martin A.)

Publications

Martin A, Markhvida M, Hallegatte S, Walsh B. "Socio-Economic Impacts of COVID-19 on Household Consumption and Poverty." Economics of Disasters and Climate Change: 1-27, 2020

Martin A, Deierlein GG. "Structural Optimization of Stacked Rocking Spine Systems for Nonlinear Earthquake Response." 17th World Conference on Earthquake Engineering, Sendai, Japan, 2020

Martin A, Deierlein GG. "Structural Topology Optimization of Tall Buildings for Dynamic Seismic Excitation Using Modal Decomposition", Engineering Structures, (216): 110717, 2020

Martin A, Deierlein GG, Ma X. "Capacity Design Procedure for Rocking Braced Frames using Modified Modal Superposition", Journal of Structural Engineering, (145)-6: 04019041, 2019

Martin A, Deierlein GG. "Topology Optimization of Elastic Spines in Rocking Braced Frames", 11th U.S. National Conference on Earthquake Engineering, Los Angeles, CA, 2018

Simpson B, Van Den Einde L, Anagnos T, Sen A, Martin A, Saiyed Z, Yin HZ. "Teaching School Safety and Advocacy in the Classroom." 11th U.S. National Conference on Earthquake Engineering, Los Angeles, CA, 2018

Presentations

Martin A, Deierlein GG. "Structural Topology Optimization for Dynamic Seismic Excitation", Pacific Earthquake Engineering Research Annual Meeting, Poster Session, Berkeley, CA, January 2020

Martin A, Deierlein GG. "Dynamic Topology Optimization for Seismic Excitation", Skidmore Owings and Merrill, Company Research Presentation Online, July 2019

Martin A, Deierlein GG. "Topology Optimization of Rocking Braced Frames for Nonlinear Earthquake Response", Engineering Mechanics Institute (EMI), June 2019

Martin A, Deierlein GG. "Topology Optimization of Elastic Spines in Rocking Braced Frames", 11th U.S.

National Conference on Earthquake Engineering, Los Angeles, CA, June 2018

Martin A, Deierlein GG. "Topology Optimization of Self-Centering Rocking Systems subjected to Earthquake Loading", ARUP, San Francisco Office, Sept 2017

Martin A, Deierlein GG. "Topology Optimization of Rocking Braced Frames", Topology Optimization Summer Course Presentations, Denmark Technological University (DTU), Lyngby, Denmark, June 2017

Martin A, Deierlein GG. "Integrated Capacity Design Optimization of Rocking Braced Frames", Minisymposium 95 - Recent Advances in Uplifting Structures and Rocking Isolation, Engineering Mechanics Institute (EMI), San Diego, June 2017

Martin A, Chang CM. "Near-Collapse Performance of Existing RC Building through Small-Scale Hybrid Testing", Quake Summit Poster Session, NEES Annual Meeting, Reno NV, August 2013

Peer Reviewer

Journal of Structural Engineering and Journal of Earthquake Engineering