Exponent®
Engineering & Scientific Consulting

Millard McElwee, Ph.D.

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Professional Profile

Dr. McElwee specializes in infrastructure systems, construction, disaster risk management, and environmental justice. He has experience providing innovative solutions to electrical utilities, offshore mooring, and large-scale transportation clients.

Dr. McElwee has investigated multiple equipment and vegetation related failures and fires of electrical transmission and distribution structures such as bird strikes, electrical tracking/flashover, line slap, vehicular contact, etc. Dr. McElwee is experienced in various analysis techniques risk and causal analysis techniques including multi-hazard risk analysis, apparent cause evaluation (ACE), and root cause analysis (RCA).

During his time as a licensed contractor, Dr. McElwee has experienced all phases of construction projects and has advised clients on a range of construction topics ranging from project controls, project scheduling, change management, risk management, and construction dispute resolution. Additionally, he has provided utility program management services to clients focused on wildfire mitigation.

Dr. McElwee is well-versed in the following areas of data collection and analysis:

- Python, MATLAB, QGIS, & R
- Machine Learning & Statistics
- Data Visualizations and Dashboards

Dr. McElwee's Ph.D. research involved modeling the impact of natural disasters on large scale transportation systems, particularly vulnerable populations. He successfully quantified the disproportionate impact of evacuating African American residents in New Orleans, LA under emergency scenarios. Dr. McElwee has in-depth knowledge and experience in community resilience and environmental justice.

At the University of California, Berkeley, Dr. McElwee served as a Graduate Student Researcher (or Research Assistant) and was the Graduate Student Instructor (or Teaching Assistant) for undergraduate courses in computer science. He currently teaches summer STEM courses at Carnegie Mellon and Rice University focused on machine learning applications to civil engineering problems.

Academic Credentials & Professional Honors

Ph.D., Civil and Environmental Engineering, University of California, Berkeley, 2021

M.Eng., Civil and Environmental Engineering, University of California, Berkeley, 2016

B.S., Civil and Environmental Engineering, Carnegie Mellon University, 2015

National Physical Science Consortium (NPSC) Fellow 2016-2018

Academic Appointments

Course Instructor, Rice Center for Engineering Leadership, Rice University, 2020 - Current

Project Instructor, Summer Academy for Mathematics and Science, Carnegie Mellon University, 2018 - Current

Graduate Student Researcher (Research Assistant), Civil & Environmental Engineering Department, University of California, Berkeley, 2017-2021

Graduate Student Instructor (Teaching Assistant), Civil & Environmental Engineering Department, University of California, Berkeley, 2019-2020

Prior Experience

Co-Founder/Licensed Contractor, McCoy Group, 2017–2021

Professional Affiliations

Alpha Phi Alpha Fraternity, Incorporated

American Society of Civil Engineers (ASCE)

American Public Health Association (APHA)

American Geophysical Union (AGU)

Publications

L. Comfort, K. Soga, M. McElwee, C. Ecosse, and B. Zhao “Collective Action in Communities, Exposed to Recurring Hazards: The Camp Fire, Butte County, California, November 8, 2018”, Vol. 11, No.4 The International Journal of Advanced Science, Engineering, and Information Technology (IJASEIT), https://doi.org/10.18517/ijaseit.11.4.14845 (2021)

D. Armanios, S. Christian, A. Francioni Rooney, M. McElwee, J. Moore, D. Nock, C. Samaras, G. Wang, “Diversity, Equity, and Inclusion in Civil and Environmental Engineering Education: Social Justice in a Changing Climate”, ASEE Virtual Annual Conference, https://peer.asee.org/36988 (2021)

L. Comfort, K. Soga, M. Stacey, M. McElwee, C. Ecosse, J. Dressler, and B. Zhao “Collective Action in Communities, Exposed to Recurring Hazards: The Camp Fire, Butte County, California, November 8, 2018” Natural Hazards Center Quick Response Reports, https://doi.org/10.13140/RG.2.2.19075.45609 (2019)

M. McElwee, B. Zhao, K. Soga “Real-time Analysis of City Scale Transportation Networks in New Orleans Metropolitan Area using an Agent Based Model Approach” MATEC Web of Conferences, https://doi.org/10.1051/matecconf/201927106007 (2019)

Presentations

Infrastructure Criticality through Traffic Simulations: lessons learned from the 2018 Paradise Camp Fire, University of California, Los Angeles, 2020

Identifying network vulnerabilities in New Orleans due to flooding hazards with traffic simulations, Rice University, 2020

Real-time Analysis of City Scale Transportation Networks Using an Agent-Based Model Approach 2019, Carnegie Mellon University, 2020

Simulation Frameworks for Assessing Community Resilience Under Natural Hazards, University of California, Los Angeles, 2019

Project Experience

Led root cause assessment of electric system outages for an electric utility which included site inspection, interviews, laboratory and field testing, simulation, and analysis leading to identification of the root cause.

Performed fragility analyses for structural assets considering multiple hazards, degradation of the assets, and climate change for a large utility company.

Provided program management and analyst support for an electric utility to assist with wildfire mitigation. Facilitated the coordination and communication of various dependency groups and vendors to expedite task release for successful execution and completion of projects.

Prepared detailed financial reports which included budget, risks, contingency, schedules, and key performance indicators for 100+ projects.