ABSTRACT
The Enriquillo-Plantain Garden Fault Zone (EPGFZ) is a system of predominantly left-lateral strike-slip faults extending through Eastern Jamaica and Western Hispaniola. The fault zone has generated at least one large (> Mw 6) earthquake per century within the last five centuries. These earthquakes include the 2010 Mw 7 Haitian earthquake, which killed 300,000 people and the 1907 Jamaican earthquake, which killed ~900 people. Both earthquakes resulted in significant infrastructural damages, tsunamis, landslides, and ground fissures. In this talk, I will provide insights into the history and societal impacts of active faulting and earthquake-triggered geohazards within the EPGFZ. Precisely, I will show that Eastern Jamaica hosts a previously unrecognized strike-slip fault system that is within 5 km of Kingston, the capital city where two-thirds of the population lives. This newly identified fault system is an extension of a prominent strike-slip fault within the EPGFZ. This study-identified fault system is active and could generate a magnitude 5.8-6.9 earthquake in Jamaica, which has historically triggered slope failures within Kingston, especially along Port Royal beach. My analysis of the sands within the upper 2 m of this beach indicates that these sediments strengthen with time since deposition. I will argue that these sands experience a time-dependent increase to their elastic moduli due to microstructural grain re-adjustments (e.g., grain rotation and slippage) that are accompanied by limited changes to their porosity. These observations form the first field base evidence for a new process within the sedimentary rock cycle and suggest that mechanical compaction isn’t the most dominant process influencing the evolution of recently deposited sands.