Many natural hazards have been well known and qualitatively understood for decades, but still lack accurate measures of how damaging future events will be. For example, despite many years of research, it still remains a question as to how much variability in ground motions one should expect of a large San Andreas type earthquake, and whether early warning for debris flows can be successfully implemented. In this talk, I address both of these questions by using simple but physically sound mechanical principles to quantify certain aspects of these hazards.