

UC SANTA BARBARA  
Department of Earth Science

# **Earth Science Colloquium**

**WEBB 1100 • THURSDAY January 9th., 2020 • 2:00 PM**

## Rivers and hillslopes: deciphering the signals of sediment transport

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In view of modern anthropogenic impacts, forecasted changes in climate and resulting shifts in the frequencies and magnitudes of surface processes such as wildfires, landslides and large floods, reliable models are needed to monitor and predict the short-term evolution of the Earth's surface. Models generally consider climate and tectonics to be the primary controls on landscape evolution over large areas and long timescales, but applying these models to real landscapes over timescales relevant to humans remains a major challenge in geomorphology. This is primarily because sediment transport at the process or field scale is nonlinear, stochastic, often heavily influenced by heterogeneous secondary parameters such as biota and soil characteristics, and hence difficult to measure in situ or model through laboratory experiments. I will discuss two novel approaches to studying sediment transport in rivers and on hills: (1) using seismometers to monitor the elastic waves generated by mobile river sediment impacting its bed; and (2) a statistical model that captures the effects of particle size, surface slope, and topographic roughness (e.g., due to vegetation) on long-distance or "nonlocal" particle motion characteristic of steepplands and post-fire erosional processes such as dry ravel.