

Nate Lindsey

UC Berkeley / LBNL

April 17, 2019

4pm Rm 265 McCone Hall

UC Berkeley Campus

**Title: Sound from Light: Three Examples of How
Fiber- Optic DAS is Changing Seismology**

Abstract:

Our understanding of the planet suffers from a profound observation bias – measurement points are sparse and clustered on continents. Distributed fiber-optic acoustic sensing (DAS) is an emerging photonic tool that transforms telecommunications cables into massive, dense ground motion arrays with 1 sensor per meter over kilometers of fiber length. This represents a new opportunity to study earth systems with continuous, long-range, regularly-sampled seismic wavefield records in large volumes (~ 1 TB / day). To-date, most DAS applications have studied processes with signal frequencies above $f=10$ Hz (e.g., active-source reservoir imaging, near surface V_s30 dispersion profiling, regional to local earthquake detection and location). Here we ask: How broadband is DAS? We explore this question using ambient noise and earthquake wavefields in three different field experiments in Alaska and California. We find that DAS is at least as broadband as a traditional broadband sensor over the range $f = 0.005 - 0.5$ Hz. We demonstrate that existing telecommunications fiber-

optic networks can be used as broadband arrays to interrogate a range of earth science processes, specifically in cryosphere and marine environments, where large-scale geophysical studies are logistically challenging.

Speaker Bio:

Nate Lindsey is a 4th year PhD student at UC Berkeley in the Earth and Planetary Science Department, and an affiliate at Lawrence Berkeley National Lab. He received a BS in Interdisciplinary Engineering from the University of Rochester, and MSc in Geophysics from the University of Edinburgh.



After the talk: We will gather at Matiki Island BBQ and Brew (no host) 1828 Euclid St (300ft from North Gate entrance on Euclid)