

SSA Photonic Seismology Workshop

How to Scale Up (presentations and panel)

Fiber optic sensing technologies hold immense promise for advancing geophysical studies. Distributed Acoustic Sensing (DAS) has demonstrated remarkable capabilities in studying surface and subsurface processes with unprecedented resolution and over extended periods, even in challenging environments. Emerging technologies like phase transmission and state of polarization (SoP) offer the potential for continental or oceanwide scale monitoring with continuously improving data quality. Yet, to fully leverage the potential of fiber sensing for geophysical applications, several key steps must be taken. This includes facilitating access to existing fibers and streamlining the installation of new fibers in both onshore and submarine environments. Overcoming challenges in telemetry, real-time monitoring, and data transportation is crucial, as proven by many ongoing efforts underway to address these obstacles. Additionally, ensuring common standards for metadata and providing user-friendly software interfaces are essential for encouraging broader use and analysis of fiber optic sensing datasets, especially as they become more accessible to the public. While advancements in photonics technology have led to faster algorithms, there is a need to develop techniques and infrastructure tailored to fully exploit the richness of fiber optic sensing datasets such as DAS and enable greater synergy among scientists. As new techniques such as SoP and projects such as smart cables emerge, it will be important for the geophysical community to embrace these innovations and integrate them effectively into existing practices. This session will feature a series of short talks followed by a panel-style discussion, exploring these topics, presenting new and emerging solutions, and addressing open challenges in deploying fiberoptic sensing technologies to the next level.