Ernest Majer has had a distinguished career as an energy geophysicist at LBNL. While a graduate student in geophysics at U.C. Berkeley, he came to work at LBNL in the late 1970s and early 1980s to do seismic wave analyses for field studies in geothermal and petroleum regions. As part of seismological explorations in Nevada and Northern California, he tested exploration instruments and data processing/interpretation techniques for locating and assessing potential geothermal and petroleum sources. This work led to characterizing acoustic emissions and microseismic activity associated with geothermal and petroleum reservoir management, the underground storage of nuclear waste (thermal and radiation effects), determining the path of hydrofractures associated with stimulation and stress measurement activities, and tracking fluid injection fronts.

Throughout this period, Majer was developing the Automated Seismic Processor, or ASP, the first mobile, computerized processor to identify, locate, and measure very small seismic events (micro-earthquakes) in real time. The motivation for developing the ASP was the need to simplify routine micro-earthquake data acquisition and reduction, as well as improve the cost effectiveness of geothermal investigations. The ASP made it practically and economically feasible to do advanced seismic surveys as part of geothermal exploration. The ASP won an R&D 100 award in 1984. Soon after, to take advantage of dramatic improvements in CPU and memory in the late 1980s, Majer and his team built an updated, faster version of the ASP, which could also save waveforms.

Taking over as Group Leader of ESD's Geophysics/Geomechanics Department in the late 1980s, Majer expanded his work to include wave propagation studies of reservoir sites. Activities focused on utilizing multicomponent vertical seismic profiling (VSP) and high resolution tomographic mapping techniques, with an initial emphasis on fractured rock sites and then on heterogeneous near-surface soils--with the goal of linking transport parameters to the geophysical parameters through laboratory studies of rock and soil physics. In conjunction with these projects, Majer also carried out work to develop in-field, seismic data acquisition and processing systems for crosswell and single well systems.

As Head of the ESD Subsurface Geosciences, Geophysics/ Geomechanics Department in the 1990s, and later as ESD Deputy Director and Acting ESD Director in the early- and mid-2000s, Majer extended his subsurface geophysics work to include not only recovery of conventional and alternative energy sources, but also the application of geophysical methods to study subsurface bacterial transport (in connection with environmental remediation) and CO2 sequestration Work has focused on complex geologic environments such as fractured reservoirs, heterogeneous environments, and multiphase/multifluid reservoirs. Recent emphasis has been on using geophysical methods to allow improved energy efficiency for extraction of resources from tight gas sands and oil sands, through application of alternative methods such as seismic stimulation, microbially enhanced oil recovery, and high resolution imaging of in situ processes.