Skeletal muscle is the most abundant tissue in humans and faces near instantaneous changes in demand for force production lasting from seconds to minutes to hours. Initiating and maintaining muscle contraction requires rapid, coordinated movement of signals and material within and among various structures located throughout the relatively large muscle cell. This seminar will focus on how energy is distributed throughout striated muscle cells in order to sustain muscle contractions, deficits in which have been implicated in many pathologies including diabetes and muscular dystrophy as well as aging. In particular, Dr. Glancy will discuss how the structure and function of the cellular energy distribution system are optimized as part of the integrated muscle cell to maintain energy homeostasis during the large change in energy demand caused by the onset of muscle contraction.