Radiative heat transfer at the nanoscale has attracted considerable attention recently due to its promise for both modulation of heat transfer and for thermophotovoltaic energy conversion. In this talk, I will describe recent efforts in our group to experimentally elucidate nanoscale radiation. Specifically, I will present recent experimental work from our group where we have addressed the following questions: 1) Can theory accurately describe radiative heat transfer in single nanometer sized gaps? 2) What is the role of film thickness on the nanoscale radiation? and 3) Can radiative heat fluxes that are orders of magnitude larger than those between blackbodies be achieved? In order to address these questions we have developed a variety of instrumentation including a novel nanopositioning platform and several microdevices, which will also be described. Finally, we will outline how these advances can be leveraged for future investigations.