ICME Prize

Background

ICME (Integrated Computational Materials Engineering) is an *integrated* approach to "enable the optimization of the materials, manufacturing processes, and component design long before components are fabricated, by integrating the computational processes involved into a holistic system." (National Academies Press, 2008). The emphasis in ICME is on the "I" for integrated and "E" for engineering. With the key ingredient being the linkage of manufacturing processes to material microstructure which in turn influence material properties and their variability, thereby enabling tailoring (engineering) of materials to optimize performance for their intended usage. For example, processing conditions produce a particular microstructure from which properties are obtained, which then dictate a specific component performance. Consequently, it is very important to understand the input and output at each scale in order to develop rigorous approaches to bridging length and time scales, enable the necessary transfer of information and computational linkages between these scales and enable a designer/analyst to optimally achieve their design objectives (performance metrics). The interconnection of these scales and the development of accurate processing/ microstructure/ property/ performance relationships as well as information management throughout the process is of primary interest. Yet computational material modeling is merely a means to an end but not the end itself.

Within the context of this contest we are looking for projects that will not only demonstrate the above scale linkage with respect to customer performance requirements but will also at the same time address specific bottom line business benefit. Consequently, it is anticipated that these projects will include cross-supply chain, cross-life cycle and cross-functional expertise from all relevant disciplines (i.e., expect that project will be multi-disciplinary in nature).