

Advancing Manufacturing Processes

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For decades, materials and manufacturing technology have been advancing at an exponential pace. Consequently, today many engineering professionals are grappling with how to incorporate many new manufacturing techniques into their businesses to become or remain competitive in the global environment. While many of these technologies are incremental and evolved from previous technologies, periodically, real game changing, “disruptive technologies” occur for which there is no prior history or infrastructure yet developed to support. These technologies are particularly challenging to embrace both for the current labor force and for academics who are responsible for training the future labor force.

Methods to quantify AM components are currently being explored both in-situ and ex-situ. In-situ techniques can be used to identify spatially resolved locations of possible defects. These techniques are helpful in optimizing the build parameters and developing procedures for developing in-situ inspection techniques. These efforts are coupled with optimization of the build parameters to obtain the best build in terms of minimizing void content. However equally important to the AM development is the post-processing heat treatments. The rapidly and repeatedly melted and solidification process results in non-equilibrium microstructures which respond differently to heat treatments than either cast or wrought materials. This presentation will summarize efforts to optimize these post processes which are needed to form the basis for standardization specifications