1154-65-2237 **Jeffrey Alan Furst Hittinger*** (hittinger1@llnl.gov), Center for Applied Scientific Computing, Box 808, L-561, Livermore, CA 94551. *Are PDEs still relevant? Scientific Computing in the Age of Big Data and Extreme Computing.*

Traditionally, scientific computing has been dominated by simulation based primarily on discrete approximations of Integral Equations, ODEs, and/or PDEs. As a community, we have seen decades of tremendous developments in both computer capabilities and numerical methods that have allowed us to model complex physical problems. Even with all these advances, there are still limitations in our modeling capabilities based on PDEs, particularly when issues of weak solutions, multiscale behavior, uncertainty, and optimization are involved, and we continue to see new advancements PDE-based simulation. However, the computing ecosystem is changing. Computer technologies are becoming more complex through hardware specialization, and the proliferation of inexpensive sensors and computing technologies are driving a new reliance on data-driven computing. Claims are being made that data-driven models will replace traditional PDE models and that traditional simulation will be less important moving forward. Is this true? What would be the trade-offs? Is this even a binary choice? Can we harness the unique strengths of both PDE and data-driven models to solve problems that today are intractable? (Received September 17, 2019)