COVID-19 and Manufacturing: Digital Twins

June 16, 2020 11:00 am - 12:00 pm

11:00am - 12:00pm	Digital Twins: The Vision. And Demystified. Brian Anthony Faculty Lead, Industry Immersion Program in Mechanical Engineering Co-Director, MIT Clinical Research Center Associate Director, MIT.nano

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Dr. Anthony is Associate Director of MIT.nano, Faculty Lead for the Industry Immersion Program in Mechanical Engineering, and Co-Director of the MIT Clinical Research Center. With over 25 years' experience in product realization—Dr. Anthony won an Emmy (from the Academy of Television Arts and Sciences) in broadcast technical innovation—Dr. Anthony designs instruments and techniques to monitor and control physical systems. His work involves systems analysis and design and calling upon mechanical, electrical, and optical engineering, along with computer science and optimization, to create solutions.

The focus of Dr. Anthony's research is computational instrumentation—the design of instruments and techniques to measure and control complex physical systems. His research includes the development of instrumentation and measurement solutions for manufacturing systems and medical diagnostics and imaging systems. In addition to his academic work, he has extensive experience in market-driven technology innovation, product realization, and business entrepreneurship and commercialization at the intersection between information technology and advanced manufacturing. His teaching interests include the modelling of large-scale systems in a wide variety of decision-making domains and the development of optimization algorithms and software for analyzing and designing such systems. He has extensive experience in market-driven technology innovation as well as business entrepreneurship.

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The Vision: With the proliferation of digital technologies and a rapidly changing global market, manufacturing paradigms will shift from automated to autonomous operations with more flexible flow chains. This in turn enables a more rapid realization of products from concepts in commercially viable ways, shorter time to market and faster throughput.

The digital thread of sensors, data, computation, and information is required to fully realize the potential of digitally-native production systems, with high-value, customized, products. The digitally native production system includes digital twins of the product, materials, manufacturing process, supply chain and production line.

A full framework of digital twins assist in simulating and integrating sensor data for data analytics. Digital twins enable greater throughput, early identification of bottleneck processes, supply chain issues and identification of novel process and production level opportunities.

And Demystified: Digital twins are, simply, physics-based and data driven models. They are design and decision tools. Let's explore some examples.