NSF grants $1.2 million to cope with complexities in manufacturing systems

by Brian Fitzgerald

In response to the recent explosive growth in computer power and consequently new access to enormous amounts of information that can speed up manufacturing processes, the National Science Foundation (NSF) has awarded $1.2 million to an interdisciplinary research team that includes faculty members of ENCo's manufacturing engineering department and one from the Center for Computational Science. Their mission is to propose solutions to computational challenges in that are fundamentally new and intricately complex.

"Our research will focus primarily on the planning and control of manufacturing production," says Michael Carma, a professor of manufacturing engineering and the grant's principal investigator. However, the ramifications of the grant are expected to transcend disciplinary boundaries.

The NSF Knowledge and Distributed Intelligence (KDDI) team was one of 40 successful teams out of 850 KDDI applications. The other members of the KDDI team are Christos Cassandras and Yankee Paschalis, a professor and an associate professor, respectively, in ENCo's manufacturing engineering department, and Francis Alexander, an assistant research professor at Boston College's Center for Computational Science. The grant is not an interdisciplinary, but interdisciplinary, and it also funds research that is not interdisciplinary.

In 1990, the research team also consists of Dimitri Bertsekas and John Tsitsiklis, professors at MHT's department of electrical engineering and computational science, and Yannia Ioannides, a professor in Tufts University's economics department.

"Carma, an expert in the design and control of manufacturing systems, points out that the complexity of manufacturing has become more and more complex since Henry Ford's 20-horsepower Model T was first assembled at the Detroit factory in 1908. Obviously, technological advancements in manufacturing have been significant. The assembly line in a modern automobile plant is far more complicated than the assembly line of a 1908 automobile. Manufacturing principles are not the same today as they were in the 1900s. Today, manufacturing systems need to be able to deal with a variety of products, each with its own unique set of requirements. This is a challenge that cannot be solved by traditional manufacturing techniques, and it requires a more holistic approach to manufacturing system design.

"To address this complexity, our team has developed a new approach to manufacturing system design that is based on the principles of distributed intelligence. The approach involves the development of new methods for modeling, simulation, and control of manufacturing systems. Our goal is to design manufacturing systems that are capable of handling the complexity of modern manufacturing environments while still maintaining efficiency and flexibility. This approach is expected to have a significant impact on the future of manufacturing and to contribute to the development of more efficient and sustainable manufacturing systems.

"As we move towards a more sustainable future, it is essential that we develop new approaches to manufacturing that can handle the complexity of modern manufacturing environments. Our approach to distributed intelligence is a step in this direction, and we are excited to see how it will evolve over time. We believe that this approach will have a significant impact on the future of manufacturing and will contribute to the development of more efficient and sustainable manufacturing systems. Our team is committed to continuing our research and to working with others to develop new approaches to manufacturing that can handle the complexity of modern manufacturing environments.

"In conclusion, we believe that the development of new approaches to manufacturing is essential to the future of manufacturing. Our approach to distributed intelligence is a step in this direction, and we are excited to see how it will evolve over time. We believe that this approach will have a significant impact on the future of manufacturing and will contribute to the development of more efficient and sustainable manufacturing systems. Our team is committed to continuing our research and to working with others to develop new approaches to manufacturing that can handle the complexity of modern manufacturing environments.

"Our work is part of a broader effort to make manufacturing systems more sustainable and efficient. We believe that our approach to distributed intelligence is a key part of this effort, and we are committed to continuing our work to develop new approaches to manufacturing that can handle the complexity of modern manufacturing environments. Our team is excited to see how our work will evolve over time and to see how it will contribute to the development of more sustainable and efficient manufacturing systems."