

## **HI-001**

### **Computational Models and Algorithms for Enterprise-wide Optimization of Process Industries**

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#### **Abstract**

The process industry is a key industrial sector in the U.S. and in the state of Pennsylvania. Enterprise-wide optimization (EWO) has become a major goal in the process industries due to the increasing pressure for remaining competitive in the global marketplace. EWO involves simultaneously optimizing the operations of supply, manufacturing and distribution activities of a company to reduce costs and inventories. A major focus is the scheduling of manufacturing facilities, as well as their modeling at the proper level of detail, often requiring nonlinear process models. Major operational items include planning, scheduling, real-time optimization and inventory control.

It is the goal of this project to provide a comprehensive set of computational capabilities for EWO problems. In particular, our multidisciplinary team from three institutions of Pennsylvania, intends to develop novel models, algorithms, decomposition methods, and computational techniques in order to provide a new generation of analytical IT tools. The project will also involve close collaboration with industry in Pennsylvania and other states, particularly from several petroleum, chemical and engineering/software companies that are members of the Center for Advanced Process Decision-making at Carnegie Mellon University. We also intend to filter our research results down to the undergraduate level with a new minor in EWO. Our research results will be available through the Internet, potentially benefiting both universities and companies in Pennsylvania.