

## MANUFACTURING AND DESIGN EDITORIAL

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The general theme of this special edition is manufacturing and design. Manufacturing encompasses a great many issues, including the science of specific processing methods, the organization of manufacturing activities from a system-wide perspective, and the influence of manufacturing operations on the natural environment. One could say that there are three levels of common manufacturing activity; the process or local level, the production systems level, and the global level. Integrating manufacturing and design is very important within each of these individual levels as well as across all levels. The contributions to this edition address a subset of these wide-ranging issues.

An important contemporary topic at the manufacturing process engineering (local) level is the development of methods and capabilities for precision and small scale machining. The first article in this issue, "Design of an Electrochemical Cell for Micromachining Applications" by Bonifas and Lilly presents the research issues involved in the development of a three-axis pulsed ECM machine designed specifically for machining features at the micro scale. Another process-related contribution, "Identifying the Best Compromises Between Multiple Performance Measures in Injection Molding (IM) Using Data Envelopment Analysis (DEA)" by Castro, et al considers optimization methods which can be applied to design process parameters for obtaining the best performance when multiple, and perhaps competing, objectives exist.

At the production systems level, the design of production layouts, schedules, and process plans are critical to efficient operation. "A New Flow Diagramming Scheme for Mapping and Analysis of Multi-Product Flows in a Facility", contributed by Zhou and Irani, presents a new approach to the design of layouts for facilities that process a high variety of products. Another contribution, "Development of a New Heuristic For Scheduling Flow-Shops With Parallel Machines by Prioritizing Bottleneck Stages" by Phadnis, et al, presents a heuristic procedure to address the difficult problem of designing efficient schedules which maximize the performance of batch-type manufacturing facilities. Also, "A Knowledge Intensive Multi-Agent System for Cooperative/Collaborative Assembly Modeling and Process Planning" by Sha et al, presents a knowledge intensive system for assembly oriented design in a distributed collaborative design environment.

On the global or environmental level, a contribution by Sun, et al "Design for Environment: Methodologies, Tools, and Implementation" considers recent developments, current activities, and future trends in the area of design for the environment. The paper discusses decision making, design support, material flow analysis and application of design for the environment in industry.

The researchers who have contributed to this special edition have demonstrated some potential benefits of integrating manufacturing and design and have described some novel new approaches. I sincerely hope that readers will find these research works interesting, thought provoking, and useful.