

## Preface

Welcome to the *TutORials in Operations Research 2007*, subtitled “OR Tools and Applications: Glimpses of Future Technologies”; this is the fourth published volume in the series that was started by Harvey J. Greenberg in 2004. Like its predecessors, the tutorials in this book, as well as eight others, will be presented at the 2007 INFORMS annual meeting in Seattle, Washington. They all represent both the breadth and depth of methodologies and applications that define operations research’s (OR) varied and significant contributions. This year, we are fortunate to have a group of tutorials presented by mostly senior INFORMS members who have extensive experience in advancing their respective topics as well as applying and presenting their material.

OR has been applied to numerous problems in the nonprofit sector with considerable success. For example, the potential and challenges of work in this area are illustrated by the tutorial by Michael P. Johnson (“Community-Based Operations Research”). In his chapter (co-authored with Karen Smilowitz), Johnson argues that political and social forces cause public sector problems to be “messier” and more complex than problems in the private sector. Johnson and Smilowitz illustrate their points with case studies in the areas of food security and affordable housing.

In other presentations, Kenneth R. Baker presents a tutorial on “safe scheduling”. In his chapter (co-authored with Dan Trietsch), Baker presents a review of scheduling theory and describes how results from deterministic scheduling theory can be extended to stochastic problems to accommodate safety times explicitly. In a related tutorial, Willy Herroelen discusses the issue of generating project planning schedules that are protected from random disruptive events and unanticipated delays (“Generating Robust Project Baseline Schedules”). Extending the topic of planning under the threat of possible disruptive events, R. Tyrrell Rockafellar’s tutorial (“Coherent Approaches to Risk in Optimization Under Uncertainty”), explores various strategies for optimizing stochastic planning problems and the mathematical implications of these strategies, as well as recently developed methodologies that avoid some of the problems (e.g., nonconvexity) inherent in previously used approaches.

Extending optimization related topics, Leon S. Lasdon presents a tutorial on solving global optimization problems (“Computational Global Optimization”). In his chapter (co-authored with János D. Pintér), Lasdon discusses various strategies that have proven effective for finding global optima in nonlinear models that have multiple local and global optima. Lasdon and Pintér review previously suggested solution approaches and present current problem areas and research opportunities. In a related tutorial, “Nested Partitions Optimization,” Leyuan Shi, presents the nested partitions (NP) method for solving large-scale discrete optimization problems. In her chapter (co-authored with Sigurdur Ólafsson), she discusses how to implement the NP method, how it relates to other exact and heuristic methods, and illustrates the applicability of the NP method to various problems in supply chain management, health case delivery, and data mining.

In the years since the first OR application was published by A. Charnes in 1956, the profession has matured in both the development and application of OR methodologies and tools. In his tutorial, Frederick S. Hillier (with co-author Mark S. Hillier) discuss the trends in OR and management science education over the past forty years. Hillier’s tutorial discusses changes that have occurred and explore what changes might be expected in the future.

Exploring the interface between OR methodologies and related areas, Gary M. Erickson will present a tutorial on “Differential Games in Marketing Science”. In his chapter, Erickson

presents an overview of differential games as applied in marketing science and advertising. Erickson's tutorial should be of interest to Operations Management researchers, among others, who are interested in expanding their work to include marketing issues. Erickson explores the challenges of using differential games and will discuss a number of applications and numerical examples.

In the final chapter, Scott Mathews (with Jim Salmon) of The Boeing Company discusses an important application of OR/finance methodologies to the problem of planning and evaluating risky proposed projects. Their approach (termed "business engineering") combines concepts from real options with Monte Carlo simulation and demonstrates how their multidisciplinary methodology can provide firms with a tool that can help them evaluate and structure high-benefit projects while minimizing risks.

These 2007 *TutORials*' chapters illustrate the contributions that derive from an interdisciplinary field that lies at the intersection of economics, engineering, computer science, mathematics, probability and statistics, and psychology. The tutorials demonstrate how OR can bring synergy, insights, and solutions to complex problems. It is the goal of the 2007 INFORMS tutorials committee to represent a breadth and width of current problem areas and tools that define our profession. We hope that all the tutorials presented will stimulate additional interest, research, and application in the many areas where OR has much to contribute.

TED KLASTORIN  
University of Washington  
Seattle, Washington