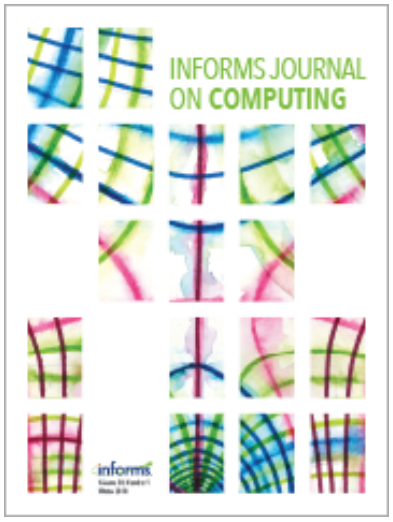

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Note from the Editor

Alice E. Smith

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Note from the Editor

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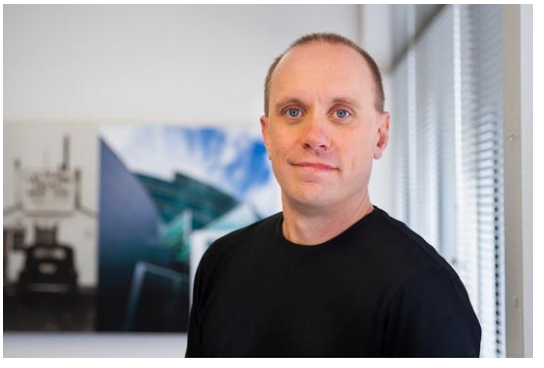
First, I want to welcome new Area Editor of the Network Optimization: Algorithms and Applications area of our journal, Russell Bent. The previous Area Editor, David Alderson, has assumed the role of Editor in Chief of the *INFORMS Tutorials in Operations Research* Journal. We sincerely thank Dave for his many devoted years of service to *INFORMS Journal on Computing (IJOC)* and wish him well in his new position of leadership. Russell is not new to *IJOC*, having served as an Associate Editor in the Computational Modeling: Methods and Analysis area. A little more about him and the network optimization area appears below along with his message concerning the Networks area.

Area Description: The Network Optimization Area focuses on networks across the social, natural, physical, and engineering sciences. This focus ranges from engineered networks like electric grids, telecommunications, and transportation, to network models of social interactions, and to natural processes like biological networks. Of primary interest are those papers that combine fundamental contributions in the advancement of computational methods for network science (optimization, game theory, artificial intelligence, etc.) with impactful computational demonstrations on an application domain.

Topics of interest include, but are not limited to, the following:

- Algorithms for analysis, design, planning, and control of networks;
- Network security, survivability, robustness, risk, and resilience;
- Network applications in emerging technological areas; and
- Case studies involving real, large-scale network problems including publishable data and a computational method contribution.

Area Editor: Dr. Russell Bent is a scientist at Los Alamos National Laboratory (LANL) in the Applied Mathematics and Plasma Physics group. Prior to joining LANL in 2005, he obtained a PhD in computer science from Brown University. At LANL he leads a team of researchers who are focused on developing next-generation algorithms for planning, operating, and designing critical infrastructure systems. He is the principal or coprincipal investigator for numerous U.S. Department of Energy projects in these areas, with focuses on improving robustness and resilience of energy systems, modeling interdependencies between systems, modeling extreme events that impact critical infrastructure, modeling smart grid technologies, and developing optimization and artificial intelligence methods. He is the author of one book, *Online Stochastic Combinatorial Optimization*, and over 100 peer-reviewed journal and conference publications (see https://public.lanl.gov/rbent/). His message of introduction appears below.



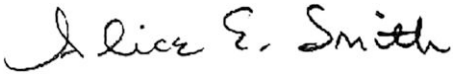
"Hello *IJOC* community!

I am excited by the opportunity to step into the role of Area Editor for Networks in the *IJOC*. As a longtime associate editor and contributor to the journal, it is truly an honor to serve the community in this way. David Alderson has done an incredible job stewarding the area for many years and I can only hope to meet the high bar that he has set. The Networks area fills a unique niche with a simultaneous emphasis on advancing the state-of-practice in computational approaches to modeling networks and connecting these methods to problems inspired by network applications. Thus, we are encouraging submissions that contribute foundational computation methods (optimization, artificial intelligence, etc.) and demonstrate impact to network application domains. We have also refreshed the application emphasis to reflect growth in network modeling of social and biological systems, which complements our traditional emphasis on engineered and physical systems like transportation and communication. I am looking forward to working with you and handling your manuscripts!"

Second, we continue to announce the winners of the *INFORMS Journal on Computing (IJOC)* Test of Time Paper Award to cover the backlog of awards since the journal's inception. The energetic and able committee chaired by John Chinneck with members Bill Cook, Bruce Golden, Pascal Van Hentenryck, and David Woodruff have selected the awardee, covering the period 1998 through 2002. What follows is the citation from the award committee and then a reflective interview with the authors about this paper.

I want to thank the committee for their superb efforts and am very pleased to share this recognition of the impactful heritage of our journal.

All my best,



The Test of Time Award for papers published in the *INFORMS Journal on Computing* in the years 1998–2002 is awarded to

Lifted Cover Inequalities for 0-1 Integer Programs: Computation

Zonghao Gu, George L. Nemhauser, and Martin W. P. Savelsbergh
INFORMS Journal on Computing 10(4):427–437
https://pubsonline.informs.org/doi/abs/10.1287/ijoc.10.4.427

Test of Time Award Citation 1998–2002

One of the great success stories in operations research has been the remarkable string of improvements in the practical performance of mixed integer-programming solvers over wide classes of applied models. An important component of that success was the early demonstration of the power of combinatorially defined cutting planes by Gu, Nemhauser, and Savelsbergh. Their computational study focuses on the use of lifted cover inequalities for models with 0-1 valued variables. The paper emphasizes the importance of careful algorithmic and implementation choices, concluding with a list of practical recommendations that can be immediately adopted in solvers for large-scale problem instances. Their work is cited in papers covering a remarkable range of problem classes, and it remains a shining example for the study and reporting of computational issues in IP methodology.

Retrospection from the Authors, Zonghao Gu, George L. Nemhauser, and Martin W. P. Savelsbergh

We thank the *IJOC* editors and the selection committee for the recognition of our paper. It is an honor to be selected for the Test of Time Award of the journal, the most favored place to publish computational work in operations research.

This paper is about theoretical and computational research in support of the development of a state-of-the-art academic mixed integer program (MIP) solver. Earlier in the 1990s, after several decades of research on simplex and interior point algorithms, commercial linear program (LP) solvers, such as CPLEX, had become quite reliable and powerful. They could be used out-of-the-box to solve many real-world applications. However, the models for most optimization applications have binary or integer decision variables, and they needed fast and reliable solvers too. Although there had been significant progress in the theory of integer programming and in the closely related field of combinatorial optimization, the principal solution technique used to solve MIPs continued to be unembellished LP-based branch-and-bound, introduced by Land and Doig in 1960. Many novel ideas were not computationally tested, and few, if any, were incorporated into commercial MIP solvers. Thus, there were no commercial MIP solvers that could reliably solve many real-world MIP models out-of-the-box.

One effort to make MIP powerful enough for real-world applications was by Nemhauser, Savelsbergh, and Sigismondi, who developed an academic MIP solver, MINTO—Mixed INTeger Optimizer. Its purpose was to further research and computational testing. Several PhD students of Nemhauser and Savelsbergh, including Atamturk, Linderoth, and Gu, joined the effort with their advisors. This paper is about the part of Gu's thesis research that addressed cutting planes. At that time, lifted cover inequalities, especially 0-1 knapsack cover inequalities, were well known and well studied theoretically and had undergone some computational testing. However, it was still important and interesting to empirically investigate the effect of various algorithmic and implementation choices regarding lifted cover inequalities. This was done using MINTO. The effort not only pushed the capability of MINTO to solve MIP models, but its exposition in the paper also prompted many of the ideas to later be incorporated into commercial solvers, such as CPLEX and Gurobi.

Because of many academic efforts similar to the one reported on in this paper and the many commercial company efforts, MIP software has now become a very successful, indeed essential, tool used daily in many real-life applications.