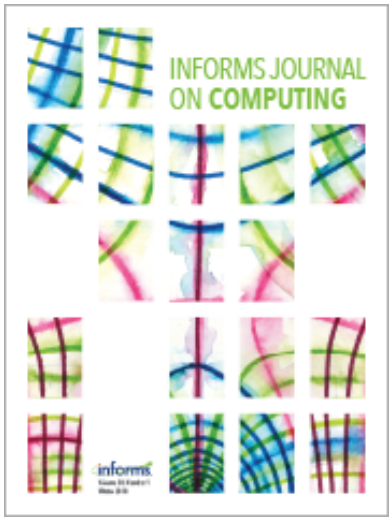


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# Note from the Editor

Alice E. Smith

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# Note from the Editor

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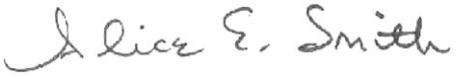
We continue to announce the winners of the *INFORMS Journal on Computing* (*IJOC*) Test of Time Paper Award to cover the backlog of awards since the journal's inception. The energetic and able committee chaired by John Chinneck with members Bill Cook (recused for this selection), Bruce Golden, Pascal Van Hentenryck, and David Woodruff have selected the awardee, covering the period 1990 through 1994. What follows is the citation from the award committee and then a reflection on the paper and this award by the authors. We have also made the landmark code from this paper available at the *IJOC* GitHub site (please see the link below).

I want to thank the committee members 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 1990–1994 is awarded to

## A Computational Study of the Job-Shop Scheduling Problem

David Applegate and William Cook
*ORSA Journal on Computing* 3(2):149–156
https://pubsonline.informs.org/doi/abs/10.1287/ijoc.3.2.149

## Test of Time Award Citation 1990–1994

This paper, together with one by Carlier and Pinson that closed the famous MT-10 problem, started a golden decade for research in job-shop scheduling and scheduling in general. It demonstrated that challenging job-shop problems could now be solved optimally in a few minutes, using beautiful mathematical programming concepts, including cutting planes and combinatorial relaxations. It was widely influential, studied both complete and heuristic methods, closed a number of open problems, and promoted the edge-finder algorithm that became standard in commercial scheduling packages.

## Comments on this *IJOC* Test of Time Paper Award from the Authors David Applegate and William Cook

We thank *IJOC* editor-in-chief Alice E. Smith and the selection committee for the recognition of our work. At the time of the paper's submission, Jan Karel Lenstra was the journal's area editor for optimization. That was a great fortune for us. We still appreciate his encouragement and his smooth handling of the review process.

In the job-shop scheduling project reported in our paper, we set out to solve instances of a model that had a well-earned reputation as a tough nut to crack. We were therefore more than happy to adopt all ideas we could find in the literature. This gives the paper a survey flavor, providing a snapshot of the computational techniques available at the time. In this, we were following up groundbreaking work by Carlier and Pinson, who had several years earlier solved for the first time a $10 \times 10$ problem that had been open for 25 years.

One idea we would like to single out is our use of a simple branching rule in a combinatorial branch-and-bound algorithm. When evaluating a branching choice, we computed lower bounds that would be produced for the two child subproblems. Because we wanted to increase the overall lower bound, we chose the branch that maximized the minimum of these two bounds. Simple enough. However, to our great surprise, this rule, together with a fast lower-bound algorithm, was able to solve the famous $10 \times 10$ example. We adopted it in our branch-and-bound code, and it evolved into the "strong-branching rule" used in the Concorde TSP solver, written together with Robert Bixby and Vasek Chvatal.

In looking back at our scheduling paper, it occurs to us that a reason for its early success is that we made the source code and problem instances easily available. We are therefore happy that *IJOC* now hosts this material at https://github.com/INFORMSJoC/TestOfTime2023.1. The authors thank Ted Ralphs for setting up the repository.

On a personal note, this was our first joint project. It was Bill's introduction to computational work and David's introduction to combinatorial optimization.