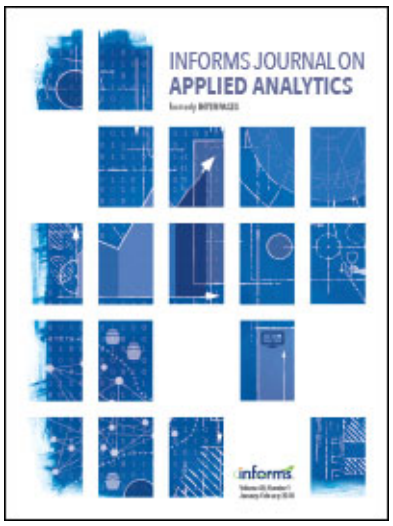

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2002 Franz Edelman Award for Achievement in Operations Research and the Management Sciences

It was a privilege and an honor to serve as chairman of the 31st annual international competition for the Franz Edelman Award for Achievement in Operations Research and the Management Sciences. As I also stated last year, I have so many satisfying memories: receiving the initial set of entries and seeing the depth, diversity, quality, and impact of operations research and management science that they represented; working with dedicated professionals to evaluate, verify, and select the six finalists; observing how the entrants worked with their coaches to develop extremely polished clear presentations; and working with the judges to determine the eventual winner. Our decisions were often difficult to make, but they were made professionally with sound judgment and consensus. The knowledge that we were working with an abundance of quality somewhat compensated for the difficulties of the decisions. Although there is one winner to the competition, there are no losers. All of the finalists whose papers are presented in this issue can justifiably be proud of their work. Also, there were many quality entries that regretfully could not become finalists.

The competition is sponsored jointly by INFORMS and CPMS, the Practice Section of INFORMS. The primary purpose of the competition is to recognize outstanding accomplishments in the practice of our profession. The prizes recognize verifiable results that had major impacts on the client organizations. The awards are given to both the client organizations, which receive the award citations, and the individuals producing the work, who receive the cash awards. This year, the prize money totaled $15,000 with $10,000 going to the first-prize winner. More important, all prize winners have the honor of knowing their work has been recognized by their peers as the best in the business. In addition to having their efforts described in this special issue of *Interfaces*, all of the finalists will have their presentations added to the Edelman Prize videotape collection.

The award is named in honor of Franz Edelman. Dr. Edelman established the operations research group at RCA, which was one of the earliest industrial OR/MS groups in North America. He worked for over 30 years at RCA and is counted among the fathers of innovation in management science.

The Edelman process takes the best part of a year. A call for papers distributed in late summer of 2001 resulted in over 20 entries. An award committee selected the most noteworthy for careful verification. After a comprehensive review, the committee chose six finalists to give presentations at an all-day session held in conjunction with the conference on practice, "Analyzing and Enhancing the Extended Enterprise," in Montreal, Canada on May 20, 2002.

In keeping with the traditional award process, all finalists were assigned a coach to assist them. These coaches played a critical role in the competition. They became both the greatest critics of the finalists and their strongest advocates, helping them to polish their presentations and bring out their very best. I thank the coaches who served this year: Anthony Brigandi, coach for Schindler Elevator Corporation; Murthy Mudrageda, coach for Syngenta Seeds, Inc.; Randall Robinson, coach for Continental Airlines (with CALEB Technologies); Richard Rosenthal, coach for PSA Peugeot Citroën; Michael Rothkopf, coach for Mars, Incorporated (with IBM); and Leon Schwartz, coach for Rhenania.

The judges also devoted a great deal of time to reading and becoming familiar with the work of the finalists prior to attending the competition. Immediately after the presentations, the judges began their deliberations, which continued until they reached unanimous agreement. I thank the judges who joined me this year: Peter Bell (Richard Ivey School of Business, University of Western Ontario), Joseph Discenza (SmartCrane LLC), Newton Garber (Garber Associates), Stephen Graves (Massachusetts Institute of Technology), Terry Harrison (Pennsylvania State University), Russell P. Labe (Merrill Lynch), Thomas Spencer

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III (New Jersey Institute of Technology), and Steven Strauss (AT&T).

All six finalists this year were outstanding. I urge you to read their papers in this issue of *Interfaces*. Since Stephen C. Graves, editor of this special issue, gives extensive information about the winner and other finalists in his introduction, I will not repeat this information.

Serving as chairman would not have been possible without the enthusiastic support of Monmouth University, both for my own time and for the use of its facilities for entry-evaluation events. AT&T sponsored the two large conference calls required to evaluate the entrants. Terry Cryan continues to be a delight to work with and helpful in all aspects of integrating the competition into the conference. Mary DeMelim has been associated with CPMS for years and oversaw many details of the process. Mary Steffens worked with the call for papers. Cheryl Clark ensured that the logistics at the competition site were flawless. The success of the 2002 Edelman Award was the result of the hard work and commitment of many volunteers. To name them all would be difficult, but my sincere thanks go to all of them, and my congratulations go to the winner, the finalists, and the entrants of the 2002 competition.

The Edelman competition has a bright future. It continues to be a major part of the applications conference, and new arrangements within INFORMS for supporting the competition financially and logistically will ensure that the competition remains the Super Bowl of operations research and the management sciences for the foreseeable future.

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I am honored to serve as the editor for this special issue of *Interfaces*. This annual special issue continues to represent the best of the best of our profession. This year is no exception. The competition for the Franz Edelman Award for Achievement in Operations Research and the Management Sciences was as competitive as ever in 2002. The six outstanding finalists each provided an excellent presentation and an excellent paper. Each is a great example of the influence and impact of management science, and each is a winner in its own right. I encourage you to read these papers, to discuss them with your colleagues, and to teach them in your classrooms.

The six finalists are from six different industries and have applied a full range of management science models and methods. All of the applications involve decision support and use some form of optimization. The applications range from dynamic production planning for seed corn to the application of analytical methods and simulation for the design of vehicle production lines. Once again an outstanding application came from the airline industry for finding the best way to recover the crew schedule after a major disruption. The applications also include a large-scale complex routing-and-scheduling problem, in this case for service technicians who perform preventive maintenance on elevators and escalators. We also saw two fairly new application contexts for operations research, one being the optimization of mailings for a mail-order firm and the other being the use of optimization in the design and implementation of a Web-based system for strategic-sourcing auctions. We were fortunate to have a rich and diverse set of superb examples of management science at work

The Edelman award went to Continental Airlines for its development and implementation of a decision support system for crew recovery. The authors of the lead article in this issue report on this exceptional work. The airlines have used operations research methods with great success to schedule their crews. However, Continental needed more ad hoc methods to fix the schedule when something goes wrong, for example, when bad weather delays flights. When a schedule is disrupted, the airline must quickly reassign crews to minimize additional flight delays and avoid cancellations, and to try to get back to the original schedule in the most cost-effective way. Continental Airlines, in collaboration with CALEB Technologies, implemented a decision-support system for finding near-optimal crew-recovery solutions. Continental has used this system to recover its flight schedules after several major disruptions, including the September 11th terrorist attacks. In comparison to other airlines, Continental has

recovered more quickly with fewer delays and cancelled flights. Continental estimates that this system saved the company $40 million in 2001, most of it from avoiding flight cancellations due to unavailable crews.

In many industries, the procurement function has control over a large share, if not the majority, of a firm's costs. Increasingly, firms seek to apply operations research to improve the results from their procurement functions. The work described in the paper from Mars, Incorporated is an outstanding example of this kind of application. Mars, in collaboration with a team from IBM, developed a Web site for conducting strategic-sourcing auctions. This Web site is unique with regard to its ability to accommodate complex bid structures, permitting suppliers to bid on product bundles or to submit quantity-based discount schedules. Built into the Web site is an optimization engine for determining the winning bids after each round of bidding and for providing pricing feedback to help the suppliers improve their bids. Several buyers at Mars, Incorporated have used the Web site to conduct auctions with impressive savings in time and cost.

PSA Peugeot Citroën is the sixth-largest automobile manufacturer in the world. In 1998, PSA launched a common-platform policy, producing multiple car models off of the same platform. This new policy increased part commonality across the car models, but it also required PSA to develop new production lines with sufficient flexibility to handle the multiple car models. Like most companies, PSA designed manufacturing systems relying on engineering art more than on science. To implement the new policy, PSA needed new tools for rapidly evaluating and designing the new production lines. These OR-based tools were based on analytical methods and a line simulator. PSA has successfully applied the tools to production lines representing over 75 percent of the cars it produces, with an average increase in productivity of four percent. Furthermore, the tools have been instrumental in PSA's discovering and disseminating design principles.

Catalogs are a critically important sales channel for many products and markets. Indeed, our household is inundated with catalogs, so many that it is hard to imagine how companies make money given the number of catalogs sent. In the mid '90s, Rhenania, a German mail-order company, was on the verge of a financial crisis as its sales, market share, and profits declined. At the time, Rhenania sent catalogs to customers for whom the expected profit from immediate sales exceeded the cost of the mailing. This practice kept each mailing profitable but resulted in fewer and fewer active customers as the firm dropped "unprofitable" customers from the mailing list. Luckily, Rhenania recognized the trap it was in, developed a customer-segmentation approach, and then optimized the frequency and mailings to different segments. In particular, Rhenania began sending catalogs to low-value customers, some fraction of whom would convert into profitable customers over the long term. The results have been spectacular, with a complete turnaround in the company's fate; sales, market share, and profits are all now increasing.

In North America, the Schindler Elevator Corporation employs thousands of service technicians to keep tens of thousands of elevators and escalators running. Much of their work is performing regularly scheduled preventive maintenance so as to avoid the need for emergency repairs. Scheduling these technicians to these maintenance tasks is an extraordinarily complex problem involving workload balancing, daily scheduling of tasks, and detailed routing. Schindler engaged Environmental Systems Research Institute to develop and deploy an automated route-scheduling-and-planning system. This system has fundamentally changed how the field offices create their routes, allowing them to plan much more efficiently with much more effective routes.

Production planning is a classic application domain for operations research. The application at Syngenta, however, is by no means old hat; rather, planning in this context requires new models and methods. Syngenta produces and sells seed corn. Its planning entails deciding how much and what type of seed corn to grow in one season for sale a year later. These decisions are subject to uncertainty in both demand and yield. Furthermore, after the US growing season, Syngenta has a second opportunity to grow additional seed corn in South America, albeit at a higher cost. Syngenta, working with researchers from the University of Iowa,

has developed a dynamic decision model that accounts for the various sources of uncertainty and the two growing seasons. After a careful trial of the model to prove its effectiveness, Syngenta has implemented the model for planning over 80 percent of its total sales volume.

I congratulate and commend all of the finalists for their excellent work and thank them for their contributions to this issue and to our profession. To all the volunteers who continue to make this competition a successful event, I extend my thanks and appreciation for their participation, input, and help. Finally, I thank and acknowledge Mary Haight, who again does a truly wonderful job at editing the papers, orchestrating the production of the volume, and keeping us close to schedule.

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