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The Daniel H. Wagner Prize for Excellence in Operations Research Practice

The Wagner prize for 2005 goes to IBM, winning over strong competitors.

Key words: professional: comments on.

Open Letter to Mary Emma Wagner
Kennett Square, Pennsylvania

Dear Mary Emma,

It is with great pride that I send you the latest news about the Daniel H. Wagner Prize for Excellence in Operations Research Practice, a prize we at CPMS, the Practice Section of INFORMS, have established in memory of your late husband, Dan.

In CPMS, we strive to support operations research practitioners by publicizing success stories and by connecting professionals with similar interests. At the time of Dan's untimely passing in 1997, we had been seeking ideas for additional prizes to publicize and honor practical achievements in operations research, similar to the Franz Edelman Award that has been so successful for many years.

We realized we could honor Dan and further this objective at the same time. At Dan's memorial service, I discussed the idea with Tom Corwin, Larry Stone, Barry Belkin, and Bill Browning. As a result, the three companies they represent, Metron, Daniel H. Wagner Associates, and Applied Mathematics, made significant donations to the Institute for Operations Research and the Management Sciences (INFORMS) totaling \$51,000.

These contributions allowed us to establish an endowment that has supplied cash prizes for first-place winners and has grown to over \$70,000 as part of the INFORMS investment fund.

When we established the prize, we tried to focus on the principles that I remember Dan advocating when I worked for him at Wagner Associates. In particular, we made clear writing and innovative mathematics the two most important criteria for acceptance into the competition and for judging winners.

With the hard work of CPMS council members and volunteer judges, we held the first competition in 1998 at the INFORMS fall meeting in Seattle, Washington, with four really good papers accepted and a team from IBM taking first place.

We've tried to maintain the quality of the competition; as a result, not every year has yielded enough qualified papers to hold the competition. However, we did have three finalists in 2000, with a team from Qwest Communications taking first place. In 2002 we had five finalists, and a team from Bank One took the first place. In 2003, we had four finalists and a winning team from General Motors' cold weather test facility up in northern Canada. A senior vice president from GM spoke at an INFORMS meeting and specifically recognized the team's participation in the prize competition. 2004 was a banner year with six excellent finalists and a winning entry from Merrill Lynch.

All the finalist papers from each competition are published in the succeeding September–October issue of *Interfaces*, the INFORMS journal focused on practical applications of operations research. I am sending you back issues from 1999, 2001, 2003, 2004, and 2005 so you can look them over and share them with your son, David.

This 2006 issue of *Interfaces* contains the work of the four finalists from last year's competition in San Francisco. A team from IBM again won first place, with other finalist teams from the University of Dayton, the Intel Corporation, and Catholic Relief Services. The winning team from IBM reprised its presentation at the spring practice meeting on May 2, 2006 and collected its \$1,000 first prize.

The Fall 2005 meeting was originally scheduled to be held in New Orleans, but Hurricane Katrina made

that impossible. However, conference volunteers from the New Orleans area continued their work to make the meeting a great success.

In recognition of their efforts of the outstanding work Catholic Charities, Catholic Relief Services, and hundreds of other private charities do in disaster and poverty relief overseas and in the United States, and of the example of the use of operations research for managing of relief organizations described by Ioannis Gamvros, Richard Nidel, and S. Raghavan, CPMS gave a special \$1,000 contribution to the Catholic Charities hurricane relief program. Solomon Belette, the executive director for Catholic Charities of the East Bay, accepted the donation at the INFORMS meeting in San Francisco.

Mary Emma, a prize competition like this does not happen without the efforts of many people. I continue to thank Tom Corwin, Barry Belkin, and Bill Browning for their companies' contributions to the prize fund. In addition, INFORMS staff, especially Mark Doherty, Terry Cryan, and Christy Kline, and the CPMS council under Steve Strauss's leadership, provide management and organization support to make sure the bills get paid, conference times get scheduled, and plaques and certificates are ordered and delivered to the conference. I also applaud the staff of *Interfaces*, who make this special issue something to look forward to each year.

Most important, I thank the judges for this year's competition, many of whom have volunteered for this duty year after year. I thank Bill Browning of Applied Mathematics, Allen Butler of Wagner Associates, Peter Bell of the University of Western Ontario, Mary Crissey of SAS, Howard Finkelberg of BBDO, Charles Beall and Terry Harrison of Pennsylvania State University, and Randy Robinson. Others who have helped in past years include Newt Garber, John Kettelle, Russ Labe, Peter Norden, Mike Rothkopf, Tom Spencer, and Steve Strauss.

Here is a little something about each of the 2005 finalists:

Brian T. Denton, formerly with IBM Systems and Technology Group (now with the Mayo Clinic), John Forrest, IBM T. J. Watson Research Center, and R. John Milne, IBM Systems and Technology Group, won first place for "IBM solves a mixed integer program to optimize its semiconductor supply chain." IBM

uses operations research models and methods extensively in such activities as scheduling production, developing factory execution systems, and strategic planning. The authors developed advanced solution methods for solving large-scale mixed-integer-programming (MIP) models. One such approach employs a decomposition-based heuristic as a pre-solve stage to get a near-optimal solution. Another solves a series of MIPs defined by assigning demand classes to groups, where for each group all demands supersede demands for less important groups reducing the size of the model to be solved. As lower-priority groups are solved, constraints prevent demands being transferred from higher priority groups. A third approach is a two-stage heuristic: in the first stage, a specialized search exploits properties of lot-sized solutions, and in the second, the heuristic finds improvements to the first-stage solution.

Finalists Ioannis Gamvros, Richard Nidel, and S. Raghavan of the Robert H. Smith School of Business, University of Maryland, presented "Investment analysis and budget allocation at Catholic Relief Services." Catholic Relief Services, a not-for-profit agency that funds humanitarian relief and economic development efforts throughout the world, faced a budget-allocation problem. The authors developed a mathematical model and a spreadsheet tool that allocates funds based on the impact that these investments will have. The model ensures a fair allocation that is consistent with the agency's priorities and is simple enough for managers to understand. Catholic Relief Services uses this tool to plan future spending and considers the work a great success that has considerably improved their planning process.

Finalists Michael F. Gorman of the Department of MIS, Operations Management and Decision Sciences, School of Business Administration, University of Dayton, and Sanjay Ahire of the Moore School of Business, University of South Carolina, presented "A major appliance manufacturer rethinks its inventory policies for service vehicles." A major consumer appliance manufacturer needed to manage \$7 million in repair-part inventories in over 1,300 service vehicles by closely managing expensive parts inventories on service vehicles while ensuring that its technicians carried the appropriate parts for completing warranty repairs in response to unpredictable customer service

calls on the first visit. The authors applied a heuristic solution to this vehicle-stocking problem and found that the firm could trim over \$3 million per year from its warranty repair costs and could improve its first-visit repair rate from 86 to 90 percent. The manufacturer is implementing this vehicle-stocking methodology across its entire US network of service trucks.

Shamin Shirodkar and Karl Kempf of Intel Corporation presented "Supply chain collaboration through shared capacity models." They developed shared operations research planning models to be used by multiple vendors supplying substrates to Intel Corporation. Substrates represent a critical part of Intel's supply chain, form a significant fraction of production cost, and if not properly planned, can constrain the agility and responsiveness of the overall supply chain. The six substrate vendors that Intel deals with lacked sophistication in this area, and the authors' vision was to share Intel's capacity-modeling expertise to upgrade and standardize models across this vendor community. After six months of discussion between the team and senior business and manufacturing personnel at the vendors, the vendors signed confidentiality agreements. As a result, the team applied multiple mathematical optimization models to the procurement of production materials, facilitated by the collaborative development of capacity models. All parties improved their productivity and profitability.

Mary Emma, I am very pleased with the fine work done by the authors submitting papers for this prize competition. I know that few, if any, of the contestants knew Dan, but I hope that by emphasizing the work quality ethics he espoused in judging the entries for the prize we can continue to honor his memory.

Best wishes,

Joseph H. Discenza
President and CEO, SmartCrane, LLC
11 Canal Drive
Poquoson, Virginia 23662

P.S. Readers of *Interfaces* may not have known Dan Wagner or the companies his former colleagues now run.

Dan Wagner earned his PhD in mathematics from Brown University in 1951. His dissertation, "On free products of groups," was published in *Transactions of*

the American Mathematical Society in 1957. He joined the Navy's Operations Evaluation Group and worked on operations research for naval warfare until 1956. After a one-year sabbatical for postdoctoral research at MIT, Dan Wagner joined Burroughs Research Center. There he directed a group of mathematicians performing analysis for the development of digital computers.

In 1957, Dan Wagner and John Kettelle formed the partnership of Kettelle and Wagner, which was dissolved in 1963. In 1963, he formed a new company, Daniel H. Wagner Associates, Inc. This company focused on the mathematics of naval tactics, especially antisubmarine warfare, detection theory, and search planning.

During his years as president and principal owner of Wagner Associates, Dan brought many high-quality mathematicians into the operations research community. They made significant advances in the firm's fields of endeavor and delivered major applications to the US Navy, the US Coast Guard, and other clients; many of these applications are still in service today.

After retiring from the firm, Dan held various teaching and research positions with the US Naval Postgraduate School and the US Naval Academy. He was a member of ORSA for more than 40 years.

Metron Inc. (Lawrence D. Stone, CEO, www.metsci.com) is a scientific consulting firm with expertise in the areas of physical modeling, probability theory, statistics, operations research, and software development. Metron develops high-technology systems, primarily for defense applications.

Daniel H. Wagner Associates Inc. (Barry Belkin, president, www.wagner.com) specializes in innovative mathematical solutions to problems in government and business. The firm provides consulting services in operations research, mathematics, and related software development. It also offers ready-made products in financial analysis.

Applied Mathematics, Inc. (Bill Browning, president, www.applmath.com) develops and implements mathematical models that are used in real time for decision making. Current application areas include submarine systems, search and rescue planning and analysis, industrial control systems, and pharmaceuticals.