Edelman Awards Gala

THE FRANZ EDELMAN AWARD
Achievement in Operations Research

THE INFORMS PRIZE
Sustained Integration of Operations Research

THE DANIEL H. WAGNER PRIZE
Excellence in Operations Research Practice

April 19, 2010
Orlando, Florida

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The Edelman Awards Gala

2010 Franz Edelman Award Ceremony

Welcome

Thomas M. Cook, Master of Ceremonies

Presentation of the Wagner Prize

C. Allen Butler, Chair, 2009 Wagner Prize Committee

Presentation of the Informs Prize

Jeffrey D. Camm, Chair, 2010 INFORMS Prize Committee

Presentation of the Franz Edelman Academy

Thomas M. Cook, Master of Ceremonies

The Franz Edelman Competition

Thomas M. Cook, Master of Ceremonies

Recognition of the Class of 2010 Franz Edelman Finalists and Laureates

Thomas M. Cook, Master of Ceremonies

Announcement of the 2010 Franz Edelman Award Winner

Susan L. Albin, INFORMS President

Srinivas Bollapragada, 2010 Edelman Competition Chair

Master of Ceremonies

Thomas Cook



Thomas M. Cook is the CEO of TCI, a small analytical consulting firm specializing in applying operations research to significant business problems.

The majority of Dr. Cook's career was spent with AMR, starting in the capacity of director of operations research for American Airlines. He is founder and past president of American Airlines Decision Technologies, the world's largest airline software and analytical consulting firm. He concluded his career at AMR as president of Sabre Technology Solutions, a $1 billion information technology services division of Sabre Inc.

Prior to joining TCI, Dr. Cook was chairman and CEO of CALEB Technologies, an airline decision support software firm. Before joining CALEB, Dr. Cook served as senior counselor to McKinsey & Company Inc., focusing on the transportation sector. Early in his career, he developed large-scale information systems for Ling Temco Vought Inc.; taught operations research, statistics, and computer science at both graduate and undergraduate levels for the University of Tulsa, the University of Texas at Austin, and Boston University; and consulted for Arthur Young and Company.

He holds a PhD in operations research from the University of Texas at Austin, an MBA from Southern Methodist University, and a bachelor's degree in mathematics from Grinnell College.

He has coauthored two books, published numerous papers in scholarly journals, and lectured at many universities, including the Massachusetts Institute of Technology, UCLA, Stanford, the Georgia Institute of Technology, the University of Texas at Austin, Rice, Duke, and Wharton.

Dr. Cook was inducted into the National Academy of Engineering and cited for his "leadership in advancing operations research and decision-support technologies within the transportation industry." He is the past president of the Institute of Management Sciences, the Airline Group of the International Federation of Operations Research Societies (AGIFORS), and the Institute for Operations Research and the Management Sciences (INFORMS).

His teams have won three Franz Edelman awards and the coveted ORSA Prize, the predecessor to the INFORMS Prize. He is an INFORMS fellow and a recipient of the George E. Kimball Award, and he has served as associate editor of *Operations Research*, *Transportation Science*, and *Interfaces*.



CONGRATULATIONS

HP Salutes The 2010 Edelman Award Honorees

Your commitment to Operations Research demonstrates a drive for excellence in business process innovation, data-driven decision making and operational excellence resulting in exceptional value to your customers. HP applauds INFORMS for providing a forum for recognizing the essential value of Operations Research and its contribution to supporting organizational efforts to delight customers as never before possible.

The Operations Research Profession

Introduction

by Susan L. Albin, Rutgers University, President of INFORMS

Celebrating Important Achievements in Turbulent Times

What a difference a year makes.

When we gathered together in 2009 to celebrate our three outstanding INFORMS practice awards—the Edelman Award, the INFORMS Prize, and the Wagner Prize—we were barely into the world's worst financial crisis since the Great Depression, and operations researchers were continuing to call for decision makers to seek the kind of expert advice that has strengthened so many INFORMS practice award nominees and winners.

This year, as the economy inches back toward normalcy, operations research is finding credit where credit is due. Health care, for example, is applying operations research to ensure excellent service delivery. On World AIDS Day, the Obama administration announced a five-year emergency plan that will use O.R. to ensure success in the battle against the disease. And two major foundations—the Doris Duke Foundation and the Clinton Foundation—have been discovering



Photo courtesy of Betsy Fruhling

that operations research can guide major charities in their quest to treat the world's most serious diseases.

In the business world, a *Harvard Business Review* editor, following up on the tremendous positive response to their article "Competing on Analytics," recognized operations research as one of the top trends of the past decade.

The importance of operations research in the public and private sectors, in the United States and across the world, is certainly evident in this year's six Franz Edelman Award finalists, which are named and judged by CPMS, the Practice Section of INFORMS.

With policy-makers' eyes trained on the banking industry, INDEVAL, the Mexican government's system for processing transactions in the world's 13th largest economy, has entered its operations research work as an example of the way O.R. improves the quality and reliability of its financial securities settlement system.

The world's infrastructure relies on energy and speedy transport. Both are represented this year. Sasol, the South African oil and chemical company, has rejected that bane of mathematicians, the average, for simulation tools that improve its production of fuels. Deutsche Post DHL, one of the world's largest package delivery companies, is using marketing science to manage its global brand investments.

As 2009 Edelman finalist Zara, a clothing company, showed, supply chain management and logistics can be crucial to product delivery and inventory control, a particular concern during a weak economy. Procter & Gamble, the Fortune 500 manufacturer of many leading household brands, is using O.R. to keep its inventory levels trim, delivery reliable, and resulting savings strong.

As the Edelman program has shown year after year, O.R. is not just providing benefits to consumers and businesses, but to taxpayers as well. The Department of Transportation in the Canadian province of New Brunswick shows this in its use of O.R. to plan infrastructure improvements and convince Ottawa that an increase in near-term expenditures on roads and bridges will provide savings to the province's citizens in the long run.

With the world's freshwater newly perceived as a potentially scarce resource that can pit its users against one another, the Delaware River Basin Commission, which manages freshwater from the Delaware River in four northeastern states, has used O.R. to reconcile the interests of conservationists, local residents, and those who manage the upstate New York reservoirs that serve New York City.

Operations research's practical impact is clear in the Wagner Prize's contribution to the evening as well. Tonight, INFORMS and CPMS officially present the 2009 Wagner Prize to Schneider National, whose entry "Approximate Dynamic Programming Captures Fleet Operations" won its deserved recognition.

The INFORMS Prize recognizes an organization for the body of its work. This year, Jeppesen, a former Edelman winner, garners the prize for the way the organization has completely remade its operations using O.R.

This has been quite a year for operations researchers who apply their insightful work to improving business, government, and the lives of those who rely on them. Tonight is a culmination of all these achievements. Congratulations to all.

SAS would like to congratulate the **2010 Edelman finalists** for achieving outstanding results with operations research!

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The Impact of Operations Research on Business and Society

by Kathryn K. Chou
VP Worldwide Commercial Sales, HP Personal Systems Group

Reminiscences and Reflections from the 2009 Edelman Award Winner



Let me start by congratulating this year's finalists. The breadth, depth, and overall significance of the INFORMS conference is truly inspiring. It is a great honor to be a finalist at this prestigious event, so enjoy the competition and the celebration of the O.R. profession—it is a wonderful experience.

Last year I was part of the team working with Hewlett-Packard (HP) Labs and HP Strategic Planning and Modeling to improve processes and planning for portfolio management through O.R. HP had been suffering with too many SKUs and too much variety for our global customers. The team's O.R. work brought us savings across the entire value chain, including greater efficiencies in the supply chain and more relevant offerings for our customers. The results were a true testament to the power of O.R. and were appreciated at the highest levels of the company.

Winning the award had a strong, positive impact within HP. We hosted Mark Doherty, INFORMS executive director, when he presented us with the engraved Edelman trophy. Two HP executive vice presidents (EVPs), Todd Bradley, EVP of the Personal Systems Group, and Shane Robison, EVP and Chief Strategy and Technology Officer, were on hand for the occasion. The event was also featured on our internal HP website and received broad attention.

In a technology company of HP's size and breadth, analyzing processes and issues and finding solutions is not a finite activity. It has to be an ongoing, never-ending process. It is inevitable that processes grow in complexity, and simplicity and clarity diminish over time. This issue begins at the individual organizational unit level, but it becomes even harder

to grasp as the processes and issues cross functional and organizational boundaries. Complexities creep in unnoticed, and employees are buried in daily tasks or strategic decisions in "their" world and rarely have the time to analyze and understand the larger picture in a strategic context.

O.R. makes these challenges manageable. It empowers us to guide discussions with facts and disconnect from emotions or cross-organizational barriers of all kinds. We call it "bridging the organizational divide," and it is the first—and essential—step for real, impactful change across the organization.

Last year's success sparked a number of new projects throughout HP that likely would not have been started without the Edelman Award. Thanks to the external and internal visibility of the award, several HP organizations learned about the work done by our team and have sought to improve their own product portfolio management practices. For example, multiple parts of HP's imaging and printing business are now pursuing the idea of segmenting their product portfolio into core and extended offerings to improve order fulfillment performance. Our LaserJet business has not only adopted a core and extended offering approach to setting inventory levels and customer delivery times for their enterprise business, but they have also extended that approach to differentiate by deal size as well. Moreover, the Industry Standard Servers business is now employing our pre- and postlaunch analytics to hone its portfolio. Beyond products, our services business has started early stage discussions with HP Labs regarding design and optimization of HP's service portfolio.

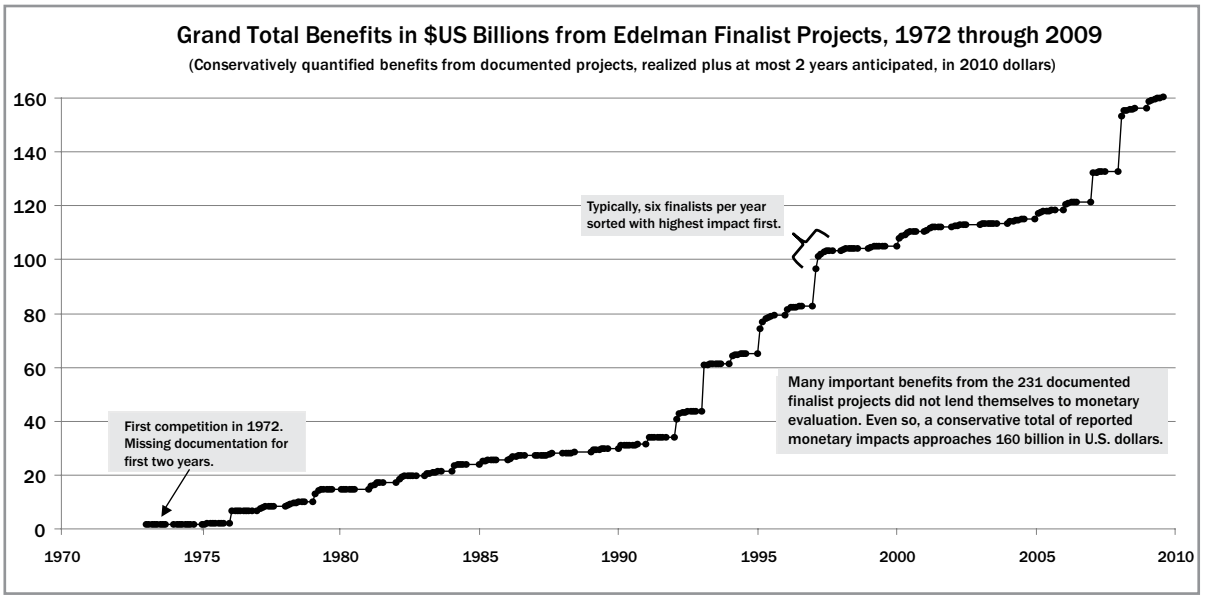
Overall, this visibility of successful O.R. applications and related innovation has not only brought increased awareness and appreciation for the core team that worked on product portfolio management, but also for other teams who build O.R. applications to address HP's business needs in various parts of the company. They are now better known and sought after for their analytical services.

Moreover, the strong business results from our work have garnered attention from top business schools. Faculty members at Northwestern's Kellogg School of Management are developing a case study to share our product portfolio management practices with high-level audiences. In addition, the *Harvard Business Review* has expressed interest in HP's O.R. accomplishments.

I am personally very encouraged by the impact and continuous use of O.R. techniques and practices at HP. We will keep pushing for more analytics work and the creation of new tools and processes to manage our complex environment with an eye on our customers and partners. Please enjoy your Gala dinner and award ceremony. I wish you success and fun celebrating O.R. at its best.

Operations Research, "Billions and Billions" of Profit!

by Jeffrey M. Alden
Group Manager, GM Operations Research



Over US$160 billion of impact! That's impressive! Is it credible? What's behind these numbers? How were they were estimated? Is there even greater impact?

Beginning in 1974, the Edelman finalists were asked to publish their project accomplishments in the INFORMS journal *Interfaces*. By reading all Edelman finalist articles (about 230), the monetary impact was estimated using the following guidelines:

- Be objective and conservative, yet make a serious attempt to estimate cost savings and increased revenues.
- Use all past reported savings and, to be conservative, include at most two more years of anticipated impact.
- Ignore costs if insignificant, like development and implementation costs.
- Include only one year of impact when enormous (billions, for example, in some military, utility, energy, and governmental projects) to downplay huge leverage of organizational size and budget.
- Ignore relative impact analysis even though, for example, doubling company revenues to $10 million for one company may be far more impressive than saving $100 million for another company.

These guidelines are definitely conservative and do not include many important yet difficult-to-quantify benefits. Examples of the latter include legal dispute resolution, cancer treatments, airline security, hazardous material deposition, budget allocation, inclusion of risk in decision making, organizational structure, on-time railway performance, and space shuttle heat shielding. How do you place a dollar value on such improvements? It's not impossible, but definitely challenging! Furthermore, almost all finalist papers report such nonmonetary benefits and frequently tout them as most important and long lasting by establishing, for example, ongoing practices and organizational changes that improve health, safety, cooperation, decision making, and job satisfaction. Great! Clearly, the reported monetary benefits understate the full impact of the Edelman finalist projects.

Another important indication of the influence of O.R. is the impressive breadth of applications. The Edelman finalists represent about 100 different application areas, including air traffic, banking, broadcasting, canal operations, consumer products, defense (air force, army), education, finance (pension, investment, credit card), fire protection, forestry, health care (hospital, pharmaceutical, diagnosis, elderly), hotel management, energy production and distribution (gas, hydroelectric, oil, nuclear), land use, manufacturing (electronics, food, paper, seeds, tires, vehicles, wood), marketing, printing, sanitation, security (airport, police), transportation (airline, highway, railway, space), treasure hunting, waste management, water (resources, quality), and weapons dismantlement. There are many more—the list goes on and on!

Finally, the O.R. impact reported here is just the "tip of the iceberg," because the Edelman competition only captures those O.R. professionals choosing to compete! Just think, the entire set of Edelman finalist authors (over 800) represents less than 10% of the current INFORMS membership. Undoubtedly, there is a vast number of O.R. projects with significant impact that did not compete because of confidentiality, or the lack of an internal advocate to compete (e.g., no one thought of it, too much effort, lack of management support, and little project documentation), or because the team was simply unaware of the competition.

The impact is immense. O.R. professionals have unquestionable reason to be proud of their profession—don't you like saying "billions and billions" when asked about the value of O.R.?

The Franz Edelman Award

Recognizing and Rewarding Real Achievement

The Franz Edelman Award Competition is jointly sponsored by INFORMS and CPMS, the Practice Section of INFORMS.



The purpose of the Franz Edelman competition is to call out, recognize, and reward outstanding examples of operations research practice in the world.

The annual Edelman Award Competition brings together top examples of innovation from large and small, profit and nonprofit, corporate and governmental organizations from around the world. The common theme characterizing all the final competing teams is the use of sophisticated analytical tools employed in operations research to make a major impact on an organization and the people it serves.

Abstracts from past Edelman Award winners are available through *Interfaces* online, and full-text versions of some of the *Interfaces* papers are available in an online archive. DVDs of past competitions, suitable for teaching, marketing, or publicizing O.R. practice successes, are available for purchase from INFORMS.

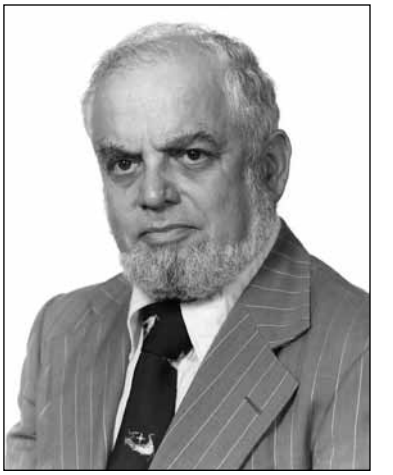
The Institute of Management Sciences (TIMS), together with its College on the Practice of Management Science (CPMS), created the award competition in 1972.

In 1986, the CPMS/TIMS award was renamed in memory of Franz Edelman, one of the forefathers of O.R. in North America.

After fleeing his native Germany in the late 1930s to escape Hitler and his Nazi regime, Franz found himself in England, where he was interned as an alien and sent to Canada for an interlude of lumberjacking. He received his undergraduate education at McGill University and later obtained a PhD in applied mathematics from Brown University.

Franz joined the RCA Corporation as an engineer and became involved in computational problems. Initially a physical science problem solver, Franz rapidly came to envision the great value of computer systems in business. His imagination and dedication made him a quintessential practitioner of operations research.

Franz established RCA's Operations Research Group, one of the first such groups in North America. Having become vice president of Business Systems and Analysis, he retired from RCA after 30 years of service to form Edelman Associates, an O.R. consulting firm. The Franz Edelman Award Fund was named in his memory to advance the profession to which he contributed so much.



Franz Edelman

Edelman First-Place Award Recipients

2009 Hewlett-Packard

"HP Transforms Product Portfolio Management with Operations Research"

HP offers a large number of innovative products and variations on those products to meet diverse customer needs. Product variety, though, comes with significant operational costs and challenges. Working with Strategic Management Solutions, HP developed two powerful operations research-based tools for product variety management that, together, address the diverse needs of its businesses throughout their products' life cycles. The first is a framework for evaluating the projected complexity-adjusted return on investment (ROI) for each proposed new product prior to its creation using a Complexity ROI Calculator customized for each business. Once products have been launched and a sales history is available, HP applies a second O.R. tool called Revenue Coverage Optimization, or RCO. The results enable HP businesses to prioritize among products for promotions, improved turnaround time commitments, and rationalization. These tools led to hundreds of millions of dollars in bottom-line savings for HP, as well as a more streamlined product offering, improved execution, faster delivery performance, lower overhead, and increased customer satisfaction and market share.

2008 Netherlands Railways

"The New Dutch Timetable: The O.R. Revolution"

By 2006, the volume of traffic on the Dutch passenger railway network had increased significantly; more and larger trains had been scheduled without changing the structure of the timetable, thus overloading the system and causing consumer nightmares. Operations researchers working with Netherlands Railways constructed an improved timetable. As a result, the percentage of trains arriving within three minutes of the scheduled time increased, commuter satisfaction improved, and the number of passengers grew. In 2007, this resulted in an additional annual profit of €40 million (approximately $60 million).

2007 Memorial Sloan-Kettering Cancer Center

"Operations Research Advances Cancer Therapeutics"

A key researcher from the Georgia Institute of Technology worked with Memorial Sloan-Kettering Cancer Center to reduce substantially the effects of treating prostate and breast cancer with radiation. The system saved an estimated $459 million per year on prostate cancer alone. Quality of life was improved by delivering less radiation to healthy organs.

2006 Warner Robins Air Logistics Center

"Warner Robins Air Logistics Center Streamlines Aircraft Repair and Overhaul"

At a time of war, the U.S. Air Force maintenance hub reduced its repair time for C-5 Galaxy transports from 360 to 250 days using lean initiatives, then further improved its turnaround time to just 160 days with Critical Chain Project Management, an O.R. technique. The work saves American taxpayers $50 million a year and decreases the demand to truck materiel through the Iraqi combat zone, saving lives as well.

2005 General Motors

"Increasing Production Throughput at General Motors"

Using operations research to achieve one of its signature benefits—greater efficiency—GM has saved over $2 billion through improved productivity at 30 assembly plants in 10 countries.

2004 Motorola, Inc.

"Reinventing the Supplier Negotiation Process at Motorola"

Combining O.R.-aided methods such as innovative bidding, online negotiations, and scenario-based optimization analysis, Motorola launched a comprehensive system to support the company's sourcing process.

2003 Canadian Pacific Railway

"Perfecting the Scheduled Railroad: Model-Driven Operating Plan Development"

Adoption of a newly optimized fixed-schedule railroad approach, including associated benefits from infrastructure and locomotive fleet investment and business process improvements, trimmed costs by C$300 million.

2002 Continental Airlines

"A New Era for Crew Recovery at Continental Airlines"

A globally optimized crew recovery solution deals successfully with several high-profile events such as the December 2000 and March 2001 Nor'easter snowstorms, the June 2001 Houston flood, and the September 11th terrorist attack. Throughout, Continental recovered from each event in record time and generated overall benefits worth tens of millions of dollars.

2001 Merrill Lynch, Inc.

"Pricing Analysis for Merrill Lynch Integrated Choice"

In early 1999 two models showed that revenue at risk for Merrill Lynch, due to the advent of electronic trading and the commoditization of trading, ranged from $200 million to $1 billion. As of September 2000, the Integrated Choice strategy helped client assets reach $93 billion in the new offer. During the first nine months of 2000, net new assets totaled $11 billion and the number of accounts increased 72%.

2000 Jeppesen Sanderson, Inc.

"Flexible Planning and Technology Management at Jeppesen Sanderson, Inc."

Jeppesen Sanderson's customer service level began to deteriorate when a growing product line of more than 100,000 charts overwhelmed its production system. The company developed a suite of optimization-based decision support tools that improved planning in each production area and revealed the value of OR/MS to Jeppesen managers. Jeppesen is now fully committed to O.R., with O.R.-based decision support systems spreading to all areas of the company, and realized cost reductions of $3 million.

1999 IBM

"Extended Enterprise Supply Chain Management at IBM Personal Systems Group and Other Divisions"

AMT consists of an optimization engine, a simulator, and a series of data extraction modules. It is used to study a wide range of issues, including inventory budgets, turnover objectives, customer service-level targets, effects of new product introduction, and supply chain scenario analyses.

1998 Bosques Arauco, S.A.

One of the largest Chilean forest firms, Bosques Arauco employs optimization systems designed by a team from the University of Chile. The impact of these systems has been organizational and financial, with Bosques Arauco reporting a total saving of $5 million over a total annual timber production of $140 million.

1997 Societé Nationale des Chemins de Fer Français (SNCF) and Sabre Decision Technologies

The national railroad of France, Societé Nationale des Chemins de Fer Français (SNCF), and Sabre Decision Technologies teamed up to address the problem of train capacity allocation. The implementation of Rail Plus, composed of a Workset manager and modules on profitability, feasibility, capacity allocation, and routing, is credited with an overall profit increase of 3%

to 5%, reductions in manpower and schedule development time, and improvements in planning and scenario evaluation.

1996 South African National Defense Force (SANDF)

A joint Deloitte & Touche and SANDF team created models to determine the size and shape of SANDF. The project resulted in force design savings of more than 22%.

1995 Harris Corporation/Semiconductor Sector

IMPReSS, a linear-programming-based production-planning system, produces plans for six major product lines encompassing over 18,000 individual products, enabling Harris to achieve 95% on-time delivery on commitments made since 1992.

1994 Tata Iron & Steel Company, Ltd.

An optimization-based model was designed in 1985–1986 for guiding marketing strategies in Tata's product mix area; the model is now used throughout the company. Since 1986, the model has contributed a cumulative benefit of $73 million in increased profits.

1993 AT&T

Over 400 Call Processing Simulator (CAPS) studies increased 800-number revenues by more than $1 billion in a $5 billion market. One reorganization yielded an 8% increase in calls completed, at annual savings of over $24 million in customer operating costs, with an increase of $2 million in AT&T revenue in 1992, $3 million in 1993, and a projected $7 million per year for each following year.

1992 New Haven Health Department

To combat the spread of HIV/AIDS via needle sharing among New Haven's drug injectors, a legal needle exchange program was implemented. A new data collection and analysis was developed that provided the needed parameters for mathematical models. Results suggest that the program has reduced HIV/AIDS incidence by 33%.

1991 American Airlines

American Airlines pioneered revenue management as an effective way to manage its seat inventory. The airline used sophisticated O.R. models to determine the overbooking levels of each flight and to allocate each flight's seat inventory to a variety of market/fare classes. By optimally overbooking flights and dynamically pricing the seats based on forecast demand, American Airlines generated an estimated $1.4 billion in incremental revenue over a three-year period.

1990 Health Care Financing Administration

Diagnosis Related Groups (DRGs), developed to measure hospital output in quantitative terms, required a search for structure through millions of patients' records plus the merging of clinical and statistical decision methods. Medicare, 20 states, and 18 other countries are currently using DRGs; Medicare payments to hospitals alone produced a projected reduction of $18 billion in 1990.

1989 ABB Electric, Inc.

O.R. models built sales strategies and accurate prediction of sales through extensive segmentation and attribute choice modeling. Predictions, integrated into production models, guided long-term supply and customer preference and helped make ABB an industry leader in 1988.

1988 City of San Francisco Police Department

An optimization-based decision support system for patrol officer deployment allows for "fine-tuning" of optimal scheduling, producing a 25% increase in patrol units available when needed; in addition, response times declined 29% and traffic citations increased 62%. Total benefit? Over $14 million annually.

1987 Syntex Laboratories, Inc.

A decision calculus model for salesforce size and deployment was devised by Syntex managers, with a time horizon of three years. Model predictions proved to be more accurate than standard forecasts and in financial terms resulted in increases of $25 million.

1986 Southland Corporation (CITGO Petroleum Corporation Subsidiary)

Optimization-based decision support and process control systems aided managers at CITGO in such

crucial areas as crude oil acquisition, spot-market buying and selling, logistical operations, and price volume strategies. Forecasting models addressed corporate price and volume. Together, they contributed approximately $70 million in profit improvement per year.

1985 Weyerhaeuser Company

The VISION decision simulator was developed to implement dynamic-programming-based improvements in raw materials returns at Weyerhaeuser. Operational benefits to date exceed $100 million in increased profits, and management philosophy has been changed.

1984 (dual) Blue Bell, Inc.

Models for inventory targets, manufacturing requirements, and production scheduling were used with a seasonal demand-forecasting technique and diagnostic computer simulation to reduce inventories. Inventory reduction over 18 months was more than $100 million.

1984 (dual) The Netherlands Rijkswaterstaat and the RAND Corporation

An integrated system of models was developed to evaluate mixes of new facilities, changes in operating rules, and adjustments to prices and regulations. The system has resulted in a national water management policy, with savings in the hundreds of millions of dollars in investment expenditures and over $10 million in estimated annual savings.

1983 Air Products and Chemicals, Inc.

A large mathematical model was developed to control deliveries of liquid oxygen and nitrogen to customers at minimum cost with improved reliability. Savings are over $2 million annually.

1982 Arizona Department of Transportation

1981 ANR Freight System

1980 Kelly-Springfield Tire Company

1979 The Greater New York Blood Program

1978 Cahill May Roberts, Ltd.

1977 Syncrude Canada, Ltd.

1976 American Telephone & Telegraph

1975 Xerox Corporation

1974 Canadian National Energy Board

1973 The Babcock & Wilcox Company

1972 The Pillsbury Corporation



Understanding the World Through O.R.: Reflections and Memories from the Edelman Competition

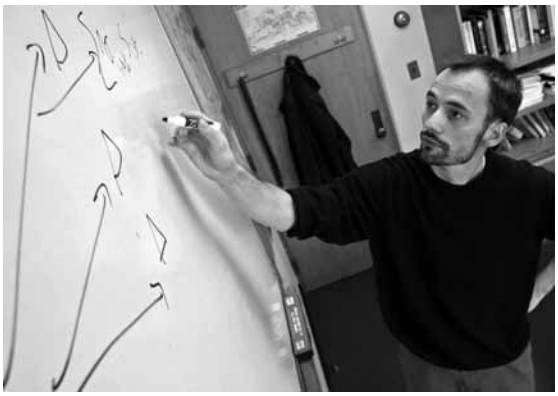
by Jérémie Gallien, Massachusetts Institute of Technology

This year, I am a verifier and assistant coach. Last year, I was a finalist with the Zara Team. And in 2008, I was a 'green apple.'

The Edelman Competition and I go back even further, since I was born the year it started (1972)! I am therefore particularly honored to share some of my reflections and memories here.

Well, some of it is about impact, and, yes, the millions. As the impressive work of this year's finalists so vividly illustrates, O.R. has already had a profound impact on the world. But as a discipline it could do even more, and this competition may be the single most effective activity for bridging the current gap between the true potential of O.R. and society's awareness of it. Thus, the Edelman Competition is very important business, one that many of us stand to benefit a lot from in the long term.

But the part that wasn't so obvious to me until recently is that O.R. also offers unique opportunities for insightful and fulfilling human interactions, cutting across national and cultural boundaries. For example, my team last year included a Chilean, a Texan, some Spaniards, and a Frenchman, and we were coached by an



Egyptian, an Indian, and a Japanese! And imagine what it takes to implement an O.R. model computing all store shipments worldwide for Zara, a fashion company where almost no one had even heard of the term "operations research" before our project, and where the most powerful figures are designers and store managers. It did take a lot of work and some luck, but ultimately, what I think really did it was an unlikely friendship between a couple of "math" professors and a few really smart and vocal Spaniards with great senses of humor.

This makes sense in retrospect: many say mathematics is the only universal language, and we are about applying math to the real world, which in contrast is a Tower of Babel: many different countries and languages as well as different cultures and backgrounds, even within the same



organizations. So the very essence of what we do involves understanding a world expressing itself in many ways to a point where we can describe it in a precise manner. And, in contrast with, say, Hilbert spaces, everyone is interested in making better decisions. In that sense, O.R. is intrinsically a global activity and offers a human experience that we could perhaps play out more as a profession.

All of it is not warm and friendly, of course. I'm not just talking about trying to convince the self-educated manager of a store selling teenager apparel that a mixed-integer program embedding a stochastic model will increase his sales, or convincing a major corporation to give us a few million euros' worth of merchandise to test our model through a controlled experiment. The decisions to work with industry and even participate in the Edelman Competition were hard for me, a tenure-track junior faculty member working in a research university, because they regrettably involved a conflict between career incentives and what I felt was both important and enjoyable. And not taking the big prize home is disappointing to anyone who gives it his best shot—reaching the final round is such a feat that a competitive personality helps get you there in the first place, and that's a hard thing to turn off. But truly measuring the impressive accomplishments of the other teams, and enjoying both the Gala itself and the following bar conversations soon turned disappointment into gratefulness—gratefulness for the opportunity to work with a team of friends from all over the world who all gave their best, gratefulness for all the new friendships made along the way, and gratefulness to the sponsors and all the volunteers who worked tirelessly to make the competition, and therefore, all these memories, possible.

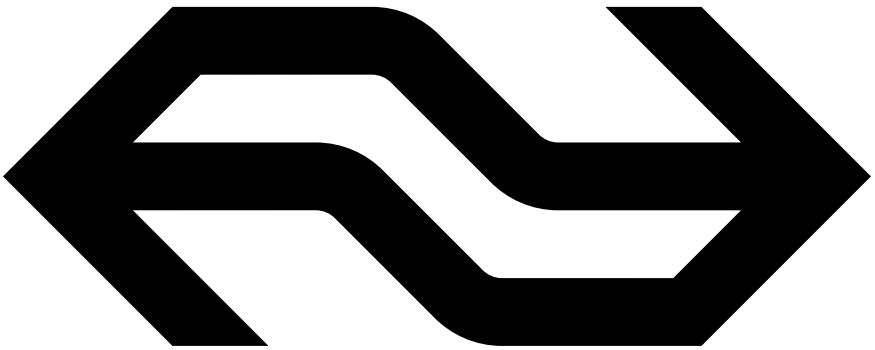
Enjoy the 2010 Franz Edelman Competition!

Here's to those who make the science of decision-making an art form.

Congratulations to the 2010 Edelman Award finalists, 2009 Wagner Award finalists and 2010 INFORMS Prize winner. As a past Edelman and INFORMS Prize winner, AT&T recognizes the importance of innovation in operations research and analytics.

at&t

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Netherlands Railways congratulates the 2010 Edelman finalists!

The Franz Edelman Award Process

The Finest Step Forward: The Franz Edelman Award Competition Process

by Srinivas Bollapragada, General Electric,
2010 Franz Edelman Committee Chair

Are You Ready for the Contest of Your Life?

Every year the Franz Edelman Award process begins with a call for entries in early September. Organizations are asked to provide a three-page summary of a completed practical operations research (O.R.) application and describe results that had significant, verifiable, and, preferably, quantifiable impact on the performance of the client organization.

Typically, over two dozen entries are received and reviewed by the Franz Edelman Award Committee. The committee consists of about three dozen experienced O.R. practitioners and academics from organizations such as AT&T, Cisco, General Electric, IBM, Lancaster University, MIT, North Carolina State University, SAS, Southwest Airlines, and the University of Western Ontario. Semifinalists are selected in early November, and the further selection of finalists is completed by mid-December.

The committee names as semifinalists a dozen or more entries that have a reasonable chance of becoming finalists if the verification process supports the entries' claims. To this end, each of the semifinalists is assigned a verifier who works behind the scenes to validate the claims made by their assigned entry.

The verifier's primary role is to completely comprehend the O.R. work presented in the assigned entry summary, as well as its potential impact, and to convey this information to the rest of the selection committee. The verifier will communicate directly with the entrant's O.R. team, the users of the work, and client management. Verification is a crucial element of the competition, as it ensures that only the highest-quality O.R. work makes it to the Edelman Award finals. All verifiers are provided with written guidelines and sample verification reports, and novice verifiers are paired with more experienced verifiers.



From this group of semifinalists, the Edelman Award Committee then selects the six best entries to advance to the Franz Edelman Award finals. Each finalist must begin the preparation of a journal-quality paper and a 40-minute presentation. Each of the finalist teams is assigned an experienced coach to advise them throughout the process. A coach's major obligation is to ensure that the team's paper and presentation convey the work clearly to a general operations research audience. Often a coach is paired with one or more assistant coaches who lend another perspective to the process.

Two months prior to the spring INFORMS Practice Conference, finalist papers are distributed to the judges. The judges study each of the papers and, shortly thereafter, discuss them amongst themselves. Each finalist is assigned a focal point judge who conveys feedback from the judging committee to the finalist's coach. The judges feedback helps to identify areas where further information and development are required in the finalist presentation in order for the judges to make a proper decision.

On the day of the competition, each team gives a 40-minute presentation, followed by a 10- to 15-minute period of questioning by the judges. After the presentations are complete, the judges sequester themselves until they reach a decision on which of the finalists best exemplifies the ideals and standards of the Franz Edelman Award for Achievement in Operations Research. Relevant factors considered include the difficulty of the obstacles surmounted, the technical solution, implementation, and the total impact and value of the project.

Following the competition, the finalists will work with the special editor of the January/February issue of *Interfaces* to make any final adjustments to their papers. All finalists are invited to reprise their work at a session of the annual INFORMS meeting in the fall, with the first-place team giving a keynote address. All of the finalists' presentations become available from INFORMS via streaming video in the summer.

The Verification Process & The 2010 Verifiers

The Edelman Award Committee wishes to thank the following individuals for their dedication and service as verifiers for this year's Edelman Award.

Each of the semifinalists is assigned a verifier who works behind the scenes, often with an assistant verifier, to validate the claims made by their entry. A verifier's primary role is to understand an applicant's O.R. work and its impact in detail, and to then convey this to the rest of the committee, both orally and in a written report. Verification is a crucial element of the competition since it ensures that only the highest-quality O.R. work with verified impact makes it to the Edelman Award finals.

Verifiers and Assistant Verifiers

- Layek Abdel-Malek, New Jersey Institute of Technology
- Sudhansu Baksi, AT&T Laboratories
- Peter Bell, University of Western Ontario
- Tony Brigandi, AT&T Laboratories
- Bruce Bukiet, New Jersey Institute of Technology
- Alfred Degbotse, IBM
- Jérémie Gallien, MIT
- Michael F. Gorman, University of Dayton
- Yoshi Ikura, Saitech
- Ananth Iyer, Purdue University
- Russell P. Labe, Bank of America
- Grace Lin, World Resource Optimization
- R. John Milne, IBM
- Murthy Mudrageda, Maritrans, Inc.
- Patricia Neri, IBM
- Yanni Papadakis, Bank of America
- Graham Rand, Lancaster University
- Randall S. Robinson
- Don Rosenfield, MIT
- Leon Schwartz, Informed Decisions Group, Ltd.
- Stephen Strauss, AT&T Laboratories
- Michael A. Trick, Carnegie Mellon University
- Rajesh Tyagi, GE Global Research

The Coaching and Judging Process & The 2010 Coaches and Judges

The Edelman Award Committee wishes to thank the following individuals for their dedication and service as coaches and judges for this year's Edelman Award.

The major role of the coach is to ensure each team's paper and presentation convey the work in a manner that may be well understood by a general operations research audience. Often a coach is paired with an assistant coach who lends another perspective to the process.

The judges must work together, evaluating the evidence to determine which finalist is most deserving of the Franz Edelman Award for Achievement in Operations Research. The award is for implemented work that has had significant, verified, and preferably quantified impact.

Coaches and Assistant Coaches

- Sudhansu Baksi, AT&T Labs
- Peter Bell, University of Western Ontario
- Bruce Bukiet, New Jersey Institute of Technology
- Howard Finkelberg, MAGIC, LLC
- Jérémie Gallien, MIT
- Michael Gorman, University of Dayton
- Yoshi Ikura, Saitech
- Patricia Neri, IBM
- Yanni Papadakis, Bank of America
- Graham Rand, Lancaster University
- Randall S. Robinson
- Don Rosenfield, MIT
- Leon Schwartz, Informed Decisions Group, Ltd.
- Rajesh Tyagi, GE Global Research

Judges

- Srinivas Bollapragada, Chair, General Electric
- Layek Abdel-Malek, New Jersey Institute of Technology
- Cynthia Barnhart, MIT
- Tony Brigandi, AT&T Labs
- Ananth Iyer, Purdue University
- Grace Lin, World Resource Optimization
- R. John Milne, IBM
- Doug Samuelson, InfoLogix Inc.
- Donald R. (Bob) Smith, Monmouth University
- Michael A. Trick, Carnegie Mellon University
- Andrés Weintraub, University of Chile

The Edelman Laureates

The men and women who author Edelman finalist papers are deemed Franz Edelman Laureates.

Authors of finalist papers are recognized with this distinction, and each is formally presented with The Franz Edelman Medal.

Laureates are recognized for their significant contribution to work that each year is selected as representative of the best applications in the world of analytical support for decision making.

The Laureate recognition is distinct and separate from membership in the Franz Edelman Academy.



The Edelman Academy

Each year, a limited number of organizations may be inducted as members of the Franz Edelman Academy.

The primary client organization, or beneficiary of the finalist work, is inducted into the Academy at the annual Edelman Award Ceremony.

In addition, organizations that played a major role in the work, and therefore deserve academy membership, may also be inducted. The most common example would be an organization that provided the professionals who did the majority of the analytical work.

The membership of the Franz Edelman Academy represents 39 years of extraordinary contributions to society through the innovative application of operations research.

Nothing But the Best:

The 2010 Franz Edelman Finalists

Introduced in the pages that follow are the six finalists for the 2010 Franz Edelman Award.

Over the past several months these teams have demonstrated to the judges that their work is among the finest examples of operations research practice in the world. One of these organizations will be recognized as the best in class, the first-place recipient of the 2010 Franz Edelman Award.

Each finalist's work is described here in a shortened summary. Full papers will be published in the January/February 2011 issue of Interfaces*, the INFORMS journal dedicated to improving the practical application of operations research and the management sciences in today's organizations and industries.*

The Finalists for the 2010 Franz Edelman Award Are

Delaware River Basin Commission

Deutsche Post DHL

INDEVAL

New Brunswick Department of Transportation

Procter & Gamble

Sasol

2010 Edelman Competitors

by Barry List, INFORMS

Helping People Work Harmoniously

The subjects of the six competing entries in this year's exciting competition show that well-crafted operations research (O.R.) models can bring harmony to the most complex problems.

Conflict between stakeholders drove the push to begin an O.R. program for the **Delaware River Basin Commission**. Although California has developed a reputation as a state where different interests play a figurative tug-of-war about water rights, New York also has groups coming to words over access and control of water. "Breaking the Deadlock: Improving Water Release Policies on the Delaware River with Operations Research" was commissioned to resolve claims between three groups: New York City, whose government seeks high water levels at its reservoir in the area to prevent rationing in the metropolis; the residents of the Delaware River basin, who have experienced flooding; and environmentalists, who are concerned for the Delaware River's fish. Operations research pointed the way to a resolution that had been decades in coming.

Going from government monopoly to private company proved to be a branding challenge for **Deutsche Post DHL**. In "Managing Global Brand Investments at DHL," the company team developed brand recognition in the private sector for what was once Germany's governmental postal service. Using a global brand assessment tool, the company segmented potential customers into six customer categories, ranging from those having simple brand awareness to those using DHL as a sole provider of package delivery service. With the insights from this research and subsequent marketing rollout, DHL last year climbed to the BrandZ Top 100 ranking of most valuable global brands.

More than a decade after a financial crisis brought Mexico economic woes, **INDEVAL** officials found themselves working to improve a highly complex system for a developing country that is becoming one of the world's largest economies. In "Mexican Financial Markets Benefit from Novel Application of Operations Research," the INDEVAL team explains how they worked to ensure that the country's Securities Settlement System was improved to handle the increasing volume of transactions. The team oiled the wheels of the system by employing key operations research tools. The result: O.R. helped INDEVAL enhance and strengthen Mexico's financial infrastructure.





The New Brunswick Department of Transportation (NBDoT), like the state of New York, also used O.R. to reconcile public policy disputes. A couple of years ago, U.S. transportation officials were alarmed when a bridge in Minneapolis collapsed, killing drivers and slowing the daily commute of thousands of people. In "Taking the Politics Out of Paving: Achieving Transportation Asset Management Excellence via Operations Research," the NBDoT wrestled with issues of public safety and convenience. With over 11,000 miles of highways and roads, 2,900 bridges, and numerous ferry crossings, the province's officials had to mount a powerful case if they were to secure substantial funding from Ottawa that would keep the province's infrastructure in good repair. Using O.R. tools, they reconciled their needs with the Canadian national government.

Making it to the Top 20 on the Fortune 500 list was no accident for **Procter & Gamble**, which handles tough business decisions with the help of a long-standing quantitative analysis department. In "Inventory Optimization at P&G: Achieving Real Benefits Through User Adoption of Inventory Tools," the team builds upon its insightful distribution requirements planning systems of the 1980s. The goal was making inventory even leaner than in the past. The team began applying multiechelon technology from Optiant on its beauty care supply unit. As a result, they were able to resolve tactical and strategic problems, thus reducing inventories from 3% to 7% and, in some cases, delivering cost reductions of as much as 25%.

Achieving corporate karma in the face of declining fuel reserves, stricter clean fuel regulations, and a global recession proved quite a trick for **Sasol**, the South African energy and chemical company. In "Innovative Decision Support in a Petrochemical Production Environment," the Sasol team moved away from inexact industry measures through improved O.R. planning tools. Recognizing a shortsighted industry approach, the Sasol team developed stochastic simulation models to address this variability. Their stochastic simulation models now guide gas and liquid production facility changes, responses to changing market needs, product composition, operational efficiency, operating philosophies, schedules, and proposed projects.

As in every Edelman competition, all of this year's entries are winners—they demonstrate the triumph of business analytics and operations research in the face of grand, complex challenges. And this year, in improving service to customers of successful businesses and citizens who want their governments to emulate successful businesses, the 2010 Edelman finalists bring an important sense of resolution to problems that were once insoluble.

Delaware River Basin Commission

Breaking the Deadlock: Improving Water Release Policies on the Delaware River with Operations Research

Project Summary

The *Binghamton Press & Sun Bulletin* headline read "Fishermen and Water Managers at Odds over Water Releases." The date was July 1972. The issue was how much water could be released over the summer from the Upper Delaware River reservoirs, which serve New York City, to sustain wild rainbow trout and American shad populations while still ensuring sufficient reserves in case of a drought.

The controversy raged without resolution for more than 30 years until, in 2006, a coalition of conservation organizations backed by a team of operations researchers worked with government authorities to implement a win–win solution.

The Delaware River, originating in New York's Catskill Mountains, travels nearly 400 miles to the sea via New York, Pennsylvania, New Jersey, and Delaware. The river is a physically and politically complex system with many stakeholders, including New York City households that rely on the river for half of their drinking water, river valley residents who fear flooding, shippers and boaters on New Jersey canals, and river life such as oysters that inhabit the Delaware Bay.

The Delaware's waters are administered under the terms of two U.S. Supreme Court decrees that gave New York City the right to build three dams on its headwaters and divert water for the city's own use, provided it maintained specified downriver flows. The Supreme Court also required unanimous agreement among the four impacted states and New York City about future changes in water release policy.

Three major issues weighed on the allocation and utilization of the Delaware's waters.

First, New York City's generally conservative water policy requires reservoir levels to ensure sufficient future supply. Second, environmentalists, concerned for the health of the wild fish population, wanted increased spring and summer releases and the elimination of unnatural fluctuations in currents to ensure sufficient and consistent cool water flows. Third, concerned Delaware River valley residents, who had suffered from serious flooding three times over four years, wanted flood protection by maintaining reservoir "voids."



An operations research solution based on adaptive inventory control helped balance these concerns. This solution expressed release policies as a function of the storage in the reservoirs and the season of the year. To establish these policies, the authors used experimental design to select a range of candidate release policies for evaluation, discrete event simulation to test the policies in detail, regression analysis to develop predictive relationships between release levels and policy outcomes, and quadratic programming to balance releases across reservoirs. Finally, cost–benefit trade-off analyses provided an objective basis for devising a balanced water release policy that met the conservationists' key objective of substantially increasing the upper river aquatic habitat while providing modest flood mitigation for valley residents—all with no increased risk to New York City's available water.

The simple structure and logic of the new program, called the Flexible Flow Management Policy (FFMP), made implementation easy and attractive to river administrators, and its ability to handle the drought of the century was an acid test of its feasibility.

Implemented in October 2007, the FFMP is estimated to increase trout and shad habitat by about 200% and provide a modest increase in flood-mitigating reservoir voids with a minimal impact on the risk of drought in New York City. The states of New York, New Jersey, Pennsylvania, and Delaware, along with New York City, unanimously approved the FFMP. The Delaware River Basin Commission and the U.S. Geological Survey Delaware River Master administer it. Three conservation organizations—Trout Unlimited, the Nature Conservancy, and the Delaware River Foundation—collaborated in the development of the FFMP, and operations research modeling and analysis was done at Columbia University.

Economic benefits include an estimated $163 million annual increase in fishing and boating income in the impoverished Upper Delaware River Valley and potential flood mitigation (losses from recent floods far exceeded $226 million). The ensuing collaboration between previously contentious adversaries in an interstate water resource dispute is seen in other U.S. regions as a possible model to emulate. As one high-ranking official involved in decision making stated, "FFMP broke the barrier on how to manage water flows efficiently."





Organizational Overview

In 1961, President John F. Kennedy and the governors of Delaware, New Jersey, Pennsylvania, and New York signed concurrent compact legislation into law that created a regional body with the force of law to oversee a unified approach to managing a river system without regard to political boundaries.



The members of this regional body, the Delaware River Basin Commission (DRBC), include the four basin state governors and the division engineer of the North Atlantic Division of the U.S. Army Corps of Engineers, who serves as the federal representative.

The DRBC worked on this project with the Nature Conservancy's Eastern U.S. Freshwater Program, the Eastern Lands Protection Program of Trout Unlimited, Columbia University, and the Delaware River Foundation.

Deutsche Post DHL

Managing Global Brand Investments at DHL

Project Summary

Following a political initiative to deregulate monopolies in the European Union, the state-owned German postal service, Deutsche Post, was transformed into a private corporation in the early 1990s. Top management was aware that they needed to develop a vision for the new company. They decided to build a global logistics business to complement the traditional domestic mail services business. Part of this vision was to acquire DHL, the worldwide Express company founded in America in 1969. Because international logistics is a global business by definition, management quickly discovered that it needed to establish a truly global brand to unify and migrate other national brands that had been acquired over time to provide the answer to the challenges of globalized trade in the 21st century.

Building a global brand almost from scratch requires huge brand investments and determining the optimal investment level by country. The challenge to operational brand management is to identify the target brand elements and activities. They need to be consistent with the global brand positioning and concept, but also adaptable to the specific requirements of the local market.
In the past, brand management has been more of an art than a business. The chief executive officer, however, felt that a fact-based approach that combines modern operations research, statistical methods, marketing concepts, and in-depth customer insights from market research would help build the brand on a long-term basis. He initiated a top-management project under the leadership of the department DHL Global Branding Unit with support from academia and McKinsey & Company. As a result of this project, a new, innovative approach of global brand assessment and development was implemented on a global scale.

Conceptually, this approach is based on modeling the hierarchical customer development process and its brand-related drivers. The fundamental assumption is that customers pass through a stylized hierarchical purchase process that represents different stages of customer development and value to the firm. In the DHL business, these stages are brand awareness, brand consideration, brand usage, choice of main provider, and choice of sole provider.


DHL
EXPRESS
DHL
EXCELLENCE. SIMPLY DELIVERED.

Customers generate different returns depending on the stage, with sole-provider customers contributing the largest share to sales and profits. Technically, the process can be specified as a sequence of conditional probabilities at the individual customer level. The impact of brand and marketing efforts on customer behavior along this funnel comes from estimating discrete choice models. A constrained profit-maximization approach produces recommendations for allocating marketing resources across different brand investment categories.

The impact of the global brand assessment tool on DHL was significant. Within less than 10 years, DHL developed into a truly global brand that shares common core





brand features among customers across the continents. The global success story is reflected in the substantial increase in brand asset value. DHL did not make it in the top 100 global brands list of Millward Brown until 2009, when it was valued at US$9.7 billion.

Apart from bringing financial success, the tool had a strong impact on strategy and the organization. New insights led DHL to refine and sharpen its global brand positioning, updating attributes and customer benefits under the core brand values of "local strength worldwide," "personal commitment," and "proactive solutions." DHL developed guidelines at a global and country level to strengthen specific pillars and to ensure operational brand delivery across thousands of customer touch points based on results of the brand assessment tool. The tool



helped establish the relevance and strategic importance of brand strategy throughout the organization, eventually transforming the global organization by making brand management transparent and tangible.

Organizational Overview

Deutsche Post DHL is the world's leading postal and logistics services group. With headquarters in Bonn, Germany, its integrated DHL and Deutsche Post brands offer state-of-the-art services and solutions in national and international mail, international express, air and ocean freight, road and rail transportation, and contract logistics. The group generated revenue of more than 54 billion euros in 2008, with about 500,000 employees in more than 220 countries and territories. It presently has more than 18,500 locations globally and serves 120,000 destinations.

Deutsche Post DHL, formerly a government-controlled national agency, is today a global, stock-listed logistics market leader. Deutsche Post AG expanded into international air express services with the progressive acquisition of DHL from 1998 to 2002. With the goal to create a truly global logistics solutions portfolio, it proceeded to further acquire leading logistics companies in the subsequent years.

DHL accepts its social responsibility by actively supporting climate protection, disaster management, and education.

DHL collaborated with the University of Passau and McKinsey & Company on this project.





INDEVAL

Mexican Financial Markets Benefit from Novel Application of Operations Research

Project Summary

In this era of heightened concern about the global economy and the leadership role played by banks, Mexico is using operations research (O.R.) to strengthen its banking system.

INDEVAL is the Mexican Central Securities Depository for all financial securities. It manages Dalí, the Securities Settlement System (SSS), which has as its core an operations research engine. Currently, Dalí settles securities operations that average over US$250 billion daily, more than 70% of the value settled in the Mexican payments system. Thus, an amount close to the Mexican gross domestic product (GDP) is settled in five operating days. Although Mexico has the 13th largest GDP in the world, Dalí places the country in 8th place when ranked by value of securities transactions settled.

The SSS is important for the stability of the financial system, so it must be secure and efficient. One of the most attractive characteristics of a financial system is high liquidity. High liquidity means (a) that banks can meet their cash obligations promptly without having to resort to such expensive solutions as large deposits that yield no interest in the Central Bank, and (b) that securities holders can convert their securities to cash quickly and at market prices.

In 2005, INDEVAL, the Central Bank, and Instituto Tecnológico Autónomo de México (ITAM) began implementing a safer, reliable, and efficient SSS. The two key requirements for the new system were (1) efficient management of resources through "netting," because having an SSS that can function with minimal resources is invaluable during financial crises when liquidity is scarce, and (2) real-time settlement to meet ever-increasing demands for intraday liquidity and for better risk management tools. With these premises, communication protocols, business rules, and best market practices were revised, and a new settlement solution was created.

The main benefits that INDEVAL management sought were providing financial markets with generate liquidity and reducing the resources needed to settle transactions.

A major challenge for implementing a new solution was to get the support of the whole industry and persuade more than 100 direct market players (including authorities and institutions such as HSBC, Bank of America, and Citibank) to change their operating procedures for handling transactions.

Usually, the handling of financial transactions relies on data management and information technology approaches, which do not take into account critical factors such as the order in which settlement instructions are executed. Considering this, operations research techniques were applied and were critical for the success of the project.

In particular, the team used business process modeling notation to redesign all business processes; designed and tested a new rule-based SSS to improve the quality, reliability, and safety of the service; and developed a simulation model to evaluate the performance of the new SSS in liquidity usage and settlement time.

The core of Dalí is an operations research-based engine that is executed automatically (currently configured to run every two minutes, or more frequently if there is





enough traffic) and offers a continuous and secure operation, ensuring that settlement is irreversible. This single clearing and settlement engine incorporates a linear programming (LP) model that chooses which pending operations can be settled with the depositors' available balances, maximizing the value of the transactions settled.

Thanks to the LP model, many transactions that would remain pending if they were processed individually are settled together, thus reducing liquidity requirements dramatically, by 52% in cash and 26% in securities. Financial intermediaries save over US$150 million per year by not having to provide daily liquidity (in the order of US$130 billion to settle over US$250 billion in securities transactions).

The most important benefit of the implementation of O.R. in INDEVAL's SSS is the enhancement and strengthening of the Mexican financial infrastructure. Additional benefits include a safe mechanism to transfer money from the Central Bank to meet obligations in other payment systems and an effective tool for depositors to close their risk positions swiftly for better risk management.



This O.R. solution, which is also a finalist for the Mexican National Technology Award of 2010, benefits the entire Mexican securities and financial market because it includes the best of two worlds: the fast circulation of liquidity of near real-time settlement and efficiency in the use of financial assets of a deferred net settlement scheme. Both advantages could not have been accomplished without the novel O.R. applications at the heart of the Mexican financial sector.

Organizational Overview

The S.D. INDEVAL, Instituto para el Depósito de Valores, S.A. de C.V. (INDEVAL) is the Mexican Central Securities Depository and Securities Settlement System. In an integrated, reliable, secure, and transparent manner, it offers the safekeeping, custody, management, clearing, settlement, and transfer of securities.

Settlement systems are the core of the financial infrastructure; therefore, it is important that they are robust and solid enough to absorb shocks and ward off the negative effects of a financial crisis. INDEVAL plays an unnoticed but mission-critical role for the Mexican economy because it is the main provider of intraday liquidity to the whole financial sector.

INDEVAL ensures a safe, continuous, and real-time settlement for its clients (banks, brokerage firms, and pension and mutual funds, among other financial institutions), processing local and cross-border transactions that involve equities and government securities, as well as bank and private debt. In total, the custody of these securities represents almost US$1 trillion.

These features position INDEVAL as a decisive component of financial market infrastructures and a world-class organization.

INDEVAL collaborated with Banco de México and ITAM on this project.



New Brunswick Department of Transportation

Taking the Politics Out of Paving: Achieving Transportation Asset Management Excellence via Operations Research

Project Summary

Today we increasingly hear of crumbling public civil infrastructure—highways, roads, and bridges—and a chronic lack of funding to maintain it. The New Brunswick Department of Transportation (NBDoT) maintains the largest per-capita inventory of transportation assets in Canada. With 18,000 km of roads, 2,900 km of bridges, and various ferry crossings, it is one of many jurisdictions facing significant challenges as it strives to efficiently and effectively maintain its billions of dollars of infrastructure assets built over generations.

NBDoT was challenged with maintaining a sufficient level of service throughout the province in the form of a quality, safe, and effective transportation system and a limited budget. The department believed that their current level of funding for infrastructure renewal was much lower than what was required to maintain the roads in an acceptable condition, but the department lacked the method to clearly demonstrate this to decision makers.

Their goal was to develop a strategic plan for managing New Brunswick's highway infrastructure using investment-minded thinking. As a public organization accountable to the taxpayers, the department had to ensure that the plans were competent, transparent, and defensible, enabling buy-in from decision makers and support from the public. For the NBDoT, the complexity was significant, and a solution to manage, maintain, and operate a safe, efficient, and sustainable transportation network was essential.

As a proof of concept, the NBDoT first developed a limited-scope prototype. The NBDoT team built a basic linear programming model to help evaluate what new or different insights could be generated and how better decisions could be developed using this approach. Results showed that the traditional planning methods could not address the exponential deterioration of the highway infrastructure, whereas the new approach offered a feasible and defensible plan with improved conditions at a lower life-cycle cost.

The operations research component of the framework, developed by Remsoft, uses a unique combination of linear programming and heuristic techniques for a goal-based approach. The model incorporates long-term objectives and constraints from an operations-wide view that weighs all options; considers costs, timings, and asset


SMITH CREEK NO.1
4.2 m
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MAXIMUM
15 t

life cycles; and produces optimal treatment plans and schedules of activities.

The result of the initial analysis offered the substantiation required to secure a three-year commitment from the government for a 200% increase over the current funding level. The increased funding helped address the growing infrastructure deficit, allowed the NBDoT to maintain the required levels of service, and assisted the local road-building industry by stabilizing funding. Furthermore, the NBDoT realized $72 million (discounted) in savings for the taxpayer annually as a return on its $2 million investment; this amounts to $1.4 billion (discounted) over the 20-year planning cycle. As of 2009, there were 1,200 fewer kilometers of poor roads than there would have been under the traditional funding and approach, and over the next few years it is projected that this trend will increase.

The project also transformed the way the NBDoT performed the business of managing public infrastructure. The solution broke down communication barriers and provided the touchstone for every manager in the department to rely on for information and analysis, thus ensuring all relevant decision-making avenues have been explored.

The new solution provides the department with the capability to commit to long-term decisions and has removed politics



from the decision-making process because the consequences of deviating from the optimized plan can be easily quantified and communicated.

In use operationally for three years, the system has been effectively used to develop the department's annual multimillion dollar rehabilitation capital budget for the past three years. Future program development capital budgets will see highway fixtures and ferries added to the model.

The Department of Transportation has become a global leader in the field of asset management, and the success has attracted the attention of transportation officials around the world. The solution has been one of the key points in the premier's throne speeches. Generous media coverage has been directed at the solution, even to the extent of editorial cartoons. In addition,

other government departments have been requesting NBDoT assistance and guidance with respect to the management of their respective assets.

Organizational Overview

The Province of New Brunswick is the largest of the three Maritime Provinces. It is the only officially bilingual (English and French) province in Canada. The population of 730,000 is located in 8 cities, 27 towns, 67 villages, and 272 local service districts.

New Brunswick is strategically located on the east coast of Canada and North America, acting as a gateway and trade corridor for national and international markets. Economic growth depends on the export and import of products and resources as well as transportation systems that enable goods and people to be transported with world-class efficiency. The vision for the Department of Transportation is for New Brunswick to be a leader in achieving and sustaining a safe, reliable, state-of-the-art, fully integrated transportation system in support of the economic and social development of the province. It is imperative that New Brunswick's transportation system meets current and future needs. A competitive growing economy requires a transportation system that can safely move people and goods quickly and efficiently.

Highways are the backbone of New Brunswick's transportation system. Recent estimates indicate that trucks move 90% of consumer goods within the region. The infrastructure under the control of the department includes 18,000 km of highway and 2,700 structures. Approximately 2,000 employees contribute to the vision of the department. They strive to protect the public investment in the province's transportation infrastructure and to meet or exceed legislative and regulatory requirements, policies, and standards. As with all transportation departments, the challenge is to protect the province's infrastructure investment with limited resources.





Procter & Gamble

Inventory Optimization at P&G: Achieving Real Benefits Through User Adoption of Inventory Tools

Project Summary

Four billion times per day, P&G brands touch the lives of people around the world. Familiar brand names—Tide, Crest, Gillette, Pantene, and 300 more—are manufactured at more than 145 sites and distributed to 180 countries. P&G has consistently been at the forefront of supply chain excellence, being ranked as one of the top five best-managed supply chains in the world and winning numerous best practice awards. The company's global reach provides significant scale opportunities to optimize areas such as inventory management, new product launches, merchandising, and promotions.

P&G's supply chain analysts employ a standard roadmap to determine which inventory optimization tools are right for a given supply chain's business and operating conditions. At one end of the spectrum, shorter and less complex supply chains utilize detailed single-stage calculators to determine optimum inventory requirements. At the other end of the spectrum, higher-complexity supply networks require more sophisticated multiechelon tools.

The adoption of distribution requirements planning systems in the late 1980s triggered the development of simple but robust models at P&G for setting inventory targets across a distribution network, one echelon at a time. These models have been very successfully adopted and have contributed to multimillion dollar reductions in worldwide inventory.

In the early 2000s, P&G recognized the need for more advanced inventory tools to allow it to continue trimming already lean inventories while maintaining its superior customer service. Multiechelon technology from Optiant was selected to serve as its future inventory optimization platform. P&G executed a successful pilot in its most complex beauty care supply chain



in 2005–2006. Since 2006, multiechelon inventory optimization has been deployed across more than 80% of the global beauty care supply chains to solve both tactical and strategic production–inventory planning problems. Even more importantly, a closed-loop planning process integrates these two sets of decisions. Beauty care supply chains are achieving incremental total inventory reductions of 3% to 7% from an already low base. Some specific applications of the multiechelon tools to aid in strategic redesign of a supply chain have yielded cost reductions of more than 25%.

The operations research (O.R.) that underlies the multiechelon inventory planning engine is based on the guaranteed service model of safety stock optimization. Although the basics of this research stream have been known to apply to strategic supply chain design for years, considerable advances in both operations research and computer science have been required to solve the tactical inventory problem at P&G's scale. These O.R. advances include modeling nonstationary demand to reflect the seasonal nature of consumer demand, modeling review periods to capture different replenishment frequencies across the supply chain, and most significantly, the ability to optimize inventory levels and locations in acyclic network topologies. It is this last advance that has allowed P&G to capture the multiechelon nature of their supply chains.

Organizational Overview

Procter & Gamble, founded in 1837, is a leading global consumer products company with nearly $80 billion in sales in 180 countries. International recognitions include the No. 6 ranking on *Fortune's* World's Most Admired Companies, the No. 2 ranking on *Fortune's* Top Companies for Leaders survey, the No. 3 ranking on *Barron's* World's Most Respected Companies list, and the No. 12 ranking on *BusinessWeek's* list of the World's Most Innovative Companies. It is organized along three major global business units: beauty (with 33% of net sales), health and well-being (21%), and household care (46%). Products are manufactured in 145 sites in 80 countries.





P&G's purpose is to provide branded products and services of superior quality and value that improve the lives of the world's consumers, now and for generations to come. Paramount to the P&G mission is to delight the consumer wherever and whenever they shop in the world for their products. Inventory optimization across P&G's end-to-end supply network is a key enabler to successfully achieving that goal.

Sasol

Innovative Decision Support in a Petrochemical Production Environment

Project Summary

The world out there is constantly in a state of flux, and every company faces the challenges that this dynamic brings!

Declining fossil fuel reserves, stricter clean fuel specifications, fluctuating oil and gas prices, a recessionary world economy, and a myriad of unique developing world issues are some of the challenges for Sasol. A passion for developing innovative solutions to deal with the issues of the day and the future has driven the company to surge ahead and become a world leader in the application of unique technologies.

Sasol's stochastic simulation models are a perfect example of this solution-oriented mindset. These models are a unique application of operations research in real life that has radically improved Sasol's decision-making capability.

Historically, the petrochemical industry based decisions on average production limits. This approach ignored any time-based variability in production, hence requiring the addition of a design margin and more expensive production facilities. Stochastic simulation models were developed in direct response to a critical need to include this key factor in decision making. The brainchild of Sasol Technology's Operations Research team, the models are reflective of an industry "first," in which production facilities have been simulated dynamically.

The simulation models are used for decision support in the business cases developed for gas and liquid production facility changes, to highlight risks, and to assist strategic decision making. They are also used to analyze the impact of changing market needs, product composition, operations efficiency, operating philosophies, schedules, and proposed future projects. In addition, the models support shorter-term questions on operations that ensure that production is sustained and improved.

As a major producer of fuels and chemicals, Sasol has relied on these models for the last 10 years to reflect production variability. Ownership of stochastic simulation models has led to an estimated value addition for





Sasol of over $230 million since 2000. Although not audited, this is in fact considered a conservative estimate because it does not account for the improvements in energy efficiency, greenhouse gas emissions, general risk reduction, and the overall understanding of Sasol's complex and integrated systems. Sasol believes that this work has applications in the wider chemical and fuels industries and represents a major innovative step forward for operations research applied to chemical engineering.

According to the general manager of business development at Sasol Synfuels, the largest business unit in the Sasol Group, stochastic operations model results are embedded in the decision-making process for both strategic decisions at Sasol Synfuels and for technical operations planning. No capital proposal is submitted to the Sasol board by business unit senior management unless the stochastic operations model results (where models exist) are reported as part of the business process. The stochastic operations model results provide the Sasol Synfuels site with integrated information, a clear identification of bottlenecks and commensurate risks.

Willem Louw, managing director of Sasol Technology concludes, "We believe that these simulation models can be applied in the wider fuels and chemical industries and represent an innovative step forward for operations research in the chemical engineering discipline. It is difficult to believe we were able to build business cases before we had these exceptional models."



Organizational Overview

Sasol is an integrated energy and chemical company based in South Africa. The company converts coal, oil, and natural gas chemical components, fuel components, liquid fuels, and chemicals with the help of its proprietary Fischer-Tropsch processes.

Formed in 1950, the company started producing synthetic fuels in 1955 and is now one of the top five companies listed on the Johannesburg Stock Exchange in South Africa. Sasol is also listed on the New York Stock Exchange.

Sasol is represented in some 30 countries and produces about 34% percent of South Africa's total liquid fuel requirements. The company's diversified fuel, chemical, and related manufacturing and marketing operations are complemented by interests in technology, research and development, oil and gas exploration and production, as well as coal mining.

With a 34,000-strong globally operating workforce, Sasol is considered an employer of choice by students and young professionals in South Africa. The company won an unprecedented three Magnet Communications' Ideal Employer Awards in 2009 in the science, petrochemical industry, and engineering categories.

The market capitalization of Sasol in 2009 was over $23 billion. The publication *BusinessWeek* ranked Sasol among the World's Best Companies in 2009 based on criteria such as a commitment to innovation, diversified portfolios, aggressive expansion, strong leadership, and a clear vision for the future. The magazine selected these top 40 companies for "thriving in the recession and preparing for beyond."



Call for 2011

Franz Edelman Award Applications

Call for 2011 Applications

THE FRANZ EDELMAN AWARD

40th Annual International Competition for Achievement in Operations Research

A $15,000 Competition with a $10,000 First Prize
Call for Success Stories

INFORMS and CPMS, the Practice Section of INFORMS, are pleased to announce the 40th International Competition for the Franz Edelman Award for Achievement in Operations Research. The competition will take place at the 2011 INFORMS Conference on O.R. Practice in Chicago, Illinois.

Any work done in recent years is eligible, unless it has already been described by a Franz Edelman Award finalist. Previous publication of the work does not disqualify it. Anyone is eligible for the competition except a member of the 2011 judging panel.

The purpose of the competition is to recognize and reward outstanding examples of O.R. in practice. The prize is awarded for implemented work, not for a submitted paper or for the presentation describing the work. The client organization that used the winning work receives a prize citation; the authors receive a cash award. In addition, finalist organizations become members of the Franz Edelman Academy; authors receive the Franz Edelman Medal and are officially recognized as Laureates.

To submit, provide a 3-page summary of your achievement and a 60-word abstract, plus the name, address, phone number, and affiliation of each author by Wednesday, October 20, 2010.

Complete instructions will be announced online at **www.scienceofbetter.org/Edelman**.

Each finalist group will give an oral presentation of its work at the 2011 INFORMS Conference on O.R. Practice in Chicago, Illinois, April 10–12, 2011.

See you at the 2011 Franz Edelman Award Competition!
www.scienceofbetter.org/Edelman

The INFORMS Prize:

Sustained Integration of Operations Research





2010 Winner

The 2010 INFORMS Prize is awarded to Jeppesen, a Boeing Company, for the outstanding widespread use of operations research throughout the company. Jeppesen maintains, manufactures, and distributes flight manuals that contain navigational and other safety-of-flight information for over 800,000 pilots and 400 airlines worldwide. In 1997, Jeppesen saw its service deteriorate when a growing line of over 100,000 aviation charts overwhelmed its production system. The company responded by establishing a small O.R. group to analyze its production problems. In only two short years, Jeppesen was able to eliminate late delivery of product orders, reducing costs by nearly $3 million annually. Since then, the expanding O.R. department has consistently applied a wide variety of O.R. techniques throughout the enterprise to improve operations and to support decision making related to resource utilization, inventory optimization, capital investments, market strategy, product development, and pricing. Today, more than 75 professionals with O.R. backgrounds, led by and connected to the central O.R. department through a strategic community of practice, are helping Jeppesen apply analytics to make better decisions, build better products, and offer better services.

By awarding the 2010 INFORMS Prize to Jeppesen, INFORMS recognizes the world-class capabilities and contributions of the Jeppesen Operations Research Department.



The INFORMS Prize

A History

This is the third year that INFORMS is presenting its most prestigious practice prizes at the Edelman Awards Gala. The Franz Edelman Award and the Wagner Prize recognize operations research practice projects that are among the very best in the world during a given year. In that same year, the INFORMS Prize recognizes long-term, multiproject achievement by honoring sustained, successful work in operations research practice.

The INFORMS Prize is awarded annually to recognize effective integration of operations research into organizational decision making. The award is given to an organization that has repeatedly applied the principles of O.R. in pioneering, varied, novel, and lasting ways.

INFORMS Prize Winners

2010 Jeppesen
2009 Intel *Decision Technologies Group*
2008 GE Global Research *Risk & Value Management Laboratory*
2006 Schneider National, Inc.
2005 Air Products & Chemicals, Inc.
2004 Procter & Gamble
2003 UPS
2002 Hewlett-Packard
1999 IBM
1998 Lucent Technologies
1997 Merrill Lynch Private Client Group
1996 Pfizer Inc
1995 Bellcore
1994 AT&T and US West Technologies
1993 New York City *Office of Management and Budget* and United Airlines
1992 San Miguel Corporation
1991 American Airlines and Federal Express

2010 INFORMS Prize Committee

Jeffrey D. Camm,
University of Cincinnati, Chair
Ranganath Nuggehalli, UPS, Past Chair
Michael Gorman, University of Dayton
Erica Klampfl, Ford Motor Company
Thomas Olavson, Hewlett-Packard
Eleni Pratsini, IBM Zurich Research Laboratory
Karen Smilowitz, Northwestern University
Sean Willems, Boston University

Notes:
Prior to 1995, the award was called the ORSA Prize.
No prize recipients were chosen in 2000 and 2001.

To adjust to the new INFORMS Prize presentation schedule, no award was given in 2007.



The INFORMS Prize

Criteria

Variety of Applications of O.R. The demonstrated use of a wide set of disciplines and application areas led to a richer set of offerings, leading to greater opportunities for impacting the winning organization.

Competitive Advantage to the Organization. O.R. adaptation within an organization is clearly varied among organizations. There are examples where O.R. permeates the parent organization's operations and was considered integral and of strategic competitive advantage for the organization. Companies that soundly demonstrate this type of adaptation were rated higher by the prize committee.

Impact. There are several ways that O.R. professionals can quantify and qualify the impact their work is having on the organization as a whole. The prize committee took one-off project impacts into consideration, as well as those O.R. applications that were used on a sustained, systemic manner and the quantifiable value they delivered. Some applicants demonstrated instances in which O.R. made fundamental changes to the client organization's overall business model and/or organizational structure, and the prize committee considered these examples in which O.R. truly made an impact on the organization's operations.

Model for Success. Applicants' business models vary, based on different industries. Some are represented very well, including marketing, budgeting, cost recovery, research funding approaches, and strategic planning. This provides a sense of sustained, growing capability, and of direction for O.R. in the organization.

Endorsements. Strong submissions include personally written endorsements from top-level organization management.

Overall Quality of the Application. The best applicants clearly put extra effort into creating a singular submission with all supporting references and endorsements. A well-written application, taken together with the overview statement, aids the prize committee and, in turn, the applicant.

Call for 2011

INFORMS Prize Nominations

Call for 2011 Nominations



Applications for the 2011 INFORMS Prize are now being accepted.

All organizations are eligible, and applications will be accepted from all sources.

The measurement of the contribution is judged relative to the impact OR/MS has had on the overall success of the organization. Thus, a multibillion dollar firm that has a large OR/MS staff but integrates OR/MS techniques only occasionally might be ranked relatively lower than a small firm that uses OR/MS throughout its activities.

Potential applicants can be assured that strict guidelines regarding the confidentiality of their application are enforced.

The Awards Committee may conduct site visits to those organizations selected as finalists. The award is presented to the key executive in charge of OR/MS activities within the organization.

Please include the following with your application:
A summary description (1-3 pages) of the scope, scale, and impact of OR/MS activities in the organization; and more detailed descriptions (1 page each) of two or three major OR/MS projects and their impact. For more information about the application process, please visit: **www.informs.org/informsprize**

Deadline is December 1, 2010.

See you at the 2011 INFORMS Practice Conference!
April 10–12, 2011 in Chicago, Illinois

The Wagner Prize:

Excellence in Operations Research Practice

2009 Winner
The Daniel H. Wagner Prize
for Excellence in Operations Research Practice

The first place winners are
Hugo Simao, Princeton University - CASTLE Lab
Warren Powell, Princeton University
Abraham George, Princeton University
Ted Gifford, Schneider National
John Nienow, Schneider National
Jeff Day, Schneider National

Their paper "Approximate Dynamic Programming Captures Fleet Operations for Schneider National" describes the development and implementation of the Schneider Tactical Planning Simulator (TPS), a model that captures, at a very high level of detail, the operations of Schneider National, one of the largest truckload motor carriers in the United States.

TPS uses the modeling and algorithmic framework of approximate dynamic programming to optimize the movements of over 6,500 drivers, moving approximately 13,000 loads per week over a four-week planning horizon. Although the sheer number of drivers and loads contributed to the complexity of the problem, the real challenge lay in the high level of detail required to model drivers and loads. Drivers were described by a 15-dimensional attribute vector that captured dimensions such as their location (or expected future location), estimated time of arrival (measured in minutes), home location, equipment type, "capacity type," country of origin (United States or Canada), and driving and duty time on a particular day, and an 8-dimensional vector giving the number of hours the driver worked on each of the last eight days (used to model the infamous "70 hours in eight days" restrictions). Loads were characterized by origin and destination, pickup and delivery windows, the equipment type needed, and the revenue. The model closely replicates historical performance and also produces accurate estimates of the marginal value of each of 500 types of drivers. Numerous projects using this model have produced millions in savings.

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

2009 Finalists

This is the second year that INFORMS is conferring the Daniel H. Wagner Prize for Excellence in Operations Research Practice at the Franz Edelman Awards Gala. The award now shares the spotlight with the two other great INFORMS practice awards, the Edelman Award and the INFORMS Prize.

A special issue of *Interfaces* will publish the winning paper along with those of the other five finalists:

Bex George Thomas, Srinivas Bollapragada, General Electric Global Research:
"Integrated Framework for Product Costing, Demand Forecasting and Capacity Planning of New Photovoltaic Technology Products"

Hernán Abeledo, The George Washington University; Eduardo Uchoa, Universidade Federal Fluminense; Nelci Nascimento, Petrobras; Marcus Poggi de Aragão, Lorenza Moreno, Pontificia Universidade Católica; and Fernanda Menezes, Oscar Porto, Marcelo Reis, Gapso Tecnologia da Decisão
"Optimizing Helicopter Transport of Oil Rig Crews at Petrobras"

Benjamin R. Wheeler, MIT Sloan School of Management; Thomas Hanschke, Clausthal University of Technology; Steven M. Brown, IBM Systems and Technology Group; and Ingo Meents, Horst Zisgen, IBM Deutschland Research and Development GmbH
"A Queuing Model-Based System for Semiconductor Production Planning at IBM"

Karl Kempf, Asima Mishra, Shamin A. Shirodkar, Intel Corporation; and Mehmet O. Atan, Berrin Aytac, David S. Wu, Lehigh University
"Extending Bass for Improved New Product Forecasting"

Michael Gorman, University of Dayton
"Hub Group Implements a Suite of OR Tools to Improve Its Operations"

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

A History

The Wagner Prize is awarded annually in honor of the late Dr. Daniel H. Wagner.

During his years as president and principal owner of Daniel H. Wagner Associates, Dr. Wagner brought many high-quality mathematicians into the operations research community. This led to significant advances in the firm's fields of endeavor and delivery of significant applications to the Navy, Coast Guard, and other clients. Many of the applications are still in service today.

Dan Wagner earned his PhD in mathematics from Brown University in 1951. His dissertation, "On Free Products of Groups," was published in the Transactions of the American Mathematical Society in 1957. Dr. Wagner joined the Navy's Operations Evaluation Group at the Pentagon, working on operations research for naval warfare. He worked there until 1956, with a one-year leave of absence for postdoctoral research on free algebras at MIT. Dr. Wagner then joined Burroughs Research Center, where he directed a group of mathematicians performing analysis for the development of digital computers.

In 1957, Dr. Wagner and Dr. John D. 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 applied itself to cutting edge work in the mathematics of naval tactics, especially antisubmarine warfare, detection theory, and search planning.

After retirement from the firm he founded, Dr. Wagner held various teaching and research positions with the U.S. Naval Postgraduate School and the U.S. Naval Academy.

Dr. Wagner was a member of INFORMS/ORSA for more than 40 years. Dan passed away in March 1997.

2009 Wagner Prize Committee

C. Allen Butler,
Daniel H. Wagner, Associates, Inc., Chair
Charles Beall, Verizon Retiree
Peter C. Bell, University of Western Ontario
William J. Browning,
Applied Mathematics, Inc.
Joseph H. Discenza, SmartCrane, LLC
Howard Finkelberg, MAGIC, LLC
Art Geoffrion, UCLA Anderson School
Randall S. Robinson
Lawrence D. Stone, Metron, Inc.

Call for 2010

The Wagner Prize Applications

Call for 2010 Abstracts

THE DANIEL H. WAGNER PRIZE

Excellence in Operations Research

Deadline May 1, 2010

The Wagner Prize is given to the authors of a previously unpublished paper detailing a real-world, provably successful application of operations research that required innovative mathematical development, a unique new algorithm, or a series of coherent O.R. advances.

The application process begins with a 1- to 2- page abstract, written verification of application success, and a commitment, if selected as a finalist, to give a 30- minute oral presentation at the INFORMS Annual Meeting and, if selected as a winner, to reprise the presentation at the spring Practice Conference. The finalist papers are published in a special issue of *Interfaces*.

Submissions can be made to The Wagner Prize Chair, Dr. C. Allen Butler, at allen.butler@va.wagner.com. For more details on the application process, please visit **www.informs.org/wagnerprize**.

The Prize amount for 2010 is $1,000.

CPMS thanks the firms of Metron, Inc., Daniel H. Wagner, Associates, Inc., and Applied Mathematics, Inc., for the generous endowments that enable the funding of this prize.

See you at the 2010 Wagner Prize competition!
www.informs.org/wagnerprize

The Institute for Operations Research and the Management Sciences

About INFORMS, Its Activity and Its History

The Institute for Operations Research and the Management Sciences (INFORMS) is the largest professional society in the world for professionals in the field of operations research (O.R.).



The Institute for Operations Research and the Management Sciences (INFORMS) is the largest professional society in the world for professionals in the field of operations research (O.R.). It was established in 1995 with the merger of the Operations Research Society of America (ORSA) and The Institute of Management Sciences (TIMS). The international scientific society, which contains over 10,000 members, is dedicated to applying scientific methods to help improve decision making, management, and operations. Members of INFORMS work in business, government, and academia. They represent fields as diverse as airlines, health care, law enforcement, the military, the stock market, and telecommunications.

Since the pioneering days of people like Franz Edelman, operations researchers have taken pride in quietly improving the world. Saving billions of dollars annually, model-based support solutions developed by INFORMS members are now relied upon in such diverse areas as airlines, telecommunications, health care, homeland security, the armed forces, and government. Research pioneers in O.R. disciplines represented by INFORMS have contributed importantly to the development of algorithms and methodologies now employed widely in engineering, science, and business. Contributions to applied math, including optimization, stochastic processes, simulation, game theory, statistics, and decision science, are especially well known.

INFORMS is often a leader in identifying the world's foremost researchers—for example, honoring Nobel Prize winners John F. Nash and Harry Markowitz before they were recognized by the Nobel Academy.

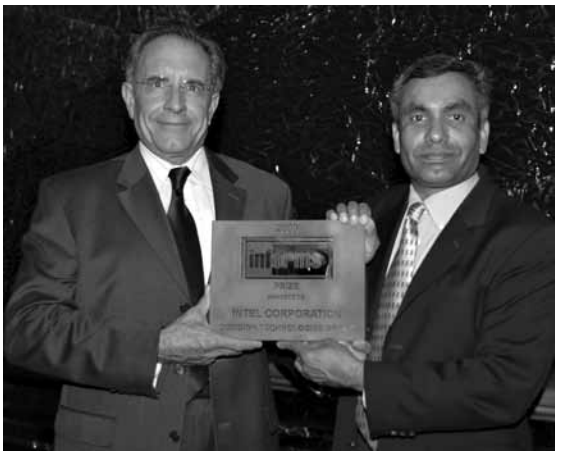
The society serves the scientific and professional needs of O.R. educators, investigators, scientists, students, managers, and consultants, as well as the organizations they serve, by such services as publishing 12 scholarly journals that describe the latest O.R. methods and applications, and a membership magazine with news from across the profession. The society organizes national and international conferences for academics and professionals, as well as for members of the society's special interest groups. The Institute serves as a focal point for O.R. professionals, permitting them to communicate with each other and reach out to other professional societies, as well as to the varied clientele of the profession's research and practice.



INFORMS advances operations research by

- Encouraging and rewarding excellence;
- Communicating all aspects of operations research to management, policy makers, and the public;
- Providing education and career development opportunities to operations researchers;
- Attracting young people and all those with talent and skill to the field of operations research.

INFORMS is a member of the International Federation of Operational Research Societies (IFORS).




WE KNOW THAT GETTING
THE OPTIMAL SOLUTION
IS ONLY PART OF THE JOB.
Gurobi Optimization salutes the achievements of
the finalists for the 2010 Edelman Award.
Gurobi
Optimization


SAVE THE DATE April 10-12, 2011
INFORMS CONFERENCE ON O.R. PRACTICE
APPLYING SCIENCE
TO THE Art of Business
Chicago, Illinois
informs

Bringing You a Crown Jewel of the Operations Research Profession

By Randall S. Robinson, Chair, CPMS: The Practice Section of INFORMS

Background of the Edelman Award and an Invitation to Participate



As we celebrate the outstanding achievements of this year's Franz Edelman Award finalists, let's take a look at the background of the influential Edelman Award, including the central role of CPMS, the Practice Section of INFORMS.

"CPMS" is an acronym originally derived from "College on the Practice of Management Science." A long-standing acronym often becomes the name, and later we rarely think of its origin. Consider, for example, AT&T, which once stood for American Telephone and Telegraph, and is still the acronym even though "telegraph" is no longer part of the AT&T business. So it is for CPMS. "College" was terminology used within The Institute of Management Sciences (TIMS), which merged with the Operations Research Society of America (ORSA) in 1995 to found INFORMS; more appropriate today is the term "Section."

CPMS is dedicated to advancing the practice of operations research and the management sciences (OR/MS). Rather than giving attention only to specific technical methods or areas of study, CPMS, like a family physician, focuses on general practice: how OR/MS may be carried out successfully in any and all organizations where executives and operating personnel seek assistance from qualified practitioners to help improve real organizational performance.

Probably the most significant activity of CPMS is administering the Franz Edelman Award. This present stewardship directly evolved from the earlier CPMS role in initiating, nurturing, and growing the competition in stature and visibility. First established by CPMS in 1971 as the TIMS Prize, the award was named after Franz Edelman shortly after his death in 1982. Franz was the founder of one of the first industrial operations research



groups (at RCA). Today, becoming an Edelman finalist is widely viewed to be rigorous certification that an organization has benefited from state-of-the-art, high-organizational-impact, applied operations research. The finalist stories and their presentations, available on DVD and in published papers, are widely employed in education and otherwise to help strengthen the profession. Past and present finalist organizations and team members are rightfully honored at our gala award ceremony every year, during the spring practice conference, where the competition takes place.

Administration of the competition is a rigorous, highly organized effort. The group of volunteers who operate the competition consists of 35–45 OR/MS professionals, most of whom are CPMS members. The chair of the committee, typically serving a two-year term, is assisted by 8–10 judges, 10–15 coaches and assistant coaches, 20–25 verifiers and assistant verifiers, and 35–40 reviewers (some volunteers take multiple roles).

The competition would not be possible without an effective support-and-evaluation infrastructure. If you would





like to help administer the Edelman Competition in the future, a good starting point is to volunteer to become one of the reviewers.

CPMS also oversees a number of other activities important to practitioners, including the Daniel H. Wagner Prize (now recognized during the Edelman Gala Award ceremony), cluster sessions at INFORMS meetings, Isolated Practitioner workshops, and a newsletter.

Currently, we are assessing how we can be even more valuable to the widespread community of OR/MS practitioners. If you have ideas about ways to do this, please contact us (randy.robinson@mac.com).

Better yet, if you are not a member of INFORMS or of CPMS within INFORMS, please join us and pitch in as we serve all full-time and part-time practitioners. If you are already a member but not actively involved, contact us to find out how you can further benefit from your membership through participation. As the cliché goes about university lecturing, "Nobody learns as much as the teacher." There is no better way to learn the ropes of successful OR/MS practice!

Edelman Awards Inspire Innovation in Marketing the Profession

by Gary Bennett, Director of Marketing, INFORMS

As the director of marketing at INFORMS, I am keenly aware of the benefits all of the Edelman finalists bring to their client organizations. One only has to give a cursory glance to Jeff Alden's article in this program book on the monetary impact of the finalists' projects over the years to be inspired to bring innovation to their own work.

Beginning with the Edelman Award itself, are you aware that INFORMS produces an Edelman DVD annually, and it is a benefit of your membership in INFORMS? At INFORMS headquarters, we have DVDs going back to 1983. They are yours for the asking. Simply contact me at gary.bennett@informs.org. Professors of O.R. report on the value of showing in the classroom these examples of real-life O.R. successes. Operations researchers in practice likewise talk of the inspiration and ideas they receive from viewing the presentations.

Beginning with the 2010 presentations, INFORMS will make the leap to providing the presentations via streaming video. Besides representing a significant cost savings over producing DVDs, streaming the presentations via the Web will allow us to have the presentations ready for viewing almost immediately, instead of the time it takes to edit and produce the DVDs. I can also visualize the day when the presentations will be streamed live to an audience who cannot attend the INFORMS Conference on O.R. Practice.

To get our feet wet with streaming video, we recorded the Wagner Prize presentations at the 2009 INFORMS Annual Meeting and made them available via the Web roughly one month after the live presentations. To date, over 1,000 members have viewed all or portions of the six recorded presentations, and feedback has been overwhelmingly positive. To view the 2009 Wagner Prize for Excellence in Operations Research Practice presentations, go to http://livewebcast.net/INFORMS_AM_Wagner_Prize_2009.

We have not forgotten about the public relations value of the Edelman Gala itself. Nothing we do at INFORMS matches the gala for sheer excitement and representing the profession in a bright, positive light. This year, as in years past, we will record the entire gala, from introductory remarks to the announcement of the winner, and post it on YouTube and the INFORMS website in near real time. Students especially enjoy viewing portions of the gala on YouTube.

Analytics magazine is not a brand new initiative but one that is certainly worth your time to get to know better. See the latest issue and all archival issues at www.analyticsmagazine.com. *Analytics* was launched in 2008 to be INFORMS outward-facing publication to the entire community interested in the use of advanced analytics to help make better decisions in business and elsewhere. To date, *Analytics* is receiving about 30,000 visits per issue. About 4,500 have thought enough of the content to register to receive notification of additional issues. *Analytics* is your magazine to use as you wish to help promote the profession. Naturally, I use *Analytics* to heavily promote the INFORMS Conference on O.R. Practice and the Edelman Competition and Gala to nonmembers. I invite you to post a link to *Analytics* on your personal, departmental, or organizational website. We make it easy for you to post a link in the form of a journal cover icon. Simply go to www.analyticsmagazine.com and click on "Promote the analytics profession with *Analytics.*" I'd also like to invite you to submit a nontechnical story idea to the editor. We are always on the lookout for great story ideas. Contact horner@lionhrtpub.com.

Last but not least, I would like to mention the launch of our newly designed website, INFORMS OnLine (IOL). See it at www.informs.org. IOL has been completely redesigned to become INFORMS' primary marketing portal, where members and visitors come to engage and learn more about the profession. Take a quick look at IOL and you'll notice not only the strikingly designed pages but also many new features that will serve us well now and into the future:

- Clearer, more user-friendly navigation throughout
- Sections with resources and content targeted specifically to our key audiences—academics, practitioners, students, and international professionals
- Easier access to breaking INFORMS and OR/MS news
- Upgraded calendar of events with a robust dedicated search function
- Member dashboard where you can renew your membership, register for conferences, update your profile, and manage your communities and subscriptions
- Improved overall site search functionality
- Links to related content throughout the site to encourage deeper navigation
- E-mail and social network sharing tools
- Quick links
- INFORMS blog and forum

The Edelman Laureates

2009
Dharma Acharya
Jason Amaral
Dirk Beyer
Ann Brecht
Matt Callahan
Brian Cargille
Felipe Caro
Russ Chadinha
Kathy Chou
Matt Collins
Juan Correa
José Manuel Corredoira
Prashant Dave
Gavin DeNyse
Miguel Díaz
Alexey Ershov
Graeme Everett
Qi Feng
Chris Fry
Jérémie Gallien
Javier García
Rune Gjessing
Michael F. Gorman
Sharon Hormby
Shailendra Jain
Shiva Kumar
Rick Lawrence
Michele Meyers
Holger Mishal
Marcos Montes
Julia Morrison
Thomas Olavson
Cookie Padovani
Claudia Perlich
Andy Philpott
Sesh Raj
José Antonio Ramos
Saharon Rosset
David Sellers
Kurt Sunderbruch
Robert Tarjan
Timothy Tenca
Kjetil Vatn
Krishna Venkatraman
Julie Ward
Joseph Woods
Bin Zhang
Jing Zhou

2008
Erwin Abbink
Terra Baranowski
Jonathan Berry
Erik Boman
Michael Brennan
Robert Carr
Lorne Cass
Michael Cirillo
Maria Delbom
Charles B. Duke
Helga Einarsdottir
Mats Eklund
Patrik Eveborn
Pieter-Jan Fioole
Matteo Fischetti
Marte Fodstad
Kim Fox
George Gray
William Hart
Lars Hellemo
Jonathan Herrmann
Ken Howard
Dennis Huisman
Robert Janke
Leo Kroon
Miro Lehky
Vaughn Lowe
Gábor Maróti
Kevin Morley
Regan Murray
James Oiesen
Cynthia Phillips
Cyndi Quan-Trotter
Sudhendu Rai
Lee Ann Riesen
Frode Rømo
Mikael Rönnqvist
Thomas Scheermesser
Lex Schrijver
Adri Steenbeek
Ved Sud
Midori Tanino
Thomas Taxon
Asgeir Tomasgard
James Uber
Jean-Paul Watson
James Wetherly
Roelof Ybema

2007
Corne Aantjes
Deirdre Borrego
Dwight Branvold
Vinayak Deshpande
Kent Everingham
Matt Gaskins
Jerry Hwang
Tim Hyatt
Irina Ionova
Ananth Iyer
Michael Jacks
Goos Kant
Alexei Khavaev
Eva K. Lee
Patty Mackenroth
Venu Nagali
Gary Polaski
Mark Pridgen
Frederick C. Riedlin
David Sanghera
Patrick Scholler
William V. Shearin
Michael A. Shirk
Greg Shoemaker
Jorge Silva-Risso
Tim Thurston
Marco Zaider

2006
William Best
Raymond H. Bittel
Richard Carnevale
Sridhar Chandrasekaran
Louis Cox, Jr.
Ross Darrow
Stéphane Dauzère-Pérès
John Elieson
Christoper A. Forgie
Dirk Guenther
Kjetil Haugen
Ulrich Koester
William H. Lee
Per Olav Myrstad
John J. Nestor
Atle Nordli
Asmund Olstad
Robert M. Peterson
Douglas Popken
B.V. Rao
Alf Reistad
Barry C. Smith
Mandyam Srinivasan
Geir Teistklub
Russell Wooten
Faker Zouaoui

2005
Jeffrey Alden
Dennis Begg
D.A. Beis
Ann Bixby
Lawrence Burns
Michael Concordia
Theodore Costy
Brian Downs
Toshiharu Hasegawa
Rick Hughes
Richard Hutton
Craig Jackson
Jim Jacobs
David Kim
Kevin Kohls
David Levine
P. Loucopoulos
Paul Martyn
Jonathan Owen
Y. Pyrgiotis
Tuomas Sandholm
Mihiro Sasaki
Katsushige Sawaki
Mike Self
Atsuo Suzuki
Mark Turnquist
David Vander Veen
K.G. Zografos

2004
Martin Barkman
John C. Butler
Alexander Chebeskov
Herman Chiu
Mathieu Clerkx
Ton de Kok
Jacques Desrosiers
Yvan Dumas
James Dyer
Thomas A. Edmunds
Rob Harlan
Richard Hicks
Fred Janssen
Jianmin Jia
Mike Kanaley
Joshua Kanner
Alev Kaya
Byung-In Kim
Seongbae Kim
Bob Kraas
Benoit Lacroix
Kam-Keung Lai
Edmond Leung
Yong Liu
Jiyin Liu
Richard Madrid
Sean Marshall
Theresa Metty
Chris Milligan
Tom Moore
Thomas Morris
Katta Murty



Alexander Oussanov
Winfried Peeters
Alexander Popov
Kevin Potts
Robert Pruneau
Olga Raskina
Jeffrey Robbins
Surya Sahoo
Quentin Samelson
Avner Schneur
Rina Schneur
James Smith
Ron Sorensen
François Soumis
Sridhar Tayur
Loren Troyer
Mitchell Tseng
Jan van Doremalen
Erik van Wachem
Yat-Wah Wan
Elan Yaniv

2003

Kirk Abbott
Surain Adyanthaya
Vedat Akgun
Andrew P. Armacost
Mordecai Avriel
Cynthia Barnhart
Corey Billington
Chris Born
E. Andrew Boyd
Gianpaolo Callioni
Monica Carbajal
Rod Case
Barrett Crane
John Fallis
Edward Feitzinger
Chyi-Fu Hong
Phil Ireland
Curtis Keller
Jason Kuehn
Jin Liu
Ronit Meiri
Marc Meketon
Wayne New
Avi Peretz
Robert Prior
Hanna Pri-Zan
Julie Unruh Rapp
Tom Rieger
John Ruark
Robert Slavens
Pat Smith
Jerry Trimarco
Carl Van Dyke
Mark Wallace
Keith A. Ware
Trace White
Sean P. Willems
Alysia M. Wilson
Bert Winemiller
Ron Woestemeyer

2002

Chae An
Michael Argüello
Fred Blakeley
Burçin Bozkaya
Buyang Cao
Andrew Davenport
Ralf Elsner
Wolfang Hall
Gail Hohner
Arnd Huchzermeier
Philip Jones
Jayant Kalagnanam
Greg Kegler
Gilles Kern
Jospeh Knolmajer
Manfred Krafft
Ho Soo Lee
Thierry Lemoine
Timothy Lowe
Sandra McCowan
Ed Ng
Alain Patchong
Grant Reid
John Rich
Gao Song
Rodney Traub
Anna White
Gang Yu

2001

Stuart Altschuler
Rick Ayer
Vince Barabba
Donna Batavia



Jeff Bennett
Srinivas Bollagragada
Robert Butchers
José Vicente Caixeta-Filho
Hong Chen
Fred Cooke
Antonio de Pádua Wagemaker
Robert Fancher
Marc Garbiras
Tim Gibbs
Gregory Hoscheit
Chet Huber
Mark Humphresville
Jeenyoung Kang
James Knowles
Russ Labe
Robert Leachman
Bonnie Liao
Vincent Lin
Kevin Lyman
Raj Nigam
Je Oh
Mark Paich
Greg Parlier
Mary Phillips
Nick Pudar
Surya Sahoo
Michael Scholes
Jim Smith
Jan Maarten van Swaay-Neto

2000

Eric Bibelnieks
Mark Bullock
E. Rod Butchers
Deb Campbell
Kan Chang
Kenneth Chelst
Harlan Crowder
Paul R. Day
Randy Erdahl
Andrew P. Goldie
Michael Haydock
Ken Howard
Doug Johnson
Elena Katok
Jeffrey Lockledge
Peter Lyon
Jeff A. Meyer
Demetrios Mihailidis
Stephen Miller
R. John Milne
Rick Oiesen
Robert Orzell
Alex Przebienda
Robert Rice
David Ryan
Amanda Scott
Laura Shisler
John Sidelko
Midori Tanino
William Tarantino
Ralph Tiedeman
Chris Wallace
Michael Wambsganss

1999

Rob Allan
Ken Ambs
James Angelo
Nader Azarmi
Sugato Bagchi
Steve Buckley
Rony Cremmery
Sebastian Cwilich
Nicolas De Schuyter
Mei Deng
Markus Ettl
Gordon Gould
Ron Holcomb
Terry Holeman
Richard Hopson
David Houck
John Hudson
Dean Jones
Kerry Kim
Edwin Kjeldgaard
Lisa Koenig
Marc Lambrecht
David Lesaint
Grace Lin
George List
David Lynch
Clive Morgan
Charles Muir
John Mulvey
Bret Naccarato
George Pfeil
Shahram Taj
Mark Turnquist
Nico Vandaele
Christos Voudouris
Dicky Yan
David Yao

1998

Henry Alden
Dean P. Angelides
Franz Behlau
Dimitris Bertsimas
Buyang Cao
James Causby
Christopher Darnell
Rafael Epstein
Matthew J. Etzenhouser
L. Russell Fletcher
Corrie Heynen
Scott P. Holmen
R. Jaikumar
Ralph Kaiser
Albert Kuttner
Ramiro Morales
Frederic Murphy
Murthy Murrageda
Kumar Rajaram
Jorge Seron
Robert Soucy
Raymond Taylor
Izaak van de Wege
Franz van Esch
Michael Vasu
Don Weigel
Andrés Weintraub
Steven Welch

1997

Nejib Ben-Kheder
Paul Brinkley
Mitchell Burman
W. David Carr
John Folger
Stanley Gershwin
Claudia Grief
Kristopher Haag

Jackie Hueter
Raymond Johnson
Josephine Kintanar
Kuanlian Liou
Cecile Queille
Eric Schweitzer
David Stepto
William Stripling
Curtis Suyematsu
Alva Svoboda
William Swart
Alireza Vojdani
Detlof von Winterfeldt
Kui Wang
Fulin Zhuang

1996

Sally Botha
Jeffrey Camm
Roy Carr-Hill
Thomas Chorman
George Curnow
Franz Dill
A.A. Elimam
James Evans
Kevin Geraghty
Kamal Golabi
Maurice Gripis
Ivan Gryffenberg
Geoffrey Hardman
Rauten Hofmeyr
Ernest Johnson
Gary Kochman
S. Kotob
Jean Lausberg
Stephen Martin
Steven Meester
Ruppert Nicolay
Stuart Peacock
Dabashish Sarkar
Trevor Sheldon
Richard Shepard
Willem Smit
Peter Smith
Dennis Sweeney
Stephanus Uys
Willie van der Merwe
Glenn Wegryn
Gysbert Wessels
Keith Wilton

1995

Tal Barnea
Michael Barnum
Dan Benanav
Robert Benson
David Bowen
Kabir Dutta
Ivy Eisenberg
Jim Euchner
Elissa Gilbert
Afshin Goodarzi
Shravan Kotha
Robert Leachman
Edwin Lee
Yu-Ling Lin
Chihwei Liu
Leon Marom
John Martin
Richard Ormerod
Justin Peterson
Randy Pope
Dale Raar
Rangu Salgame
Sanjeev Sardana
Gary Sevitsky
Yishay Spector
Miguel Taube-Netto

1994

Bruce Arntzen
Gerald Brown
B.S. Chandrasekaran
A. Roy Choudhury
Zhang Chuntai
Peter Cook
Steven Cosares
Zhou Dadi
David Deutsch
Scott F. Donahue
Anthony Durso
Goutam Dutta
Lin Fatang
Terry Friesz
Terry Harrison
Toshiharu Hasegawa
Michael Kuby
Niloy Mitter
Susan Neuman
Rong Qiang
Shi Qingqi
P.N. Roy
Iraj Saniee
Tsuna Sasaki
Gao Shenhuai
S.B. Singh
Gopal Sinha
Linda Trafton
Ondria Wasem
Thawat Watanatada
Cao Wei
Yu Xiaodong
Sun Xufei
Wang Xusheng
Tsuyoshi Yoshino
Xie Zhijun

1993

Anthony Brigandi
David Carino
Dennis Dargon
Paul Fischbeck
Paul Katz
Terry Kent
Roy Marsten
David Myers
M. Elizabeth Paté-Cornell
John Quillinan
Amir Sadrian
Richard Scheff
Thomas R. Sexton
Michael Sheehan
Sally Sleeper
Thomas Spencer
Celine Stacy
Radhika Subramanian
Mike Sylvanus
Robert Taggart
Patrick Tendick
Andrew Turner
Kouji Wantanabe
D. Steve Wiper
William Ziemba

1992

Benedo Beltrán
William Burnett
Michael F. Cahn
A. Dale Flowers
Earl D. Geyer Sr.
Louis Goldring
Bruce Hoadley
Edward H. Kaplan
Paul Katz
Richard Larson
Dominic Monetta
José Pablo Nuño
Elaine O'Keefe
José Manuel Padillo
Amir Sadrian
Martin Shell
Dan Shunk
Barry Silverman
Arthur Swersey

1991

Yosi Ben-Dov
John Braklow
Ingrid Busch
Michael Cerby
Ross Darrow
Anura de Silva
Fred DiLisio
Jefferey L. Dodge
Joseph Ecker
William Graham
Donna Granfors
Gerald Hahn
Glen Harrison
Stephen Hassler
Lakhbir Hayre
Michael Hilliard
Carolyn Jack
Sheng-Roan Kai
Ronald Kraemer
John Leimkuhler
Cheng Liu
William Makuch
Ken Peck
Vincent Pica
Warren Powell
Alexander Shulman
Barry Smith
Rajendra Solanki
Lawrence D. Stone

1990

Ranga Anbil
Bruce Andrews
J.T. Day
S.R. Erwin
A. A. Farley
Robert Fetter
Eric Gelman
Lonny Gorban
Jim Griffith
K.D. Le
E. William Moore
Henry Parsons
Bruce Patty
Phillip Quinn
Rajan Tanga
Alberto Vasquez-Marquez
Janice Warmke
J.T. Wood
C.K. Yin

1989

Nicola Aversa
Jean-Yves Blais
Anthony Brigandi
Angel Chiarri
Morris Cohen
Dennis Dargon
Ron Dembo
Hisham El Sherif
Kenneth Fordyce
Dennis Gensch
Jesus Gomez Martin
Pasumarti Kamesam
Paul Kleindorfer
Jacques Lamont
Hau Lee
Steven Moore
Luis Paradinas
Jean-Marc Rousseau
Michael Sheehan
Thomas Spencer
Gerald Sullivan
Armen Tekerian

1988

Adedeji Badiru
Donald Brenner
Hung-Po Chao
Stephen Chapel
Charles Clark
Calvin DeWitt
Bobbie Foote
Paul Green
Richard Grimes
Stephen Huxley
Ibrahim Kavrakoğlu
Ali Riza Kaylan
Leon Lasdon
Lawrence Leemis
Simon Melhem
Peter Morris
Süleyman Özekici
A. Ravindran
M. James Sandling
Marsha Scarbrough
James Schierer
Douglas Shifflet
Kenneth Stott
Güniz Tamer
Phillip Taylor
Francis Vasko
Allan Warren
Larry Williams
Jerry Wind
Floyd Wolf

1987

Susan Atherton
Richard Box
Kevin Butterbaugh
Donald Chung
Ellen Curtis
Amir Elger
Donald Herbe
Jonathan Jacobs
Leonard Lodish
Michael Ness
Kenneth Nickerson
Warren Powell
James Selsor
Yosef Sheffi
M. Kerry Simpson
Jacob Ulvila

1986

James Beam
Bell Beckert
Dennis Blumenfeld
Robert Breitman
Gerald Brown
Lawrence Burns
Carlos Daganzo
Dennis Dare

Elmer Dougherty
Carol Ellis
Michael Frick
Glen Graves
Randolph Hall
P.A. Hutchinson
Jim Keyes
Darwin Klingman
John Lastavica
Enrico Lombardino
John Lucas
Charles Noon
Nancy Phillips
David Ronen
Gary Salton
David Steiger
Warren Young

1985
T.A. Araripe Neto
Judson Bryn
Uli Chi
George Gross
J.F.R. Gussow
Gene Hall
Thomas Holloran
Yoshiro Ikura
Mark Lembersky
Anne Litke
Joseph Miller
M.V. F. Pereira
Lucius Riccio
P. R.H. Sales
L.F. Silva
L.A. Terry
Norma Welch

1984
Raymond Boykin
Bill Bulloch
Douglas Cochard
Mark Daskin
David Eaton
Jerry Edwards
Bruce Goeller
Glen Jansma
Peter Kleutghen
J.C. McGee
Dennis Simmons
Harvey Wagner
William P. Wood
Kirk Yost

1983
Walter Bell
Ronald Bierbaum
Louis Dalberto
James Farrell
Marshall Fisher
Arnold Greenfield
Thomas Hatch
Donald Holland
R. Jaikumar
Gerald Katz
Pradeep Kedia
Russell Leslie
Robert Mack
Paul Putzman
Robert Sauder
Alvin Silk
Glen Urban
William Westerman

1982
Emily Bassman
James Dyer
Kamal Golabi
Joseph Graves
Ram Kulkami
Alan Kuritsky
John Little
W.L. McMahan
Alvin Silk
Bruce Smith
George Way

1981
Henry Barker
Donald Brout
Lewis Chakrin
Wayne Dawson
Luca Donno
Warren Erickson
Said Hilal
S. Lakshminarayan
Andre Landry
J. Bruce McLeod
Joseph Pilskin
Dilip Sen
Ed Sharon
Janet Showers
William Swart
Eileen Tell

1980
Lee Brosch
Richard Buck
Dale Cooper
Kenneth Cooper
Lynn Davidson
Robert King
Robert Love
Shmuel Oren
Michael Rothkopf
Richard Smallwood
William Sparrow
James White

1979
William Bingham
William Boyce
Eric Brodheim
Fred Glover
Carl Hamilton
Gene Jones
Andrew Kalotay
David Karney
John Mote
Greg Prastacos
Miles Vogel

1978
Dalip Bammi
Deepak Bammi
D. Wayne Darnell
Joseph Debanne
Adel Gaballa
Harry Harrison
William Jahnke
Ronald Lanstein
Jean Noël Lavier
Carolyn Loflin
Richard Thomson
Charles Tiplitz

1977
John Chambers
Stephen Chen
Dwight Crane
Martin Edelstein
William Fudge
Ronald Hudson
Robert G. Johnston
Frederick Knoop
Leonard Lodish
Charles McCallum
Myron Melnyk
William Pettigrew
Thomas Saaty
F. Paul Wyman

1976
J.H Henry
R. Jaikumar
M.E. Kamrass
D.B. Kotak
J. McDonald
J. Orlansky
U.R. Rau
R.E. Reichenbach
T.C. Rowan
K.W. Shepherd
J.A. Svestka

1975
Joseph Balintfy
Douglas Beene
William Bleuel
James Bruce
Robert Clark
Joseph Debanne
James Gilean
Suresh Jain
James Reddy

1974
David Ahlers
Homer Bishop
Edward Blum
Grace Carter
Dale Cooper
Joseph Debanne
Wayne Drayer
Sidney Hess
Ronald Hudson
Edward Ignall
Peter Kolesar
Robert Machol
A.K. (Raj) Nigam
Steve Seabury
Arthur Swersey
Warren Walker

1973
R.L. Anderson
L.D. Bodin
Leo Boucher
T.O. Carroll
D.P. Coveleski
James Fitzsimmons
Mark Grossman
Allen Lee
Robert Stark
Sally Stout
E.D. Thomas

1972
Donald Blumberg
Julio Bucatinsky
Richard Condon
Robert Cutler
Ralph Keeney
Robert Meyer
Peter Salomone



The Edelman Academy

ABB Electric, Inc.
ABB Power Systems, Inc.
AD OPT Technologies, Inc.
Aeon Decision Engineering, Inc.
Agrico Chemical Company
Air New Zealand Ltd.
Air Products & Chemicals, Inc.
Alternative Management Solutions
American Airlines
American Airlines Decision Technologies
American Edwards Lab
American Water Works Association
Analytics, Inc.
Animal Health Institute
ANR Freight System
ANSER, Inc.
Anthony Durso Associates, Inc.
Applied Decision Analysis, Inc.
Argonne National Laboratory
Arizona Dept. of Transportation
Arizona State University
Arthur D. Little, Inc.
Aspen Technology, Inc.
AT&T
AT&T Capital Corporation
AT&T Capital Leasing Services
AT&T Laboratories
AT&T Long Lines
AT&T National Technical Center
AT&T Network Services
Athens University of Economics and Business
Babcock & Wilcox Company
Bank Hapoalim
Bankers Trust Company
Bechtel Power Corp.
Becton Dickinson & Company
Bell Communication Research (Bellcore)
Bell Laboratories
Bellcore
Bethlehem Steel Corp.
Blue Bell, Inc.
Bombardier Aerospace
Bombardier Flexjet
Booth Fisheries
Bosques Arauco
Boston University
British National Health Services
British Telecommunications
Burger King Corp.
Cabinet of Egypt
Cahill May Roberts, Ltd.
CALEB Technologies Corp.
California Power Exchange
Canadian Forest Products
Canadian National Energy Board
Canadian National Railways
Canadian Pacific Railway
Carnegie Mellon University
Carrefour
Case Western University
Center for Transportation Analysis, ORNL
Centro de Enseñanza Técnica y Superior
Centrum Wiskunde & Informatica (CWI)
CEPEL
Cerestar
Cerestar Benelux BV
Cerestar Deutschland
Chessie System, Inc.
Chinese State Planning Commission
Chinese University of Hong Kong
CIM Systems Research Center
CITGO
City of Austin
City of Cleveland
City of Los Angeles Fire Dept.
City of New York
City of San Francisco Police Dept.
City of Stockholm, Sweden
Cleveland State University
Cleveland Trust Company
Coca-Cola Enterprises Inc.
Cogna System Corp.
Columbia University
Columbus America Discovery Group
CombineNet, Inc.
Consilium, Inc.
Continental Airlines
Cornell University
Cox Associates
CQM
CSX Railway
D. K. Shifflet & Associates, Ltd.
D.S.I. Consulting
DaimlerChrysler Corp.
David M. Griffith & Associates, Ltd.
Decisio
Decision Focus Inc.
Decision Insights
Decision Science Consortium, Inc.
Deere & Company
Defense Headquarters
Dell Computers
Deloitte & Touche Consulting Group
Delta Air Lines
Dept. of Transport, Canada
Dept. of Transportation- State of CA
Deree-Pierce College
Detroit Diesel
Digital Equipment Corp.
District of Columbia Public Service Commission
Double-Click SAS
Dowling College
DSApps, Inc.
DuPage County
Eastern New Mexico University
Ecole des Mines de Saint-Etienne
Ecole Polytechnique
Economic Research Institute
Electric Power Research Institute
Electronic Data Systems Corp.
Eletrobras
Emeraldwise, LLC
Emergency Medical Services Dept. of Austin
Emptoris, Inc.
Energy Research Institute
Erasmus University Rotterdam
ESRI
Exxon Company
Farm Credit Banks, NY
Federal Aviation Administration (FAA)
Federal Highway Administration
Fingerhut Companies, Inc.
Flexjet
Ford Motor Company
Frank Russell Company
Gas Research Institute
Gassco
GE Capital Corporation
General Electric Company
General Motors
General Motors Research Lab
General Research Corporation
George Darling & Associates
George Mason University
George Washington University
Georgia Institute of Technology
Getty Oil Company
GIRO, Inc.
GIS/Trans, Inc.
Goodyear Tire and Rubber Company
Govt. of the Sudan & Kuwait Fund for Arab Ecomonic Dev.
Grantham, Mayo, Van Otterloo & Company LLC
Great Lakes Transmission
Great Northern Paper Company
Greater NY Blood Program
GTE Laboratories, Inc.
Hanshin Expressway Public Corp.
Harris Corp./Semiconductor Sector
Harvard University
Hazardous Waste Remedial Actions Program
Health Care Financing Administration
Hebrew University
HEC
Hewlett-Packard Company
Hewlett-Packard Laboratories
Hidroelectrica Espanola, S.A.
Homart Development Company
Honeywell, Inc.
Hongkong International Terminals
Hong Kong Productivity Council
Hong Kong University of Science & Technology
Huaneng Corp.
IBM Corp.
IBM Global Services
IBM Korea, Inc.
IBM Microelectronics
IBM Optimizer
IBM Personal Systems Group
IBM Printing Systems Company
IBM T.J. Watson Research Center
Information Resources, Inc.
Ingalls Shipbuilding
Institute for Physics and Power Engineering
Institute of Comprehensive Transportation
Institute of Information Technology, Inc.
Institute of Tech-Economics
Intelligent Systems Research
Interativa S/C Ltda.
Intuit
Israeli Air Force
Istanbul Chamber of Industry
Jan de Wit Company
Jansma Consulting, Inc.
J.D. Power and Associates
Jeppesen Sanderson, Inc.
John Laing Engineers Ltd.
Johnston County (NC) Public Schools
Kansas Geological Survey
Katholieke University
Kelly Springfield Tire Company
Kenan Systems Corporation
KeyCorp
Kinki University
Kodak Australasia
Kutztown University
Kuwait Institute for Scientific Research
Kyoto University
Lawrence Livermore National Laboratory
Leachman and Associates LLC
Level 3 Communications
Liberty National Bank & Trust Co.
Linköping Municipality
L.L. Bean, Inc.

Lotus Development Corp.
Loughborough University
LTC Techno-Economics Research Group, Inc.
LTV Steel Company - Cleveland Works
MA Dept. of Public Health
Management Decision Systems
MARACO, Inc.
Maritrans, Inc.
Marriott Corp.
Marriott International
Mars, Inc.
Mason and Hanger Corporation
Massachusetts Institute of Technology
Memorial Sloan-Kettering Cancer Center
Menlo Worldwide
Merit Brass Company
Merrill Lynch
Merrill Lynch Management
Metron Aviation
Metron, Inc.
Mexico City
M-Factor, Inc.
Military Airlift Command
Ministry of Railways
Mobil Oil Corporation
Molde University College
Monash University
Monsanto Corp.
Motorola, Inc.
MPSA
MPT Associates, Inc.
MultiModal Applied Systems, Inc.
Nanzan Educational Complex
Nanzan University
NASA
Nash, Phillips-Copus Company
National Airlines
National Broadcasting Company
National Bureau of Standards
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