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

UPS GEORGE D. SMITH PRIZE
Strengthening Ties between Academia & Industry

April 16, 2012
Huntington Beach, California

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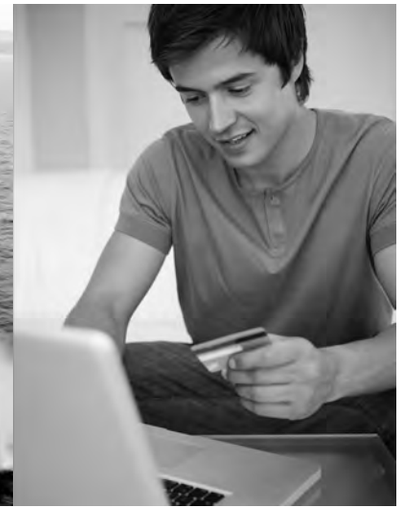
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The Edelman Awards Gala

2012 Franz Edelman Award Ceremony

Welcome, Acknowledgements, and Awards to be Presented
Graham Rand, Master of Ceremonies

Presentation of the Wagner Prize
C. Allen Butler, Chair, 2011 Wagner Prize Committee

Summaries of 2012 Edelman Finalist Work
Carlson Hotels
The Centers for Disease Control

Presentation of the Informs Prize
Michael F. Gorman, Chair, 2012 INFORMS Prize Committee

Summaries of 2012 Edelman Finalist Work
Danaos Corporation
Hewlett-Packard

Presentation of the UPS George D. Smith Prize
Donald R. Smith, Chair, 2012 UPS George D. Smith Prize
Randy Stashick, Senior VP for Engineering, UPS

Summaries of 2012 Edelman Finalist Work
Intel
TNT Express

Recognizing Members of the Franz Edelman Academy
Graham Rand, Master of Ceremonies

Announcement of the 2012 Franz Edelman Award Winner
Terry P. Harrison, President, INFORMS
Srinivas Bollapragada, Acting Chair, 2012 Edelman Award Committee
(serving on behalf of Stephen C. Graves, Chair)

Master of Ceremonies

Graham Rand



Graham Rand has been a member of TIMS (The Institute of Management Sciences) and then INFORMS since 1980, attended his first conference in Milwaukee in the fall of 1979, and has attended many conferences since. In recent years, most of his professional service has been with INFORMS. He has been on the Edelman jury, coached finalists (including the 2008 winner, Netherlands Railways), and verified several applications. Graham recently joined the editorial board of *Interfaces* as the book review editor and will become president of Omega Rho, the international honor society for O.R., later this year, after several years as European director.

For many years he served IFORS (International Federation of Operational Research Societies), including being vice president from 1998 to 2000. For IFORS he was the editor of *International Abstracts in Operations Research* from 1979 to 1991, the editor of the O.R. 1987 Conference Proceedings, chairman of the O.R. 1990 Conference Programme Committee, and managing editor of the *International Transactions in Operational Research* from 2001 to 2005. He has been very supportive of the development of O.R. in developing countries, particularly in Africa. He created the Operational Research Hall of Fame.

Graham has of course served his own society, the Operational Research Society, being chairman of the conference committee in 1984 and editor of the *Journal of the Operational Research Society* from 1991 to 1996. For his international service to O.R. he was honored with the Companionship of Operational Research, one of the highest awards bestowed by the Operational Research Society, in 2006.

Graham's work has been published in several journals, including *Interfaces*, the *Journal of the Operational Research Society*, the *European Journal of Operational Research*, *Computers & Operations Research*, and the *International Journal of Production Economics*. Buried in these papers are several algorithms, known to very few people. His research these days mainly concerns the history of O.R., for which his age gives him a head start.

Graham Rand, senior lecturer at Lancaster University in Great Britain, is director of studies and admissions tutor for three master's programs: Operational Research and Management Science, Logistics and Supply Chain Management, and Management Science and Marketing Analytics. He has also served the university as principal of one of its colleges and has been chair of the university's Chaplaincy Management Committee since 2006.

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April 16, 2012
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The Operations Research Profession

Introduction

by Terry P. Harrison, Penn State University
President, INFORMS

An Analytical Journey

Success

Preparation, and Lots of It

What did it take for the six best O.R. and analytics projects to qualify for tonight's moment when Franz Edelman Award competition judges will pronounce one of them the best in the world?

It took many things: intelligence, tenacity, insight, opportunity, and especially hard work. When I say that, I am not writing as an observer. In 1994, as a younger management science professor at Penn State, I collaborated with operations researchers at what was then Digital Equipment Corporation (DEC) and with Gerry Brown of the Naval Postgraduate School to present the global supply chain work that we did on behalf of DEC at that year's Edelman competition. Looking back, especially in light of my subsequent decade as an Edelman judge, my overarching memory is that the level of preparation for the Edelman competition is formidable. I have heard the Edelman competition referred to as "the Olympics of O.R. practice." It is an apt description.

Tonight's competitors, as in past years, show variety—they are for profit and not for profit, U.S.-based and European, and they represent industries as new as the computer manufacturers who have recast our lives and as old as the shipping industry that for centuries, if not millennia, has connected people all over the world.

Tonight's Edelman competitors are Carlson Hotels, the parent company of Radisson and other brands; Centers for Disease Control, the premier public health agency in the United States; Danaos Corporation, the Greek shipping company; Hewlett-Packard, the legendary manufacturer of computers and electronic devices; Intel, which for years has been increasing computer power and shrinking computer size; and TNT Express, the express delivery company centered in Western Europe. Each rose from among the many entrants and semifinalists to become an Edelman finalist for a unique reason.

Carlson Hotels, recognizing how the Internet has permitted travelers to compare hotel prices, responded to the resulting competition with O.R. models that balance factors such as room availability and competitor prices.

The Centers for Disease Control, with the 2001 specters of 9-11 and an anthrax attack still in mind, used O.R. to plan prevention and responses to potential public health emergencies.

Danaos Corporation, hearkening back to the era of Alexander the Great, has cut the Gordion Knot of the shipping industry, using O.R. to resolve shippers' age-old dilemma of pitting speed of delivery against cost of delivery.

Intel, the quintessential business-to-business (B-to-B) company that winks at the business-to-consumer sector in its ads, has borrowed techniques from the world of finance to leverage the way that it plans its construction of new computer chips.

HP explains how it used O.R. to overcome the challenge of transitioning from a company that was purely B-to-B to one that used its online store HPDirect to make a major entrance into the consumer market.

TNT Express modernized its decision support system to make its package support business resilient in a competitive industry.

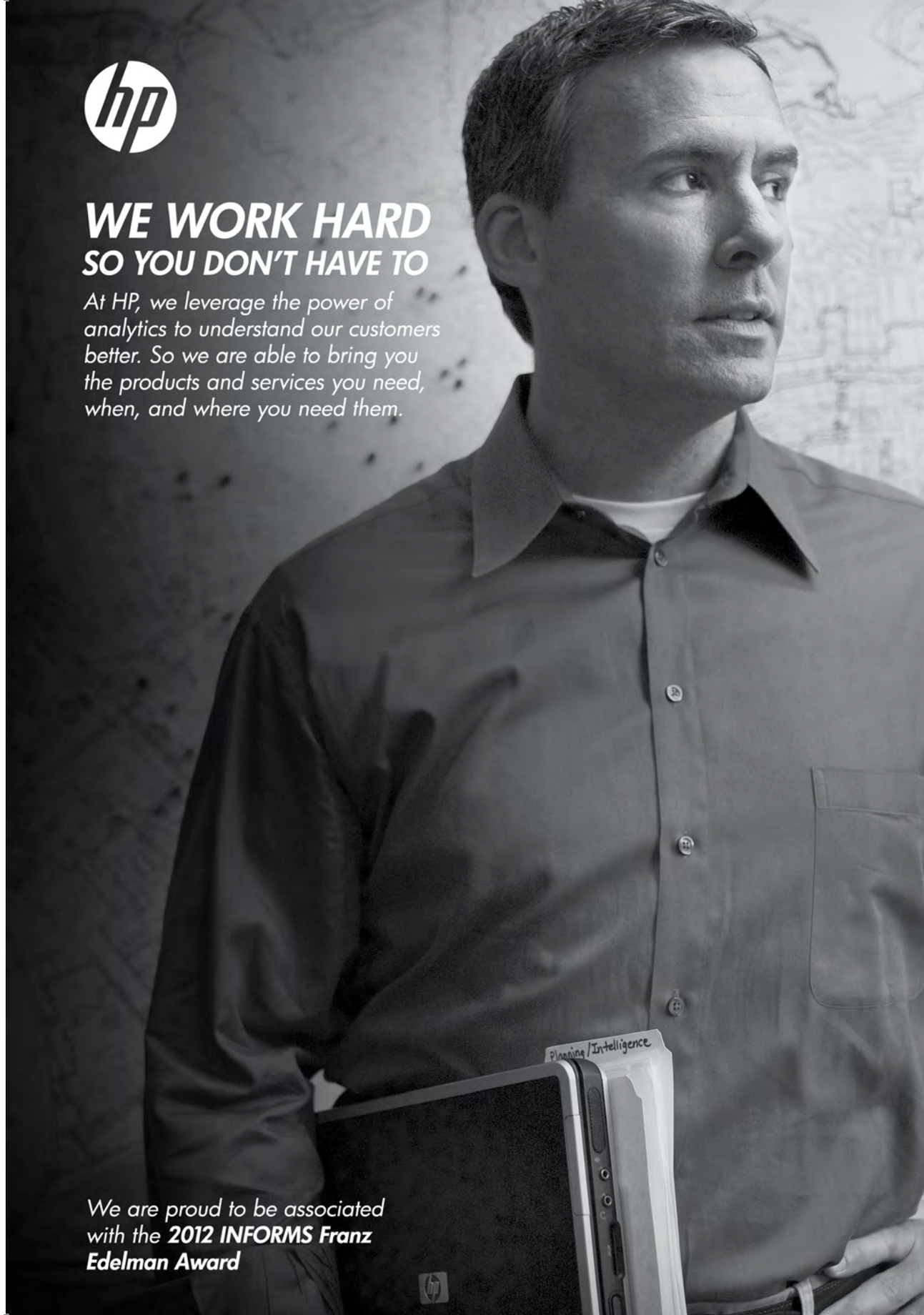
Tonight's Edelman Award representatives are joined onstage by those receiving two venerable INFORMS awards and one very new one. Those who remember Daniel H. Wagner's lead in our field will again see a prize named in his honor that recognizes clarity and excellence of O.R. analysis.

Every year, INFORMS recognizes an organization for the overall excellence of its operations research work, and this year we will again award the INFORMS Prize to a leading organization.

Our newest award tonight is the UPS George D. Smith Prize, announced only last year, whose competition winner is being judged even as the Edelman judges deliberate. The Smith Prize was created to bring together researchers in industry and universities.

We've come a long way from the initial moment in 1972 when a group of judges from The Institute for the Management Sciences (TIMS), a forerunner of INFORMS, presented its very first award (not yet named for Franz Edelman, who was then very much alive, a model for operations researchers at RCA). Beginning with that first award and continuing 40 more years until today, Edelman teams have made a contribution in dollars—a remarkable $180 billion—and less tangible benefits in extending life, providing the basis for peace agreements, and protecting citizens. It has taken a lot of hard work, and that hard work has been memorable.





INFORMS in the Age of Analytics

by Anne G. Robinson
President-Elect, INFORMS



Welcome to the age of analytics. Long gone are the days when family and friends would return bewildered stares as you tried to explain your profession at the proverbial cocktail party. We have arrived at an age of optimism for all of us academics and practitioners in operations research, business analytics, decision science, and mathematical modeling in its mosaic of fields and applications. These days you cannot flip through a popular business press publication or shuffle through an airport terminal without seeing colorful advertisements for analytics software, services, or academic programs promising new vigor to industry, both large and small.

INFORMS is embracing and harnessing this growing awareness of analytics. Addressing our members and the organizations that they serve, we have characterized analytics into three segments:

- *Descriptive analytics* (traditional business intelligence that answers the question "What happened?"),
- *Predictive analytics* (forecasting and probability techniques that answer the question "What could happen?"), and
- *Prescriptive analytics* (use of data and mathematical techniques such as optimization and simulation that answers the question "What is the best possible outcome given a particular set of circumstances?").

We have watched this lexicon spread like wildfire throughout our community as members fluently describe their work and areas of expertise.

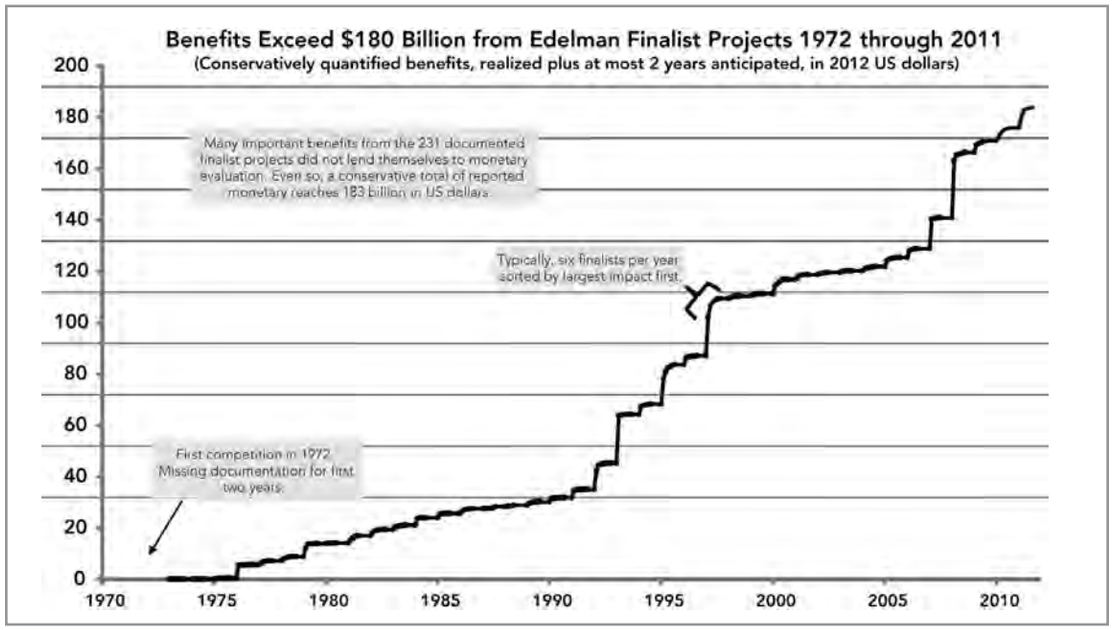
We at INFORMS recognize that there are several exciting opportunities on our horizon and want to continue helping organizations like tonight's Edelman finalists take full advantage of analytics. To that end, we have initiated several important undertakings, including:

- *New special interest group*: We have formed a special interest group for those interested in analytics, the Analytics Section of INFORMS. In less than one year, this group has grown to more than 500 members.
- *Analytics maturity model*: The organizations in tonight's Edelman competition have reached a level of ability to complete projects that make enormous contributions. We are frequently approached by other organizations who wish to achieve similar results. To that end, INFORMS is developing an analytics maturity model to help companies benchmark and evolve their analytical capabilities. Different facets of this model include current use of analytics, recruiting and training of analytics professionals, and implementation of analytical software and an information infrastructure. INFORMS will help enable low-maturity firms to grow, while medium- and high-maturity firms solidify their analytical prowess.
- *Certification*: We are the premier organization in advanced analytics and therefore well positioned to certify analytics professionals. With the assistance of a certification expert, we have begun developing an analytics certification program that will help analytics professionals demonstrate their mastery in our field.
- *Industry and government outreach*: Analytics can help businesses of varying sizes, as well as government at the federal, state, and local levels. INFORMS is making a targeted effort to introduce the society and the profession in various industry and government forums. INFORMS board members, INFORMS's Executive Director, and additional representatives of the INFORMS community are spreading the word about analytics and all INFORMS has to offer as we visit conferences and organizations across the country.

As tonight's Edelman competition and gala unfold, we are even more acutely aware of what an exciting time it is to be an analytics professional. I am proud of what our society has accomplished as we continue to lead with our academic expertise while contributing significant business and societal value. Analytics has opened a new door for us and made our work mainstream and a "must-have" capability within every organization. I look forward to INFORMS continuing to foster and expand our community, cultivating more Edelman, Smith, Wagner, and other award finalists for years to come.

Operations Research, Billions and Billions of Benefits!

by Jeffrey M. Alden
Group Manager, GM Operations Research



Over $180 billion of impact! That's impressive! Is it believable? What's behind these numbers? How were they were estimated? Is there more?

Beginning in 1974, the Edelman finalists were asked to publish their project accomplishments in the INFORMS journal called *Interfaces*. By reading all articles (almost 240), the monetary impact was estimated under 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 the 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 performance. 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 the 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 O.R.'s influence is the impressive breadth of applications. The Edelman finalists represent over 100 different application areas including air traffic, banking, broadcasting, canal operations, consumer products, delivery (express), defense (air force, army), education, financial (pension, investment, credit card, settlement), fire protection, forestry, healthcare (hospital, pharmaceutical, diagnosis, elderly), hotel management, energy production and distribution (coal, gas, electric, oil, nuclear), land use, manufacturing (electronics, food, paper, seeds, tires, vehicles, wood), marketing, printing, sanitation, security (airport, police), tax collection, transportation (airline, highway, railway, space), treasure hunting, waste management, water (resources, quality, flow), 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 captures only those O.R. professionals choosing to compete! Just think, the entire set of Edelman finalist authors (over 900) 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 due to confidentiality or lack of an internal advocate to compete (e.g., no one thought of it, too busy, lack management support, inadequate 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 administered for INFORMS by CPMS, the Practice Section of INFORMS.



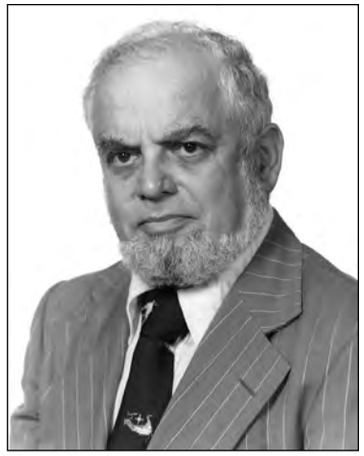
The purpose of the international Franz Edelman competition is to bring forward, recognize, and reward outstanding examples of operations research (O.R.) in practice. The competition allows for the fact that operations research may be pursued under various other names, including especially "management science" and "analytics."

Granted annually to an organization that sponsored, implemented, and benefited from an operations research project, the Edelman Award attracts competition entries from organizations large and small, for profit and not for profit, business and governmental, private and public, and worldwide. The common theme shared by all selected finalists is having realized substantial benefit from practical application of the advanced analytical methods of operations research.

Abstracts from papers prepared by past Edelman Award finalists are available through *Interfaces* online; full-text versions of some of those *Interfaces* papers are available in an online archive. Streaming videos and DVDs of past competition presentations—suitable for teaching, marketing, or publicizing O.R. practice successes—are available 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, this CPMS/TIMS award was renamed in memory of Franz Edelman, one of the earliest industry practitioners of O.R. in North America. TIMS merged with the Operations Research Society of America to create INFORMS in 1995, at which time the Edelman Award became an INFORMS award.

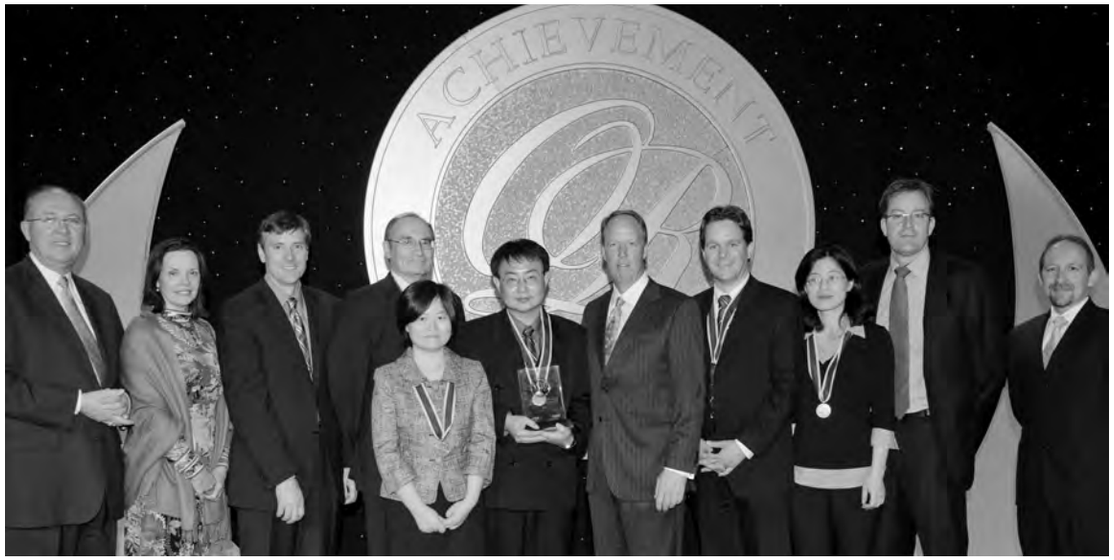
After fleeing his native Germany in the late 1930s to escape Hitler and the Nazi regime, the young Franz Edelman found himself in England, where he was interned as an alien and sent to Canada for an interlude of lumberjacking. He received his undergraduate education at McGill University; later, he earned a PhD in applied mathematics from Brown University. Franz joined the RCA Corporation as an engineer concentrating on computational topics. Initially a physical science problem solver, he rapidly came to envision the great value of computer systems that would assist with management and with business operations. This insight led Franz to establish RCA's Operations Research Group circa 1950, one of the first such groups in a North American corporation.



Franz Edelman

Franz was well known in the O.R. profession for advocating that success in operations research requires excellence in information technology (IT)—computer software, computer hardware, and communications. Reflecting his great interest in IT, he ultimately became vice president of business systems and analysis, responsible for IT as well as O.R. at RCA. He likely would have been pleased to see our present focus on "analytics" and "business intelligence," where strong analysis combines with strong IT.

Franz retired from RCA after 30 years of service to form Edelman Associates, an O.R. consulting firm. Throughout his career, Franz's O.R. achievements, forward-looking insights, and positive influence on others made him a quintessential practitioner. The Franz Edelman Award was named in his memory because this award advances the operations research practice to which he contributed so much.



Edelman First-Place Award Recipients

Achievement

2011 MISO

"Midwest Independent Transmission System Operator Applies Operations Research to Energy and Ancillary Services Markets, Unlocking Billions in Savings"

The Midwest Independent Transmission System Operator (MISO) used O.R. to design and launch its energy and ancillary services markets. For many years, the U.S. power industry consisted of utilities that focused locally. During the 1990s, the Federal Energy Regulatory Commission (FERC), a power industry regulator at the national level, pushed the industry to reduce individual utilities' market power and to drive more efficiency through the formation of regional transmission organizations (RTOs). In 2001, the FERC approved MISO as the nation's first RTO. Driven by the goal of minimizing delivered energy costs in a reliable fashion, MISO leveraged advances in computing capabilities and O.R. algorithms to launch its original energy market on April 1, 2005, and its upgraded energy and ancillary services markets on January 6, 2009. The MISO region realized between $2.1 and $3.0 billion in cumulative savings from 2007 through 2010 and anticipates an additional $6.1 to $8.1 billion of value through 2020.

2010 Indeval

"Mexican Financial Markets Benefit from Novel Application of Operations Research"

Indeval, the Mexican Central Securities Depository for all financial securities, manages Dalí, the securities settlement system (SSS) that settles securities operations averaging over $250 billion daily, more than 70% of the value settled in the Mexican payments system. In 2005, Indeval and its partners began implementing Dalí, a safer, more reliable, and more efficient SSS. The core of Dalí is an operations-research-based engine that is executed automatically and offers a continuous and secure operation, ensuring that settlement is irreversible. Now many transactions that would remain pending if processed individually are settled together, thus reducing liquidity requirements dramatically—by 52% in cash and 26% in securities. Indeval's SSS enhances and strengthens Mexico's financial infrastructure.

2009 Hewlett-Packard

"HP Transforms Product Portfolio Management with Operations Research"

Working with Strategic Management Solutions, HP developed two powerful operations-research-based tools for product variety management that together address the diverse needs of HP's businesses throughout their products' lifecycles. 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. Once products have been launched and a sales history is available, HP applies a second OR tool called revenue coverage optimization. These tools led to hundreds of millions of dollars in bottom-line savings for HP, as well as a 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 CAD $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.

1988 City of San Francisco Police Department

1987 Syntex Laboratories, Inc.

1986 Southland Corporation (CITGO Petroleum Corporation Subsidiary)

1985 Weyerhaeuser Company

1984 (dual) Blue Bell, Inc.

1984 (dual) The Netherlands Rijkswaterstaat and the RAND Corporation





1983 Air Products and Chemicals, Inc.

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

STRATEGY & ORGANIZATION | TECHNOLOGY | ENGINEERING & OPERATIONS | ANALYTICS

Make sense of your data.

Achieve operational efficiencies.

Exceed your mission goals.

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The Franz Edelman Award Process

The Finest Step Forward: The Franz Edelman Award Competition Process

by Stephen Graves, MIT
2012 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 diverse organizations such as AT&T, Bank of America, Cisco, General Electric, HP, Intel, IBM, Lancaster University, MIT, Purdue University, SAS, Southwest Airlines, the University of Dayton, 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 with the relevant stakeholders 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 because 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 five or 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 responsibility 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 other perspectives to the process.

Two months prior to the spring INFORMS Analytics Conference, finalist papers are distributed to the judges. The judges study each of the papers and, shortly thereafter, discuss them among themselves. Each finalist is assigned a focal point judge who conveys feedback from the judging committee to the finalist's coach. This feedback helps to identify areas in which the finalist's presentation might be improved.

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 importance of the application, the novelty and portability of the technical solution, the quality and effectiveness of the implementation, and the total impact of the project, in both quantitative and qualitative terms.

Following the competition, the finalists will work with the special editor of the January/February issue of *Interfaces* to prepare their papers for publication. All finalists are invited to reprise their work at a session of the INFORMS Annual 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 2012 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

- Susan Albin, Rutgers University
- Sudhansu Baksi, AT&T Laboratories
- Cynthia Barnhart, MIT
- Carrie Beam, Carrie Beam Consulting
- Peter Bell, University of Western Ontario
- John Birge, University of Chicago
- Srinivas Bollapragada, General Electric
- Yonghong Chen, MISO
- Gavin DeNyse, HP
- Mingguo Hong, MISO
- Ananth Iyer, Purdue University
- Shailendra Jain, HP
- Peter Kolesar, Columbia University
- Russell P. Labe, Bank of America
- Grace Lin, World Resource Optimization
- Yingdong Lu, IBM
- R. John Milne, Clarkson University
- Yanni Papadakis, Bank of America
- Atul Rangarajan, Praxair, Inc.
- Graham Rand, Lancaster University
- Anne Robinson, Verizon Wireless
- Randall S. Robinson
- Mark Squillante, IBM
- Michael Trick, Carnegie Mellon University
- Andrés Weintrab, Universidad de Chile

The Coaching and Judging Process & The 2012 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

- Carrie Beam, Carrie Beam Consulting
- Peter Bell, University of Western Ontario
- John R. Birge, University of Chicago
- Jérémie Gallien, London School of Business
- Yoshi Ikura, Saitech
- Grace Lin, World Resource Optimization
- Yanni Papadakis, Bank of America
- Atul Rangarajan, Praxair, Inc.
- Randall S. Robinson
- Douglas A. Samuelson, InfoLogix, Inc.
- Rajesh Tyagi, GE Global Research
- Andrés Weintraub, Universidad de Chile

Judges

- Stephen Graves, Chair, MIT
- Susan Albin, Rutgers University
- Cynthia Barnhart, MIT
- Srinivas Bollapragada, General Electric
- E. Andrew Boyd, formerly at PROS
- Anthony Brigandi, AT&T
- Peter Kolesar, Columbia University
- Russell P. Labe, Bank of America
- R. John Milne, Clarkson University
- Michael A. Trick, Carnegie Mellon University

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 41 years of extraordinary contributions to society through the innovative application of operations research.



Nothing But the Best:

The 2012 Franz Edelman Finalists

Introduced in the pages that follow are the six finalists for the 2012 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 2012 Franz Edelman Award.

Each finalist's work is described here in a shortened summary. Full papers will be published in the January/February 2013 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 2012 Franz Edelman Award Are

Carlson Hotels

The Centers for Disease Control

Danaos Corporation

Hewlett-Packard

Intel

TNT Express

Smarter technology for a Smarter Planet:

The anatomy of a decision.

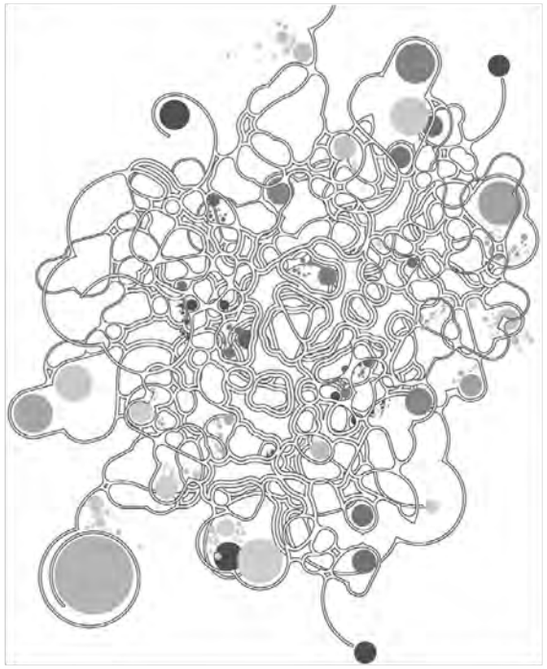
Today, with computation times compressed from days to seconds, Operations Research is becoming accessible to not only scientists and engineers, but business leaders as well—fundamentally redefining how real-world companies meet their performance goals. What's more? We're helping companies leverage customer, supplier, and partner data to enable integrated, adaptive planning and execution strategies that allow them to anticipate, control, and react to disruptions and volatility at the business point of impact

Together with the advanced analytics and consulting expertise of IBM Research and Global Business Services®, IBM's industry-leading ILOG® Optimization and Supply Chain Management technology is allowing businesses to take the guesswork out of decision making.

Already, over 1,300 corporations and government organizations are using IBM ILOG CPLEX® Optimization Studio, a complete toolkit for mathematical and constraint programming, featuring a powerful IDE, modeling language, APIs and 3rd party connectors. And now with a connector to IBM SPSS Modeler, IBM offers an integrated toolkit bringing together predictive and prescriptive analytics capabilities.

A smarter business needs smarter software, systems and services.

Let's build a smarter planet. **ibm.com**/optimize



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2012 Edelman Competitors

by Barry List, INFORMS

O.R. and Analytics Make a Critical Difference

As the United States slowly emerges from the Great Recession that began in 2007–2008 and the European Union (EU) negotiates to preserve the euro and handle the stresses felt by numerous EU countries, the world economy no longer seems to be looming, so to speak, over the shoulders of operations researchers. That's because more and more organizational leaders, in business as well as in government, have heard the increasingly popular term "analytics" and have come to realize the unique role that advanced analytics, applied by highly trained operations research professionals, play in allowing organizations to succeed despite difficulties from budget squeezes, a torrent of data, and mounting complexity.

This year's Franz Edelman finalists are using the best of operations research and analytics to improve the real performance of organizations. They are working in the United States and throughout the world, in fields as diverse as shipping, hospitality, public health, computers, and package delivery. They have excelled at identifying opportunities, diagnosing them, and coming up with solutions that blend sophisticated analytical methods, software and databases, computing power, and communications, while taking advantage of the unique characteristics of their applications.

Carlson Rezidor Hotel Group has more than 1,065 hotels in 77 countries and a portfolio of brands—Radisson, Country Inns & Suites by Carlson, Park Inn by Radisson, Park Plaza, and Hotel Missoni. They find themselves competing in a business climate that allows consumers to compare hotel room prices on the Internet at a time when occupancy levels are down and the hospitality business leans toward a buyer's market. Accordingly, they partnered with JDA to respond to this challenge. Utilizing O.R. expertise, they created Stay Night Automated Pricing, or SNAP, which optimizes prices and reduces problems associated with traditional revenue-optimization programs. SNAP includes improved demand forecasting to anticipate demand for rooms. With better forecasting in place, Carlson and JDA then designed a large-scale network-optimization solution to dynamically optimize hotel stay nightly rates based on price elasticity and other factors. Their one-two punch resulted in consistent revenue increases of 2%–4% for U.S. properties. Success in North America allowed Carlson to introduce SNAP in Europe, the Middle East, and throughout the world.

Georgia Tech's Eva K. Lee, who collaborated with Memorial Sloan-Kettering Cancer Center in 2007 to win the Franz Edelman Award (Sloan-Kettering is this year's winner of the INFORMS Prize), continues her far-ranging work in public health, this year with the Centers for Disease Control (CDC). The CDC is charged with two worrisome tasks: preventing the outbreak of a public health emergency (whether a pandemic or a terrorist threat or the effects of a natural disaster) and planning a response to such an emergency if it actually occurs. The CDC provides support to state and local governments, so their role throughout the United States is key. To carry out their mission, the CDC adopted RealOpt, a powerful decision support suite created at Georgia Tech for tactical and strategic operational planning. RealOpt has enabled the CDC to provide modern tools for dynamic operational planning for emergencies, plan at the strategic and tactical levels, and establish a knowledge databank to furnish feedback about the deployment of various techniques. It has led, across the United States, to more efficient staffing, more strategically placed sites for dispensing relief supplies, the means to generate large cost avoidance, and the potential to save millions of lives.





Greece has long been well known for its shipping industry. Now the Greek company Danaos, much like last year's South American competitor CSAV, is showing how mathematical modeling can improve the deployment of limited resources to stay vital in the shipping industry during a time of great international competition. The optimal solutions provided by the new Danaos system known as ORISMA resulted in a revenue gain of many millions of dollars in a single year.

HP for years has focused its sales and manufacturing on large customers and retailers. When company leadership determined that it was necessary to sell to consumers as well, they formed HPDirect.com. Management then turned to their operations research department to help ramp up production and guide their marketing effort. The O.R. group applied demand generation models to determine the impact of online marketing efforts on customers; regression models, Bayesian hierarchical models, and discriminant techniques to predict customer product choice, timing of purchase, and marketing channel preference; and time series forecasting to guide warehouse order forecasts. The benefit so far from these analytical models has been valued at more than $117 million.

Intel Corporate fights continually to keep up with the speed of computer manufacturing innovation that it was so instrumental in creating. Moore's law originated at Intel—the idea that the number of transistors that can be placed inexpensively on an integrated circuit should double every two years. In electronics and related industries, companies that command the market one year (think Compaq or Nokia) may be overtaken the next year. To keep up requires an enormous investment in manufacturing capacity. Calling on operations research, Intel optimized its capital investment decisions in a way that allows it to respond in the long term (four to six quarters in advance of sales) and in the short term (one to two quarters ahead). The result is a system that allows Intel to take advantage when increased demand requires a rapid step-up in manufacturing yet also to avoid acquiring too much long-lead-time manufacturing equipment and stocking too much costly inventory.





TNT Express began in Australia and has come to make a major impact in express package delivery originating in Europe. Working with ORTEC and professors from the TiasNimbas Business School in the Netherlands, TNT added decision support tools to help better deliver 4.7 million parcels, documents, and pieces of freight. Its O.R. project provided a line-haul routing and scheduling solution (TRANS), a tactical route planning solution for pickup and delivery (SHORTREC), and a supply chain optimization solution (DELTA), all of which led to more than €207 million of savings over a three-year period.

Facing gargantuan organizational challenges such as how in massive amounts of data to discover insights that lead to beneficial actions, this year's Edelman finalists rose to the top of the world's most competitive operations research/analytics elite. Their success is instructional for organizations of every size and in every country.



Carlson Hotels

Carlson Hotels Maximizes Revenue Through Improved Demand Management and Price Optimization in Collaboration with JDA Software Group

Project Summary

Carlson is a vibrant, global, family-owned hospitality and travel company headquartered in Minneapolis, Minnesota. The Carlson Rezidor Hotel Group has more than 1,065 hotels in 77 countries and a portfolio of leading brands: Radisson, Country Inns & Suites By Carlson, Park Inn by Radisson, Park Plaza, and Hotel Missoni. Under changing market conditions for hospitality, the Carlson Rezidor Hotel Group partnered with JDA Software Group to use operations research to drive higher revenue for its hoteliers and to stay ahead of the competition.

The global economic conditions have not only led to fewer sold-out nights for hotels, but also contributed to customers being more sensitive to the prices they are paying. Through increased price transparency via the Internet, customers can now easily compare prices offered by different competitors. In this highly competitive environment, there were major shortcomings that the Carlson Rezidor Hotel Group identified in the traditional revenue management systems, such as depending heavily on busy nights for their benefits and using complicated length-of-stay controls, which were difficult to digest for time-pressed hotel operators. Therefore, the Carlson Rezidor Hotels Group decided to take a different approach and collaborated with JDA on an innovative revenue optimization project, SNAP, which stands for Stay Night Automated Pricing. The SNAP project started with enterprise demand forecasting, which utilized multiple linear regression-based hierarchical time-series forecasting techniques in the JDA Demand solution, which is used by more than 400 companies worldwide. This initial phase went live with 600 U.S. properties in 2007.

For the next phase, JDA designed a large-scale network optimization solution, in collaboration with the Carlson Rezidor Hotel Group, to dynamically optimize stay night rates based on price elasticity of demand, competitor rates, remaining inventory availability, demand forecasts, and business rules. The solution was supported by supplementary modules, such as a discrete time simulator for evaluating the expected bookings to come at the current rates, a constrained regression module to estimate best weightings for each competitor, and a market reference price computation module to estimate

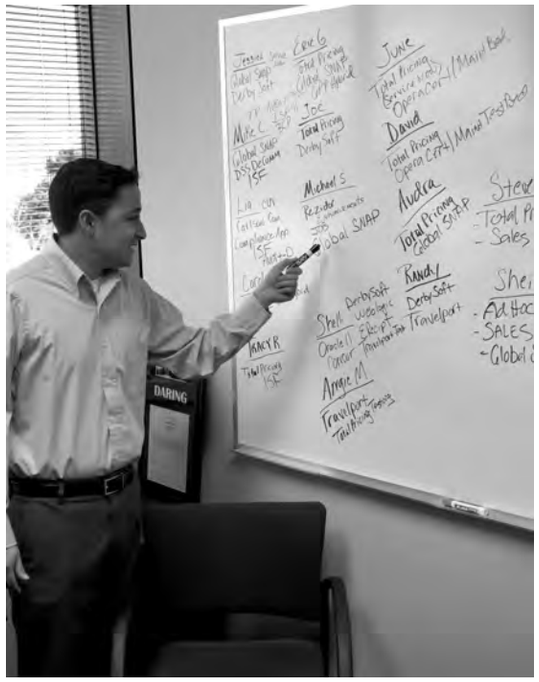
the willingness of customers to pay, given the competitor rates. This solution was designed generically across industries and later implemented in other travel and leisure industries such as passenger rail, luxury yacht rental, and golf.

The whole North American estate, approximately 650 properties, was using SNAP by March 2011. Starting from the optimization prototyping results in 2008, the Carlson Rezidor Hotel Group consistently measured a 2%–4% revenue improvement in compliant hotels over noncompliant ones. Detailed analysis of the price recommendations demonstrated the quick response of the solution, ahead of the competition, to move rates up or down for all nights, particularly for nights





that achieved more than 95% occupancy at the end. To date, compliant hotels increased revenue by more than $8 million annually. After a successful deployment in the Americas, the Carlson Rezidor Hotel Group extended the partnership with JDA to roll out SNAP globally with an initial focus on Europe, the Middle East, and Africa, as well as Asia Pacific. Price optimization is part of the attractive package of services that the Carlson Rezidor Hotel Group provides to its franchisees, and this capability is a critical component of its aggressive Ambition 2015 strategy, which entails growing its global portfolio to more than 1,500 hotels by 2015. The worldwide revenue from the solution is expected to exceed $30 million annually.



Organizational Overview

Carlson
The Carlson Rezidor Hotel Group, born in early 2012, is one of the world's largest and most dynamic hotel groups. The portfolio of the Carlson Rezidor Hotel Group includes more than 1,300 hotels, a global footprint spanning 80 countries, and a powerful set of global brands. In most of the group's hotels, guests can benefit from the loyalty program Club Carlson. The Carlson Rezidor Hotel Group and its brands employ more than 80,000 people. It is headquartered in Minneapolis, Minnesota, and Brussels, Belgium.

JDA
JDA Software delivers best-in-class supply chain solutions that help businesses grow revenue, increase profits, and operate in a more efficient and sustainable way. The combined heritage, technology, and knowledge capital of JDA's people, solutions, and acquired brands, including market leaders such as i2 Technologies, Manugistics, E3, Intactix, and Arthur, enable companies from around the world to transform their supply chains into powerful competitive advantage.



The Centers for Disease Control

Advancing Public Health and Medical Preparedness with Operations Research

Project Summary

Planning for a catastrophe involving a disease outbreak with the potential for mass casualties is a significant challenge for emergency managers. They must make critical decisions rapidly to assess the affected populations, determine the location and size of treatment distribution facilities, appropriately staff those facilities with adequately trained personnel, and provide them with needed medicines and supplies. The timing and nature of the decisions and the ability to efficiently carry them out could mean the difference between life and death for many people. Although extensive resources have been devoted to planning for a worst-case scenario on the local, regional, and national scales, the U.S. Government Accountability Office found that gaps still exist. Although many states have made progress in planning for mass casualty events, many noted continued concerns related to operational efficiency, system flexibility, maintaining adequate staffing, and accessing resources necessary to effectively respond.

Since the Anthrax attacks in 2001, great effort nationwide has been devoted to population protection, in particular to rapid detection of outbreaks and to mass dispensing of prophylactic medical countermeasures that contain biological/pandemic incidents. Despite this enormous effort, there is little actual experience or first-hand knowledge to call upon to plan for such rare but potentially catastrophic events. Their rarity, cost, complexity, and competing priorities are of great concern to policymakers who are aware of past failures to manage fast-changing catastrophes. Hence, the importance of having a powerful and realistic math modeling and real-time decision support system for training and planning.

Working with the Centers for Disease Control and Prevention (CDC), the national authoritative public health organization, the Georgia Tech operations research team devised sophisticated modeling and computational strategies that address the fundamental challenges in mass dispensing: medical supply distribution, locations of dispensing facilities, optimal facility staffing and resource allocation, routing of the population, and dispensing modalities. The O.R. technology is integrated into a powerful information decision support suite, RealOpt, for tactical and strategic operational planning.





RealOpt combines O.R. modeling techniques—novel and large-scale computational engines, sophisticated graph-drawing tools, and three-dimensional geographical spatial information—with census data, demographic and socioeconomic data, and policy analysis. It facilitates

- effective and dynamic operational planning and execution, including optimal facility layout, resource allocation, and cost-effective dispensing networks;
- strategic/tactical decision and policy making, including budget/resource estimation; continuous training, evaluation, and improvement; and regional/national dispensing strategies to protect populations and respond to mass casualties; and
- establishment of a knowledge databank, including time-motion studies performed when there is mass dispensing.

RealOpt has been able to accurately predict the staffing needs and the dispensing operations for many events, including anthrax preparedness and seasonal flu/H1N1 vaccinations. At a sample of events where it has been used, throughput efficiency was improved by 175% to 1000%, while staffing needs were reduced by 32% to 85%. In addition, regional planners can now realize optimal coverage by setting up a reasonable number of dispensing sites (a reduction of two- to fivefold in cities with population ranging from 50,000 to over 10 million). The rapid dispensing achieved by improved throughput translates into the potential to save hundreds of millions of dollars in cost and, most importantly, to save millions of lives.

With the distribution of the system nationally (a current user base of over 4,000 public health and emergency directors covering all states and more than 1,000 cities), its potential significance is far reaching. It makes two profound impacts:





- It removes the operator-dependent aspect of planning and has the potential to establish standard quality assurance guidelines for emergency response.
- The resulting operations are integrated under one umbrella system providing better overall coordination, resulting in reduced staffing needs, drastically increased throughput, and decreased operator dependency.

RealOpt not only helps policy makers better prepare and more efficiently deploy available resources; the program also identifies gaps crucial to effective mitigation planning. It thereby addresses the Homeland Security Presidential Directive 21, which requires plans, procedures, and policies to recover from major events and render the appropriate public health and medical response to mitigate the effects of illness and injury, and to limit morbidity and mortality to the maximum extent possible.

In the words of one CDC official, "RealOpt is the first system that looks at the design of strategic planning and operational response on the ground. It gives policy makers a tool to assess their capabilities for handling large-scale medical emergencies and how they might handle scenarios ranging from local public health emergencies to a situation of national magnitude."

Organizational Overview

Centers for Disease Control
The Centers for Disease Control and Prevention is the nation's premier public health agency, working to ensure healthy people in a healthy world. The CDC, a part of the U.S. Department of Health and Human Services, is the primary Federal agency for conducting and supporting public health activities in the United States. The CDC's focus is not only on scientific excellence, but also on the essential spirit that is the CDC—to protect the health of all people. The CDC keeps humanity at the forefront of its mission to ensure health protection through promotion, prevention, and preparedness.

Georgia Institute of Technology
The Georgia Institute of Technology is one of the nation's top research universities, distinguished by its commitment to improving the human condition through advanced science and technology.



Danaos Corporation

Operational Research in Ship Management

Project Summary

From the days of celestial navigation to our own, where we navigate by satellite, the voyage-planning dilemma has remained the same: Should planners plan the least expensive or the fastest voyage? Should they save money or time?

Danaos took on this problem statement and set an objective of maximum revenue routing. The program, ORISMA (Operations Research in Ship Management), like Alexander the Great, cuts the Gordian Knot, providing a solution based on whole-fleet utilization. It combines financial data, hydrodynamic models, and weather forecasting.

Project implementation was finalized at the beginning of 2011, after a six-year period harmonizing the vision of Danaos Corporation and the professional expertise of Danaos Shipping Co. together with the creative thinking of Danaos Management Consultants SA, the worldwide leader in maritime enterprise information systems.

ORISMA was designed to enrich, upgrade, and transform existing conventional maritime information systems to provide decision support and expert ontologies. It is the result of both bona fide research and operations research partially sponsored by the European Union and used on the worldwide Danaos Enterprise maritime information platform. It realized a return of millions of dollars only in a single year, achieved thanks to optimum solutions in operational, tactical, and strategic decision making. The project focused on improvement of fleet utilization, scheduling optimization, intelligent voyage planning, and bunkering. ORISMA employs dynamic, linear, and nonlinear programming, as well as artificial neuron networks. Intelligent algorithms were implemented, existing techniques were refined, and ingenious models were designed and integrated with success.

ORISMA led to the identification and elimination of nonproductive costs, increase of revenue, improvement of quality of services, and improvement of customer satisfaction. An average increase of 8% of net profit—approximately $1 million per vessel annually—was realized.



ORISMA was welcomed with enthusiasm by large shipping companies, including Anangel, TEN, Euroseas, and Target. It is already utilized by hundreds of vessels. Benefits, including an anticipated $500 million cost savings to ORISMA clients, is estimated for 2012, with further significant increases expected in coming years. Companies realized additional, equally significant, qualitative positive impacts in social responsibility, environmental awareness, and customer satisfaction.



Organizational Overview

Danaos Corporation
Danaos Corporation is one of the world's largest containership charter owners, with a fleet of 60 containerships. Danaos, listed on the New York Stock Exchange, has an ambitious new building program set to increase the fleet to 65 vessels in coming months. Danaos vessels have a carrying capacity of 365,000 containers and a pro forma revenue stream exceeding $650 million per annum. The company's primary objective is to remain a highly respected shipping company committed to technological leadership, offering integrated cutting-edge solutions.

Danaos Shipping Co. LTD
Danaos Shipping Co. is a Cyprus incorporated ship manager with offices in Greece, Germany, and Ukraine. It provides ship management services to one of the world's largest fleets of containerships. It also supervises many technically demanding and geographically diverse shipbuilding projects.

Danaos Management Consultants S.A.
Danaos Management was founded in Greece in 1986. It has more than 500 clients worldwide and 300 staff in offices in Greece, the United States, the United Kingdom, India, Norway, and Cyprus. It is a maritime information technology partner to the maritime industry.



University of Strathclyde
The Department of Naval Architecture and Marine Engineering at the University of Strathclyde's research interests lie in ship design, ship stability, ship management and operation, maritime human factors, marine hydrodynamics, marine structures, offshore engineering, sustainable marine engineering, and emerging technologies for energy efficiency and low-carbon shipping.

Business College of Athens
Business College of Athens, one of the leading private colleges in Greece, offers degrees in shipping, business management, marketing and communication, accounting and finance, hospitality management, psychology, and computer science.



Hewlett-Packard

Delivering Profitable Growth for HPDirect.com Using Operations Research

Project Summary

Hewlett-Packard (HP) is the world's largest provider of information technology infrastructure, software, services, and solutions to individuals and organizations of all sizes. The company has traditionally relied on its strong sales force and retail partnerships to reach customers in more than 170 countries. With Internet penetration increasing and customers taking to the Web over the past decade, building a strong online sales channel became an important strategic need for HP.

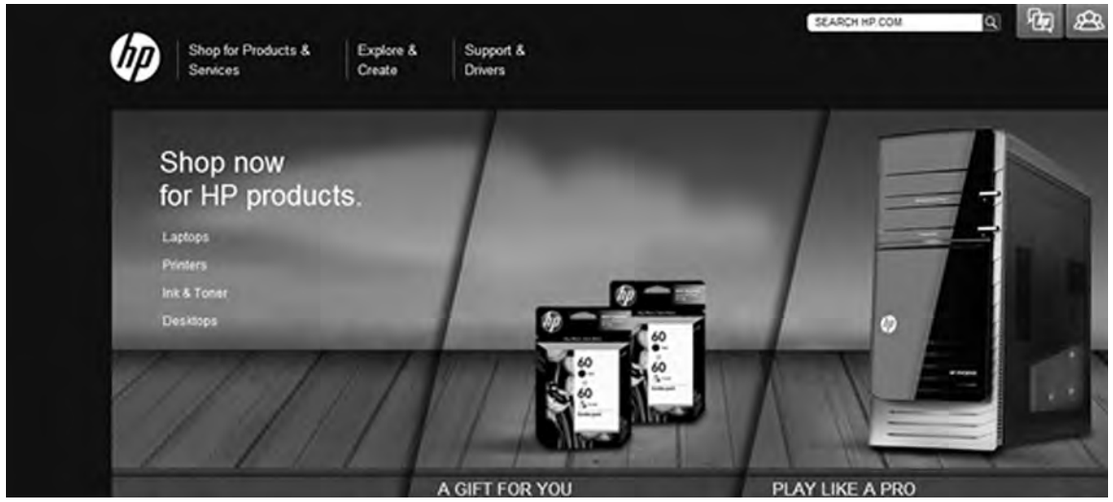
HPDirect.com was established in 2005 to fulfill the need for an online sales channel and to help realize the company's vision of enabling a more holistic buying experience for the consumer across multiple touch points—retail stores, the Internet, and by telephone. However, for a company where the systems, processes, and people were all wired to sell to large organizations and retailers, building the capability to sell directly to consumers was challenging. In addition, HPDirect.com, like other e-commerce companies, is constantly faced with the need to improve the volume and quality of online traffic, increase conversion of visits to transactions, and increase order sizes, all factors directly impacting revenue and profits. The ability to accurately predict online demand also impacts fulfillment costs and lead times, and impacts profits and customer satisfaction.

"HP's ability to grow the e-commerce business profitably depends heavily on the application of O.R. techniques and advanced analytics to better inform daily business decisions," acknowledged Suresh Subramanian, vice president and general manager of HPDirect.com.

Recognizing the importance of O.R. to the success of the online sales model, HPDirect.com forged an alliance in 2008 with O.R. practitioners and data scientists at HP Global Analytics. Together they developed a set of solutions based on mathematical programming, Bayesian modeling, regression modeling, and time-series forecasting to address these key business issues.

Demand generation models help quantify the impact that online marketing activities have on customers visiting the online store. These models, based on a hybrid





approach of time-series forecasting and multiple linear regression, have been helping HPDirect.com management prioritize marketing dollars across online marketing activities to maximize traffic. Because they provide predictions of weekly Web traffic that are accurate within 15% of the forecast, these models have become integral to the planning of demand generation activities at HPDirect.com.

Next, a customer targeting framework, based on a combination of regression models, Bayesian hierarchical models, and discriminant techniques, predicts a customer's product choice, timing of purchase, and marketing channel preference. This helps ensure that the customer receives the right offer at the right time, leading to increased conversion rates and order sizes. Enhanced customer targeting using this framework has yielded an average incremental conversion rate of 1.5% on an average base conversion rate of 2.5% across a series of marketing campaigns. These up-sell/cross-sell models have helped drive a 20% improvement in average order size.

Finally, a time-series forecasting model provides a baseline order forecast, which is then recalibrated using the regression coefficients from demand generation regression models to provide warehouse order forecasts that are accurate within 15% of forecast for 85% of forecast periods.

By creating desktop-based solutions where the technical sophistication of the models and algorithms developed is embedded in simple user interfaces, the Global Analytics team has ensured high levels of business-user adoption.

These O.R.-based solutions that HPDirect.com has deployed in the period 2009-2011 have increased online customer traffic, improved conversion and up-selling/cross-selling, and reduced warehouse inventory costs to generate $117 million in incremental business impact. The capabilities and O.R.-based solutions developed to grow HP's online sales channel in the United States are now being leveraged across similar HP businesses in 23 countries globally.

Organizational Overview

HP is the world's largest provider of information technology infrastructure, software, services, and solutions to individuals and organizations of all sizes. The company offers consumers a wide range of products and services from digital photography to digital entertainment, and from computing to home printing. This comprehensive portfolio helps match the right products, services, and solutions to customers' specific needs.

HP Global Analytics
HP Global Analytics provides data-driven decision support and allied knowledge services focused on providing tangible business impact in a cost-effective manner. Global Analytics is a 1500+-member team serving clients across the company's Enterprise Business, iImage and Print Group, Personal Systems Group, and global functions across regions.

HP Global Marketing, Customer Intelligence
HP's Global Marketing Customer Intelligence team provides actionable insights about its customers so that HP can touch them in a relevant and meaningful way. The team has seven Centers of Excellence focused on brand and consumer research, consumers, emerging markets, enterprise insights, platforms and go-to-market strategies, small and medium businesses, and the total addressable market.

HPDirect.com
HPDirect.com is HP's online direct-to-consumer e-commerce store in the United States that is focused on the U.S. consumer, home, and home office market segments. The store has grown to receive traffic in excess of 140 million visits to its Web store and calls in excess of 3 million at its call centers in a year. The store process well over three million orders per year.





Intel

Optimizing Capital Investment Decisions at Intel Corporation

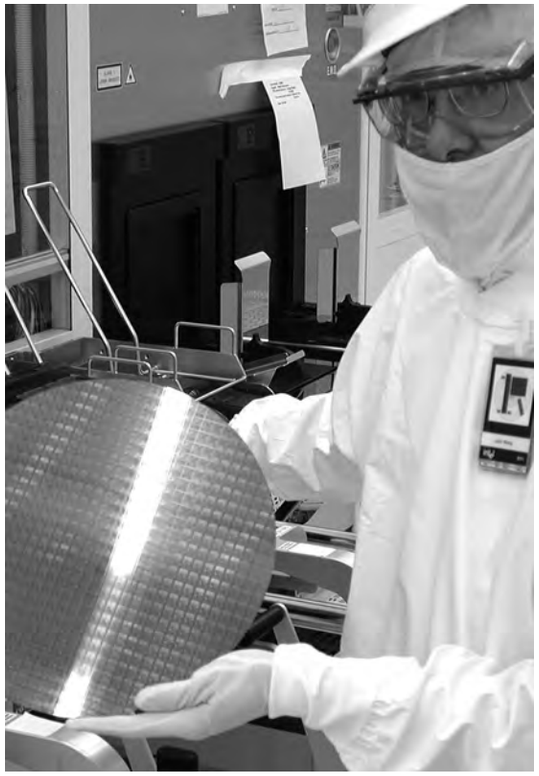
Project Summary

Intel Corporation is a world leader in semiconductors with 2011 revenues of $54 billion. The company competes in a wide variety of computing, networking, and communications markets as a midechelon player with a number of suppliers, customers, and competitors. To maintain a leadership position, Intel develops improved manufacturing process technologies with a two-year cadence. Over the years, this has resulted in transistors shrinking to nanoscale, enabling ever more capable products. Each of these process advances necessitates the purchase of a few billion dollars' worth of progressively more sophisticated manufacturing equipment to outfit Intel's factories.

The core business problem is one of timing and risk management. On the one hand, equipment continues to increase in complexity, resulting in longer lead times and higher costs from suppliers. On the other hand, Intel's markets have gotten more dynamic, diverse, and competitive, resulting in increased difficulty in forecasting demand. There is tension between Intel's desire to delay ordering until demand forecasts are more reliable (one to two quarters ahead of sales) and the need to place orders at the lead times required by suppliers (four to six quarters in advance). The cost of overordering is a few hundred million dollars of equipment depreciating while sitting idle. The cost of underordering may be a few billion dollars in missed revenue or worse—lost market share. Historically, this asymmetry has enticed Intel's decision makers to repeatedly overcapitalize by several hundred million dollars.

Intel's most recent solution to this problem was the development of a dual-mode multiperiod procurement methodology with each supplier. The "base" mode supports ordering capacity at a normal lead time (four to six quarters) to cover the high-confidence, lower bound demand forecast. The "flex" mode is realized through option contracts that include reduced lead time (two quarters) for covering the capacity gap to the low-confidence, upper bound demand forecast. Balancing the two modes enables agility and flexibility in Intel's capacity supply chain while guaranteeing risk sharing with suppliers, thus contributing to a healthier ecosystem.

The Intel operations research team's biggest challenge was convincing Intel management and equipment suppliers to depart from standard practice. Senior decision makers were intrigued by the promise of the option approach, but cautious considering the dollars at stake. Initial success with one supplier led to the opportunity to expand and engage many suppliers. More recently, adoption of this new decision method for capital investments has been driven by the documented benefits. When the initial demand forecast turned out to be too high (+10% to +15%), Intel realized approximately $300 million in benefit through abandonment of the options, avoiding the purchase of unnecessary equipment. When the initial forecast turned out to be too low (-10% to -15%), the options were exercised early to build capacity more quickly than was previously possible, resulting in the capture of a $2 billion revenue upside.





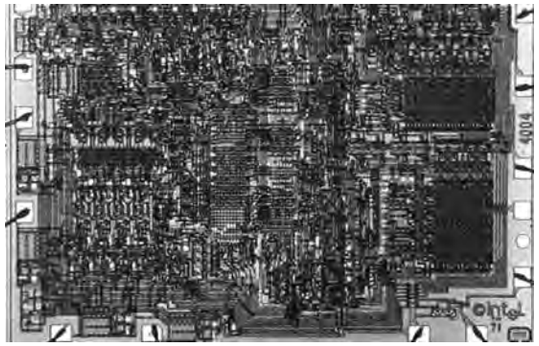
The work has transformed the way Intel makes capital investment decisions, resulting in repetitive cost savings or revenue upside at each manufacturing process transition. The approach has fostered a win–win relationship with equipment suppliers by providing a practical risk-sharing mechanism. Customers worldwide benefit through reduced cost for ever more innovative and capable products. The method has broad applicability because any organization making capital investments based on demand forecasts can benefit from its implementation.

Organizational Overview

Intel Corporation, Intel Architecture Group, Decision Engineering
Employees in the Intel Architecture Group (IAG) deliver innovative platforms across computing and communication segments including data centers, mobile and desktop personal computers, handheld devices, embedded devices, and consumer electronics. Intel's industry-leading technology is used to create integrated hardware and software solutions such as processors, chipsets, communication radios, graphics processors, motherboards, and networking components that deliver capabilities from security and manageability to computing performance and energy efficiency.

The Decision Engineering organization is focused on supplying decision support tools across all engineering, business, and finance functions in the IAG, but has also collaborated with other groups inside of Intel.

Intel Corporation, Technology and Manufacturing Group, Technology Manufacturing Engineering
Employees in the Technology and Manufacturing Group are part of a worldwide network of fabrication and assembly/test facilities. As the world's largest chip manufacturer, Intel strives to make every facet of semiconductor manufacturing—from semiconductor process development and manufacturing, through yield improvement to final test and optimization, to packaging—state of the art.



The Technology Manufacturing Engineering (TME) organization is responsible for managing semiconductor equipment industry relations, including development and delivery of equipment capabilities.

Stanford University School of Engineering, Management Science and Engineering
The Management Science and Engineering Department (MS&E) provides education and research opportunities associated with the development of knowledge, tools, and methods required to make decisions and to shape policies, to configure organizational structures, to design engineering systems, and to solve problems associated with the information-intensive technology based economy.

In January 2012, MS&E celebrated its twelfth anniversary. From three independent departments (Engineering Economic Systems, Operations Research, and Industrial Engineering and Engineering Management), MS&E has become a thriving intellectual community of more than thirty faculty, eight areas of research, climbing enrollment, and strong links to industry and government.

TNT Express

Supply Chain-Wide Optimization at TNT Express

Project Summary

TNT Express N.V. is one of the world's leading business-to-business express delivery companies, with the largest express road and air network in Europe. Worldwide, it operates 2,600 hubs and depots, flies 50 aircraft, runs 30,000 road vehicles, and employs 83,000 people. TNT Express takes pride in its customer service. Every week, 4.7 million parcels, documents, and pieces of freight have to be transported to over 200 countries while maintaining strict service requirements.

Until some years ago, this challenge was addressed without any mathematical support in decision making. In 2005, TNT leaders realized that to remain competitive, more fact-based decision making was required, which led to the introduction of the Global Optimization (GO) program.

The quality of decision making at TNT Express improved tremendously with the supply chain-wide introduction of operations research. The GO program enabled TNT Express to organize its operations in a better and smarter way, resulting in significant operational benefits. In the past seven years, TNT developed a portfolio of optimization solutions. The most significant savings originate from the company's line-haul routing and scheduling solution (TRANS), the tactical routeplanning solution for pickup and delivery (SHORTREC), and the supply chain optimization solution (DELTA). These solutions drew on the GO program principles:

1. Match optimization complexity with the maturity level of optimization knowledge and data quality of the business and ensure full alignment with expectations.
2. Involve experts and decision makers in the development of the optimization solutions through "communities of practice," a platform to exchange experience, best practices, logistics, and optimization knowledge.
3. Effectively educate decision makers in using optimization; the GO Academy, a two-year global educational program teaching the principles of optimization, was developed to train TNT employees in understanding and applying optimization at TNT Express.



Over the period 2008–2011, more than €207 million in savings were realized. The DELTA solution has been used to support strategic decisions with large impact. More than 150 TNT senior managers and staff members were trained at the GO Academy. These graduates, without being mathematicians, recognize optimization opportunities and know which tools to use to solve them. They can share experience and knowledge on a global scale because they speak the same (optimization) language, basing decisions at each level of TNT on fact.





Organizational Overview

TNT
TNT Express is one of the world's four largest express delivery companies and number one in Europe. TNT Express continuously optimizes its air and road networks in Europe, China, Asia-Pacific, South America, Africa, and the Middle East, connecting international routes to domestic networks. In 2010, TNT Express earned €7.053 billion in revenue. TNT was created in Australia in 1946, moved to Europe in 1973, and built a worldwide presence in recent decades. Today, TNT Express is a global player delivering shipments to over 200 countries, with fully owned operations in 64 countries.

TiasNimbas Business School
TiasNimbas, the business school of Tilburg University and Eindhoven University of Technology, offers a broad, flexible portfolio of internationally recognized management programs. The motto of TiasNimbas is "Never Stop Asking," and this is reflected in programs that are rooted in leading management research designed to address the specific educational needs of individuals and organizations in the evolving world of business.

ORTEC
ORTEC is one of the world's largest independent providers of advanced planning solutions, decision support systems, and consulting services. ORTEC assists companies and organizations to make informed, fact-based decisions based on thorough analysis and modeling, providing decision-making confidence.





Call for 2013

Franz Edelman Award Applications

Call for 2013 Applications

THE FRANZ EDELMAN AWARD

42nd 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 42nd International Competition for the Franz Edelman Award for Achievement in Operations Research. The competition will take place at the 2013 INFORMS Conference on Business Analytics and Operations Research in San Antonio, Texas.

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 2013 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 17, 2012.

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

Each finalist group will give an oral presentation of their work on April 8, during the analytics conference in Texas.

See you at the 2013 Franz Edelman Award Competition!
www.scienceofbetter.org/Edelman

The INFORMS Prize:

Sustained Integration of Operations Research

2012 Winner

The 2012 INFORMS Prize is awarded to Memorial Sloan-Kettering Cancer Center (MSKCC) for the outstanding widespread use and influence of operations research throughout the company. MSKCC is the oldest and one of the largest cancer hospitals in the world, treating over 25,000 patients per year. In 2003, MSKCC's first O.R. position was created. In 2006, MSKCC created the operations research specialty group "QuantStrat," which has grown and has future growth plans.

The most impressive application of O.R. at MSKCC is the Edelman Award-winning work (2007) of MSKCC's Dr. Marco Zaider in collaboration with Eva Lee of the Georgia Institute of Technology using optimization modeling to create more effective prostate cancer treatment.

However, the role of O.R. is as pervasive in administrative decisions. For example, O.R. has improved the utilization of expensive radiation oncology equipment called linear accelerators—avoiding capital expenditure and construction and operation costs of over $20 million. O.R. methods were used in determining improved strategies for

Memorial Sloan-Kettering Cancer Center

The Best Cancer Care. Anywhere.

building a new leukemia center, resulting in a $43 million improvement in donations, but more importantly, 11% more cancer patients can be treated annually. O.R. has also been integral in improved patient forecasting and improved staffing decisions.

Because of the success of operations research in these projects, O.R. has continued to gain importance and influence at MSKCC to the point that now the role of operations research in the organization has taken hold in most major decisions. MSKCC continues to work with leading software providers to extend the use of O.R. as a central capability in hospital administration and cancer treatment. As testimonial, MSKCC's president, Dr. Craig B. Thompson, has termed operations research as "institutional priority number one."

By awarding the 2012 INFORMS Prize to Memorial Sloan-Kettering Cancer Center, INFORMS recognizes the extensive and growing role of operations research at that organization.

The INFORMS Prize

A History

This is the fourth year in which the INFORMS Prize has been honored during the Edelman Awards Gala. While the Edelman Award and the Wagner Prize recognize single projects that demonstrate outstanding accomplishments in O.R. practice, the INFORMS Prize complements them by recognizing long-term, multi-project achievements.

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

2012 Memorial Sloan-Kettering Cancer Center
2011 Sasol
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

2012 INFORMS Prize Committee

Michael Gorman, University of Dayton, Chair
Erica Klampfl, Ford Research, Past Chair
Stefan Karisch, Jeppesen
Ivan Oliveria, SAS
Jeffrey Stonebreaker, NC State University
Sridhar Tayur, Carnegie Mellon University
Julie Ward, HP Laboratories

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 2013

Informs Prize Nominations

Call for 2013 Nominations

Applications for the 2013 INFORMS Prize are now being accepted.

Organizations in the public and private sectors are eligible. Outside contractors to a candidate organization are not eligible, unless a proven, dedicated relationship exists over a prolonged time period between the vendor and the client organization. In this case, the client organization and vendor will be co-recipients of the prize, presented to appropriate executives of both organizations.

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, 2012.

See you at the 2013 INFORMS Conference on Business Analytics and Operations Research! April 7–9, 2013, in San Antonio, Texas.

The Wagner Prize:

Excellence in Operations Research Practice

2011 Winner
The Daniel H. Wagner Prize
for Excellence in Operations Research Practice

The first-place winners are **Karl Kempf** and **Evan Rash** of Intel Corporation's Decision Engineering Group.



Their paper, "Product Line Design and Scheduling at Intel," describes the development and implementation of a holistic, coherent model for the challenging problem of designing and scheduling product lines. The model incorporates market requirements and financials, design-engineering capabilities, manufacturing costs, and multiple-time dynamics. A new solution to maximize overall profit was invented by integrating techniques from optimal set covering, resource-constrained job scheduling, dynamic programming, and portfolio optimization. The key idea is decomposition of the problem into two layers. An outer genetic-algorithm layer handles resource constraints, scheduling, and financial optimization. An inner mathematical-programming layer optimizes product composition as classical set covering. The resulting algorithm efficiently solves problems of larger size and higher complexity than previously possible. A decision support suite that surrounds the algorithm has been in use for the past 18 months by over 125 personnel representing most major Intel groups and many distinct job functions. This suite is serving to integrate a set of previously separate, noncommunicating business processes.

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

2011 Finalists

This is the fourth year of the Franz Edelman Awards Gala in which INFORMS is conferring the Daniel H. Wagner Prize for Excellence in Operations Research Practice. The award now shares the spotlight with three other great INFORMS practice awards: the Edelman Award, the INFORMS Prize, and the UPS George D. Smith Prize.

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

Paul Kleindorfer, INSEAD; Andrei Neboian, Stefan Spinler, WHU-Otto Beisheim School of Management; and Alain Roset, Direction du Courrier Groupe La Poste:
"Fleet Renewal with Electric Vehicles at La Poste"

Radha Mookerjee, Vijay S. Mookerjee, University of Texas at Dallas; and Subodha Kumar, Texas A&M University:
"To Show or Not to Show: User Profiling to Manage Internet Advertisement Campaigns at Chitika"

Adeline Kuo, Gerald van den Berg, Anjuli Kannan, Analytics Operations Engineering, Inc.:
"iSchedule to Personalize Learning"

Eva K. Lee, Chien-Hung Chen, Niquelle Brown, Tsung-Lin Wu, Georgia Institute of Technology; Joseph Handy, Alex Desiderio, Ruth Lopez, and Brian Davis, Georgia Aquarium:
"Designing Guest Flow and Operations Logistics for Dolphin Tales"

Ada Y. Barlatt, University of Waterloo; Amy Cohn, University of Michigan; Oleg Gusikhin, Yakov Fradkin, Rich Davidson, and John Batey, Ford Motor Company:
"Ford Motor Company Implements Integrated Planning and Scheduling in a Complex Automotive Manufacturing Environment"

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. That same year, 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.

2011 Wagner Prize Committee

C. Allen Butler, Daniel H. Wagner Associates, Inc., Chair
Susan L. Albin, Rutgers University
Peter C. Bell, University of Western Ontario
Srinivas Bollapragada, GE Global Research Center
William J. Browning, Applied Mathematics, Inc.
Manoj Chari, SAS Institute
Joseph H. Discenza, SmartCrane, LLC
Randall S. Robinson
Donald R. (Bob) Smith, Monmouth University
Lawrence D. Stone, Metron, Inc.

Call for 2012

The Wagner Prize Applications

Call for 2012 Abstracts

THE DANIEL H. WAGNER PRIZE

Excellence in Operations Research Practice

Deadline Midnight May 1, 2012

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 one- to two-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 in Phoenix, Arizona, and, if selected as a winner, to reprise the presentation at the spring Analytics Conference in San Antonio, Texas. 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 2012 is $1,000.

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

All finalists' presentations can be viewed in the INFORMS Video Learning Center at http://livewebcast.net/INFORMS_AM_Wagner_Prize_2011.

See you at the 2012 Wagner Prize competition!

www.informs.org/wagnerprize

The UPS George D. Smith Prize

The UPS George D. Smith Prize



The UPS George D. Smith Prize is awarded to an academic department or program for effective and innovative preparation of students to be good practitioners of operations research, management science, or analytics. It is accompanied by a $10,000 cash award.

The prize committee is pleased to announce the finalists for 2012, the first year of competition (in alphabetical order):

- Cornell University, School of Operations Research and Engineering, Master of Engineering Program
- Lehigh University, Department of Industrial and Systems Engineering
- University of Michigan, Tauber Institute for Global Operations

The UPS George D. Smith Prize is an exciting new award created in the spirit of strengthening ties between industry and the schools of higher education that graduate young practitioners of operations research.

The UPS George D. Smith Prize is named in honor of the late UPS chief executive officer who was a patron of operations researchers at the leading Fortune 500 corporation. George D. Smith was the second CEO of UPS, holding the position from 1962 to 1972. He joined UPS as an accountant in 1925 and at some point in his long and illustrious career held almost every functional title within the company.

While his background was steeped in finance, George Smith had a keen engineering mind. In the late 1940s, after learning about operations research, George Smith realized that intuition alone would not be enough to help UPS master the many issues it faced as it grew in size from a regional to a nationwide carrier.

George Smith recognized O.R. as an engineering approach to making decisions and started advocating the use of operations research concepts in UPS. Quantitative analysis became the bedrock on which UPS's engineering function was built. Because of George's vision, UPS now employs thousands of engineers whose focus is efficiency, sustainability, and service.

He was a strong believer in investing in our younger generation. For him, nurturing them was the key to sustained prosperity. This new prize embodies George Smith's beliefs: to recognize the importance of operations research in practice and ensure that our younger generation gets proper exposure to its value, and in turn benefits society.

The UPS George D. Smith Prize

About this year's competition

Since the first days of operations research there have been highly divergent opinions about how effectively our universities are preparing students to be effective practitioners. From the perspective of the committee charged with administering the first UPS George D. Smith Prize this year, there is strong evidence that, overall, our universities are doing very well in this area!

In this first year of the competition, the committee was very pleasantly surprised by the quantity (18) and outstanding overall quality of the programs applying for the award. We feel confident that there will be a truly outstanding winner this year and for many years to come. It was hard but rewarding work to choose the finalists, but was also somewhat painful because, unfortunately, many very outstanding programs could not become finalists this year. Selecting the winner from the finalists will also be very difficult.

Seeing the diversity, quality, and innovation of these entries has given the committee a unique and encouraging picture of how well we, as a profession, are preparing future practitioners. Please look at the following pages for additional information about the finalists. We will announce the winner tonight. Plan to attend the special presentation at the conference on Tuesday in which the winning team members will describe their program in more detail. All of us will undoubtedly learn something about how to better prepare practitioners, and also experience a taste of the many reasons that the committee is so excited about the overall state of academic practitioner training.

The 2012 UPS George D. Smith Prize Committee:

Donald R. (Bob) Smith, Monmouth University, Chair
Ranganath Nuggehalli, UPS, Vice Chair
Susan Albin, Rutgers University
Cynthia Barnhart, MIT
Michael Gorman, University of Dayton
Russell Labe, Bank Of America
Patricia Neri, SAS Institute, Inc.

Cornell University, School of Operations Research and Information Engineering, Master of Engineering Program

Cornell University
Operations Research and
Information Engineering

Cornell's MEng program in ORIE provides an academically rigorous environment that provides students with a strong foundation that enables them to apply O.R. to practical business problems and do real consulting work. ORIE MEng students each concentrate in one of six areas: applied operations research, strategic operations, manufacturing and industrial engineering, data analytics, information technology, or financial engineering. In addition to specialized courses and other activities in the concentrations, all students take a common core of technical courses that cover optimization, simulation, probability, statistics, and stochastic processes.

One of the outstanding features of this program is the two semester-long internships on real problems for real companies. Projects typically earn five credit hours spanning one or two semesters. They involve travel to sponsor sites, interaction with the sponsor's operational staff and O.R. professionals, dealing with real data, and preparation and delivery of project reports and presentations at a high professional level. During these internships, ORIE faculty members function as project advisors. In addition to being outstanding scholars, many ORIE faculty members have held industry positions and/or are actively involved in consulting for companies and other organizations.

Most courses in the ORIE MEng curriculum feature applied problems. Increasingly, courses are structured with particular emphasis on a problem area; they are largely "problem pull" rather than "method push" courses. The learning outcomes of the master's of engineering make evident the central role that professional practice plays in the program.

Development of soft skills is addressed by the five-day MEng Connect professional development programs as well as during the internships. Students receive formal feedback on their soft skills after their internships/projects by their peers, faculty, and industry sponsors.

Students benefit from the regular interactions with practitioners during ORIE weekly Enterprise Engineering Colloquia. The School of ORIE has developed a mentorship program specifically for MEng students in Ithaca and Manhattan. Nearly 200 alumni in a broad array of fields have offered to serve as mentors.

Lehigh University, Department of Industrial and Systems Engineering

Lehigh is characterized by its pervasive use of industry-driven experiential learning at all levels of its operations research curriculum. For over 35 years, Lehigh's Industrial and Systems Engineering (ISE) department has run an Enterprise Systems Center (ESC) that maintains close contact with local companies such as Kraft Foods and Nestle to provide students with course projects and internships. Lehigh employs a system it calls "layered mentoring," combining relationship managers from the ESC, industry partners, and faculty to give teams of undergraduate and graduate students well-rounded practical and rigorous theoretical guidance on the application of O.R. Its tenured and tenure-track faculty have extensive practical consulting experience, and its Leadership Fellows program includes retired executives with decades of management experience to help in the mentoring process.

Lehigh's ISE department emphasizes real-world project learning throughout its curriculum. Every undergraduate and master's student must complete an applied capstone project for a corporate client. Similarly, most Ph.D. students conduct applied research, with over three-quarters going on to jobs in the industry after graduation. Just as importantly, real-world projects and problems can be found throughout the curriculum, with Lehigh estimating that about a quarter of the curriculum in total is based on such projects. Such practical engagement extends beyond the classroom as well, with many students engaging in ESC-sourced internships.

In total, Lehigh graduates approximately 130 students per year (4 Ph.D.'s, 50-65 undergraduates, and 65-72 master's students), and its program is growing in number of faculty (from 13 to 16), students (e.g., the undergraduate major has grown 35% in the last three years), and course offerings (over a dozen new courses have been recently created).

Written testimonials of both students and clients indicate that the program creates high value for all involved. Clients report sizable savings due to projects, but perhaps most notably, both students and clients suggest that the professionalism, team-building skills, problem-solving skills, and communications skills developed in a real-world setting give Lehigh graduates confidence, business savvy, and sophistication that sets them apart in the labor market.

University of Michigan, Tauber Institute for Global Operations

The Tauber Institute for Global Operations provides interdisciplinary education, successfully uniting the fields of engineering and business. The Tauber Institute strives to meet corporations' needs for a new kind of graduate—leaders with exceptional academic background and relevant professional experience who can successfully integrate business and engineering perspectives to lead international corporations into the future.

Approximately 100 students per year graduate from the Tauber Institute prepared for the practice of OR/MS at the highest levels. MS students in Industrial and Operations Engineering and MBA students with an engineering background apply to become members of the Tauber Institute. All students receive training in both engineering and business.

The most outstanding aspect of the Tauber program is the 14-week, full-time, on-site paid internship. It costs the sponsoring company approximately $90,000 to support a project, and the expectation is that the project will have a major financial impact. The average return over three years per project is $18 million. These cost savings have been verified and approved by each corporate sponsor.

In interviews, students and graduates emphasized the active involvement in the projects by top-level executives and regarded this exposure to the highest levels of an enterprise as a unique and extremely valuable learning opportunity.

The projects are organized in advance of the 14-week period with site visits and definition of scope. There is a formal process including company presentations and interviews to assign students to projects. Each project has a faculty advisor from both the business and engineering faculties. Each team has a communications coach and a team dynamics advisor. Milestones are scheduled for intermediate deliverables, progress checks, midproject visits, and final reports and presentations.

More than a decade ago, following suggestions from its Industry Advisory Board, the Tauber Institute began to formally offer leadership and practical skills training. The program, entitled LeadershipAdvantageSM, consists of nine teaching modules and seven in-depth workshops, all designed to develop leadership skills through discussion, counseling, and practice. Topics include personality styles, presentation skills, Six Sigma and Lean, advanced Excel, interviewing, cultural awareness, team dynamics, and meeting management.

Call for 2013

George D. Smith Prize Applications

Call for 2013 Applications

THE GEORGE D. SMITH PRIZE

Strengthing Ties Between Academia and Industry

Deadline for Applications is Monday, October 29, 2012.

The UPS George D. Smith Prize was created in the spirit of strengthening ties between industry and the schools of higher education that graduate young practitioners of operations research. INFORMS, with the help of CPMS, will award the prize to an academic department or program for effective and innovative preparation of students to be good practitioners of operations research, management science, or analytics.

The UPS George D. Smith Prize is named in honor of the late UPS Chief Executive Officer who was a champion of operations researchers at a leading Fortune 500 corporation. UPS has generously underwritten the award in his memory.

The prize will be awarded to an academic program or department. It will include a trophy and a $10,000 cash award. The first UPS George D. Smith Prize will be announced at the 2013 INFORMS Franz Edelman Gala.

The application process begins with a summary of the role of operations research in the academic program and why competence in operations research practice is one of the goals of the program, written verification of program success, and a commitment, if selected as a finalist, to give a 30-minute oral presentation at the spring Analytics Conference in San Antonio, Texas, and, if selected as a winner, to reprise the presentation at the INFORMS Annual Meeting in Minneapolis, Minnesota. The finalist papers are published in a special issue of *Interfaces*.

Submissions can be made to dsmith@monmouth.edu.
For more details on the application process, please visit **www.informs.org/smithprize**.

See you at the 2013 INFORMS Conference on Business Analtytics and Operations Research!
www.informs.org/smithprize

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 is the largest professional society in the world for professionals in the fields of operations research, the management sciences, and analytics.



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 is rapidly becoming the central organization serving those in the field of analytics.

INFORMS 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, the military, finance, telecommunications, and business analytics. Over the last years, INFORMS leadership has recognized the growing role of analytics in the business world and is providing leadership to professionals with skills in both O.R. and analytics.

INFORMS is reaching out to the business world through *Analytics* Magazine, an online publication for those who analyze data in the marketplace and those who work with them and direct their departments. The magazine's new online homepage, www.analytics-magazine.com, offers breaking news, feature articles, and an "Executive Edge" column written by guest writers like UPS vice president Chuck Holland.

INFORMS also expanded its services to analytics practitioners by creating an analytics special interest group. The Executive Forum and the special tracks for analytics professionals at this conference are part of INFORMS's new contributions to the rapidly expanding movement.

INFORMS is also exploring new initiatives like a certificate program in analytics.

INFORMS retains its traditional side. 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.

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

Congratulations to Edelman Award winners both past and present

Merrill Lynch salutes the honorees of the 2012 Edelman Awards. And we applaud INFORMS for understanding the value of innovations in operations research and management science. As a member of the Franz Edelman Academy, we proudly congratulate all Edelman Award winners.

Merrill Lynch
Wealth Management®
Bank of America Corporation

The Franz Edelman Award, presented annually by the Institute for Operations Research and the Management Sciences (INFORMS), recognizes outstanding examples of operations research, management science and advanced analytics in practice throughout the world.

Merrill Lynch Wealth Management makes available products and services offered by Merrill Lynch, Pierce, Fenner & Smith Incorporated, a registered broker-dealer and member SIPC, and other subsidiaries of Bank of America Corporation.

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ANALYTICS

Know what's hot.

The topic of analytics is on fire right now. SAS congratulates the **2012 Edelman Award Finalists**, who know how to discover innovative ways to increase profits, reduce risk, predict trends and turn data assets into competitive advantage.

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Congratulations
to all the 2012 finalists

AIMMS
THE MODELING SYSTEM



Paragon Decision Technology is excited to see so much value created through the application of Operations Research

As proud members of the 2011 Edelman Award-winning team from Midwest ISO, we wish to recognize your achievements and contributions toward improving business and society

Missed the presentation last year? See it now:

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Bringing You a Crown Jewel of the Operations Research Profession

By Russell P. Labe, 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" yet 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 supports the practice of operations research and the management sciences (OR/MS), also called the practice of advanced analytics. 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.

One of the most important activities of CPMS is administering the Franz Edelman Award. This present stewardship evolved directly from the earlier role of CPMS in initiating, nurturing, and growing the competition in stature and visibility. First established by TIMS in 1971 as the CPMS Prize, the award was renamed to honor Franz Edelman shortly after his death in 1982. Franz was the founder of one of the



first industrial operations research groups in the United States, at RCA, circa 1950. Today, becoming an Edelman finalist is widely viewed to be rigorous certification that an organization has benefited from the application of state-of-the-art, highly impactful operations research. The finalists' stories and their presentations, available from the INFORMS Video Learning Center, in papers published in the journal *Interfaces*, and on DVD, 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 analytics conference, where the competition takes place.

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





The competition would not be possible without an effective support-and-evaluation infrastructure. We are always looking for new members to get involved in the prize committee. 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 and the UPS George D. Smith Prize (both recognized during the Edelman Gala award ceremony), cluster sessions at INFORMS meetings, Isolated Practitioner workshops, and a newsletter.

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 practitioners, part-time practitioners, and researchers interested in practice. If you are already a member but not actively involved, contact us (at russ.labe@bankofamerica.com) 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!





The Edelman Laureates

2011
Naoki Abe
Fernando Alarcon
Gary F Anderson
Gustavo Angulo
Alex Beiza
James J Bennett
Cristian Berner
Brian Carlson
Jaime Catalan
Yonghong Chen
Brent R Cooley
Kenneth Cooper
Jin Dong
Xing Dong Zhang
Craig Eister
Rafael Epstein
Timothy Gardinier
Edward Godlewski
Cristian Gonzalez
Guillermo Gonzalez
Jon A. Higbie
Mingguo Hong
Sergio Hurtado
Florencio Infante
David L Jensen
Roy Jones
Dev Koushik
Kevin Larson
Gregory Lee
Guo Li Jie
Xingwang Ma
Prem Melville
Gerard Miller
Mauricio Naveas
Andres Neely
Peter Nieuwesteeg
Cezar Pendus
Xi Quan Wang
Chandan K Reddy
Haili Song
Kimberly Sperry
Matthew Tackett
Doug Taylor
Li Thomas
Vince P Thomas
Fernado Valenzuela
Jie Wan
Melissa Weatherwax
Andres Weintraub
Liu Xiao Hu
Ming Xie
Jun Yin Wen
Daniel Yung
Eugene Zak
Bin Zhang

2010
Gerkotze Bonthuys
Ebert Cawood
Jay Cunningham
Esmi Dreyer
Ingrid Farasyn
Andrea Feunekes
Ugo Feunekes
Marc Fischer
Michele Fisher
Tjark Freundt
Wolfgang Giehl
Francisco J. Herrería
Salal Humair
Johan Janse van Rensburg
Jaco Joubert
Joel I. Kahn
Peter Kolesar
Miguel de Lascurain
Willem Louw
John MacNaughton
Kim Mathisen
Marlize Meyer
David Fernando Muñoz
John J. Neale
Arturo Palacios-Brun
Steve Palmer
Hylton Robinson
Omar Romero-Hernandez
Oscar Rosen
Ruan Rossouw
John Ruark
Luis de los Santos
James Serio
Francisco Solis
Gerrit Streicher
William Tarlton
Hentie van den Berg
Anette van der Merwe
Wim Van de Velde
Lorraine van Deventer
Jaime Villaseñor
Glenn Wegryn
Sean P. Willems
Cecile Wykes

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
Donald P. Coveleski
James Fitzsimmons
Mark Grossman
Allen Lee
Robert Stark
Sally Stout
Elden D. Thomas

1972

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Julio Bucatinsky
Richard Condon
Robert Cutler
Ralph Keeney
Robert Meyer
Peter Salomone

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Bell Laboratories
Bellcore
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British Telecommunications
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Canadian National Energy Board
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Canadian Pacific Railway
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City of San Francisco Police Dept.
City of Stockholm, Sweden
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Delaware River Foundation
Dell Computers
Deloitte & Touche Consulting Group
Delta Air Lines
Dept. of Transport, Canada
Dept. of Transportation- State of CA
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Detroit Diesel
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Ecole des Mines de Saint-Etienne
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Electric Power Research Institute
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Eletrobras
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NYNEX
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Omya International AG
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ORTEC
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South African National Defense Force
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State University of New York-Stony Brook
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Technological Education Institute of Crete
Temple University
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The Finance Ministry of Kuwait
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TransCanada-Great Lakes Transmission
Transportation Security Administration
Travelocity
Turkiye Sise ve Cam Fabrikalari A.S.
Tyecin Systems, Inc.
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Unisys Corp.
United Airlines
United States Air Force
United States Air Force Academy
United States Army
United States Army-Center for Army Analysis
United States Coast Guard
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Universidade de São Paulo
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University of Antwerp
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University of British Columbia
University of California, Berkeley
University of California, Los Angeles
University of California, Riverside
University of Cincinnati
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University of Detroit
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University of North Carolina at Charlotte
University of Oklahoma
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University of San Francisco
University of Southern California
University of Southern Maine
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University of Texas at Austin
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U.S. Dept. of Energy
U.S. Dept. of Housing & Urban Development
U.S. Environmental Protection Agency (USEPA)
USAREC
USCAP
Verizon Laboratories
VESTRA
Veterans Administration
Vilpac Corporativo, S.A.
Visteon Automotive Systems
Visteon Sterling
Volpe National Transportation Systems Center
Wagemaker Consultoria Ltda.
Warner Robins Air Logistics Center
Warwick Business School
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