

## From the Editor

### An Issue of Development

**I**FORs role in promoting OR for development is most visible in this issue. We start out with the Editorial of IFORS VP at large, Sue Merchant, who has been assigned the Developing Countries Committee portfolio. She puts forth questions for the international OR community on whether IFORS is on the right track, and what it can do more to perform its role in promoting the use of OR for development.

That IFORS concern in this area goes beyond lip service is visible in this issue. Here, you will read about its: sponsorship of an OR colloquium in Cameroon; efforts to bring outstanding OR for development implementations out of the woodwork through the IFORS Prize; and activities to hone professional development and knowledge sharing through new initiatives for the International Conference on OR for Development (ICORD).

From the developing world, we feature two reflections - about the use of soft OR, and how a young man found OR and stuck with it.



We do see OR at work in a developed country too as we get a glimpse of how OR had been used to protect lives against a threat that is very real for Netherlands – floods. Adopted by the Dutch government in recognition of the efficient investment strategy it generated, the project recently won the prestigious Edelman Award given out by INFORMS. We get a peek into the activities and contributions of this IFORS member in our regular OR Society in Focus section.

To INFORMS belongs the honor of having had Saul Gass as its member. The international OR community mourns his passing, and we include here a tribute from one of his colleagues and former IFORS President, along with a brief, candid, and heart-warming remark from his family.

Speaking of families, we feature two “relatives”, who have closely worked with IFORS through the years, namely, AGIFORS and POP. Turn to the page and see the specific fields of OR on which they focus.

As IFORS Distinguished Lecturer, Saul Gass dwelt on developing a timeline description of events, people, and other influences on the history of OR. Interestingly, the book reviewed for this issue, *Blackett's War*, gives us a detailed look at how OR was born and the people involved in the historic defeat of the U- boats during the Second World War.

Indeed, this issue is all about development – the OR personalities who have spent their lives developing and contributing to the field that is alive and well today; those who have found fulfillment and personal development in its practice; the various people and organizations which have enabled its practice to grow and be of service to society and humankind. 🌐

Elise del Rosario <elise.del.rosario@stepforward.ph>

## What's Inside:

### From the Editor .....

- 1 An Issue of Development

### Obituary .....

- 2 A Tribute to Saul I. Gass

### Editorial .....

- 2 Are We Doing It Right?

### Conference .....

- 3 IFORS Brings OR to Cameroon

### OR for Development Section .....

- 4 Message from the Section Editor
- 4 OR in Post Modern Era:  
Apple Pie a la Mode
- 5 Gearing Up for Rome Workshop
- 6 IFORS Prize for OR in Development  
Second Call for Papers

### Feature .....

- 6 For Better Or for Best: My OR Story

### Study Groups .....

- 7 AGIFORS Holds May Conference
- 8 EUROPT Partners with POP

### OR Impact Section .....

- 8 OR: Improving Flood Protection  
in the Netherlands

### Book Review .....

- 10 Blackett's War: OR Spells Victory

### OR Society in Focus .....

- 11 INFORMS,  
the Growth of Analytics and OR

Reproduction of materials printed here is welcome. We do request that the source, IFORS News, be acknowledged.

# A Tribute to Saul I. Gass (1926-2013)

Heiner Müller-Merbach <hmm@bior.de>, University of Kaiserslautern

Saul Irving Gass (born February 28, 1926, died March 17, 2013) became famous in the OR world since his early textbook "Linear Programming: Methods and Applications" (1958) which was published prior to the LP textbooks by Vajda 1961, Hadley 1962 and even George B. Dantzig's "Linear Programming and Extensions" 1963 etc.

Saul and I met in the winter term 1963 at the Operations Research Center (ORC) of the University of California, Berkeley, where he worked for his PhD. Saul was quite well-known in the OR community at this time already, particularly because of his LP textbook. I spent the academic year 1963/64 at the same place, a post-doc-year. The ORC was directed by George B. Dantzig. Dantzig suggested that Saul and I should share the office in the ORC. Thus, we became close friends.

In addition to the early LP textbook (above; fifth edition 1984), Saul published "An Illustrated Guide to Linear Programming" (1970) and



The above photo of Saul Gass was supplied by Saul's daughter, Joyce Gass. She writes: "We love this casual photo of Dad taken during the weekend of his 80th birthday bash given by the University of Maryland in February 2006. It was an amazing tribute, and we were so delighted that he was honored by his colleagues in this way. Dad certainly spent a lot of time in his upstairs study solving O.R. and L.P. problems, writing, researching, and reading. We always knew that he was contributing something extraordinary to the field. But no matter what, his door was always open to us kids and, of course, his beloved wife Trudy."

"Decision Making, Models and Algorithms" (1985; Reprint 1991) in addition to numerous contributions to scientific journals. At the age of some 70 years, he began to edit coherent surveys, such as the "Encyclopedia of Operations Research and Management Science" in 1996 (jointly with Carl Harris; 753 pages; 3rd edition to appear soon), then "An Annotated Timeline of Operations Research: An Informal History" in 2004 (jointly with Arjang A. Assad; 213 pages, some 700 entries) and more recently the "Profiles in Operations Research – Pioneers and Innovators" in 2011 (again jointly with Arjang A. Assad; 867 pages, presenting 43 pioneers of OR. Saul's energy and enthusiasm beyond the age of 70 years requires particular mention.

Saul Irving Gass was one of the very rare recent OR generalists. The international OR community owes him extensive gratitude. 🌐



From left to right: Ellie Josephs, Joyce Gass, Arianna Gass, Ron Gass, Johanna Pfund, Trudy Gass and Saul Gass, taken during Arianna's (Saul's only grandchild) high school graduation in 2009.

## Editorial

### IFORS Developing Countries Committee

## Are We Doing The Right Things In The Right Places At The Right Times With The Right People?

Sue Merchant, IFORS VP at large <suemerchant@hotmail.com>

For many years, in fact since the Ahmedabad Declaration in 1992 where a policy on OR for Developing Countries was initiated, IFORS has devoted effort to helping developing countries in a variety of ways. Readers of this newsletter will be well aware of most of these excellent initiatives thanks to the newsletter section on this edited by Arabinda Tripathy, to the numerous advertisements for conferences and prizes sponsored by IFORS, and to the hard work of the IFORS administrative committee members who have held responsibility for the Developing Countries portfolio over the last 20 years or so.

I feel very privileged that the IFORS President Nelson Maculan has recently

passed to me the responsibility for IFORS' developing countries portfolio and I have made a start on my new task by reviewing the objectives of the Developing Countries committee and consulting widely with a range of interested OR people. I have formed a small action committee to drive forward initiatives (with members Elise del Rosario, Theo Stewart, Yindong Shen and Adam Ouorou – thanks to them all for agreeing to take part!) and plan to create a larger consultative group on which to test ideas, so if you would like to be part of the consultative group which will inform the work of the action committee please let me know as soon as possible.



### Draft key objectives

1. To support the continuing development of methods which are likely to be useful to developing countries (especially those for dealing with ill-structured problems);
2. To try to ensure that existing and new methods of OR and case studies (especially those which treat social and economic issues specific to the conditions of less developed countries) are disseminated to developing countries and those working on projects for developing countries, and included in postgraduate courses which train students from developing countries;
3. To support the development of OR students, researchers and practitioners from developing countries;
4. To try to find ways of encouraging the formation of OR societies in developing countries without them at present, and of supporting existing ones.

### Current activity in support of objectives

The activities which IFORS currently undertakes towards meeting these objectives include: arranging for the International Conference for OR in Developing Countries (ICORD) to take place every three years; arranging for ICORD workshops in intervening years; running the IFORS prize for OR in Development every three years; encouraging twinning of institutions in the developed and less developed worlds to strengthen academic

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centres of OR in developing countries (eg summer and winter institutes); publishing the Developing Countries section of the newsletter and maintaining the Developing Countries website; exploring ways of making books and journals available to developing countries; and exploring ways of keeping OR researchers and practitioners in touch with each other worldwide (eg use of Linked In discussion groups).

### How YOU can contribute

The questions I would like to put to our readers, particularly those in developing countries and/or who have participated in our conferences/competitions, are:

- Are our objectives the right ones or are there better ones?;
- How well are we achieving our objectives with current activity? Do any of our activities have little impact and are there other activities, which could give more 'bangs for our bucks'?
- In other words are we doing the right things in the right places at the right times with the right people?

Thank you very much for your help – I look forward to hearing from you. Just drop me a line at [suemerchant@hotmail.com](mailto:suemerchant@hotmail.com). 🌐

## IFORS Brings Operations Research To Cameroon

Nkem Khumbah <[nkhumbah@umich.edu](mailto:nkhumbah@umich.edu)>, James J. Cochran <[jcochran@latech.edu](mailto:jcochran@latech.edu)>

The Third Buea International Conference on Mathematical Sciences held April 30 to May 3, 2013 featured a new colloquium on Operations Research, made possible with the sponsorship of the International Federation of Operational Research Societies. The objective of the activity is to generate enthusiasm for the study and application of operations research in the region. This objective was addressed through a series of workshops and conference-wide plenaries presented by Maseka Lesaoana of the University of Limpopo, Thomas Edwards of Wayne State, and J. Cochran to participants who were primarily mathematics faculty and students from West Africa.

The colloquium opened with the conference-wide plenary, "From Katie Scarlett O'Hara Hamilton Kennedy Butler to Pretzel Rods to Frankenstein for President to Taxi Wars: One Odd OR Odyssey and Lessons for Africa," illustrating the broad range of problems that can be addressed by operations research. Lesaoana, who is Director of the School of Mathematical & Computer Sciences for her University, followed with a workshop on the basics of mathematical programming. She gave the participants a solid foundation for ensuing discussions by placing a strong emphasis on applications, formulations, and solution algorithms.

The second day was opened with a plenary, "Active Learning to Engage Students in Applied Mathematics." In this talk, the audience was given classroom exercises that have been designed to engross students in mathematics and improve their understanding and retention. Williams, who is Associate Dean for Research in the College of Education of his university, followed with a workshop demonstrating the use of software for solving mathematical programming problems. Focus was primarily on two software packages that are readily available, GeoGebra and Excel Solver.

Participants in the conference showed great appreciation for the presentations and repeatedly indicated how useful the concepts

discussed in the colloquium would be to them. A large portion of the 200+ conference registrants who attended the workshops gave a very enthusiastic feedback. As would be expected at a conference held

in Buea, most of the participants were from Cameroon, joined by others from Nigeria, Ghana, Central African Republic, Kenya, Liberia, Malawi, and South Africa. The broad backgrounds of the participants resulted in interesting and stimulating discussions on potential applications of OR in Africa and the forging of many potential collaborative relationships. On the last evening of the conference, attendees traveled to the coastal town of Limbe for dinner on the town's black sand Atlantic beaches, with much of the conversation in transit and at dinner revolving around ways to integrate operations research into college curricula and use the discipline to solve local problems.



▲ A mountain in western Cameroon reflected in a small stream

The objective of the activity is to generate enthusiasm for the study and application of operations research in the region.

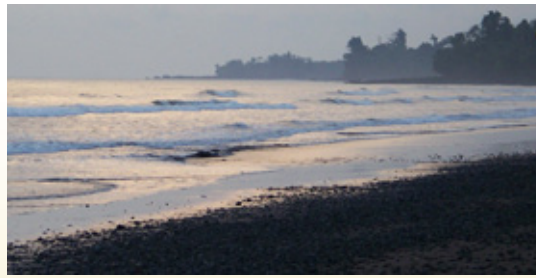
The Buea International Conference on the Mathematical Sciences <http://bueaconference.com/> is hosted by the University of Buea (known as UB by Bueans) <http://www.ubuea.net/>. Held biannually in odd-numbered years since 2009, it features plenary talks of broad interest and

a series of sessions in which researchers present results on a wide variety of mathematical topics. The summer school, which in 2013 focused on mathematics in finance, starts before the conference and runs through the first few days of the conference to enable students enrolled in the summer school to participate in the conference.





One of the authors (Khumbah), who is chair and brainchild of the conference, worked closely with Co-Chair Boniface Nkemzi of the University of Buea and the organizing committee composed of Miranda Teboh-Ewungkem of Lafayette College, and Gideon Ngwa of the University of Buea. University staff members Nana Cyrille, Alexander Mengnjo, Mary Fomboh, and Eric Ngang Che ably assisted the committee. The conference was supported by an impressive and diverse international advisory committee that included Dan Burns of the University of Michigan; Sergey Foss of Heriot-Watt University; Max Gunzburger of Florida State University; Samuel Jator of Austin Peay State University; Philip Maini of the University of Oxford; Gaston N'guerekata of Morgan State University; Serge Nicaise of the University of



▲ Early evening on a black sand beach in Limbe

Nantes; James Turner, Jr. of Virginia Tech; Anders Wandahl of e-Math for Africa; Ralf Wunderlich of Zwickau University of Applied Sciences; and Abdul-Aziz Yakubu of Howard University.

The 2015 Buea International Conference on the Mathematical Sciences will be another opportunity to address the strong interest in and a pressing need for operations research in West Africa as revealed by this activity. The authors are also exploring the possibility of

organizing a similar conference in other African nations on even-numbered years. Efforts are now focused on finding funds to support the conference, identifying counterpart organizers in the host nations and looking for potential hosts. 🌐

## OR for Development Section

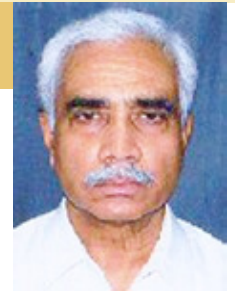
### Message from the Section Editor

Arabinda Tripathy <tripathy44@rediffmail.com>

In the last issues, this section has featured news largely from Africa and South Asian countries. We would like to reiterate our request to our readers and OR society members in developing countries to send in write-ups about their activities. We continue to receive news from the Operational Research Society of Nepal (ORSN), which despite its small size and limited resources has organized various activities. The latest of these is the Annual Day conference which carried the theme "Operations Research: Applications in Developing Countries." A gist of one of the conference talks is featured here.

Meanwhile, the 46th annual convention of the Operational Research Society of India (ORSI) is being hosted by the Department of Statistics, University of Kashmir from 19th-22nd October, 2013 at the beautiful city of Srinagar. An International Workshop on Optimization Techniques & Software is also being organised along with the convention. More details can be obtained from [aquilstat@gmail.com](mailto:aquilstat@gmail.com) or [icordada13@gmail.com](mailto:icordada13@gmail.com).

I am looking forward to your views and contributions. 🌐



## Operations Research in Post Modern Era: Apple Pie with Ice Cream



Dinesh P. Chapagain <dinesh.chapagain@yahoo.com>

*(Summarized from the keynote address at the 2nd National Seminar on Operations Research Application in Developing Countries, Kathmandu, February, 1~2, 2013)*

The Operations Research methods inceptioned, owned and advocated by scientists, mathematicians and technologists in a military environment were later applied in manufacturing as well as service industries for modernizing the post-war world economy.

The hard nature of these mathematical optimization models made it difficult to capture the complex, uncertain and messy real-world situations. Limitations of classical OR methods which include dependence on an electronic computer, consideration of non-quantifiable factors, distance between manager and operations researcher, considerations of money, time, and implementation resulted in less-than-expected take up of the methodologies. The (in)famous articles "OR/MS: Dead or Dying? Rx for Survival", "The Future Of Operational Research Is Past" and many others published in the 70s to 90s questioned the validity of OR for addressing the messy, unstructured and complex problems of the real world.

In the postmodern era, many psychosocial and behavioral scientists initiated the development and application of a soft type of OR involving systematic thinking and structuring perceptions of various stakeholders as

inputs to managerial decision-making. Involvement of the stakeholders at problem definition makes it easier to manage change. Soft methods are crucial when many stakeholders' views have to be taken into account. They can help understand the issues at hand and provide a range of reasonable alternatives, making them appropriate for issues faced by the community, by not-for-profit organizations, and by developing economies in general.

While classical and hard OR methods are based on quantitative and objective information, neo-classical and soft OR methods are based on

qualitative and subjective information. While hard OR methods are problem oriented using complex mathematics, soft OR methods are people oriented using systems thinking. While it is difficult for hard OR methods to capture the real world especially at strategic level, it is difficult for soft OR methods to optimize, especially at operational level. While hard OR methods are powerful at optimizing problems at the operational level, soft OR methods are best at generating alternatives derived by consensus of stakeholders and owned by implementers.

Thus, by integrating hard and soft OR, composite OR methods capture perceptions of all stakeholders while considering the quantifiable relationships among

various factors. It is not just a general interdisciplinary science but also a rich composite of engineering, science, arts and humanities based both on theory and experience.

...by integrating hard and soft OR, composite OR methods capture perceptions of all stakeholders while considering the quantifiable relationships among various factors.



Through composite OR methods, OR will not die but rather, fly much higher, flapping both wings of hard and soft OR. Composite OR methods served to decision makers is just like apple pie and ice cream served after dinner. Apple pie, the base of the dessert, is hard and warm like hard or classical OR and the ice cream topping, soft and cool like soft or neo-classical OR.

An Industry-Institute Interface (I3) strategy suggested will go a long way towards supporting corporate as well as community

development and government sectors in developing nations. 🌐

*Professionally trained as an Industrial Engineer, Prof. Dinesh P. Chapagain ([www.dineshchapagain.com.np](http://www.dineshchapagain.com.np)) is former dean of School of Engineering, Kathmandu University and founder President and Advisor of Network for Quality, Productivity and Competitiveness (NQPCN) and founder President and chief Patron of Quality Circles in Education for Students' Personality Development, Nepal (QUEST-Nepal). Full text of speech can be downloaded from [http://dineshchapagain.com.np/quality\\_worklife.php#3](http://dineshchapagain.com.np/quality_worklife.php#3).*



## JOINT ICORD/EWG-ORD WORKSHOP

"OPERATIONS RESEARCH: ADDRESSING ISSUES OF DEVELOPMENT"

June 27-28, 2013 Rome, Italy

## IFORS and EWG ORD Gear Up for the ICORD Workshop in Rome

IFORS, in cooperation with the EURO Working Group on Operational Research for Development (EWG ORD), has organized a Workshop with the theme "Operations Research: Addressing Issues of Development" on June 27-28, right before the 26th European Conference on Operational Research to be held in Rome from July 1 to 4.

The Workshop is part of the International Conference on OR for Development (ICORD) that had been sponsored by IFORS (<http://ifors.org/web/icord-history>) every 3 years. In an effort to enhance continuity and sustain interest in the field, IFORS launched a program to conduct more frequent workshops in different regions. The first such workshop held in Tunisia in 2012 was an educational one aimed at developing appropriate OR skills in Problem Structuring Methods.

This year, participants were selected based on the development-oriented application papers they submitted, as follows:

Ali, Sadia Samar	Optimization Approach in Closed Loop Green Supply Chain Management: A Case of Indian Company	India
Amaya, Jorge	Optimization Modeling for Resource Allocation in the Chilean Public Educational System	Chile
Baldemor, Milagros	Performance Efficiency of DMMMSU Colleges and Insitutes: A Data Envelopment Analysis Study	Philippines
Guerrin, Francois	Integrated Modeling of Agricultural Production Systems: Application to Organic Waste Recycling	France
Lotero, Laura	Urban Mobility Planning: A Complex Network Approach	Colombia
Lucas, Paul	Long-Term Scenarios for Global Child Mortality: the Role of Food, Water and Energy	Netherlands
Masmoudi, Youssef	A Balancing Approach for Infectious Medical Waste Allocation Problem: Application to a Real Case in Tunisia	Tunisia
Miidla, Peep	StaffLogic – Workforce Scheduling with Ants	Estonia
Moore, Robyn	Reaching Consensus on Water Reforms in Developing Communities: a Case of Community Operational Research in Kāpiti, New Zealand	New Zealand
Mulyati, Heti	Multiple Criteria Decision Support for Mitigating Seaweed Supply Chain Risks in Indonesia	Germany, Indonesia

Tripathy, Arabinda	Soft Problems - Hard Impacts: Some Applications	India
Tabatabaei-Akhavan, Raha	Capacity and Location Planning of Auxiliary Medical Facilities in Earthquake Relief Operations	Colombia
Valladao, Davi	Corporate Debt Management: A Risk Management Application for the Brazilian Oil Industry	Brazil
Watson, Neil	Developing Decision Support for Foodbank South Africa's Allocation System: A Reflection on Future Research	South Africa
Veiga, Alvaro	Corporate Debt Management: A Risk Management Application for the Brazilian Oil Industry	Brazil
Yusri, Doni	Prioritization of Value Chain Development Strategies of Bogor Botanical Garden in Indonesia using Analytical Hierarchy Process	Germany

Resource persons include Arabinda Tripathy (who had not missed a single ICORD except for the one held in Tunisia), Subhash Datta, Jonathan Rosenhead and Leroy White, all noted for the work they do in the field of OR for development.

To promote greater interaction, the 2-day Workshop will feature participant presentations, discussions of each presentation, a tutorial and case discussion, as well as plenary talks. 🌐



IFORS is pleased to announce that the Prize will be awarded during the 20th Triennial conference on "The Art of Modeling" to be held in Barcelona, Spain from 13-18 July 2014.

This competition has been held for over 25 years, and recognizes outstanding and relevant OR work carried out in developing countries.

- Awarded at the close of the IFORS Triennial Conference and carries with it a grand prize of US\$ 4,000.00 and a runner-up prize of US\$ 2,000.00

- The finalist papers are automatically considered for publication in the IFORS Publication, International Transactions in Operational Research (ITOR). Publication is contingent upon the usual refereeing process. Authors of these papers agree that the first right to publish their papers lies with ITOR; as such, they will not publish the same until and unless they receive permission to do so by the ITOR editor.

Important details about the competition follow:

#### Topic of paper

- The paper should describe a practical OR application in a developing country, conducted to assist a specific organization in its decision-making process with regard to education, health, and other basic services, water, technology, resource use (physical or financial), infrastructure, agricultural/industrialization, natural resources, or environmental sustainability. It should also contain original features in methodology and/or implementation in developing countries.
- The paper should include some description of: the application's social context, how the project succeeded despite constraints and limited resources, and particularly its impact on the decision making process or on the organization for which it was conducted. Where appropriate, the relevance of the country's state of development to the study should be

addressed. A stress on developmental issues will be an important factor in the judging.

- Papers of a purely technical nature, or those, which have no relevance in the developmental context, will not be considered.

#### Judging Criteria

- Qualifying papers will be evaluated on the following criteria: problem definition, creativity and appropriateness of approach, MS/OR content, stress on developmental issues, innovative methodology, impact of the study, paper organization and structure, and quality of written and (if selected as finalist) oral presentation. Participation of local researchers will also be a judging criterion.

#### Other Information

- Principal authors and presenters of any nationality are welcome. If selected to be among the finalists, the entry must be presented by one of the principal authors during the IFORS Triennial Conference to be held in Barcelona, Spain from 13-18 July 2014.
- Finalists' registration fees will be sponsored by IFORS. For finalists who are nationals of developing countries, a grant for living expenses may be requested but cannot be guaranteed.
- Entry must be submitted using the submission site for the IFORS journal, International Transactions on Operations Research (ITOR) <http://mc.manuscriptcentral.com/itor>, indicating in the cover letter that it is intended for this competition. At this point, authors warrant that their paper submissions have not or will be published in another journal. ITOR Editor Celso Ribeiro will forward the papers submitted to the Chair. When the finalists are announced, only finalist papers will be considered as formal submissions to ITOR.
- An international panel of judges chaired by Andres Weintraub, Chile, has been formed and will be announced at the same time as the selection of finalists. 🌐

Further inquiries should be sent directly to the Prize Chair:

**Prof. Andres Weintraub**

Professor Department of Industrial Engineering  
University of Chile  
P.O. Box 2777 Santiago, Chile  
E-mail: [aweintra@dii.uchile.cl](mailto:aweintra@dii.uchile.cl)

**Last date of submission of the full paper: November 30, 2013**

**Finalists will be notified by: February 28, 2014**

**Date of presentation: July 14, 2014**

## Feature

### For Better Or for Best: My OR Story

**Francis Z. Miranda** <[franzmiranda@yahoo.com](mailto:franzmiranda@yahoo.com)>

**Editor's Note:** This account of the President of the Operations Research Society of the Philippines cites jobs he has held and OR projects he has done within the Philippines, where a limited number of companies have groups practicing OR. It is remarkable that one who is practicing OR in this part of the developing world will have this variety of opportunities to practice OR. He has in turn, done a lot in educating those with whom he has worked.

As an undergraduate, I was sure I wanted to work as a manufacturing engineer. I was eager to see the Industrial Engineering theories I learned in school applied on the production floor. A few months after graduating in 1997, I joined a leading beverage company as Cadet Engineer. Six months later, the company announced a vacancy in the newly created Operations Research Department. Feeling this offered a better long-term career opportunity, I applied for and was accepted to the post. There were initially just two of us in the department – the manager, with myself as analyst.

We worked on different supply chain problems, such as determining what products (specifically, SKUs) each plant should produce, and which distribution centers these plants should supply. OR modeling was a staple for distribution planning, especially when one has to deal with 20+ plants, 60+ filling lines, 100+ distribution centers, and 50+ SKUs. One of our major projects was a long-term infrastructure plan which details out line additions and transfers, opening and closing of plants, as well as opening and closing of distribution centers for the 10-year period.





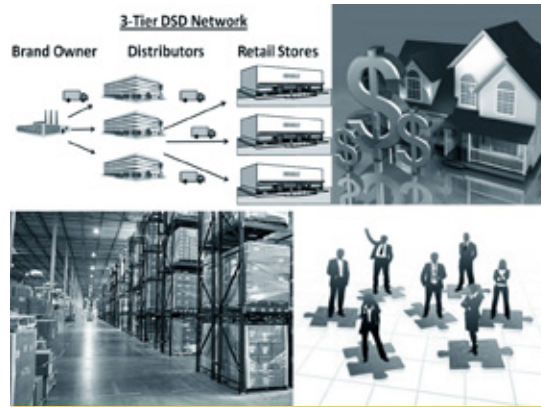
This facilities expansion plan, which minimizes total relevant fixed and variable costs while meeting the demand and capacity constraints, was updated every year as plans were implemented and new information became available.

The job necessitated a lot of interaction with senior management, such that early in my career, I was fully convinced that OR is essential in making strategic decisions. Four years into my job, an OR career opportunity in another industry - Business Process Outsourcing (BPO) - presented itself.

By way of a background, BPO involves shifting an internal job process to another company which may be at a different geographical location to reduce costs, gain flexibility and focus on core competence. Processes usually outsourced are backend jobs like call/help centers and non-voice services such as medical transcription, billing, payroll processing, and data entry. For voice services, BPO agents may be asked to make calls to customers on behalf of a business or client (outbound) or respond to calls initiated by customers (inbound). BPO has seen phenomenal growth in India and the Philippines. BPO accounts for more than 5% of the Philippine GDP, having generated \$13 Billion in revenues in 2012. The Philippines ranks number 1 in voice and number 2 in non-voice services among those providing these services to the world.

As the company's Workforce Planning Officer, I developed OR models to determine the optimal working schedules of inbound and outbound agents. There were three shifts in a day with multiple accounts handled and the challenge is to match the right people to the right accounts. It was here that I concerned myself not only with models that minimize costs and those that determine optimum staffing levels, but also with those that match preferences and skills of agents to the accounts handled.

Deeply convinced of the powers of OR, one of the executives of the beverage company for whom I did work joined a pharmaceutical distribution outfit and sought me out to do OR work. Soon, I found myself involved in its strategic infrastructure planning. A multinational like the beverage company, it is the largest distributor of imported and locally toll-manufactured drugs. In the toll-manufacturing arrangement, local manufacturers process semi-finished imported goods. Distribution companies then take it from here to make the products available in the market.



The job necessitated a lot of interaction with senior management, such that early in my career, I was fully convinced that OR is essential in making strategic decisions.

The company distributes more than 10,000 SKUs all over the country. As such, it was natural that the company's prime concern was its facilities. A major project involved determining the optimal number of distribution centers over 10 years. At the more operational level was a model that optimized the layout of warehouses. The model minimizes product handling, i.e., the distance traveled of products. By assigning fast moving products closer to the docks, the model saved 30% in processing time and cost for the company compared to when the assignments were done manually. I also worked on a forecasting model to predict the number of manpower required for product withdrawals ("pick lines") based on the forecasted peso value of sales per month per client.

The multi disciplinary nature of OR allowed me the mobility to move to other departments such as Supply Chain, Business Development, Market Research, and Analytics. I spent almost 10 years with the distribution company before deciding that it was time to find OR challenges in another industry.

Currently, I work for a leading market research company engaged in estimating consumer product sales of different channels with the use of POS data from retailers or monthly audit data of selected stores. The company is also engaged in tracking consumer behavior using a household panel. Households are asked what products they buy as well as where and how often they buy the products. Household members can either fill up a diary or scan the products they buy using a mobile scanner provided by the company. The company maintains a household sample that is stratified according to the major areas of the country and socio economic classification (SEC). An OR model is used to extend the behavior of the sample to the behavior of the total population.

My partnership with OR has spanned 16 years and 4 industries. It has seen me through other educational degrees and a wedding! This partnership (the one with my new wife also applies here) has been a gratifying one. It is rewarding when one sees those who use OR for the first time think of it as "magic", and even more so when companies are enabled to improve their revenues, streamline costs, and increase their competitive advantage. I am looking forward to the continued growth of this partnership and am excited to meet a greater variety of situations requiring all that OR has to offer in the years to come. 🌐

## Study Groups

**A** GIFORS Scheduling and Strategic Planning (AGIFORS SSP) is a forum for airline and airport personnel, vendors, members of academia and other industry experts to review the most pressing issues faced by airline planning and scheduling departments, offer potential solutions, and provide opportunity for high level networking. This year, around 50 delegates attended AGIFORS SSP study group annual meeting that was hosted by American Airlines in Miami on May 20th-22nd.

Participants from 13 airlines and over 20 vendors, aircraft manufactures, consulting companies and other industry organizations were presented with 12 technical presentations. Discussion topics included demand forecasting, clean sheet scheduling, network development, fleet assignment, aircraft rotation, short-term capacity reallocation and others. Presentations are available for downloading at [http://www.agifors.org/studygrp/ssp/2013/AGIFORS\\_SSP\\_2013\\_part1.zip](http://www.agifors.org/studygrp/ssp/2013/AGIFORS_SSP_2013_part1.zip) and [http://www.agifors.org/studygrp/ssp/2013/AGIFORS\\_SSP\\_2013\\_part2.zip](http://www.agifors.org/studygrp/ssp/2013/AGIFORS_SSP_2013_part2.zip).

## Airline Scheduling Group Holds May Meeting

The best presentation award went to Cumhuriyet Gelogullari from American Airlines for the "Data Visualization for Scheduling at American Airlines." Don Casey, VP of Revenue Management at AA, presented the keynote talk on challenges and opportunities in collaboration between scheduling and revenue management departments.

A discussion on the current state and future development directions for data management in airline planning processes was featured as an interactive panel of several airline experts. Prior to the conference an introductory seminar on the basic OR models used in airline planning and scheduling was offered.

The conference was sponsored by Sabre Airlines Solutions, Amadeus, masFlight and Booz Allen Hamilton and organized by Sunny Ja and Sergey Shebalov, Technical Chair and SSP Study Group Chair, respectively. 🌐



# EUROPT partners with the Pacific Optimization Research Activity Group

Sun Jie, National University of Singapore <jsun@nus.edu.sg>

Gerhard-Wilhelm Weber, IAM, METU, Turkey <gweber@metu.edu.tr>



▲ Among the participants of the SJOM held in Beijing is former IFORS Vice president Professor Xiangsun Zhang (9th from right) of the Chinese Academy with POP chair Professor Masao Fukushima (8th from right) of Kyoto University, and the current chair of POP, Professor Jie Sun (7th from right).

EURO Working Group on Continuous Optimization (EUROPT, <http://europt.iam.metu.edu.tr/>), the working group within The Association of European Operational Research Societies (EURO <http://www.euro-online.org/>) announces its partnership with the Pacific Optimization Research Activity Group (POP). EUROPT was established in 2000 during the annual EURO conference in Budapest. EUROPT has since contributed to international optimization theory. The close scientific partnership with POP was co-initiated and personally supported by one of the founders and leaders of POP, the late Prof. Dr. Alexander Rubinov (University of Ballarat, Australia) who in turn, was appointed as the first EUROPT Fellow for 2006 for his extraordinary achievements. Professor Gerhard-Wilhelm Weber has been serving as a Representative of EUROPT in POP. The EUROPT POP partnership has been a very valuable for the qualitative and quantitative growth of EUROPT and its scientific activities, contributing also to the success of the EURO and IFORS conferences. POP will again be present in the forthcoming highlight of the OR calendar worldwide, the EURO-INFORMS 2013 in Rome.

POP (<http://bschool.nus.edu/DecisionSciences/pop/>) is an internet-based group of researchers which aims to promote optimization research activities in the Pacific region. Founded in October 2000 during the First Sino-Japanese Optimization Meeting in Hong Kong, initiated by professors Masao Fukushima, Masakazu Kojima, Liqun Qi, Jie Sun, Kok Lay Teo, and Jianzhong Zhang, this group counts 560 members from 40 countries and regions, ranging from Asia, Europe, North America, Oceania, and South America.

Its electronic newsletter - Optimization Research Bridge (ORB) first came out in March 2001 and has since come out every three months. On the other hand, its official journal - Pacific Journal of Optimization (PJO) – was launched in 2005 and is now published quarterly. In addition to the journal, POP also sponsors two international conference series - International Conference on Optimization: Techniques and Applications (ICOTA) and Sino-Japanese Optimization Meeting (SJOM). The First ICOTA was held in 1990, with succeeding conferences held in the Pacific Region, such as Singapore, China, Hong Kong, Australia, and Japan. The next ICOTA will be held December this year in Taiwan. On the other hand, SJOM has been held five times after the First SJOM in Hong Kong in 2000. During its September 2011 meeting in Beijing, the Steering Committee changed the name of this conference series to Pacific Optimization Meeting.

POP is governed by its working committee of 7 members, under the supervision of the POP board of 15 members. The current chair of working committee is Professor Jie Sun from National University of Singapore. Those interested in joining POP can fill up the form in POP's website <http://bschool.nus.edu/DecisionSciences/pop/registerpop.asp>. Please send any inquiries to Miss Lee Chwee Ming, at [chweeming\\_Lee@nus.edu.sg](mailto:chweeming_Lee@nus.edu.sg).

POP fully supports IFORS and encourages its members to participate in the IFORS and EURO conferences and to be involved with the national OR societies. POP cordially invites IFORS members to its forthcoming ICOTA 2013 in Taipei, Taiwan (<http://icota9.conf.tw/>). 🌐

## OR IMPACT

### Articles demonstrating direct benefits from implementing OR studies

**Section Editors: Sue Merchant** <[suemerchant@hotmail.com](mailto:suemerchant@hotmail.com)>, **John Ranyard** <[jranyard@cix.co.uk](mailto:jranyard@cix.co.uk)>

The latest paper in our OR Impact series is by a team from the Netherlands who recently won the Edelman award. It is an excellent example of teamwork and real impact on a nation's safety. The findings will be published in full early next year in Interfaces and we hope that this short article will whet your appetite for the full paper.



L-R: Peter Kolesar (coach from Informs), Jarl Kind, Dick den Hertog, Carel Eijgenraam, Jaap Kwadijk, Ruud Brekelmans, Kees Roos, Ioannis Papadakis (coach from Informs)





# Operations Research Used For Improving Flood Protection Levels In The Netherlands

**Carlijn Bak**, Deltares, The Netherlands; **Ruud Brekelmans**, Department of Econometrics and Operations Research, Tilburg University, Tilburg, The Netherlands; **Matthijs Duits**, HKV Consultants, Lelystad, The Netherlands; **Carel Eijgenraam**, CPB Netherlands Bureau for Economic Policy Analysis, The Hague, The Netherlands; **Dick den Hertog** (corresponding author, [D.denHertog@uvt.nl](mailto:D.denHertog@uvt.nl)), Department of Econometrics and Operations Research, Tilburg University, Tilburg, The Netherlands; **Jarl Kind**, Deltares, The Netherlands; **Kees Roos**, Department of Information Systems and Algorithms, Delft University of Technology, Delft, The Netherlands; **Pieter Vermeer**, Ministry of Infrastructure and the Environment, The Hague, The Netherlands and **Wim Kuijken**, Delta Commissioner, The Hague, The Netherlands

With 55% of the country susceptible to flood risk, protection against flooding is a vital issue in the Netherlands. Each year, the Dutch government spends roughly one billion euro on protection by dikes and dunes. In total there are 3500 kilometers of primary dikes in the Netherlands. In 1953 a big flood disaster occurred in the southwestern part of the Netherlands; more than 1800 people were killed, and the economic damage was enormous. In 1995 there was again a critical situation in several parts of the Netherlands; 250,000 people were evacuated at that time, but fortunately no serious flood occurred.

The Dutch Water Act gives flood protection standards for all dike ring areas in the Netherlands. These standards range from a flood probability of 1/1250 per year for dike ring areas along the upper part of the Rhine and Meuse, to 1/10,000 per year for the most important dike ring areas along the coast. See figure on the right.

In 2008, the 2nd Delta Committee advised the government to increase the protection standard of all dike ring areas by a factor of ten. This committee also convinced politicians on the urgency of taking action. A Delta Programme, chaired by the Delta Commissioner, was therefore initiated to ensure protection against high water and maintenance of freshwater supply within standards. It was also decided to update the protection standards in the Water Act by 2017. To get a scientific basis for the political decision process, Deltares (an independent Dutch institute for applied research in the field of water, subsurface and infrastructure) was asked to determine economically efficient flood protection standards for all dike ring areas.

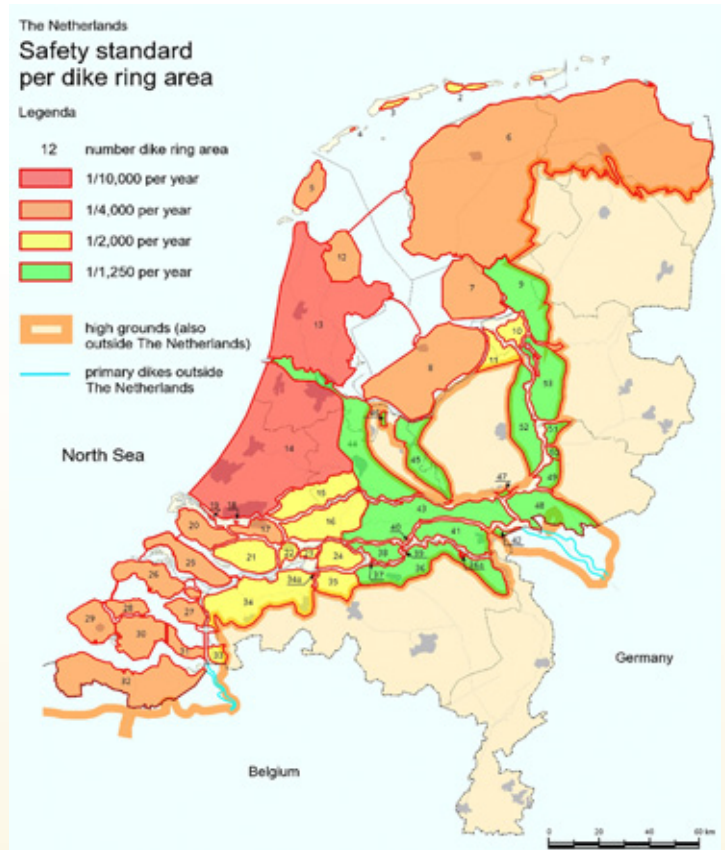
There are 53 (large) dike rings in the Netherlands, each protecting a certain area against flooding. A cost-benefit model was developed to derive an optimal investment strategy for such a dike ring area. In this strategy, the total long term social cost, consisting of investment cost of increasing dike height and expected loss by flooding, is minimized while taking into account the dynamic effects of climate change and socio-economic growth. Several model assumptions with respect to investment cost function, discounting, economic growth, water-level rise were extensively generated. State-of-

the-art Mixed Integer Nonlinear Programming techniques were used to find optimal strategies for all the 53 dike ring areas in the Netherlands. For more details on this approach, see [1].



Finally, economically efficient flood protection standards were derived from the optimal investment strategy. HKV Consultants implemented the optimization models and techniques discussed through a user-friendly software package called *OptimaliseRing*. Deltares collected data on investment costs, flood probability, number of inhabitants, damage costs, among others, for each of the 53 dike ring areas. Using *OptimaliseRing*, it then ran the scenarios that were used to generate the final advice for all 53 dike ring areas. A Monte Carlo analysis showed the robustness of the results.

From an economic point of view, results showed that it was not necessary to increase the protection standards of all dike ring areas by a factor of ten. The current protection standards are appropriate, with the exception of three regions: areas along the Rhine and Meuse Rivers, the southern part of Flevoland, and two areas near Rotterdam. Economically efficient flood protection standards for these areas have been derived.



In 2012 the House of Parliament endorsed the final results in a unanimous motion and consequently the results were accepted as basis for government policy by the State Secretary. The proposal for new flood protection standards will closely follow the main conclusions of this project, which have been recognized already in discussions with the Water Boards and the provinces. The final protection standards will gain force of law in 2017.

In 2012 the House of Parliament endorsed the final results in a unanimous motion and consequently the results were accepted as basis for government policy by the State Secretary.

The Operations Research approach not only provided an objective basis for finalizing a political discussion on the right flood protection standards, but also resulted in a very significant increase in protection for these regions. Two thirds of the total expected flood damage costs in the Netherlands are avoided at investment costs that are some 8 billion euro less compared to the advice of the 2nd Delta Committee. 🌐

Interested readers may consult the following References:

[1] *Safe dike heights at minimal costs: the nonhomogeneous case*, R.C.M. Brekelmans, C.J.J. Eijgenraam, D. den Hertog, C. Roos. *Operations Research* 60(6), 1342-1355, 2012.

[2] *Economically efficient flood standards to protect the Netherlands against flooding*, by the same authors as the current article. Will be published in *Interfaces*, January 2014.



# Book Review

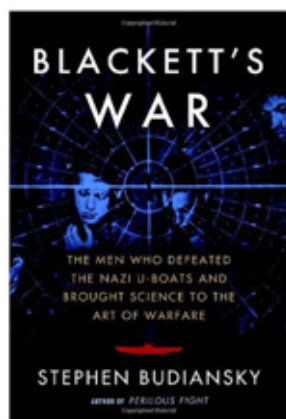
## OR spells Victory

Hans Ittmann <hittmann01@gmail.com>

**Blackett's War – The Men Who Defeated the Nazi U-Boats and Brought Science to the Art of Warfare** by Stephen Budiansky, 2013. Alfred A Knopf, New York, USA. pp 306, ISBN 978-0-307-59596-6, \$27.95.



Operational Research originated in the period just before and during World War II. A number of books on the topic have been published, both by scientists and military historians. Blackett's War is an addition to this collection with a focus on the defeat of the U-boats and the scientists who made it possible. It is the story of scientists who confronted operational problems of the military during the war with their arsenal of simple mathematics and probability theory. In so doing, they played a central role in turning the tide against the devastating onslaught of the U-boats and in the process, developed the new discipline of Operational Research. The book is about the hurdles thrown along the way, the dedication of the scientists that it spawned, and the eventual realization for everyone that science in war can make an impact.



The book contains three main storylines with a spattering of shorter ones to come up with a coherent whole that is easy to read. The background and history of the U-boats comprises one of the important storylines. The development of the submarine from its origins is tracked, how the Germans built up a sizeable fleet of U-boats before World War I, and how they used these very successfully during that war. In an unprecedented and humiliating event, Germany had to surrender all its submarines at the end of the war, in compliance with the Armistice

that was reached. It was not long after when private companies were contracted by the Germans to build a new fleet of U-boats in secret.

A second main storyline centers on Patrick Blackett and other scientists who got involved in the war effort. Blackett as a youngster joined the navy and by the end of World War I, witnessed the devastation caused by U-boats. After the war, the Navy sent him to Cambridge University where he realized that "the intellectual life of a place like Cambridge" was what he was cut out for, and therefore resigned from the military. After graduating, he joined the famous Cavendish Laboratory at Cambridge as a research fellow working under Nobel Laureate Rutherford. In 1932, he started the work that earned him the Nobel Prize in physics in 1948. These achievements, which include the discovery of the positron, were backed by a "make sure you gather plenty of data", "the importance of statistics" and "minute, critical and accurate study of rare individual events" work ethic that proved critical during the war. Notwithstanding his left-wing almost Marxist liberal views, he and many other prominent scientists campaigned for involvement in the war effort. The publication of a booklet *Science in War* proved to be very convincing in this regard.

The third storyline of note is that of the German U-boat campaigner, Commander Karl Dönitz. He was involved in World War I and ended the war as captain of a U-boat. An excellent naval officer who remained very loyal to his political leaders and his country, he inculcated in his men a "spirit of selfless mission readiness". He took command of the U-boat Flotilla in 1935 and a year later, of the entire U-boat force. The early years of World War II saw this unit as very successful in waging a devastating onslaught on merchant shipping which impacted

the supply of food and other necessary goods to Britain. Many, including Churchill, feared these immense losses could be the Achilles heel of the entire war effort.

The scientific endeavor even before the war is described in detail. There were rising concerns about how Britain will be able to defend itself against a possible future air attack. Influential people, including Churchill and a close friend Prof Lindeman, lobbied hard to get scientific advisers for the military. A scientific committee was established with three prominent scientists including Patrick Blackett. Through their efforts, more scientists were subsequently involved. One of the first tasks was to investigate the feasibility of using radio waves to detect aircraft, leading to the birth of radar. The next step was how to integrate this with the air defense system. Using radar to determine the location of aircraft through a system of tracking stations erected along the south east coast, a proper air defense system was in place when the war started. This work prompted one of the scientists to coin the term "operational research" to describe their efforts.

While scientists were continuously drawn into supporting the military, it was far from smooth sailing. The book details the difficulties of telling generals and admirals how to do their jobs and how military bureaucracy made it very difficult to draw civilians into the defense environment. In addition Churchill, although supporting the science endeavor very strongly, sometimes became over excited about, and pushed ideas that were just not workable, detracting the focus from real problems and real solutions. The egos and personalities of many of those involved and the preconceptions that clouded their thinking were indicative of the obstacles faced. Closer cooperation with scientists from the USA was another endeavor that was welcomed by scientists on both sides but was met with distrust and skepticism from the military and political authorities on both sides. This was eventually overshadowed by the continuing intensification of the threat, making collaboration possible in the end.

The Battle of Britain during 1940 saw large air raids over London. Blackett was named Anti-Aircraft Command scientific adviser to assist in addressing this dangerous situation. He recruited a small team of scientists into his Anti-Aircraft Command Research Group which the Army officers began referring to as "Blackett's Circus". Its members were diverse in background, including three physiologists, two mathematical physicists, one astrophysicist, one surveyor, one general physicist, two

mathematicians and an Army Officer. The anti-aircraft used to defend London was terribly inefficient. Among others, it was soon realised that the available radar data were not being used to calculate the proper bearing and elevation of the guns used, a process called "gun laying". A method was developed to address this while the deployment of 30 batteries of 4 guns each was altered. Half of the batteries did not have access to radar data and by concentrating the guns into 15 batteries of 8 guns each, the odds of engaging successfully was significantly increased. Within a year the scientists were able to reduce the number of shells required for a "hit" from 20,000 to 4,000!

The increasing threat from the U-boats contributed to the transfer of Blackett to Coastal Command where one of the scientists in his group, EJ Williams, began to work on possibly the most cited example of OR during the war. Through relatively simple calculations and data analysis, >>

the "Operational Researchers", are described as follows: "As human beings they were prideful, touchy, opinionated, and sometimes mistaken, human failings too widespread to merit much condemnation. They were also selfless, incorruptible, and absolutely determined to let the facts lead where they will and damn the consequences, human virtues so rare as to seem, at times, almost otherworldly to the men burdened by politics and plans and career ambitions, to whom they showed the way to victory".





>> Williams was able to point out a number of flaws in the fight against the U-boats, including, among others: the depth charges had a success rate of only 1%; they went off at the wrong depth; the attack on a U-boat should happen before it was able to submerge too far and 'escape'; direct hits were required to damage or destroy a U-boat; during daylight, U-boats can sight aircraft early enough to submerge and avoid being hit. Blackett installed a philosophy of improving available tools and methods already on hand rather than inventing new ones to solve problems.

Another critical issue in the antisubmarine war was "what should the size of convoys be"? Bigger convoys were clearly preferable but it was counter intuitive and proved difficult to get adopted. In the fight against the U-boats intercepting signals and communication, decoding the Enigma generate codes was critical to the ultimate success of the effort - a topic covered in detail. The result of this entire endeavour was that by the end of 1943 and early 1944 the U-boat menace was virtually eradicated. Germany lost almost 70% of its U-boats and their crews by the end of the war.

It is interesting to note that after the war, Blackett and some of his colleagues, mainly on the political left, sought to transfer their expertise from military concerns to the scientifically planned society they had dreamed of for so long. Their effort was largely a failure with most of those involved in the scientific war against the U-boats returning to their old jobs, getting on with their lives and careers. There were exceptions.

In the USA, Morse and Kimball published a book that drew mainly on examples from the antisubmarine war, to show how OR might be applied to other problems.

The contribution of Operational Research to winning the war cannot be overstated. Quoting from Blackett's War: "As the official British history of the scientific contribution to the war observed, it was this more than anything that ultimately defeated Hitler, a man who had a romantic view of war ... Hitler and his generals failed to produce any operational research comparable to the British development, if they had, they would probably have won the submarine campaign and the war". Finally, the scientists involved in this effort, the "Operational Researchers", are described as follows: "As human beings they were prideful, touchy, opinionated, and sometimes mistaken, human failings too widespread to merit much condemnation. They were also selfless, incorruptible, and absolutely determined to let the facts lead where they will and damn the consequences, human virtues so rare as to seem, at times, almost otherworldly to the men burdened by politics and plans and career ambitions, to whom they showed the way to victory".

A fascinating book on an enthralling topic, Blackett's War is not just another book about the origins of OR. It is an exciting must-read for those interested in a close-up and personal look on the impact that OR has made on the art of war. 🌐

## INFORMS and the Growth of Analytics and O.R.

Barry List, INFORMS Director of Communications <barry.list@informs.org>

As we look with excitement to the 2013 EURO-INFORMS Joint International Meeting, we at INFORMS are reminded of our long involvement and cooperation with our sister O.R. Societies in the development and promotion of operations research. While we continue this valuable work, we are also beginning new initiatives and cooperation in the growing field of analytics – initiatives that will benefit our members and continue our long history of improving operational processes and decision making.



▲ Anne Robinson

### A New Era of Analytics

Anne Robinson, the President of INFORMS, is devoting her plenary talk at the EURO/INFORMS conference this July to the critical juncture of analytics and operations research, a challenge that INFORMS has gladly recognized. If you're attending this 26th annual IFORS conference, you'll hear her explain how reports by McKinsey Global Institute and Capgemini, and the influence of American author Tom Davenport, opened new doors. You'll also hear her clarify three distinct types of analytics: descriptive analytics, predictive analytics, and prescriptive analytics.

### International Collaboration

INFORMS has always had the priority of being a good international partner, and we are always eager to work with IFORS societies, learning from our sister societies and sharing expertise in strategic planning, analytics, and administration.

As INFORMS develops new programs for analytics and strengthens its commitment to its core O.R. services, the association takes pride in its longstanding membership in IFORS and approaches its international ties with respect for our colleagues at sister societies.

INFORMS is diligent about making sure that our members recognize

the work of IFORS and learn about its events. INFORMS representatives take seriously their role on IFORS decision-making bodies. On the regional level, INFORMS headquarters recently welcomed the EURO business manager for a visit featuring an exchange of ideas and approaches to association management. INFORMS has worked with associations like the OR Society of the United Kingdom, collaborating on the Science of Better outreach campaign and sharing research conducted by the consulting firm Capgemini.

Although based in the U.S., INFORMS and its journals publish refereed research conducted by operations researchers from numerous countries and regions. INFORMS award and prize committees look to every country for excellence and regularly award prize winners from throughout the world. As a matter of fact, for the last two years, the Edelman Prize winners have been from Europe.

### Growth in O.R.

While we have our eyes on growing activity in analytics, INFORMS reinforces its core mission of serving operations research. Our membership is predominantly academic with a high percentage of PhD's and many students, so we strive, as always, to assist them and work with our fellow IFORS societies to help OR professionals worldwide.

INFORMS remains an independent publisher committed to publishing the most respected scholarship in operations research and its subspecialties. INFORMS' thirteenth journal, Service Science, begun as an online-only journal in March, 2013. It, and another new journal, Strategy Science, exemplify INFORMS' commitment to continued scholarship in O.R. specialties. Service Science focuses on service theory; service management, operations, and marketing; service engineering and systems; service economics; service education; and simulation. The journal's founding was driven by the many new ways that organizations provide service to their clients and customers.



Strategy Science, proposed by the current editor-in-chief of the INFORMS journal Organization Science, Daniel Levinthal of the Wharton School, provides a focus on research and practice in strategy. The field of strategy science touches organizational decision making, competition within industries, and the institutional context in which organizations operate. The journal will begin accepting submissions early 2014.

We continue to gain strength from the networking and activity of our subdivisions, i.e. special interest groups, our local chapters, industry Roundtable, and student chapters. We continue to recognize excellence through our INFORMS and subdivision awards.

With a strong meetings department, INFORMS continues to offer our staple annual meeting and analytics conference, as well as special-focus conferences. This year, INFORMS offered a Health Services conference in Chicago and next year we will be offering a new conference on Big Data. We especially value our work with IFORS regions on international conferences; the upcoming EURO-INFORMS conference being a direct example. We have partnered with ALIO on a South American conference and CORS on several North American conferences and hope to do more where our expertise and audience can enhance value.

### Analytics at INFORMS

In the United States, INFORMS' goal is to be recognized as the leading association for advanced analytics professionals by advancing the practice, research methods, and applications of analytics and identifying and serving analytics professionals with products and services they value. We have come a long way in the last two years with the development, and in most cases, the realization of our initiatives.

We are expanding into analytics while retaining our core programs and services in Operations Research and our programs for our members who focus on operations research. We see the synergies with analytics and O.R. We recognize how O.R. advances analytics and how analytics advances O.R. We want to expand INFORMS top down to include people who have analytical skills or an analytics charge and help them find the resources, knowledge, and activities they need to succeed. INFORMS, and our fellow O.R. Societies, are uniquely qualified to do this: to share information and knowledge to advance the science and practice of OR and Analytics-based decisions.

### Analytics Initiatives

We have made great strides in analytics since 2010, when we began publishing Analytics Magazine. The magazine is now the foremost analytics publication for analytics professionals and executives who make decisions about deploying analytics.

Another one of our earliest efforts to assist members and those in the analytics community was the development of a special interest group in analytics – our Analytics Section. Many members not only thought of themselves as analytics professionals but also felt strongly about joining and generating ideas for the new Section. We started the section when Anne Robinson was President-Elect in 2011 and in a few short months over 400 members had joined. A year later membership more than doubled, to nearly 900. The section is very active with a newsletter, an annual Innovation in Analytics Award and active involvement in our meetings and conferences.

One of our most recent additions is our certification program for analytics professionals – CAP, Certified Analytics Professional. The CAP is a designation that enables a prospective or current employee to demonstrate their skills and an employer to hire a demonstrably competent analytics expert.



As explained in the December, 2012 issue of IFORS News, INFORMS convened a task force that created both an exam and an ongoing process for certification and recertification. The INFORMS Certified Analytics Professional (CAP) program tested and awarded its first CAP certifications this spring. Additional exams will be held at five other locations in the U.S. this year. INFORMS is eager to work with our sister Societies in offering the exam in additional countries in 2014. Let us know if you are interested in joining this effort.

Organizations display a varying degree of maturity in adopting an analytics culture as well as the sophisticated tools and techniques. Many organizations want to know how well they are doing. Are they using the full capabilities

of the analytics process? Are they as mature as they think they are? In what areas can they improve to gain even greater benefits from analytics? These questions and more can be answered using the Analytics Maturity Model we currently have in development. Using the model, an organization can do a self-assessment, determine the level of maturity (low, medium, high), and then find INFORMS' (and other) services and knowledge that can help them improve and gain greater benefits from analytics.

With the heightened interest in analytics and demand for analytics professionals, academic institutions have begun developing degree programs. To help these new programs, we have begun a new Committee for University Analytics Programs. Chaired by Michael Rappa, who founded the first such program at North Carolina State University, the committee is bringing together people from the breadth of university programs to assist in networking, benchmarking, comparing their syllabi, and aiding those beginning or growing their programs. If you're starting a new program in analytics and want to join the committee, please contact the author.

But education isn't just for those in university programs. We all know the importance of continuing professional development. We are working on a new continuing education program that will offer courses on subjects and with content that provides real take-away value; capabilities that are relevant, useful, and can be implemented immediately. The initiative, chaired by Dr. Stephen Powell of Dartmouth College, has developed our initial courses, "Professional Skills for Analysts" and "Data Exploration & Visualization," which will be presented this fall. Additional courses are expected in 2014 along with online offerings.

### Improving Online Services and Social Media

With the ever-increasing importance of the Internet, computer infrastructure, and social media, INFORMS began to make improvements in all these services. INFORMS is scheduled to begin an online collaborative tool that will allow members to form personal and professional ties more easily online, sharing research, considering ways to do joint projects, and getting to know one another.

To streamline access to our services, the INFORMS IT department is working on ensuring that our members and others are able to use Single Sign-On for all our online services. We are continually looking for ways of improving our services and their access and availability. We very actively communicate with our members and non-members through Twitter, Facebook, LinkedIn, and Google +, and also through message boards and sites like OR-Exchange.



▲ INFORMS IT Committee

This is an exciting time for INFORMS, as we explore the relationship between traditional O.R. and the increasingly popular field of analytics. Through this period of growth, we remain committed to our roots in operations research. We especially value our decades-long collaboration with our sister societies, IFORS regional organizations, and operations researchers and analytics professionals worldwide. 🌐

