



The CORS Bulletin

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In This Issue

Dear CORS Members,

Happy New Year! I am pleased to announce that the CORS Bulletin has undergone a makeover. I hope you approve. Aside from the usual fare, this Bulletin includes a few additions, normally not found in the Winter issue.

We have news about the impending fee increases as well as attempts to provide electronic services wherever possible. We have a Call for Nominations for CORS council positions as well as an update on the CORS 2011 conference to be held in St John's this summer. The Organizing Committee is hard at work. The website is up and running. The deadline to submit abstracts is Feb 15, 2011. Information about the 2011 Practice Prize Competition, the 2011 Student Paper Competition, and the opportunity for student funding to attend CORS 2011 is also included. Aaron L. Nsakanda presented his research related to loyalty reward programs to the Ottawa Section and the Calgary Section held a Professional Development Seminar with a presentation by Diane Bischak on *Behavioural Operations Management*.

Last month, you received an invitation to contribute to the Bulletin; news and information about your work and achievements. Thanks to a robust response we have just that so be sure to read CORS Members Making Waves to find out what's new with your colleagues. A submission regarding the results of INFORMS Data Mining contest was also submitted and is included in this issue. A follow up is provided by our 2010 OR@Work Practice Prize participants about their projects. This includes the work by Bozkaya et al with the City of Edmonton to redesign its electoral districts as well as Kent Kostuk and Keith Willoughby's work in developing a decision support system for scheduling the CFL games. I hope you enjoy reading them as much as I did.

In the President's Message, Armann talks about how he became interested in OR. I found this story very interesting, as it made me remember the reason I first became interested in this field. I definitely find my work and my career choice to be very rewarding. That is why, please keep those contributions coming in. Your participation not only recognizes your notable achievement, it may help inspire others to emulate.

Sincerely,
Chirag Surti,
Bulletin Editor

Editor

Chirag Surti

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THE 2010 - 2011 COUNCIL

CORS Council is made up of the Officers of the Society, four Councillors, the Immediate Past President, a representative designated by each local section of the Society, and the Standing Committee Chairs. Contact information for 2010-2011 Council representatives is provided below. For a complete listing go to www.cors.ca.

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Toronto	Currently vacant
SW Ontario	Matt Davison, University of Western Ontario, mdavison@uwo.ca
Winnipeg	Currently vacant
Saskatoon	Winfried Grassmann, University of Saskatchewan, grassman@cs.usask.ca
Calgary	Chandandeep Grewal, University of Calgary, csgrewal@ucalgary.ca
Edmonton	Armann Ingolfsson, University of Alberta, armann.ingolfsson@ualberta.ca
Vancouver	Taraneh Sowlati, University of British Columbia, taraneh.sowlati@ubc.ca
Toronto Student	Jonathan Y. Li, University of Toronto, jli@mie.utoronto.ca
Waterloo Student	Bissan Ghaddar, University of Waterloo, bghaddar@uwaterloo.ca

PRESIDENT'S MESSAGE

Dear CORS Members,

I wish you a Happy New Year and success in carrying through on your new year's resolutions, whatever they may be. One of my new year's resolutions was to finish a proposal for revising an undergraduate major in Operations Management at the University of Alberta. This got me thinking about how to attract students to operational research and related fields. It seems to me that there are two ways to do this: (1) by emphasizing the prospect of high future earnings or (2) by capturing student interest in the questions that operational researchers try to answer and the methods they use to come up with answers. I have become increasingly convinced that we should place greater emphasis on the second approach, for two reasons.



Armann Ingolfsson

First, I can identify the precise moment when I became interested in operational research, and it had nothing to do with future earnings. After finishing high school in Iceland, I worked for one year in an office of the School of Engineering and Natural Sciences at the University of Iceland. One day, I was photocopying a case study for Operational Research Professor Thorkell Helgason.

The case study was based on the decision faced by the council of a small town in Iceland: whether or not to drill for hot water for geothermal heating. One of the council members had consulted a psychic about whether such drilling would be successful. This information, together with more conventional sources of information, was all incorporated in a decision analysis framework. I decided then and there that I wanted to learn more about operational research. (As an aside, Dr. Helgason's career provides an interesting example of the variety and richness of endeavors that may await OR students. Sixteen years later I invited him to give a plenary lecture at the CORS 2000 meeting in Edmonton. After retiring from teaching, he used his OR skills in various executive positions with the Icelandic government, including health care, industry, and energy, and he has consulted on policies for taxation, voting systems, and fisheries management. Recently, he was one of the people elected to draft a new Icelandic constitution. For more information, see <http://thorkellhelgason.is/> and <http://translate.google.ca/> - in case you don't know Icelandic!)

Second, in addition to this anecdotal sample of one, pedagogical research in Information Systems¹ suggests that whether or not students are genuinely interested in the subject matter is a major determinant of the choice of major. I don't know of anyone who has studied the influences on students' decisions about whether to study OR or not. I think someone should, but my expectation is that the pattern would be similar to what has been observed for Information Systems.

¹ For example, see Zhang, W. 2007. Why IS: Understanding Undergraduate Students' Intentions to Choose an Information Systems Major. *Journal of Information Systems Education* 18(4): 447-458.

Of course expected future earnings will be a consideration for many students, but I think we tend to overemphasize that factor at the expense of trying to attract the students who find our field intrinsically interesting. Last fall, when we were asked to prepare a flyer for incoming Bachelor of Commerce students about our Operations Management major, we opened with a set of questions that we thought would capture the interest of those students that we would want to see enrolled in the major. The questions included:

- How many new and used textbooks should the University Bookstore order?
- How much vaccine should Alberta Health Services stock for a potential pandemic?
- How should you encourage health care workers to wash their hands more often?
- How should a car-sharing service be organized?
- Where should ambulances be located for quick response to life-threatening calls?
- How many low-priced seats should Air Canada offer on a flight from Edmonton to Toronto?
- After a snowstorm, which city roads should be plowed first?

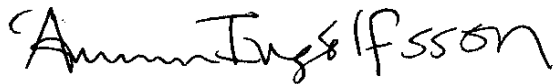
The OR @ Work section of this issue of the Bulletin provides more questions that could help attract students to the field—how to design electoral districts and how to schedule games for the CFL.

As I mentioned in my last message, CORS is on a path towards providing electronic services wherever possible, in order to reduce cost and environmental impact and increase convenience. We are moving ahead with electronic invoicing, and by now you should have received an e-mail invoice. If you haven't, please contact Wendy L. Caron, CORS Membership Services (caronwendyl@symaptico.ca).

As you will have noticed, the Bulletin has a new format—thanks to Chirag Surti, the Bulletin Editor, and Wendy Caron, Membership Services, for their hard work in implementing the new format. This issue has a call for nominations for various positions on CORS Council. If you are looking for a way to become more involved with CORS, here is your chance. I have found serving on Council to be a rewarding experience, both professionally and personally.

In closing, I encourage you to make plans to attend the CORS 2011 conference in St. John's and to send in your presentation abstracts and registration early—the conference organizers will appreciate it.

Best regards,



Armann Ingolfsson
CORS President

ANNOUNCEMENTS

New Format for the *CORS Bulletin*

Respondents to last year's membership survey made several suggestions on how the *CORS Bulletin* could be improved—a new updated look, more feature articles in non-academic language, separate English/French versions of the publication, and electronic distribution only. You asked and your CORS Council and Bulletin Editor have responded. As you have probably noticed, this issue of the Bulletin sports a new banner and is published in separate English and French versions. When you receive it electronically, if you prefer to print the Bulletin before reading it, you can save paper by only printing one version. This issue also includes feature articles and contributions from the membership that we hope you will find interesting.

For those who received a paper copy of the Bulletin, until such time as the proposed '\$10 Fee for Print' policy is implemented, you can continue to receive a paper version **but only** if you contact Wendy L. Caron, CORS Membership Services (caronwendyl@sympatico.ca). Your message should indicate your language preference for the publication. If a response is not received, by default you will only receive the electronic version.

We want to hear from you about what you think of the new format. Please don't hesitate to contact us with comments and suggestions for Bulletin content.

Chirag Surti
Bulletin Editor
Chirag.Surti@uoit.ca

Armann Ingolfsson
CORS President
Armann.ingolfsson@ualberta.ca

Proposed Membership Fee Increase

Dear CORS members,

CORS membership fees have remained constant since 2002. The current CORS membership fee is considerably lower than that of comparable Canadian and international societies. For these reasons, together with dwindling conference profits over the past few years, the CORS executive council would like to propose an increase in the membership fees. In this article, we summarize the financial situation of the society and the measures we propose to safeguard its continued existence. Please consider the proposal that we summarize at the end of this article carefully. CORS members will be asked to vote on the proposal later this year.

First, we present a summary of actual expenses and receipts for the period 2005-06 to 2009-10 and the budget for 2010-2011, in the table at the end of this article. We have categorized the receipts into membership dues, conference profit, and miscellaneous (includes sales of advertisements, interest earned, and Industry Canada refunds). We have categorized the expenses as follows:

- Administration: Membership Services, postage, printing, office supplies
- *CORS Bulletin*: printing and mailing
- Translation services: for the Bulletin and the web site
- *INFOR*: cost of printing and mailing, less royalties
- Sections: portion of dues paid to local sections
- Awards: preparation of award certificates, travel expenses
- Grants: Graduate Student (non-CORS) Conference Support, Travelling Speaker Program, and CORS Events
- Miscellaneous: Council meeting travel expenses, bank and credit card charges, participation in INFORMS credentialing committee (2009-10), GST, Proquest lawsuit (2009-10), Teaching Management Science workshop faculty support, CORS 50th Anniversary Project (2008-09), IFORS subscription

Observe the following from the summary of receipts and expenses:

- The profits for 2005-06 and 2007-08 are mainly due to revenue generated by the 2005 (Halifax) and 2007 (London) annual conferences
- The conference profits have been dwindling, whereas our expenses have been increasing

We propose the following measures to address the growing imbalance between receipts and expenses:

- Decrease council meeting travel expenses by limiting the number of face-to-face meetings per year to one rather than two (this measure has been implemented already).
- Encourage members to receive the *CORS Bulletin* and *INFOR* in electronic form. To cover the cost of printing and postage, we propose that those members that request printed copies pay an additional annual fee of \$10 for the *CORS Bulletin* and \$20 for *INFOR*

Increase the membership fees to \$110 for regular members and \$55 for retired and student members. Although this is a 45% increase for regular members and a 60% increase for other members, the proposed fees will remain similar or lower than the fees of other societies that many of us belong to, such as INFORMS, the Production and Operations Management Society, the Mathematical Programming Society, and the Canadian Statistical Society.

These measures are supported by the executive council. We encourage you to consider the financial summary carefully and to vote in favour of the proposed fee increase later this year.



Armann Ingolfsson
CORS President



Navneet Vidyarthi
CORS Treasurer

CORS: Summary of Receipts and Expenses: 2005-06 to 2009-10 and the 2010-2011 Budget

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11 Budget
I. Receipts						
Membership Dues	30,782	20,576	27,848	25,910	24,722	25,000
Conference Profit	23,461	20,826	40,177	4,554	1,413	1,000
Miscellaneous	1,151	120	264	224	5,884	120
Total Receipts	55,393	41,522	68,289	30,688	32,019	26,120
II. Expenses						
Administration	12,147	11,784	12,642	11,296	17,080	17,000
<i>CORS Bulletin</i> Translation	1,162	519	1,034	1,306	842	1,000
Services	4,962	3,332	4,074	3,372	4,766	4,500
<i>INFOR</i>	-5,415	28,653	10,853	4,541	9,092	9,650
Sections	4,738	3,179	1,412	2,341	3,519	3,700
Awards	3,533	4,701	3,131	3,028	2,537	2,500
Grants	2,405	4,322	2,977	2,131	2,806	4,000
Miscellaneous	11,297	10,677	10,540	22,515	12,621	13,600
Total Expenses	34,829	67,167	46,664	50,530	53,262	55,950
Profit/Loss	\$20,564	-\$25,646	\$21,624.63	-\$19,842	-\$21,243.28	-\$29,830
III. Balances						
Opening Balance	\$125,353	\$145,917	\$120,271	\$141,896	\$122,054	\$100,810
Closing Balance	\$145,917	\$120,271	\$141,896	\$122,054	\$100,810	\$70,980

CALL FOR NOMINATIONS

2011 - 2012 Council Positions

The following positions are open for the 2011-2012 CORs Council:

- Vice-President (President Elect)
- Two Councillors (Two year term)
- Secretary
- Treasurer

Please send your nominations by
March 19, 2011 to:

Vinh Quan
Ryerson University
email: vquan@ryerson.ca
Phone: 416-979-5000 Ext. 7814

2011 CORs Service Award

If you know of anyone who has dedicated their time to CORs and who has a longstanding service record, please consider nominating him or her for the CORs Service Award. CORs National Council urges all local sections to consider and nominate its best candidates.

Nominations, including the candidate's name, activities, positions, and years of service should be sent to Samir Elhedhli, Vice-President of CORs, before March 1, 2011. The nominating committee will evaluate the submissions and bring three to four names forward to Council for approval. Evaluations use the point system shown below for guidance in assessing CORs-related activities. Previous winners are not eligible for additional service awards. A list of past CORs Service Award recipients may be found at: http://www.cors.ca/en/prizes/i_service.php. In exceptional circumstances self nominations will be accepted.

The point system is provided on the next page. As a guideline, winners should be at or above the 2000 point level.

For further information or to submit a nomination, please contact:

Samir Elhedhli
University of Waterloo
E-mail: Elhedhli@uwaterloo.ca

Service Award Point System

Responsibility	Point Value (per year served)
CORS Council	
President	500
Vice-President	350
Secretary	300
Treasurer	300
Councillor	250
Committee Chair (Standing or Ad hoc)	200
Past President	250
International Conference	
Conference Chair	350
Committee Chair	300
Committee Member	200
National Conference	
Conference Chair	300
Committee Chair	250
Committee Member	200
Publications	
Bulletin Editor	200
INFOR Editor	350
INFOR Special Issue Editor	250
Others (e.g. CORS Meeting Newspaper Editor)	150
Local Council	
President	250
Vice-President	175
Secretary	150
Treasurer	150
Others	100
Past President	100

Concurrent appointments: Suppose that a nominee served in two positions in the same year, which are worth x and y points according to the above. If one position is for CORS National and one is for a local section, then the nominee shall receive $x + y$ points. If both positions are for a local section or both positions are for CORS National, then the nominee shall receive $\max(x,y)$ points.

CORS SECTIONS NEWS

Calgary

On November 19, 2010 the Calgary Section held a Professional Development Seminar. The topic of the presentation given by Diane Bischak, Haskayne School of Business, University of Calgary was *Behavioural Operations Management: An Introduction and a Sample of Applications*.

Abstract:

Behavioural operations management is a relatively new field of study that examines the impact of the human element on the performance of operational systems. Controlled experiments place subjects in situations to observe how they actually make decisions concerning aspects of operations or to test how their reactions vary with changes in operational conditions. This talk will offer a sample of interesting findings related to (1) production management (can lean inventory methods in production lines have beneficial effects on the workers themselves?), (2) inventory management (given overage and underage costs, can managers readily determine the best quantity to order?), and (3) supply chain management (are contractual arrangements between a supplier and retailer affected by how well the two parties know each other?).

About the Speaker:

Diane Bischak is an associate professor of Operations Management at the Haskayne School of Business, University of Calgary. She has published articles in *Management Science*, *IIE Transactions*, *Journal of Quality Technology*, and *Health Care Management Science*. Diane is currently researching applications of behavioural operations management to queuing systems. Her other research interests include health care operations management and statistical quality control. Her research is supported by a grant from the Natural Sciences and Engineering Research Council (NSERC).

Ottawa

On December 1st 2010, at the University of Ottawa, the Ottawa Chapter of CORS held its Fall meeting. The core of the event was the presentation titled *Coping with the planning of rewards supply in loyalty reward programs*, by Aaron L. Nsakanda (Associate Professor of Management Science in the Sprott School of Business, Carleton University) and Yuheng Cao (Ph.D. student at the same school). The abstract of the presentation and short bios follow:

Abstract:

The loyalty reward programs (LRPs) industry is today an important economic sector that involves millions of Canadians who have embraced the many LRPs that exist across a spectrum of industries (travel, hotel, retail, telecommunication, banking, etc.). Their prevalence worldwide and their emergence as the most effective means of finding, nurturing, and sustaining long-term relationships with a brand's most profitable customers have increased considerably their management and control complexities. LRP practitioners are more and more being challenged by ever-higher customer expectations, increasingly operating costs and risks, management issues resulting from the increases in the diversification of customer sources for collection of points and the diversification of reward offerings. Our work is directed to the modeling of planning and operational issues faced by LRP departments or organizations operating either as

cost or profit centers to support short, medium, and long term decisions. We address the problem of planning the supply of rewards (and points), a key operational management issue in loyalty reward programs operations. The problem is discussed in the context of supply chain management and we propose a mathematical model that seeks to maximize the LRP firm's value creation, subject to satisfying budget and capacity limitations as well as taking into account demand uncertainties and various liability control strategies. We also discuss a number of extended models to include the type of contracts governing the partnership relationship (wholesale contract versus revenue sharing contract), the adoption of cooperative advertising, and the adoption of option contracts as a coordination mechanism. A solution methodology based on stochastic linear programming will be reported as well as some preliminary results.

About the Speakers:

Yuheng Cao is a PhD candidate and part time Instructor in Management Science at the Sprott School of Business, Carleton University (Ottawa, Canada). She holds an M.Sc. in Information and Systems Sciences. Her research interests are in the areas of supply chain management, the interface between operations and marketing, and modeling and analysis of loyalty/incentive programs. Her papers have appeared in the *International Transactions in Operational Research* and *Information Systems Frontiers* as well as in the ASAC, HICSS, POMS, and SCSC conference proceedings.

Aaron L. Nsakanda is Associate Professor of Management Science in the Sprott School of Business, Carleton University (Ottawa, Canada). He has also worked as a Senior Operations Research Analyst in the airline industry. He holds a Ph.D. in Operations and Decision Systems from Laval University (Quebec, Canada). His research interests are in the areas of modeling and analysis of loyalty/incentive programs, global supply chain management, pricing and revenue management, and modeling and analysis of advanced manufacturing systems. His most recent works have been published in the *European Journal of Operational Research*, *Journal of the Operational Research Society*, *International Journal of Production Research*, *International Transactions in Operational Research*, and *Information Systems Frontiers*. He has served as a reviewer for a number of refereed journals and for Canadian government agencies (e.g., NSERC, SSHRC).

CORS MEMBERS MAKING WAVES

2010 Harold W. Kuhn Award

The 2010 Harold W. Kuhn Award for an outstanding paper published in the last three years in *Naval Research Logistics* was presented to Erhan Erkut, Armann Ingolfsson, and Güneş Erdoğan, all of whom have connections to Canada, for their paper titled "Ambulance Location for Maximum Survival." (*Naval Research Logistics*, 2008, Vol. 55, pp. 42-58.)

For more information, see <http://www.nrljournal.com/NRLHistory.html> .

U.S. Federal Trade Commission Research Award

The Center for Business and Industrial Studies at the University of Missouri-St. Louis, directed by CORS member L. Douglas Smith, has been awarded \$1.13 million from the U.S. Federal Trade Commission to conduct a study of the accuracy of information maintained by the major U.S. credit reporting agencies and to investigate the workings of the FCRA dispute resolution process. Doug and his colleagues Tom Eysell at UMSL and Mike Staten at the University of Arizona are collaborating with professionals at Fair Isaac Corporation to execute the study.

Research teams at the two universities are engaging 1,000 consumers nationwide to review detailed information in their credit reports to estimate the frequency and severity of alleged errors in the data. The researchers extract detailed credit files from each of the three credit bureaus and retain frozen copies that may be altered to examine the impact of correcting alleged errors by using the same credit-scoring model as used to generate the original credit scores.

In cases where the consumers allege that the data are in error, the research team alters the files to remove the errors, generates new credit scores, and helps to prepare paperwork for filing disputes with the credit bureaus. Then they track the results of disputes. Six weeks after the filing of disputes(s), a second set of credit reports is drawn to see whether changes were made in conformity with the dispute letters. If partial changes were made to the file, a second rescoring of the original files is done after making corresponding changes to appropriate items in the original frozen files. This unique research methodology thus removes the variability in credit scores that can occur as a result of other credit usage and payment behavior that may occur while the dispute was under investigation.

The results of the study will inform the FTC as it develops recommendations to Congress for regulatory policies and industry practice. For more information please contact Douglas Smith.

L. Douglas Smith, Ph.D.
Professor and Director
Center for Business and Industrial Studies
University of Missouri-St. Louis
<http://www.umsl.edu/divisions/business/ncbis/index.html>

The 2010 Lionel-Boulet Prize

Professor Michael Florian, researcher at CIRRELT and Emeritus Professor at the Department of Computer Science and Operations Research of the Université de Montréal, is awarded the 2010 Lionel-Boulet Prize. This prestigious award is one of the eleven *Prix du Québec* presented annually by the Government of Québec. It is the recognition of outstanding career achievement by a researcher from Québec.

The Lionel-Boulet Prize recognizes the career of a researcher who has become famous by his inventions, leadership in the scientific development and his influence on the Québec economic growth. This award has been named after Lionel Boulet (1919-1996), the first director (1967-1982) of Hydro-Québec research institute (IREQ).

The *Prix du Québec* are the most prestigious distinctions to be awarded by the Government of Québec to express the recognition of the society to the persons who have contributed to the social and scientific advancement of Québec.

For more information:

<http://www.prixduquebec.gouv.qc.ca/recherche/desclaureat.php?noLaureat=418>



Michael Florian appears second from the right

Elected to Serve on the EUROPT Managing Board

Professor **Dr. János Pintér**, an Industrial Engineering faculty member at Özyeğin University, Istanbul has been elected to serve on the Managing Board of EUROPT, the Continuous Optimization Working Group of EURO.

EURO is the Association of European Operational Research Societies: its aim is to promote operational research throughout Europe. EUROPT focuses on continuous optimization, and facilitates communication among European and other researchers working in various areas of continuous optimization. EUROPT is one the largest working groups of EURO: Professor Pintér will serve as a member of the EUROPT Managing Board (currently) for the next three years.

For further details about EUROPT, visit <http://www.iam.metu.edu.tr/EUROPT/>
For further details about EURO, visit www.euro-online.org or contact:

Janos D. Pinter, PhD, DSc
Department of Industrial Engineering
Özyeğin University
janos.d.pinter@gmail.com



CORS Annual Conference 2011

Delta Hotel, St. John's, Newfoundland

From 30 May to 1 June

(Registration will begin on Sunday evening 29 May)

Conference website: <http://www.busi.mun.ca/cors2011>

email: cors2011@mun.ca

(version française à la page suivante; other photos on the next page)

For the first time, the CORS Conference will be held in St. John's, Newfoundland. All sessions will be held in the Delta Hotel, a four-star hotel with extensive convention facilities.

Local Organizing Committee: Drs. Wieslaw Kubiak (Chair), Peter Song, David Tulett, and Manish Verma.

The Harbour Le Port



An Iceberg Un Iceberg



The sea La mer



We hope that you will come to St. John's for the CORS Annual Conference 2011.

Information about this historic city and the beautiful scenery which surrounds it is available from the official tourism website:

<http://www.newfoundlandlabrador.com>

Photographic credits: *The Sea*: David Tulett; all other photographs: Dennis Flynn

CORS 2011 CONFERENCE

Latest News from Conference Organizers

Dear colleagues

The next CORS Annual Conference will be held in St. John's (NL) from May 30th to June 1st, 2011, and the relevant details are available on the webpage: <http://www.busi.mun.ca/cors2011>. As always, we have been fortunate to receive the support of and commitment from eminent individuals serving as Cluster Chairs.

I would like to take this opportunity to bring the following items to your attention:

- Abstracts can now be submitted using the conference webpage, and the deadline is February 15, 2011.
- Contributed submissions can also be made through the webpage. Alternatively, this could be emailed at mverma@mun.ca.
- We encourage you to register early to take advantage of the early bird rates.
- DELTA St. John's is the venue for the conference. We have negotiated with the hotel, and you can avail yourself of the conference rates a few days before and after the scheduled conference dates. A dedicated link has been created for CORS, and it is: <http://www.deltastjohns.com/gbcors511>.

Please let me know if there are any questions/concerns. We are very excited and are looking forward to a successful conference.

Manish Verma
CORS 2011 Program Chair

Graduate Student Funding to Attend CORS Conferences

CORS funds graduate students attending CORS annual meetings, using funds from SSHRC, when available. This funding is subject to availability and the following eligibility criteria:

- Student is a member of CORS.
- Student is enrolled in a graduate program in a field related to operational research.
- Student is studying at a Canadian university, or is a Canadian citizen or permanent resident studying abroad.

The following criteria will be used to determine the amount awarded to each eligible applicant:

- Whether the applicant is presenting a paper at the conference.
- Travel cost from student's home city to the conference.

The application form for funding is available at: http://www.cors.ca/en/students/i_cors_conf.php.

Applications must be received at least two months before the conference date to receive full consideration. Applicants that meet this deadline will be notified at least one month before the conference date whether their application was successful.

For further information, contact the CORS Education Chair:

Fredrik Odegaard
email: fodegaard@ivey.uwo.ca

2011 Harold Larnder Prize awarded to Edward G. Coffman



Ed Coffman, Professor Emeritus, Columbia University has been selected as the 2011 Larnder Memorial Lecturer. He will receive his award at the CORS 2011 Annual Conference to be held May 30 – June 1, 2011 in St. John's, NL. The title of his Larnder Lecture will be:

"Fifty years of modeling dynamic resource allocation"

Professor Ed Coffman began his career as a systems programmer at the System Development Corporation (SDC) in the late 50s. He wrote the scheduling/dispatching kernel of the SDC/ARPA time-sharing system, which joined the MIT time-sharing system in 1963 in becoming the first fully operational time sharing systems. His modeling and analysis of the SDC system, which also established the beginnings of computer networks, was the springboard for his career in OR. His PhD at UCLA in 1966 was followed by a series of positions at Princeton University, The Pennsylvania State University, Columbia University, and the University of California at Santa Barbara. In 1979, he joined the Math Center at Bell Labs where he stayed until his retirement in 1999. After a one-year stint at the New Jersey Institute of Technology, he returned to Columbia University with appointments in Computer Science, Electrical Engineering, and Industrial Engineering and Operations Research. He retired from teaching in 2008 and is now a Professor Emeritus still fully engaged in research and in professional activities.

Coffman's research has followed several parallel paths drawing on the tools of combinatorial optimization along with those of applied probability and stochastic processes. The OR disciplines include scheduling, bin-packing, and dynamic resource allocation, along with problems in polling, reservation, and moving-server systems. His contributions have been divided between mathematical foundations and the design and analysis of approximation algorithms for NP-hard problems. Applications have been very broad in scope. Most recently, his research has been directed toward Internet congestion, peer-to-peer networks, self-assembly processes of molecular computing, local-rule algorithms in sensor networks, and dynamic spectrum pooling in wireless communications. His professional contributions have included several editorships, conference organizations, and participation on committees of the National Research Council charged with setting research agendas; in the late 60s and early 70s he co-founded the Symposium on Operating System Principles, and two special interest groups on computer and network performance evaluation under the sponsorship of ACM and IFIPS.

2011 CORS Practice Prize Competition

Each year the Canadian Operational Research Society conducts a competition on the practice of OR at its annual conference. There are two basic purposes behind the Competition, the first being the obvious one of recognizing outstanding OR practice. The other is to focus attention on OR and its applications by practitioners from Canada by attracting quality papers to the CORS National Conference. Entries are expected to report on a completed, practical application, and must describe results that had a significant, verifiable and preferably quantifiable impact on the performance of the client organization.

Award:

Up to a maximum of \$1800 in prize money may be awarded by the committee: however, the committee reserves the right not to award any prize. Prizes (First, Second, Third/Honourable Mention) are awarded at the discretion of the Committee. Every team member receives a certificate.

Eligibility:

Work on the submitted project may have taken place over a period of several years, but at least some of the work must have taken place over the last two years. Previous publication of the work does not disqualify it; however, you may not report on a project which has been previously submitted to the CORS Competition on the Practice of OR. The submitter/author must be a resident of Canada.

Requirements of Finalists:

Finalists must submit a detailed written report not exceeding 25 pages in the body and make an oral presentation of the paper at the CORS Annual Conference. They are also required to prepare a one page project summary, suitable for publication in the CORS Bulletin and on the CORS website, detailing their project and its impact on the client organization.

How to Enter the Competition:

To enter this year's competition, one or more of the authors is to submit an application before **March 19, 2011** to:

John Blake
Department of Industrial Engineering
Dalhousie University
Halifax, NS B3J 2X4
Phone: (902) 494-6068
Fax: (902) 420-5878
E-mail: john.blake@dal.ca

A complete entry will include:

1. An abstract both by e-mail and in hardcopy, not exceeding 500 words of a paper on an actual success story of OR.
2. A letter by an executive of the client organization that sponsored the application, attesting that this application truly had an impact and that the organization would not object to having a paper presented.
3. The phone number of the author(s) and the name(s), title(s) and phone number(s) of at least one executive of the client organization where the OR application was put into effect.

Selection Criteria:

The main criteria considered in evaluating submissions are:

1. The project, which should exemplify the challenging application of the operational research approach to the solution of significant applied problems.
2. The quality of the analysis, of the modeling and of the successful implementation of the results at the client organization.
3. The significance of the impact of the results and recommendations on the performance of the client organization.
4. The presentation, both written and oral. A crucial part of the presentation is a "case history" of the project, which describes the project's development from start to finish, and focuses upon the challenges faced by the analysts.

Important Dates/Deadlines:

Applications must be received by **March 19, 2011**.

Finalists will be selected by **April 9, 2011**.

Finalists must submit a detailed written report by **April 30, 2011**.

Finalists must make an oral presentation of the paper at the CORS Annual Conference in St. John's, NL **May 30 to June 1, 2011**.

For more information, please contact the Practice Prize Committee Chair:

John Blake
Dalhousie University
E-mail: john.blake@dal.ca

2011 CORS Student Paper Competition

Each year the Canadian Operational Research Society conducts a student paper competition to recognize the contribution of a paper either directly to the field of operational research through the development of methodology or to another field through the application of operational research. The competition serves to showcase the high quality of OR education in Canada as well as the excellence of the new generation of operational researchers. Prizes are awarded in two categories: Undergraduate and Open.

Award:

The winner of the open competition will receive a trip to the CORS conference, where he/she will be entitled to present his/her paper. Airfare (from the port of entry for foreign entry), accommodation expenses, and any conference and banquet fees will be covered by CORS. If an undergraduate wins the open competition, no undergraduate prize will be awarded. Certificates to be awarded are:

First Prize, Open
Honourable Mention, Open
First Prize, Undergraduate
Honourable Mention, Undergraduate

All authors of the winning papers receive certificates.

Eligibility:

The candidate must be registered as a full-time student at a Canadian institution at the undergraduate, master, or Ph.D. level during the current or previous year of the CORS Annual Conference to which the paper was submitted. Canadians studying abroad also qualify. Undergraduate entries are eligible for the open (overall) award as well as for the undergraduate award.

How to Enter the Competition:

Applicants must fill out the online competition entry form found at http://www.cors.ca/en/students/i_student.php#3 before **March 31, 2011**. The form is automatically submitted to the Chairs of the competition:

Open Category:

Dr. Fatma Gzara
University of Waterloo
Waterloo, ON N2L 3G1
fgzara@uwaterloo.ca

Undergraduate Category:

Dr. Anjali Awasthi
Concordia University
Montreal, QC H3G 2W1
awasthi@ciise.concordia.ca

A complete entry will include:

1. Abstract of 200 words or less. Author's name, address, phone number, and e-mail address.
2. Academic institution and supervisor's name, if applicable.
3. Indication of whether the author is planning to attend the conference regardless of the outcome.
4. Indication of whether the paper is submitted to a journal.
5. A PDF copy of the paper:
 - a. With separate title page containing the name of the authors, their coordinates and affiliations. No identifiers should appear on the other pages.
 - b. No longer than 35 pages (with minimum 1-inch margins, maximum 34 lines per page and minimum font size of Times 11) including all figures, tables, appendices, and references.
6. An e-mail from the supervisor indicating that the participant is the first author of the paper should be sent to the Competition Chair.

Selection Criteria:

In the selection of the winner(s) of the competition the judges will take into account:

- The contribution of the paper either directly to the field of Operational Research through the development of methodology or to another field through the application of Operational Research.
- Originality.
- Writing style, clarity, organization and conciseness of the paper.

Important Dates/Deadlines

Applications must be received by **March 31, 2011**.

By **April 30, 2011** the winners of the competition are chosen.

The winner(s) of the Open Competition is invited to present the paper at the CORS Annual Conference in St. John's, NL **May 30 to June 1, 2011**.

ARTICLES

Predicting Stock Price Movements – INFORMS Data Mining Contest Results

by

Louis Duclos-Gosselin

Chair INFORMS Data Mining Contest 2010

In June 2010, the INFORMS Data Mining Section held a Data Mining Contest which required participants to develop a predictive analysis solution that predicts stock price movement (increase or decrease) in the next 60 minutes. For example, at 9:30 predict if XYZ stock price will increase or decrease at 10:30 based on historical data.

This contest was one of the biggest Data Mining Contest ever organized according to its 894 participants and 147 teams (from 27 countries) submitting predictive analysis solutions.

Day traders, mutual fund traders and hedge funds have always tried to predict the direction of stock prices in the next few hours. Predictive analysis solutions developed in this contest aim to pursue this objective. Hedge funds will use this kind of solutions to build complex strategy to be executed automatically. Mutual funds traders will use it to achieve a “best execution” of fund manager’s buy/sell orders and day traders will use it to realise fast profits over short period of time.

To build their predictive analysis solutions, participants were provided with a set of macro-economic and high frequency financial data. The data were composed of stock prices, sector indexes, economic indicators and expert predictions on economic indicators. The database was separated into two data sets: the training set for building predictive analysis model(s) and the test set (in which the target variable has been excluded) for evaluating participants’ predictions. The participants built their predictive analysis solutions using the training set and implemented it on the test set by predicting target variable.

The winners of the contest presented their methods at the 2010 INFORMS Annual meeting in Austin, Texas. See contest website for their slides: www.kaggle.com/informs2010.

Ranking:

- 1) Cole Harris from Exagen Diagnostics
- 2) Christopher Hefele from AT&T
- 3) Nan Zhou from University of Pittsburgh

Judges:

Durai Sundaramoorthi, Assistant Professor, Missouri Western State University
Philippe Bélanger, Co-Chair of the INFORMS Data Mining Contest 2010, Laval University
Louis Duclos-Gosselin, Chair of the INFORMS Data Mining Contest 2010, Sinapse

OR@WORK

Editor's note: In this issue, we highlight some OR@Work projects. Some of these projects are from last year's Practice Prize Competition where the authors have submitted an update. Others are work in process or have been mentioned in the press. If you are presently pursuing an industry driven project, please feel free to submit relevant details to me for consideration in the next issue of the bulletin.

Designing New Electoral Districts for the City of Edmonton

by

*Burcin Bozkaya (Sabanci University), Erhan Erkut (Özyeğin University)
Dan Haight (University of Alberta), and Gilbert Laporte, HEC Montréal*

From a 6-ward to a 12-ward system: How the City of Edmonton used OR to change its electoral district boundaries

Elections are integral characteristics of a democracy that entail an arduous preparation process involving also many person-months of electoral district planning. Political districting problems in this context are highly political by nature, especially when there are multiple decision makers with conflicting interests and/or subjective views. The best course of action to take in such cases is to rely on an objective and systematic solution methodology.

The City of Edmonton, Canada, faced with a similar challenge, must periodically review and possibly change its electoral district boundaries. The city is governed by a city council whose members are elected through a district-based municipal election system. Most North American cities are formed out of single member districts, meaning that each district elects a single representative to the legislative body based on the "winner-take-all" principle. Edmonton districts, however, were formed back in 1980 as two member wards, each ward electing two councilors to the city council. Duggal (2009) reports that Edmonton in fact was the only city in North America not to have a single-member district plan.

In early 2009, the City decided to review the current district plan in preparation for the October 2010 election. The City considered not only modifying existing boundaries due to population shifts, but also converting the district plan from a six-ward system with two council members in each to a single-member 12-ward system. This was accomplished using a spatial decision support system called *DistrictBuilder* that runs an optimization engine based on multi-criteria heuristic optimization principles.

A study, which was initiated by the City officials after contacting the authors of this article and asking them to extend their previous work on political districting and decision support system development, was completed in seven months and resulted in a change of Edmonton's district plan. The process, which includes planning, district plan development, public consultation and final approval, resulted in a 12-ward map that was formally adopted by the City to be effective for the 2010 election. In May 2010, the authors of this study won the first prize of the practice competition organized annually by the Canadian Operational Research Society.

Towards the 12-Ward System: DistrictBuilder as Spatial Decision Support System

Edmonton's municipal electoral districts are designed based on a precise set of criteria. Wards should be balanced in terms of population and number of electors (*population equality among districts*). Wards must be created while taking into account the fastest growing and declining

areas of the city (*future growth*). Wards must be designed in a way not to split any Community League (*respecting community league boundaries*). The wards should have round, block-like or compact shapes, as opposed to elongated, snake like or twisted shape to ensure impartiality (*compactness*). Wards must be designed to keep communities with common interests within the same ward (*communities of interest*). As few changes as possible must be made to the existing wards when redesigning the districts (*least number of changes*). All wards must be designed as contiguous geographical areas unless they are divided by natural or man-made boundaries (*contiguity*).

The latest redistricting exercise ultimately had two main goals: first, to ensure that the criteria just listed were still met, taking into account the results of the 2006 census; second and more importantly, to possibly introduce an alternative 12-ward system with one councilor each.

Solution Methodology

The problem of partitioning a territory into districts (or wards in the case of Edmonton) is widely recognized as a difficult multi-criteria combinatorial optimization problem. To solve the Edmonton districting problem in an efficient and interactive way, the authors decided to integrate a tabu search algorithm within a GIS-based decision support framework. The spatial decision support system (SDSS) developed for this purpose is called *DistrictBuilder*.

In simple terms, *DistrictBuilder* performs one fundamental task: as input, it takes city neighborhoods (referred to as basic units) which serve as building blocks of districts, and as output, it generates a complete district plan that satisfies the decision maker's criteria. The *DistrictBuilder* application is organized as a set of tools that can be used to carry out automated or manual districting. Using these tools, the user can define the parameters of a districting problem, including the districting criteria; solve the districting problem; view charts to compare districts in terms of population counts and compactness values; and use the manual districting tool to modify existing or build new district plans.

For automated and manual districting analyses, *DistrictBuilder* uses the geographical input data for Edmonton provided by the city officials in the data format known as shapefile. However prior to any automated or manual districting analysis, a preprocessing step is necessary. Once this step is complete, *DistrictBuilder* is ready to perform automated and manual district building.

In Edmonton, the authors used *DistrictBuilder's* automated districting tool to run a number of scenarios with different districting criteria and generated various district plans. After three rounds of meetings and several iterations of scenarios with a small number of manual changes on the maps, a plan was generated.

The *DistrictBuilder* generated the automated solution for the proposed district plan shown in Figure 1 in less than 10 seconds on a Windows XP based computer system with 1.83 GHz Core Duo CPU and 1.5 GB of RAM. After this, the automated solution was manually processed and changed according to the instructions of the city officials. The proposed plan yielded impressive results with a maximum deviation of 5.60% in Ward 12 and the average absolute deviation of 2.64%, as opposed to the city council's policy permitting a population deviation from 10% to 25%.

DistrictBuilder has also fought against time and helped Edmonton in meeting its tight deadlines. While the city officials requested that the whole process should be completed in three weeks, the authors were able to come up with the proposed plan within a week, including the time for meeting sessions, running various scenarios, making manual modifications, and the time to prepare the final report with maps, graphics, etc. The project, which started in January 2009,

was effectively completed when City of Edmonton bylaw 15142 was passed on July 22nd, 2009. The approval process also incorporated a telephone survey conducted with 400 randomly selected Edmontonians, and focus group discussions with stakeholders and city residents. The results of the survey indicated that 54% of Edmontonians were in favor of the new plan, while 28% supported the existing dual councilor wards.

Thus a process that typically requires months of intensive, trial-and-error map design was completed within a week. This application has provided the City of Edmonton with the following benefits:

- Objective decision making criteria were successfully employed, which increased the accountability of the resulting plans in the eyes of all stakeholders.
- Many person-months of election planners' time were saved due to the use of a computer-based approach, without sacrificing relevant decision criteria.
- Most of the district plans produced in the scenarios considered were of very high quality, leaving little or no need for further manual work.
- A highly user-friendly, intuitive and interactive DSS made the district-building process very smooth, requiring no training on the city officials' part and allowing them to focus only on the districting process.

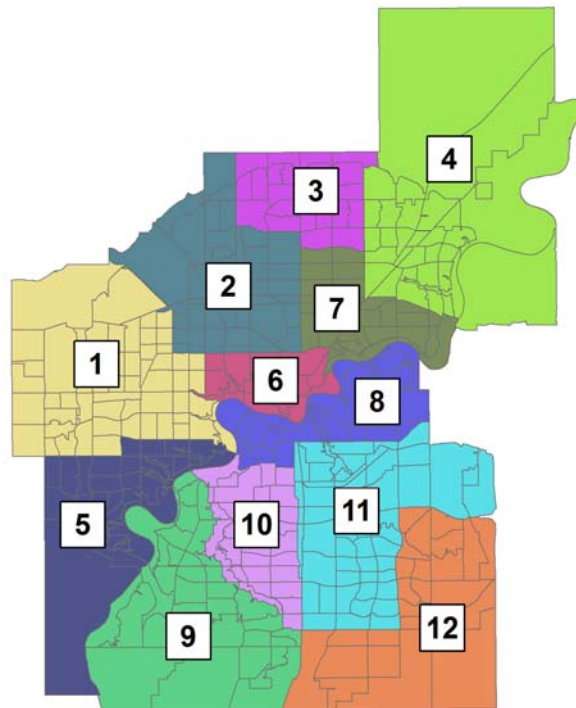


Figure 1

Editor's Note: A shorter version of this article was originally published in the CORS Bulletin Volume 44, Number 3 in July 2010. This work was the winner of CORS Practice Prize award. Here the authors give a follow up on the implementation and the success of the project with the City of Edmonton.

A Decision Support System for Scheduling the Canadian Football League

by

Kent J. Kostuk, Federated Co-Operatives Limited, Saskatoon

Keith A. Willoughby, University of Saskatchewan

The 8-team Canadian Football League (CFL) features an 18-game regular season played between late June and early November. The regular season schedule is manually created using an iterative process between league management, teams and a television sports broadcaster.

The problem of developing suitable schedules presents challenges for the CFL. In particular, league franchises submit specific days—known as "stadium blocks"—in which they are unable to host games. Moreover, some franchises play their home games in multi-tenant facilities, thus suggesting that league management may have to revise schedules based on the requirements of other events. Football games are televised by a single broadcaster which limits the number of games that may be scheduled on a single day. Further, time zone restrictions dictate that particular pairs of teams may be unable to simultaneously host games on a given day. League management must provide each team with an appropriate number of days off between their games so as not to generate a competitive imbalance by forcing a team to play consecutive contests in quick succession. The league desires to schedule particular matchups around key holidays (e.g. Labour Day). It also seeks to limit the number of times two teams face each other during consecutive weeks (so-called "back-to-backs"); however, such instances are quite likely for an entity such as the CFL featuring a relatively small number of teams. The objective function for this scheduling problem is ill-defined, thus making the notion of a particularly "good" schedule unclear. Finally, regular turnover within team management implies that different individuals may be interfacing with league officials on schedule creation on a year-to-year basis. This lack of continuity disrupts schedule development.

We approached the CFL about applying OR to this particularly challenging problem and collaborated with league officials on the construction of the 2010 regular season schedule. Specifically, we developed a MIP-driven decision support system that provided league officials with multiple schedule versions in relatively quick fashion. We selected a basic 0-1 IP formulation in which the decision variable $x(i,j,k)$ took on the value of 1 when team i visits team j on day k . We introduced a series of modeling constraints, broadly classifying them as: structural, stadium blocks, preassignments, and pattern assignments.

Structural constraints represented the basic logic of the schedule. They included features such as scheduling at least one game every Friday, requiring all teams to play nine games at home and nine games on the road, and scheduling four games each week (except for weeks eight and nine ("bye weeks") in which only two games are slated).

Stadium blocks represented a list of dates during the season in which any of three mutually exclusive outcomes could occur: the team prefers to play a home game (i.e., preferred dates), the stadium is not available (therefore, the team cannot be scheduled to play at home), and the stadium is available but the team would prefer not to play.

Preassignments involve instances in which the CFL has predetermined which teams will play against each other on particular dates. For example, the league features several rivalries wherein specific pairings are an annual ritual at set times (e.g., Saskatchewan plays Winnipeg around the Labour Day weekend). These games are promoted heavily, help teams to maximize attendance, and enhance league ratings.

Pattern assignments include pairings that follow a pattern but are not constrained to occur on specific dates or between specific teams. Examples of such assignments include:

- teams that play on a Sunday do not play on the following Thursday or Friday (to ensure a sufficient number of days of rest before the next scheduled game);
- teams playing on a Monday do not play the following Thursday, Friday, or Saturday;
- teams do not play on the road more than two weeks in a row, or two weeks at home;
- teams should not finish the season with a home-home or away-away pattern;

Although classifying the constraints in this hierarchical manner was unnecessary from an analytical perspective, it was appreciably invaluable from an organizational viewpoint. As we spent time with the decision maker, we were able to better communicate each other's requirements and develop a more sophisticated model. The classification system provided a basis for expanding and reevaluating the model. Initially, we introduced structural constraints. If the model could not be solved with only considering the structural constraints, this would indicate that the league's basic requirements were infeasible. Fortunately, this was never the case.

Once we established that the structural constraints provided for a feasible schedule, the next step was to introduce the stadium blocks. This permitted us to factor in the requirements of the teams and the facilities they shared with other tenants. Any infeasibilities identified at this time resulted in a review of team preferences and of stadium availability.

We next introduced preassignment constraints. Recall that these assignments are league-mandated. If their introduction induced infeasibilities, then trade-offs associated with these preassignments and the resulting impossibilities would need to be addressed. In practice, this was not an issue. The most likely reason the preassignments proved feasible is that most of these game pairings are long-held rivalries based on rich CFL tradition. Had they been problematic, they would not have survived the annual process associated with the scheduling efforts of previous years.

Admittedly, the pattern-assignment constraints were the ones most likely to generate conflicts with previously introduced restrictions. Given stadium availabilities, it was not always possible for a team playing on a Sunday to be given a rest period until the following Saturday. At this point, the decision maker must draw upon past experience and determine how best to trade off these various inconsistencies. For example, he could use an alternative set of rules or constraints that would generate a schedule without compromising the intended pattern of games.

We set up our decision support system as a 0-1 integer optimization model (consisting of 5,320 binary variables) using the mathematical programming language (MPL) modeling system with the 2008 version of FICO's XPressMP on a Lenovo ThinkPad T42-Pentium M735. In this MPL-XPressMP environment, we were able to solve the model in roughly two minutes, including the time required for data transfer activities. The actual optimization period was in the range of 30 seconds or less. These rapid solution times—a far cry from the one-day effort required under the league manager's manual approach—enabled us to feed multiple versions in quick succession to CFL headquarters.

When solving our models, we found it particularly helpful to initially optimize on a specific performance measure, for example, the number of intradivisional matchups during the season's final four weeks. After determining the optimal value for this criterion, we would subsequently

set this value as a constraint and then reoptimize on another performance measure (e.g., the minimum number of Thursday games). This enabled us to identify how we could obtain the best performance on a specific measure, while ensuring reasonably good outcomes on the first criterion.

During an intense period between December 10, 2009 and January 20, 2010, we provided the official scheduler with 22 schedule versions. The respective versions resulted from the modeling of different objective functions (e.g., maximizing the number of Friday games), or from incorporating additional constraints the league provided to us in our real-time, iterative work. Examples of such constraints could be new requirements that the league wanted to include in a version (e.g., restricting Team A from hosting two home games in consecutive weeks) or revised stadium availabilities.

The luxury of assessing a fair number of acceptable versions was appealing to the league scheduler. Trade-offs became evident with our different versions. Achieving benefits along one dimension came at the expense of another measure. For example, we demonstrated that the league could lessen the number of back-to-back matchups, but this would necessitate fewer preferred dates and more Friday games. In addition, the league could reduce the number of Thursday contests, but this would entail fewer intradivisional matchups, more Friday games, and a drop in the number of Sunday contests.

A further example of our approach's advantages involved its ability to inform league management of proper courses of action to mitigate several stumbling blocks that emerged as the league began composing the schedule. Because of stadium availability issues, one franchise (Montreal) was forced to begin the 2010 season with three consecutive road games. League management duly recognized that Montreal's situation was inevitable. However, it was concerned that such a scenario would oblige another team to start its season with three consecutive home games. This would entail a team playing one-third of its entire home game complement by the middle of July, hardly a result that would engender ongoing fan interest throughout the remainder of the season. By virtue of our model's results, we demonstrated that a team would be forced to start its season with a three-game home stand, given the current (stringent) stadium availabilities throughout the league. Only by obtaining relaxed stadium availabilities could the number of home games be sufficiently distributed during the first three weeks of the season so that no team would start with three consecutive home contests. The league used this finding to request various franchises to submit more flexible stadium availabilities for the start of the season.

Obviously, regardless of our assistance, the league would have generated and released an actual schedule. However, our analysis reduced the labour hours required by the scheduler to create and disseminate the final schedule. In previous seasons using his manual schedule creation method, he readily admitted that he would only end up with two or three suitable versions that could be circulated to the teams and television broadcaster for further scrutiny. With our approach, he enjoyed the luxury of several acceptable versions that league stakeholders could evaluate. The league considered our various versions and subsequently fine-tuned them manually to create the final 2010 schedule. We anticipate continuing our relationship with the league in its development of the 2011 regular-season schedule. Our experiences with the CFL demonstrate the successful role that OR modeling can play in informing actual practice.

For more information, please contact Keith Willoughby (willoughby@edwards.usask.ca).

Optimizing the Locations of Public Access Defibrillators in Toronto

by
Timothy Chan, University of Toronto

A research project led by Timothy Chan was highlighted in a Canadian Press article on Nov. 15, 2010. The project focused on optimizing the locations of public access defibrillators in Toronto. The team analyzed the current distribution of public access defibrillators in relation to historical cardiac arrests and, using a maximal covering location model, showed that increasing the number of defibrillators in the city by a small percentage could result in a major improvement in cardiac arrest coverage. This research was presented at the American Heart Association Scientific Sessions 2010, the pre-eminent cardiovascular conference in the world. The subsequent news article was picked up by many media outlets including CTV and the Toronto Star.

This project is a collaboration between Chan and researchers from St. Michael's Hospital in Toronto. The team is currently refining and extending the model to incorporate stochastic, real-life factors that impact defibrillator location.

For more information, please contact Timothy Chan at tcychan@mie.utoronto.ca.

<http://www.ctv.ca/CTVNews/Health/20101115/defibrillators-locations-101115/>

In Memoriam



Santosh Narayan Kabadi
1956-2010

Santosh Narayan Kabadi was born in 1956 in Goa, India. He completed his schooling at G.S. Amonkar Vidya Mandir in Goa in 1972, obtained his B.E. degree in Mechanical Engineering from Victoria Jubilee Technical Institute, did his M.Tech in Industrial Engineering at Indian Institute of Technology, and PhD in Operations Research at the University of Texas at Dallas (1984). He joined The University of New Brunswick at Fredericton, NB, Canada in 1985. Dr. Kabadi passed away in Haridwar, India on the banks of the sacred river Ganga on November 14, 2010.

His areas of interest were network flows, matroid theory, design of online algorithms, very large neighborhood search algorithms, strongly polynomial approximation algorithms, traveling salesman problem and its extensions, linear complementarity problem, total dual integrality, combinatorial optimization, and operations research. He contributed to all these areas and was a prolific researcher. His publications appear in many of the top journals including *Mathematics of Operations Research*, *Linear Algebra and its Applications*, *Discrete Applied Mathematics*, *Sankhya*, *Operations Research*, and *Discrete Mathematics*. He was on the Editorial Board of *Algorithmic Operations Research*. He has also written a book "Statistical Techniques in Business and Economics" with D. Lind, W. Marshall, R. Mason, S. D. Gupta and chapters in "The Traveling Salesman Problem and its Variations", (G. Gutin and A. Punnen Eds).

Santosh, a CORS member since 2002, was a dynamic member of the UNB Faculty of Business Administration and many other OR circles. He will be missed.

Submitted by: Anonymous friends of Santosh Kabadi

MEETINGS AND CONFERENCES

CORS Business Meetings

March 25, 2011	CORS Council Meeting, Teleconference
May 29, 2011	CORS Council Meeting, St. John's, NL
May 30, 2011	CORS Council Meeting, St. John's, NL
May 31, 2010	CORS Annual General Meeting, St. John's, NL

CORS Annual Conferences

May 30 – June 1, 2011	CORS Annual Conference Delta Hotel, St. John's NL http://www.busi.mun.ca/cors2011/
2012	Joint CORS-Multi Objective Programming Goal Programming (MOPGP) Conference Niagara Falls

Other Conferences

2011 Feb. 28 – Mar. 1	2011 International Conference of the Association of Global Management Studies, Las Vegas, Nevada www.association-gms.org
2011 March 8-10	Challenges in Statistics and Operations Research, Kuwait http://conf.stat.kuniv.edu/
2011 April 5-8	The 6th International Conference on Evolutionary Multi-Criteria Optimization, Ouro Preto/MG – Brazil http://www.mat.ufmg.br/emo2011/
2011 April 10-12	INFORMS Conference on Business Analytics and Operations Research http://meetings2.informs.org/Conf/Practice2011/
2011 April 14-16	2011 Northeast Decision Science Institute Annual Meeting, Montréal http://www.nedsi11.org/
2011 April 29-May 2	22nd Production and Operations Management Society (POMS) International Conference, Reno Nevada http://www.pomsmeetings.org/ConfEvents/016/
2011 May 20-22	The Interdisciplinary Conference of AHLiST (Association of History, Literature, Science and Technology), Houston, Texas www.nebrija.es/~cmalagon/Mmedis/conferences.html

- 2011 June 13-17 21st International Conference on Multiple Criteria Decision Making (MCDM2011), University of Jyväskylä, Finland
<https://www.jyu.fi/en/congress/mcdm2011>
- 2011 June 20-22 INFORMS Healthcare 2011, Montreal (Co-Sponsored by CORS)
<http://meetings2.informs.org/healthcare2011/>
- 2011 July 2-5 Administrative Sciences Association of Canada (ASAC 2011), Montreal, <http://asac2011.uqam.ca/>
- 2011 July 10-15 IFORS 2011, Melbourne Australia
www.ifors2011.org
- 2011 July 18-20 International Symposium on Transportation and Traffic Theory (ISTTT), Berkeley, California
<http://www.isttt19.org/>
- 2011 July 24-26 2011 World Congress on Mathematics and Statistics (WCMS'11) Cairo, Egypt
<http://infomesr.org/en/scientific-research/conferences/2011-conferences/48-wcms11>
- 2011 Nov. 19-22 2011 Decision Sciences Institute Annual Conference. Boston, MA
- 2011 Nov. 13-16 INFORMS 2011, Charlotte, NC
- 2012 Oct. 14-17 INFORMS 2012, Phoenix, AZ

WWW Conference Listings

CORS / SCRO Conference Page: http://www.cors.ca/en/conferences/i_other.php

INFORMS Conference Home Page: <http://www.informs.org/Conf/Conf.html>

IFORS Conferences: <http://www.ifors.org/panorama/conferences/index.shtml>

Netlib Conferences Database: <http://www.netlib.org/confdb/Conferences.html>

SIAM Conference Home Page: <http://www.siam.org/meetings/calendar.php>

POMS Conference Page: <http://www.poms.org/conferences/>

CORS FUNDING OPPORTUNITIES

Graduate Student Conference Support (GSCS) Program

CORS has established the GSCS program to encourage attendance of graduate students at conferences, symposia, or workshops specifically aimed at graduate students, such as student conferences, doctoral colloquia, and conferences for junior operations researchers. CORS may provide partial funding up to \$500 per student for attendance at such events. Note that the GSCS program will *not* fund attendance at CORS meetings, because CORS has a separate program for this purpose. All GSCS funding is subject to availability of funds and the following eligibility criteria:

- Student is a member of CORS.
- Student's supervisor is a member of CORS.
- Student is enrolled in a graduate program in a field related to operational research.
- Student is studying at a Canadian university, or is a Canadian citizen or permanent resident studying abroad.

The application process is competitive. The following criteria will be used to select applications that will be funded:

- The quality of the paper to be presented at the conference, if applicable.
- The benefits that the student is likely to derive from attending the conference.
- The stage that the student has reached in his/her degree program.
- Prior GSCS funding received by the applicant (new applicants will be given preference, all else being equal).

An online application form for GSCS funding is available at:

http://www.cors.ca/en/students/i_graduate.php .

Since funding is limited, applicants are encouraged to submit their applications in a timely manner. Applications must be received at least two months before the conference date to receive full consideration. Applicants who meet this deadline will be notified of the outcome of their application at least one month before the conference date.

For further information, contact the CORS GSCS Coordinator:

Fredrik Odegaard

Tel: (519) 661-4278

email: fodegaard@ivey.uwo.ca

INFORMS Teaching Effectiveness Colloquium (For Faculty)

In conjunction with the Annual INFORMS Meetings, INFORMS hosts a Teaching Effectiveness Colloquium. CORS has funding available to partially support a limited number of faculty members interested in attending. Faculty members that are awarded funding are expected to:

- give a presentation in an OR/MS Education session at CORS National Meeting, and
- write a short article regarding OR/MS education for the CORS Bulletin.

Funding is restricted to faculty members, and not available to graduate students. For more information and instructions on how to apply please contact:

Fredrik Odegaard
CORS Education Chair
email: fodegaard@ivey.uwo.ca

CORS Traveling Speakers Program

The Traveling Speakers Program (TSP) enables local sections to bring Canadian O.R. practitioners / researchers as speakers to their local events. In order to keep costs in line while maximizing the CORS National profile, CORS sponsorship will be limited to 50% of the total expenses, up to a maximum of \$500 per speaker or \$1 000 for a single event (conference, workshop). Other expenses can be covered by the local section. The program of the event must acknowledge the contribution of CORS. Each local section must contact the TSP coordinator to obtain approval for funding preferably at least one month in advance of the event date. Payment will be made by the CORS Treasurer upon receipt of the expense report.

Vinh Quan
CORS TSP Coordinator
Tel: (416) 979-5000 ext. 7814
Email: vquan@ryerson.ca

THE NEXT ISSUE

The next issue of the Bulletin is scheduled to appear in April 2011. Apart from the regular features and news from the local sections, the next issue will include up-to-date information on next year's conference in St. John's, NL. Contributions to this issue, especially news on the activities of local sections or CORS Members should be submitted by **March 21, 2011** to:

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The preferred method of submission is by a MS-Word attachment to an e-mail.

CORS BULLETIN ADVERTISING POLICY

Ads cost \$120 per page, proportional for fractional pages. Logos and prepared layouts can be accommodated. This fee also includes distribution of the advertisement on the CORS ListServ. Direct inquiries to the Editor.

CORS LISTSERV

As a benefit of membership, members may use the CORS ListServ to transmit messages, announcements, and job postings to the entire membership or to a targeted subgroup such as a local section. For example, you can send

- messages regarding the activities and business of the Society;
- announcements about conferences, conference sessions, special journal issues, seminars or other activities provided that these are related to operational research in its broadest sense;
- job postings of general interest to CORS members.

The ListServ is not used for commercial purposes, and all messages are vetted before they are sent out. To submit items to the ListServ, email Wendy L. Caron, CORS Membership Services at caronwendyl@symaptico.ca.

For non-members, a fee of \$60 is charged for the distribution of Job Postings and other announcements or messages of interest to the CORS membership.



Canadian Operational Research Society
Société canadienne de recherche opérationnelle

The **Canadian Operational Research Society** was founded in 1958. Its goal is to advance the theory and practice of O.R. and to stimulate and promote contacts between people interested in the subject.

Publications: A quarterly scientific journal called *INFOR* and a news *Bulletin*.

Meetings: An annual National Conference with award ceremony, occasionally organized jointly with an international society (IFORS, INFORMS), as well as numerous local events organized by the local sections.

Local Sections: CORS has twelve local sections located throughout Canada and three student sections.

Awards and Prizes: CORS presents the following annual Awards and Prizes at its National Conference:

Award of Merit for significant contributions of a present or past member of CORS to the profession of O.R.

Harold Larnder Memorial Award to an individual who has achieved international distinction in O.R.

Omond Solandt Award to an organization, private or governmental, that is deemed to have made an outstanding contribution to O.R. in Canada.

Practice Prize for the challenging application of the O.R. approach to the solution of applied problems.

Service Award for outstanding contributions of time and service to the Society.

Student Paper Competition to recognize the contribution of a paper either directly to the field of O.R. through the development of methodology or to another field through the application of O.R.

Graduate Student Funding: CORS encourages attendance of graduate students at conferences, symposia, or workshops by providing partial funding. Visit CORS website for details.

CORS Diploma: This diploma is awarded to students graduating from a university curriculum comprising several O.R. courses. Criteria and an example certificate may be found on the CORS website.

Membership Directory: An online Directory of CORS Members is available as a membership benefit.

To join CORS: Go to the CORS website (www.cors.ca) and join online by credit card using the form found under membership services or complete the PDF application form found on the CORS website and mail it with payment to the address below.

Fees: Member \$75 Retired Member \$37.50 Student Member \$35

Web site: <http://www.cors.ca>

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www.cors.ca