

Volume 32 Number 1

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In This Issue

In this issue of the Bulletin, we feature the fifth article in our series highlighting O.R. activity across Canada. This issue's article is by Marty Puterman and it highlights the activities at the Bureau for Research on the Application of Management Science and Statistics (BRAMSS) at the University of British Columbia. Marty, who is well known in Operations Research circles, is the current director of BRAMSS. (If you have suggestions for future feature articles, or if you wish to contribute to the series, please contact me at rcaron@uwindsor.ca.)

This issue also features an article by Cecil Law (CORS President, 1967/68). Cecil recently attended the Blackett Memorial Lecture in London and has written a delightful account of his trip.

Be sure to see page 4 to read the announcement of Dr. Paolo Toth as the 1998 Larnder Lecturer. This award is our Society's most prestigious and most recognized.

Other items in this issue include a call for nominations for the various positions on CORS Council / Executive, Current Contents of INFOR and ITOR, etc. The issue is loaded, so open it up and enjoy!

Rick Caron

Editor/Rédacteur

Richard J. Caron

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Congrès conjoint INFORMS / SCRO-CORS du printemps 1998

(40e Congrès annuel de la SCRO)

Montréal, Québec, du 26 au 29 avril 1998

« www.crt.umontreal.ca/mtl98/ »

The 1997/98 Council

Your 1997/98 Council, which is made up of the Officers of the Society, the Elected Councillors, and the Section Presidents, is given below. This information, together with complete mailing addresses, can be found at <www.cors.ca>.

Le Conseil 1997/98

Le Conseil 1997/98 de la Société se compose des officiers de la Société, des conseillers élus et des présidents des sections locales, tel qu'indiqué ci-dessous. Cette information, ainsi que les adresses complètes des membres du Conseil, est disponible à <www.cors.ca>.

President	Roger Roy, Department of National Defense, rlroy@dgs.dnd.ca
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Kingston	Bill Hurley, Royal Military College, hurley-m@rmc.ca
Saskatoon	Winfried Grassman, University of Saskatchewan, grassman@cs.usask.ca < http://www.engr.usask.ca/~kjk340/cors/corshome.htm >
Waterloo Student	Sean Kellington, University of Waterloo, sbkellin@uwaterloo.ca
Toronto Student	Allison Hewlitt, University of Toronto, hewlitt@mie.utoronto.ca

Paolo Toth wins the Larnder!

Paolo Toth has been awarded the 1998 Harold Larnder Memorial Prize. The Prize, which is financed through the Harold Larnder Memorial Trust of the Canadian Operational Research Society, is awarded annually to individuals who have achieved international distinction in Operational Research.

Dr. Toth is a Professor of Operations Research and Optimization Algorithms at the University of Bologna. His current research interests include Operational Research methodologies and, in particular, the study of Combinatorial Optimization, Graph Theory and Transportation problems. He has published over 60 papers in international journals, has published and edited books for the Wiley-Interscience Series in Discrete Mathematics and for the Annals of Operations Research. He is Co-Editor of the Software Section of Discrete Applied Mathematics and Associate Editor of the European Journal of Operational Research, Transportation Science, Foundations of Computing and Decision Sciences, Belgian Journal of Operations Research, Statistics and Computer Science, Journal of Heuristics, and Operations Research. Dr. Toth is also Past President of EURO and Chairman of the Program Committee of the Triennial IFORS Conference 1999.

Dr. Toth will deliver the Harold Larnder Memorial Lecture at the INFORMS / SCRO - CORS meeting in Montréal, on April 28 at 11:30 a.m. in the Marquette Room.

(For more on Dr. Toth see <<http://promet4.deis.unibo.it/toth.html>> and for more on the Larnder Prize see <<http://www.cors.ca/handbook/awards/larnder.htm>> .)

Paolo Toth reçoit le Larnder !

Le prix Harold Larnder a été décerné à Paolo Toth. Ce prix, financé par le Harold Larnder Memorial Fund de la Société canadienne de recherche opérationnelle, est remis chaque année à un scientifique qui s'est distingué sur la scène internationale par sa contribution à la recherche opérationnelle. Dr Toth prononcera la Conférence Harold Larnder au Congrès INFORMS /SCRO-CORS à Montréal, le 28 avril à 11h30, dans la salle Marquette.

Dr Toth enseigne la recherche opérationnelle et les algorithmes d'optimisation à l'Université de Bologne. Ses intérêts de recherche actuels incluent les méthodologies de recherche opérationnelle, notamment l'étude de l'optimisation combinatoire, la théorie des graphes et les problèmes de transport. Il a publié plus de 60 articles dans des revues internationales, il a publié et édité des ouvrages pour la Wiley-Interscience Series in Discrete Mathematics et pour Annals of Operations Research. Il est corédacteur de la section sur les logiciels de Discrete Applied Mathematics et rédacteur associé des revues European Journal of Operational Research, Transportation Science, Foundations of Computing and Decision Sciences, Belgian Journal of Operations Research, Statistic and Computer Science, Journal of Heuristics et Operations Research. Dr. Toth a également été président de EURO et il dirige le comité de programme du Congrès triennal de IFORS 1999.

Vous trouverez de plus amples renseignements sur Dr Toth à l'adresse suivante : <<http://promet4.deis.unibo.it/toth.html>>. Pour en savoir plus long sur le prix Larnder, consultez le site <<http://www.cors.ca/handbook/awards/larnder.htm>>.

Mise en nomination pour le Conseil 1998-99

Les postes suivants sont à pourvoir pour le Conseil 1998-99 de la SCRO:

Vice-Président (Président élu)
Secrétaire
Trésorier
Deux Conseillers
(mandat de deux ans).

Prière d'envoyer vos mises en nominations avant le 1 mars 1998 B:

Call For Nominations: Positions on the 1998/99 Council

The following positions are open for the 1998/99 CORS Council:

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

Please send your nominations by March 1, 1998 to:

Dr. Michel Gendreau
Président, Comité de nomination SCRO/CORS
Centre de recherche sur les transports
Université de Montréal
C.P. 6128, succursale Centre-ville
Montréal, Québec
Canada H3C 3J7
<michelg@crt.umontreal.ca>

New Bulletin Editor Needed:

Upon becoming President of CORS at the Annual General Meeting in Montreal (April 28, 1998), Rick Caron will resign as Bulletin Editor. If you wish to take on these duties, please contact Roger Roy.

Nous avons besoin d'un nouveau rédacteur en chef pour le Bulletin

En raison de sa nomination au titre de président de la SCRO qui sera officialisée dans le cadre de l'assemblée générale annuelle à Montréal le 28 avril 1998, Rick Caron démissionnera de son poste de rédacteur en chef du Bulletin. Si vous souhaitez prendre le relais, veuillez communiquer avec Roger Roy.

Mr. Roger L. Roy
1610 Des Grives Crescent
Oleons, ON K1C 5B8
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**BRAMSS - A Center for Applied Management Science
at the University of British Columbia
Martin L. Puterman, Director**

The Bureau for Research on the Application of Management Science and Statistics (BRAMSS) carries out applied research in UBC's Faculty of Commerce. BRAMSS provides a bridge between the university and the business community by applying operations research methods to solve operational and planning problems. BRAMSS stimulates research in applied operations through student and faculty involvement in projects, internships, courses, seminars and a working paper series. BRAMSS is co-sponsoring the June 1998 MSOM meeting in Seattle.

Through its base in UBC's world class Management Science Division and its affiliations with faculty in other UBC centres and institutions worldwide, BRAMSS provides innovative and timely solutions to a wide range of current operational problems. BRAMSS has carried out projects in collaboration with Avcorp Industries, BC Transit, BC Tel, Court Escort Services - BC Attorney General's Office, The BC Cardiac Registry, BC Maritime Employers Association, Canadian Tire Pacific Associates, ESCO Industries, UBC's Physical Plant and The Worker's Compensation Board of BC. Project details are described below. These projects have generated financial support from these organizations in addition to grant funding from the Natural Science and Engineering Research Council (NSERC) and the BC Advanced Systems Institute (BCASI). Projects have addressed issues in claims forecasting, scheduling and dead head reduction, job shop scheduling, maintenance, project prioritization and scheduling, inventory control and vehicle routing.

BRAMSS staff includes a full-time project manager - research associate, a full time financial manager-development officer, part-time analysts and computer systems administrators. Projects are supervised by faculty associates and are carried out by analysts and students. BRAMSS is run by a part-time director, an internal steering committee and an external advisory board. BRAMSS currently provides financial support for M.Sc. students, Ph.D. students and post-doctoral fellows through internships, grants and external projects. It anticipates many such opportunities in the future and is actively seeking additional students in the coming year.

Based on the success of BRAMSS, the Management Information Systems Division has developed the Bureau for Research on Information Technology (BRITE) to carry out applied research in information technology and collaborate with BRAMSS as necessary. BRAMSS and BRITE make up the Applied Research Services arm of the proposed Centre for Operations Excellence. Another key component of the COE is the Partners for Operations Excellence programme which will establish formal links between UBC and several public and private sector organizations.

Project details:

Avcorp Industries is a Richmond, BC based supplier of aerospace assemblies for Boeing, Canadair, de Havilland, Mc Donnell-Douglas and other aircraft manufacturers. Faced with long and highly variable cycle times in its sheet metal fabricating facility, Avcorp contacted BRAMSS to develop procedures to reduce cycle time. Using a simulation model, BRAMSS developed The queueing Management Tool, a finite capacity planning model which enables Avcorp management to investigate the impact of staffing decisions, prioritization rules and release rules on work in process and cycle times over the short term.

BC Transit operates busses in Vancouver and its surrounding areas. BRAMSS developed an integer programming based model to assign bus routes to depots to reduce system-wide deadhead (time spent driving empty busses from the ends of routes to depots). This model was used to investigate the impact of new depot locations and the effect of closing existing depots on total deadhead. The model also enabled BC Transit to investigate the effect of allowing different busses on the same route to be assigned to different depots.

Le BRAMSS
un centre de sciences de la gestion appliquées à l'Université de Colombie-Britannique
Martin L. Puterman, directeur

Incorporé à la Faculty of Commerce de la UBC, le Bureau for Research on the Application of Management Science and Statistics (BRAMSS) a pour mission la conduite de recherches appliquées. Agissant à titre d'intermédiaire entre l'université et les milieux d'affaires, le BRAMSS utilise des méthodes de recherche opérationnelle pour résoudre des problèmes opérationnels et de planification. Le BRAMSS fait la promotion de la recherche appliquée en incitant les étudiants et le corps professoral à participer à des projets, à des stages, à des cours, à des séminaires et à des documents de travail. Le BRAMSS coparraine le congrès de juin 1998 de MSOM à Seattle.

Grâce à sa position au sein de la réputée Management Science Division à la UBC et à affiliations avec des professeurs et des chercheurs dans d'autres centres de la UBC et dans des institutions à travers le monde, le BRAMSS est en mesure de présenter des solutions innovatrices pour un large éventail de problèmes opérationnels actuels. Le BRAMSS a réalisé des projets en collaboration avec Avcorp Industries, BC Transit, BC Tel, Court Escort Services - BC Attorney General's Office, The BC Cardiac Registry, BC Maritime Employers Association, Canadian Tire Pacific Associates, ESCO Industries, le service des installations de la UBC et le Worker's Compensation Board of BC. Vous trouverez ci-après une brève description de chacun de ces projets. Ces différents projets, qui ont reçu une aide financière des organismes visés ainsi que des subventions du Conseil de recherches en sciences naturelles et en ingénierie (CRSNI) et du BC Advanced Systems Institute (BCASI), s'attaquaient à divers problèmes, dont la prévision et l'ordonnancement de demandes d'indemnisation, la réduction du haut le pied, l'ordonnancement d'un service travaillant à la demande, l'établissement des priorités et l'ordonnancement de projets, la gestion des stocks et les tournées de véhicules.

L'équipe du BRAMSS comprend un gestionnaire de projet - chargé de recherche à plein temps, un directeur financier - agent de développement à plein temps, des analystes à temps partiel et des administrateurs des systèmes informatiques. Sous la supervision des membres du corps professoral, les projets sont exécutés par des analystes et des étudiants. Le BRAMSS est administré par un directeur à temps partiel, un comité directeur interne et un conseil consultatif externe. Actuellement, le BRAMSS accorde une aide financière aux étudiants de maîtrise M.Sc., de doctorat et aux détenteurs de bourses de recherches postdoctorales par le biais de stages, de subventions et de projets externes. Comme de nombreux projets sont envisagés dans un avenir prochain, le BRAMSS recherche activement des étudiants additionnels pour l'année à venir.

Suite au succès obtenu par le BRAMSS, la Management Information Systems Division a mis en place le Bureau for Research on Information Technology (BRITE) qui conduira des recherches appliquées en technologie de l'information et collaborera au besoin avec le BRAMSS. Le BRAMSS et le BRITE constitueront le volet Applied Research Services du Center for Operations Excellence projeté. Le programme Partners for Operations Excellence est un autre élément clé du COE qui établira des liens formels entre la UBC et plusieurs organismes des secteurs public et privé.

Description des projets

Située à Richmond, Colombie-Britannique, l'entreprise Avcorp Industries est un fournisseur d'assemblages pour Boeing, Canadair, de Havilland, Mc-Donnell-Douglas et d'autres avionneurs. Aux prises avec des temps de cycle longs et extrêmement variables dans ses usines de finition de tôlerie, Avcorp a demandé au BRAMSS d'élaborer des procédés afin de réduire le temps de cycle. À partir d'un modèle de simulation, le BRAMSS a mis au point le « Queuing Management Tool », un modèle de planification de capacité restreinte qui permet aux dirigeants de Avcorp d'évaluer l'impact de décisions en dotation, des règles de priorité et des règles de disponibilité sur les travaux en cours et les temps de cycle à court terme.

BC Tel is the major telephone company in British Columbia and is facing many challenges in light of deregulation of telephone service. BRAMSS is working with BC Tel to deal with several of these operational challenges. It has carried out an operational review of its surveillance department and developed a simulation model of the call centre in its customer database administration area which investigates the impact of staffing, training and scheduling decisions on response times. Currently BRAMSS is developing an integer programming based corporate wide planning model which selects and schedules projects to implement subject to workforce and equipment availability and capital and operating budget constraints.

The Court Escort Services (CES) in BC Attorney General's Office moves prisoners between correctional centres and courts throughout BC's Lower Mainland. BRAMSS is working with CES to develop a new and more efficient system for prisoner movement. Issues being investigated include appropriate performance measures, flexible scheduling, decentralization of vehicle depots and combination of several existing escort services. The eventual goal is develop a dispatching system for vehicle and prisoner movement.

The BC Cardiac Registry maintains a database containing records for all cardiac operations performed in British Columbia. BRAMSS designed, provided ongoing consultation and assisted with data analysis for a reliability audit of the database. This audit compared information in the database to records in patients charts in selected fields. Measures of performance and factors with high error rates were detected. Recommendations for improving reliability were provided and a paper on this topic was published.

The BC Maritime Employers Association is responsible for training dock workers and maintaining detailed records of workforce activity, skills and availability. BRAMSS in collaboration with SCARL (The Statistical Consulting and Research Laboratory at UBC) carried out an investigation of causes for workforce shortages and provided recommendations on desirable skill mixes for workers. BRAMSS developed a set covering model to determine if by reallocating workers, all job could have been filled on days in which there were shortages.

Canadian Tire Pacific Associates operates 21 retail stores in BC's lower mainland. Faced with high levels of in store inventories, Canadian Tire contacted BRAMSS to design an inventory control system to reduce inventory costs and maintain high service levels. BRAMSS designed a data collection procedure and a model to efficiently compute optimal ordering policies which satisfied a service level constraint. Special attention was devoted to develop a model which worked well for "slow-moving" products. The research for this project was carried out as part of Brian Kapalka's MSc. Dissertation and was awarded a prize for the best student publication of the Canadian Association of Logistic Management.

ESCO Industries is a Portland, Oregon based manufacturer of hardware for the construction industry. ESCO contacted BRAMSS to develop a model to set inventory levels for its slow moving products. To account for long lead times, BRAMSS developed a model to determine optimal reorder points and order quantities using a stochastic simulation combined with a search algorithm. BRAMSS is working with ESCO to integrate this optimization module with its new enterprise wide information system.

UBC's physical plant operates boilers which deliver heat to all campus buildings. BRAMSS developed a computer simulation model to investigate whether the current configuration was adequate to meet projected needs and to compare different preventive maintenance strategies.

The Worker's Compensation Board of BC (WCB) provides employee's with benefits in the case of on the job injuries. BRAMSS developed a claim forecasting system which provides monthly forecasts of short term disability claims broken down into many sub categories. These forecasts are used by WCB for premium setting and staffing decisions. The forecasting engine determines optimal forecasts by pooling forecasts from Holt-Winters and automatic autoregressive models. Pooling weights are chosen to best fit a hold out sample of data. A quadratic programming model is used to balance sub-category and total forecasts.

BC Transit exploite un service d'autobus à Vancouver et dans les régions avoisinantes. Le BRAMSS a développé un modèle de programmation en nombres entiers pour l'affectation des parcours d'autobus vers les dépôts en vue de réduire le haut le pied (temps pendant lequel les autobus vides, à la fin de leur parcours, se rendent au dépôt) pour l'ensemble du système. On a utilisé ce modèle pour évaluer l'impact des nouveaux emplacements des dépôts et de la fermeture des dépôts existants sur le haut le pied total. Ce modèle a aussi permis à BC Transit d'évaluer l'effet de l'affectation de différents autobus de la même ligne vers des dépôts différents.

BC Tel est la principale compagnie de téléphone de Colombie-Britannique et avec l'entrée en vigueur de la déréglementation des services téléphoniques, cette entreprise fait face à de nouveaux problèmes opérationnels. Le BRAMSS collabore avec BC Tel pour résoudre plusieurs de ces problèmes. Il a effectué une analyse opérationnelle du service de surveillance et a mis au point un modèle de simulation du centre téléphonique dans le secteur de gestion de la base de données des clients qui permet d'évaluer l'impact des décisions en matière de dotation, de formation et d'établissement des horaires sur le temps de réponse. Le BRAMSS travaille actuellement au développement d'un modèle de planification par programmation en nombres entiers pour l'ensemble de l'entreprise qui sélectionne et ordonne les projets à réaliser en fonction de la disponibilité des effectifs et de l'équipement et des contraintes du budget d'exploitation et d'établissement.

Les Court Escort Services (CES) du BC Attorney's General's Office sont responsables des déplacements des détenus entre les centres correctionnels et les tribunaux dans la région « Lower Mainland » de la Colombie-Britannique. En collaboration avec le CES, le BRAMSS travaille à l'élaboration d'un système de déplacement des détenus plus efficace. Divers éléments doivent être examinés, notamment les mesures de rendement, l'établissement d'horaires flexibles, la décentralisation des dépôts de véhicules et la combinaison de services d'accompagnement existants. Ce projet vise l'instauration d'un système de répartition pour le déplacement des véhicules et des détenus.

Au BC Cardiac Registry, on tient à jour une base de données où sont consignées toutes les interventions en cardiologie effectuées en Colombie-Britannique. Le BRAMSS a développé et fourni un service de consultation régulier et a participé à l'analyse des données en vue d'une vérification de la fiabilité de la base de données. Dans le cadre de cette vérification, on a comparé l'information de la base de données aux renseignements contenus dans les dossiers des patients dans des secteurs spécifiques. On a ensuite dégagé les mesures de rendement et les facteurs dont le taux d'erreur était élevé. Le BRAMSS a émis des recommandations visant à améliorer la fiabilité du système et un article à ce sujet a été publié.

La BC Maritime Employers Association est responsable de la formation des travailleurs de quai et de la tenue de registres détaillés sur les activités, les qualifications et la disponibilité de sa main-d'œuvre. En collaboration avec le SACRL (Statistical Consulting and Research Laboratory à la UBC), le BRAMSS a examiné les causes à l'origine des déficits en main-d'œuvre et a émis des recommandations sur les combinaisons de qualifications souhaitables pour les travailleurs. Le BRAMSS a développé un modèle de recouvrement d'ensemble pour déterminer si par une réaffectation des travailleurs, on aurait pu combler tous les postes les jours où les effectifs étaient insuffisants.

Canadian Tire Pacific Associates exploite 21 magasins de détail dans le « Lower Mainland » de la Colombie-Britannique. Aux prises avec des niveaux de stock élevés dans les magasins, Canadian Tire a demandé au BRAMSS de concevoir un système de gestion des stocks visant à réduire les frais de stockage et à maintenir un niveau de service élevé. Le BRAMSS a élaboré un procédé de collecte des données et un modèle visant à établir des politiques d'ordonnancement optimal permettant de satisfaire aux contraintes de niveau de service. On s'est attaché à développer un modèle s'appliquant aux produits à circulation lente. La recherche pour ce projet a été effectuée par Brian Kapalka dans le cadre de son mémoire M. Sc. qui a reçu le prix de la meilleure publication par un étudiant décerné par la Canadian Association of Logistic Management.

ESCO Industries est un fabricant de matériaux de construction situé à Portland, Oregon. ESCO a demandé au BRAMSS de développer un modèle visant à établir les niveaux de stock pour ses produits à circulation lente. Prenant en compte les longs délais d'approvisionnement, le BRAMSS a conçu un modèle qui fait appel à la simulation stochastique combinée à un algorithme de recherche afin de déterminer les points de commande optimaux et les quantités commandées. Le BRAMSS travaille

conjointement avec ESCO pour intégrer ce module d'optimisation au nouveau système informatique général de l'entreprise.

Le service des installations de l'UBC gère les chaudières qui distribuent la chaleur à tous les bâtiments du campus. Le BRAMMS a mis au point un modèle de simulation visant à déterminer si la configuration actuelle convient aux besoins prévus et à la comparer à différentes stratégies d'entretien préventif.

La Worker's Compensation Board of BC (WCB) indemnise les employés dans les cas de blessures et de maladies professionnelles. Le BRAMSS a élaboré un système de prévision des demandes d'indemnisation qui établit des prévisions mensuelles pour les demandes d'indemnisation pour invalidité à court terme ventilées en plusieurs sous-catégories. La WCB utilise ces prévisions pour fixer les primes et pour prendre des décisions en matière de dotation. L'outil de prévision établit des prévisions optimales en combinant les prévisions de Holt-Winters et des modèles autorégressifs automatiques. Les poids ont été choisis de manière à convenir à un échantillon isolé de données. On utilise un modèle de programmation quadratique pour équilibrer les prévisions de chacune des sous-catégories et de l'ensemble.



From the Ottawa Chapter

These items are from Volume 7 of OR-Bits, the newsletter of the Ottawa Chapter of the Canadian Operational Research Society (Le bulletin de la section locale d'Ottawa de la Société Canadienne de Recherche Opérationnelle). The 1997 / 98 Executive is:

President	François Julien, Tel: (613) 562-5800 x 4788 E-Mail: Julien@admin.uottawa.ca
Treasurer	George Haines, Tel: (613) 520-2600 x 7487, E-Mail: Ghaines@ccs.carleton.ca
Special Events	Robin Harvey, Tel: (613) 598-2500 E-Mail: harvro@edc2.edc.ca
OR-Bits Editor	Agathe Martin Tel: (819) 953-2934 E-Mail: amartin@tygerteam.com

The 1997-98 activities got off to a good start with a November 26th seminar by Mike Carter on "Operations Research Opportunities in Health Care". The seminar was in collaboration with the Faculty of Administration of the University of Ottawa. Another activity scheduled is OR-Days. It will take place in the spring of 1998. The dates have yet to be finalized. The last activity will be the election of the 1998 executive which will be held in the spring.

(**Editor's Note:** *The Ottawa Student Chapter, which was inactive for some time, has been rolled into the Ottawa Chapter.*)

Report on Mail Ballots

This year the Society had mail ballots on two issues: A change in the allocation of dues and conference profits, and a constitutional change eliminating the "Associate Member" distinction. (See Volume 31 Number 2.) The result for the dues / profits ballot was 117 for with 3 against. The membership change was approved with 118 for and 1 against. The updated constitution, French and English versions, can be found at www.cors.ca.

Résultats des scrutins par la poste

Cette année, la Société a procédé à deux scrutins par la poste : le premier portait sur un changement dans la répartition des cotisations et des profits des congrès et le second, sur un changement à la constitution visant à éliminer le titre de « membre associé ». (Se reporter au volume 31, numéro 2). Pour le scrutin sur les cotisations et les profits des congrès, on a obtenu 117 voix pour et 3 voix contre. Le changement relatif aux membres a été approuvé par un vote de 118 voix pour et 1 voix contre. On peut consulter la version révisée de la constitution, en anglais et en français, dans le site www.cors.ca.



Our National Contribution to IFORS XV.

The 15th Triennial Conference of the International Federation of Operational Research Societies is being held in Beijing, P.R. China from August 16 - 20, 1999. As a Member Society, CORS will select a paper to be presented as Canada's National Contribution. If you plan to attend the conference, and if you wish your paper to be considered as the National Contribution, please send your abstract to any member of the Selection Committee: David Martell, Michel Gendreau, or Rick Caron (see page 2 for addresses). A \$100 honorarium will be awarded to the selected candidate.

Notre contribution nationale à IFORS XV.

Le XV^e Congrès triennal de la Fédération internationale des sociétés de recherche opérationnelle aura lieu à Beijing, République populaire de Chine, du 16 au 20 août 1999. En tant que société membre, la SCRO choisira un article qui sera présenté à titre de Contribution nationale du Canada. Si vous comptez participer au congrès et que vous souhaitez soumettre votre article, veuillez en faire parvenir le résumé à l'un ou l'autre des membres du comité de sélection : David Martell, Michel Gendreau ou Rick Caron (vous trouverez leurs adresses à la page 2). Une somme de 100 \$ sera remise au candidat retenu.

BLACKETT MEMORIAL LECTURE 1997
Prof. Emeritus C. E. Law

The Blackett Memorial Lecture is given each year by the Operational Research Society (ORS) of the United Kingdom, but the 1997 lecture was a special occasion in that it was the 100th anniversary of Lord Patrick Maynard Stuart Blackett's birth. Because of this, those who were Founding Members of the ORS were invited to attend, and I was included. Through the auspices of CORS and the School of Business at Queen's University, most of my travel expenses were covered, which helped make the occasion memorable. I was somewhat taken aback to discover that, at age 75, I was one of the oldest in attendance, and indeed, was one of the earliest members. Naturally I pointed out that Sir Charles Goodeve was Canadian, and that Harold Larnder, and, of course, Dr. Omond Solandt were very early participants in the OR game, and that both had been founders of the OR Club, the forerunner of ORS (UK), and also of CORS.

The lecture was held in the Meeting Room of the Linnean Society in Burlington House, on Piccadilly, near Green Park. The Linnean Society was founded in 1788, and moved into its present quarters in 1873. It was in the previous rooms across the courtyard, that the Darwin/Wallace paper on the Origin of Species was read in 1858. It is equally interesting to realize that Darwin's descendent, also Charles Darwin, was one of the original scientists in Operational Research in the Second World War. The Linnean Society is now the oldest scientific society in the world devoted to natural history.

Patrick, Baron Blackett of Chelsea, born 18 November 1897, was a naval officer in the First World War, but resigned his commission to study physics at Cambridge, where he worked on cosmic rays. In 1934 he was called in with Sir Henry Tizard and A.V. Hill to form one of the earliest special teams to assist in the development of radar. Later, after a highly successful tour with AA Command of the Army and then with Coastal Command of the RAF, his own team soon became popularly known as Blackett's Circus. Blackett was called upon in 1942 to be Naval Chief Advisor of Operational Research which, in 1944, was changed to Director of Naval Operational Research. He supervised much of the seminal work on both convoys and anti-U-boat warfare. He was awarded the Nobel Prize in physics in 1948 for his work on nuclear physics, cosmic rays and rock magnetism. From 1947 until 1964 he became effectively persona non grata with Western governments, including his own, partially because of his wartime quarrels with Air Marshall Slessor and Lord Cherwell (Prof. Lindeman) regarding the area bombing campaign and partially because of his views on nuclear weapons. This was reversed under the Labour government in 1964. Blackett later became President and Fellow of the Royal Society. He was made a Life Peer in 1969. Blackett was also noted for his controversial analysis of wartime decision making (Studies of War, Oliver and Boyd, London, 1961). Lord Blackett died in 1974. A summary of his career can be found in Lovell's 1987 Blackett Memorial Lecture (Lovell, B., "Blackett in War and Peace", J. Opl. Res. Soc. 39: 226-257.)

Before introducing the Memorial Lecture, the Goodeve Silver Medal was presented by the President of ORS, Dr I.J. Disley, to this year's two winners, Chris Yates and Dr. Tahir Rehman for their study of LP Models in Bovine Reproductive Technology in Agriculture, combining Markov Chain modelling with LP. (The medal is in honour of British OR pioneer Sir Charles Goodeve, also originally a Canadian, who worked actively with Omond Solandt to have CORS qualify for admission to IFORS.)

The Blackett Memorial speaker was W.W. Cooper, Foster Parker Professor of Finance and Management (Emeritus) at University of Texas at Austin. Well known as one of the earliest proponents of Linear Programming (Charnes, A., and W.W. Cooper, Management Models and Industrial Applications of Linear Programming, New York, John Wiley and Sons, 1961) and also Chance Constrained Programming (Charnes, A. and W.W. Cooper, "Chance Constrained Programming", Management Science 6, 1959), he is also known for the more recently developed Data Envelopment Analysis. Cooper was a Founder and first President of TIMS, the Institute of Management Sciences. He announced the title of his address as: "OR and MS, Where it is and Where it Should be Going?"

Professor Cooper noted that Blackett was really an instrumentalist rather than a philosopher in physics, that is, he was noted for developing instrumentation useful in many areas of physics and geology. OR too has moved in the direction of the development of tools. But Cooper favours more of the soft areas of OR. He spoke of DEA as a move in that direction. He pointed to one of Blackett's analyses

in March of 1942 in which he pointed out that the proposed extension of heavy bombing to Berlin and other major German cities in order to help the struggling Russians, would cost much more in bomber crews lost than in German workers killed. The Germans lost more in road accidents than the bombing would cause. Blackett and his supporters, especially Sir Solly Zuckerman, were over-ruled, and Harris had his bombing campaign. Cooper also noted that the OR of wartime days tended to use standard methods of calculus, largely ignoring the powerful potential of the statistical theories then being developed at the Rothamstead Research Station to deal with agricultural field trial analysis, a philosophy that could have had a powerful impact on the thinking of the day, but was somehow ignored. Cooper also noted that Tukey and Hunter in the US quarrelled over the use of statistics in exploratory data analysis, with the consequence that their department was disbanded, losing that potential. Cooper felt that some combination of these approaches was what was needed in the future, and described the Fed-Ex story as an example of forward looking analysis of a new kind that led to a turn around from a failing industry to an outstanding success. This is real OR/MS at its best.

In defining applications and challenges to OR/MS he pointed to an Australian study using DEA, Data Envelopment Analysis, to analyze an extremely large volume of data from one of the largest mines in the world. Without the DEA approach using the RAM Model the simple volume of the data would have been overwhelming and the results obscure. It is this sort of direction that shows great promise for dealing with the excess of data now produced by our information age. (Cooper and Pastor, General Efficiency Models (GEMs) and Model Relationships for Use in DEA, J Prod. Analysis.) He then laid out the fundamental DEA RAM Model, which is NOT reproduced here. He then compared the DEA approach with the statistical approach.

	DEA	Statistics
1.	n operations on n observations	one operation on n observations
2.	best estimate for each observation	best estimate for the mean observation
3.	oriented to individual observations	oriented to central tendencies
4.	emphasis on sufficient conditions	emphasis on necessary conditions
5.	used for causality	used for causality

Prof. Cooper expanded on the Fed Ex story as an outstanding example of the application of OR/MS methodology. The initial idea of the founder and CEO of Federal Express Corporation, Frederick W. Smith, a keen pilot, was to establish an 11 city network over which to move small-sized, high-value air cargo with overnight delivery using small jet aircraft, then available in some numbers at a good price. A company of fellow enthusiasts and investors was formed, but in practice the idea proved a dismal failure - not enough cargo, and Fed Ex Corporation was in danger of bankruptcy. Next, a 112-city, origin-destination computer model was developed, with OR assistance, from which a satisfactory 26-city system was derived. Within a few months this system had to be enlarged to attract additional capital, and earn additional revenue. These and later OR models were used to "sell" the concepts to both management and investors. The OPEC crisis and resulting fuel restrictions led to an urgent need to develop several new models for an 82-city system. Within months, the need for an engine overhaul strategy led to further modelling (FLY, Joe/Engine, and ultimately, various versions of AUTOROUTE) which was used to lobby for the Air Cargo Reform Bill. Further modelling enabled Fed Ex to expand and evolve into a highly profitable company with 1996 revenues in excess of \$8 billion US. (Mason, R.O., J.L. McKenney, W. Carlson, and D. Copeland (the latter from U. Western Ontario), "Absolutely, Positively Operations Research: The Federal Express Story", Interfaces 27:2 March-April 1997). In Prof. Cooper's words, the Fed Ex story in particular reveals the presence of new opportunities and new challenges in OR, despite any rumours of its decline and death. It shows:

- A need for new methods and approaches
- The value of simulation
- The potential for Data Mining and pattern recognition
- The potential for Data Envelopment Analysis

Prof. Cooper then drew attention to two studies in the hospital care field: "Diagnosis Related Groups (DRGs) and Prospective Payment Systems (PPS) in Health Care" by R. Fetter, which appeared in Interfaces 21. DRGs were originally developed to provide product definitions for the output of hospitals. They were adopted by (US) Medicare in 1983 to serve as the basis for a prospective payment system

(PPS) for US hospitals. This system has resulted in savings of more than \$50 billion US in Medicare hospital payments through 1990. More than 20 countries are currently developing DRG-based systems for managing and financing hospital care. Fetter used Cluster Analysis which permitted the identification of suitable measures for predicting and controlling cost factors. (Fetter, R.B., "Diagnosis Related Groups: Understanding Hospital Performance", Interfaces 21:1, Jan-Feb 1991.) The following are some of the statistical and simulation approaches that were used:

- Statistics and DEA versus DEA and then statistics
- Chance constrained programming and DEA
- Multiple Objective Programming and DEA
- Reliability Theory and DEA
- Neural Networks
- Solution Typing and DEA
- Data Mining and Exploratory Data Analysis

Cooper then discussed at some length a study of the performance of public schools in Texas where the volume of data obscured the analysis completely. The use of DEA to examine the efficiency of schools enabled a more clear cut definition of the effort required to improve results. Again, multi objective programming and DEA, and Role Programming and DEA were suggested as approaches to such problems. Prof. Cooper used other examples to lead to the conclusion that liaisons with other models, approaches and disciplines is required. The possibilities for application of Prof. Cooper's concepts and analysis to both hospital costs and measuring the efficiencies of elementary schools in Ontario is intriguing.

The social aspects of the meetings were quite interesting. About 80 persons attended "Tea and Biscuits" before the lecture and about 24 invited guests were present at the dinner following the lecture. Several old friends of CORS were present. The attendees included Prof. Cooper, Sam Eilon and daughter, Patrick Rivett, Companions of the OR Society: Brian Haley, George Mitchell, Jack Plyman, Maurice Shutler, Rolfe Tomlinson and Mr. Watkins; Past Presidents: Jonathan Rosenhead, R. Stanton, Lyn Thomas, and Paul Thornton; and Invited guests: including officers, and Members in 1953, Ian Disley (President), Robert Dyson, Mr. Glaskin, Bill Hancock, Mr. Hopkins, Mr. Jackson, Mr. Stringer and Cec Law. Also attending were Goodeve Medal Winners Dr. Tahir Rehman and Chris M. Yates. All in all, a most memorable occasion.

(It was also fascinating to compare the London of November 1997 with the London I had known in 1942 and early 1944, and later in 1955, 1956 and 1960. I couldn't believe I had once dared to drive there!)

INFOR SPECIAL ISSUES ALERT

INFOR has long been known for its Special Issues, and over the years readers have expressed an interest to see more of these. As one of the Editors of INFOR, I would like to encourage anyone who has an idea for a S.I. to submit a brief proposal regarding the subject area. Send it along to myself or to Mina Wright, the Information Systems Editor, or directly to David Wright, Editor In Chief. Wade D. Cook CORS Editor

NUMÉROS SPÉCIAUX DE INFOR

INFOR est reconnue pour ses numéros spéciaux et, au fil des ans, les lecteurs ont maintes fois exprimé le souhait d'en voir publier un plus grand nombre. À titre de rédacteur d'INFOR, j'aimerais inviter toute personne qui a une suggestion pour un numéro spécial à présenter une brève proposition relative au domaine choisi. Veuillez me la faire parvenir ou l'envoyer à Mina Wright, rédactrice, Systèmes d'information, ou directement à David Wright, rédacteur en chef. Wade D. Cook, rédacteur, Recherche opérationnelle

NEW EDITORIAL POLICY**POLITIQUE ÉDITORIALE D'INFOR**

INFOR offre à ses lecteurs des articles dans deux domaines importants du savoir: les systèmes d'information et la recherche opérationnelle. On a voulu rapprocher ces deux disciplines dans une même publication, car elles visent toutes deux à l'application des méthodes quantitatives en administration. Cette intégration souligne également les objectifs pratiques que s'est donnés INFOR, les concepts des systèmes d'information trouvant leur application dans la mise en oeuvre des modèles de recherche opérationnelle.

On invite les auteurs à soumettre des articles portant sur la théorie, la méthodologie ou la pratique de la recherche opérationnelle ou des systèmes d'information, y compris des articles faisant appel à des éléments des deux disciplines. Se voulant un moyen de communication privilégié entre théoriciens et praticiens, INFOR publie volontiers des articles présentant l'application de nouveaux concepts et approches à des problèmes importants rencontrés dans la pratique, incluant les études de cas. Les articles de nature plus théorique sont aussi les bienvenus dans la mesure où les auteurs démontrent clairement l'intérêt des résultats présentés en termes d'applications.

INFOR EDITORIAL POLICY

INFOR provides its readers with papers on a powerful combination of subjects: Information Systems and Operational Research. The importance of combining IS and OR in one journal is that both aim to expand quantitative scientific approaches to management. The integration of these two subjects also enhances the applied orientation of INFOR, since IS concepts are used in the practical implementation of OR models.

Authors are invited to submit papers on the theory, methodology and practice of either OR or IS, including papers incorporating elements of both subjects. As a medium of communication between academics and practitioners, INFOR welcomes papers, including case studies, that demonstrate novel approaches and concepts applied to important practical situations. As well, INFOR welcomes papers of a more theoretical nature, provided the author demonstrates clear applications of the work presented.

CURRENT CONTENTS OF INFOR**VOLUME 35 NUMBER 4, NOVEMBER 1997*****Special issue on, "Intelligent Scheduling of Robots", edited by Eugene Levner and Jeffrey Sidney.***

H. Nagamochi, K. Mochizuki and T. Ibaraki, "Complexity of the single Vehicle Scheduling Problem on Graphs"

M. Wang, S. Sethi, C. Sriskandarajah and S. Van De Velde, "Minimizing Makespan In Flowshops with Pallet Requirements: Computational Complexity"

K. Tanaka and M. Vlach, "Minimizing the Range of Lateness on a Single Machine Under Generalized Due Dates"

Z. Nutov, M. Penn and D. Sinreich, "On Mobile Robots Flow in Locally Uniform Networks"

C. Varnier, A. Bachelu and P. Baptiste, "Resolution of the Cyclic Multi-hoists Scheduling Problem with Overlapping Partitions"

CURRENT CONTENTS OF INTERNATIONAL TRANSACTIONS IN OPERATIONAL RESEARCH (IFORS)**VOLUME 4, NUMBER 5/6, SEPTEMBER/NOVEMBER 1997*****Special issue on, "Intelligent Scheduling of Robots", edited by Eugene Levner and Jeffrey Sidney.***

Mingzhe Li and Masanori Fushimi, "The efficiency analysis of skyscrapers based on the inner traffic"

Erne Houghton and Victor Portugal, "Trade-offs in JIT production planning for multi-stage systems: balancing work-load variations and WIP inventories"

Thomas Ingold and Heinz Gröflin, "Feasible sequential decisions and a flexible Lagrangean-based heuristic for dynamic multi-level lot sizing"

Karl-Werner Hansmann and Michael Hoeck, "Production control of a flexible manufacturing system in a job shop environment"

A. Kennings and A. Vannelli, "VLSI placement using quadratic programming and network partitioning techniques"

Susumu Okumura, "An inspection policy for deteriorating processes using delay-time concept"

Peter Schwerin and Gerhard Wäscher, "The bin-packing problem: a problem generator and some numerical experiments with FFD packing and MTP"

François Leclerc and Jean-Yves Potvin, "Genetic algorithms for vehicle dispatching"

Dragan Radojevic and Sanja Petrovic, "A fuzzy approach to preference structure in multicriteria thinking"

Des nouvelles de Québec

(*présenté par Bernard Lamond*)

Cette année, la section locale de Québec a organisé une série de séminaires à l'Université Laval, conjointement avec le groupe CRAEDO (Centre de recherche sur l'aide à l'évaluation et à la décision dans les organisations) et le département OSD (Opérations et systèmes de décision). Voici le calendrier des conférences.

SÉMINAIRES CRAEDO - SCRO - OSD 1997 - 1998

JEUDI 11 DÉCEMBRE - 14 HEURES: Professeure Grazyna Trzpiot, Department of Econometrics, Karol Adamiecki University of Economics, Katowice, Pologne, "Multivalued stochastic dominance in optimal portfolio selection: Evidence from the Warsaw stock exchange"

JEUDI 18 DÉCEMBRE - 9H30: Professeur Philippe Vincke, Vice-recteur à la recherche Université Libre de Bruxelles, Belgique, "Le problème du choix d'une méthode d'aide multicritère à la décision"

JEUDI 18 DÉCEMBRE - 10H45: Professeur Michel Bigras-Poulin, Faculté de médecine vétérinaire Université de Montréal, "Information Épistémologie et point de vue d'un épidémiologiste"

VENDREDI 20 FÉVRIER - 10H30: Professeur Laszlo Nandor Kiss, Faculté des sciences de l'administration, Université Laval, Québec, "Hiérarchisation des projets d'investissement dans l'infrastructure de transport sous une contrainte d'allocation quasi-uniforme des ressources, assistée par une procédure d'analyse multicritère"

(*)VENDREDI 6 MARS - 10H30: Professeur Horand Gassmann, Université Dalhousie, Halifax, "Stochastic programming: Models and algorithms"

VENDREDI 20 MARS - 10H30: Professeure Danielle Marceau, Département de géographie, Université de Montreal, Professeur Michel Bigras-Poulin, Faculté de médecine vétérinaire, Université de Montreal, Professeurs Maurice Landry, Jean-Marc Martel et Claude Banville, Faculté des sciences de l'administration, Université Laval, Québec, "Développement d'une approche globale de gestion intégrée d'un territoire agricole à vocation de productions animales"

VENDREDI 27 MARS - 10H30: Professeur Marc Gravel, Département d'informatique et mathématiques, Université du Québec à Chicoutimi, Professeur Wilson L. Price et Mme Caroline Gagné, Faculté des sciences de l'administration, Université Laval, Québec, "La conception de cellules manufacturières sérielles pour un atelier général kanban"

VENDREDI 3 AVRIL - 10H30: Monsieur Slim Ben Khelifa, Faculté des sciences de l'administration, Université Laval, Québec, "Aide multicritère à la décision de groupe"

JEUDI 16 AVRIL - 12H (MIDI): Dr. Belaid Aouni, Direction de la recherche opérationnelle et de la planification, Direction générale du cadastre, Ministère des ressources naturelles, Québec, Professeurs Ossama Kettani et Jean-Marc Martel, Faculté des sciences de l'administration, Université Laval, Québec, "La linéarisation des expressions quadratiques en programmation mathématique : des bornes plus efficaces"

VENDREDI 17 AVRIL - 10H30: Professeur Jean-Pierre Villeneuve, MM. Alain Mailhot, Alain N. Rousseau, Jean-François Tremblay, Richard Turcotte, Marc Duchemin, Université du Québec, INRS-Eau, Ste-Foy, M. Jacques Dupont, Ministère de l'Environnement et de la Faune, Québec. "GIBSI, un système de modélisation hydrologique intégrée et d'aide à la décision pour la gestion de l'eau par bassin versant"

VENDREDI 24 AVRIL - 10H30: Professeur Ulrich Rieder, Université de Ulm, Allemagne, "Hedging and portfolio-optimization in discrete-time financial markets: A martingale approach"

(*) Les coûts de déplacement du professeur Gassmann sont défrayés en partie par le Programme de conférenciers itinérants de la SCRO.

Congrès conjoint INFORMS / SCRO-CORS du printemps 1998

(40e Congrès annuel de la SCRO)

Montréal, Québec, du 26 au 29 avril 1998

« www.crt.umontreal.ca/mtl98/ »

News From the Calgary Chapter

The 1997-1998 officers of the Calgary chapter of CORS are:

President:	Jaydeep Balakrishnan
Vice President:	John Heffer
Secretary:	Maurice Elliott
Treasurer:	Cradock Spence
Program Director:	Thorn Walden
Directors:	James Morrison, Thomas Grossman, Dorothy Jones

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SSHRC Funding for National Conference Attendees

(submitted by John Blake)

For the past several years CORS has received a small amount of funding from the Social Sciences and Humanities Research Council (SSHRC) under their program of support for scholarly associations. The purpose of the grant is to provide travel assistance for individuals attending the annual CORS conference. Monies granted by SSHRC under the scholarly associations program may be used to fund travel and accommodations, but not conference fees.

In the past, chapters have applied to CORS national for SSHRC funds on behalf of their members. Starting this year, SSHRC travel grants will be available directly to individuals. As in the past, a limit of \$400 per person will apply. Priority for funding will be given to student members giving papers, other student members, senior member without other funding (e.g., NSERC grants, or company paid travel), and geographically distant members.

Applications for funding can be made by writing or sending an e-mail to John Blake at the address given below. Applications need not be formal. Please provide an outline of your travel plans and give some indication that other funding sources are not available. Applications should be made by March 30, 1998 to John Blake (address below).

Subventions du CRSH pour les participants du congrès

(sujet présenté par John Blake)

Au cours des dernières années, la SCRO a reçu de petites subventions du Conseil de recherches en sciences humaines (CRSH) en vertu de son programme d'aide aux sociétés savantes. Cette subvention vise à financer les frais de déplacement des personnes qui assistent au congrès annuel de la SCRO. Les sommes versées par le CRSH dans le cadre de son programme d'aide peuvent être utilisées pour financer les frais de déplacement et de séjour, mais non les frais d'inscription au congrès.

Par le passé, certains chapitres ont présenté une demande auprès du bureau national de la SCRO pour obtenir des subventions du CRSH au nom de leurs membres. À compter de cette année, les participants pourront s'adresser directement au CRSH pour obtenir une subvention de déplacement. Une limite de 400 \$ par personne s'applique. On donnera la priorité aux membres étudiants qui présentent un article, puis aux autres membres étudiants, aux membres sans autre financement (subvention du CRSNG ou déplacement payé par une entreprise) et aux membres provenant de régions éloignées.

Vous pouvez envoyer votre demande de subvention par la poste ou par courrier électronique à John Blake, à l'adresse indiquée ci-dessous. Il n'est pas nécessaire de présenter la demande sous une forme officielle. Il vous suffit de fournir un sommaire de votre programme de voyage et de préciser que vous ne bénéficiez d'aucune autre source de financement. Vous devez présenter votre demande d'ici le 30 mars à l'adresse suivante :

John Blake
CORS Treasurer
Dalhousie University Polytechnic
Department of Industrial Engineering
PO Box #1000
Halifax, NS B3J 2X4
Phone: (902) 420-7806
Email: blakejt@tuns.ca

Software Announcement¹

Advanced Decision Support for Nonlinear Systems Modelling and Optimization²

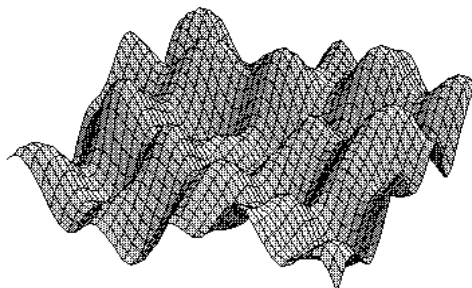
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János D. Pintér
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Decision models are important tools in many areas of scientific investigations. Global optimization (GO) is aimed at finding the best solution of nonlinear models, in presence of multiple local solutions (which represent only 'pseudo-optima'). GO problems are frequently met in practice: model fitting (calibration), and systems of nonlinear equations are just two prominent examples. They also represent a substantial theoretical, as well as numerical challenge [1, 3, 4].

The research monograph [3] is devoted to the subject of continuous and Lipschitz global optimization. It discusses algorithm development, implementation aspects, and a variety of scientific and engineering applications. As a follow-up to this work, a decision support system for continuous global optimization has been developed. The program system LGO solves GO problems under very general structural assumptions. Hence, it is particularly suitable to analyse problems which are related to complete, stand-alone ('black box') system models, or to models supported by limited, difficult-to-use analytical information.

Problem formulations can be submitted to LGO by simply providing the functions describing the problem (explicitly, in object code form, or even by calls to external executable programs). These options leave ample room for connectivity with other applications. Note in this context that since LGO has been developed using the Fortran 90 implementation of Lahey Computer Systems [2], connectivity to Borland C/C++ and Delphi, Microsoft Visual Basic and Visual C/C++ is readily supported; connection to other applications via the Windows API is also possible.

LGO integrates several robust and efficient global and local scope solvers: these can be invoked in fully automatic or interactive modes. The software can be used on various personal computers and workstations; the PC version runs on all currently used DOS and Windows platforms. The program system is accompanied by a User's Guide [5]. The PC version can be directly integrated under a menu interface, assisting rapid prototyping and application development. Similar interface design for workstations, and/or integration with other software environments is also possible.

The educational version LGO-e serves to introduce students and researchers to GO, by enabling the solution of smaller size (yet far from trivial) global optimization problems. Problem formulation, execution and the analysis of results—in graphical and text forms—is fully supported by the system. LGO-e is licensed to individual researchers, or to research and university departments at a significant discount.

The professional version LGO-p has all capabilities of LGO-e, and includes several solver enhancements, enabling the solution of 'industrial size' problems. Both versions of LGO are supported, and can be customized to meet specific application demands.

References

1. R. Horst and P.M. Pardalos, eds. (1995) *Handbook of Global Optimization*. Kluwer Academic Publishers, Dordrecht / Boston / London.
2. Lahey Computer Systems, Inc. (1997) *Fortran 90 User's Guide*. Incline Village, NV.

3. J. D. Pintér (1996a) *Global Optimization in Action*. Kluwer Academic Publishers, Dordrecht / Boston / London.
4. J. D. Pintér (1996b) Continuous global optimization software: A brief review. *Optima* 52, 1-8.
5. J. D. Pintér (1997) *LGO — A Model Development System for Continuous Global Optimization. User's Guide*. Pintér Consulting Services, Halifax, NS.

¹If you wish to announce your software package in the Bulletin, please contact the Editor.

²Text submitted to: Dr. R. Caron, Editor, *CORS Bulletin*, Dec. 1997; revised: Feb. 1998.



CORS PRESIDENTS 1995 - 1999

From left to right we have David Stanford ('95/'96), Michel Gendreau ('96/'97), Roger Roy ('97/'98), and Richard Caron ('98/'99). This picture, which is courtesy of D. Stanford, was taken at the 1997 National Conference in Ottawa.

CORS Competition on the Practice of O.R.

Each year the Canadian Operational Research Society conducts a competition on the Practice of O.R. to recognize the challenging application of the Operational Research approach to the solution of applied problems. The main criteria considered in evaluating submissions are project impact on the client organization, contribution to the practice of O.R., quality of analysis, degree of challenge and quality of written and oral presentation.

There are two basic purposes behind the Competition, the first being the obvious one of recognizing outstanding O.R. practice. The other is to focus attention on O.R. and its applications by practitioners from Canada by attracting quality papers to the CORS National Conference.

Entries will be expected to report on a completed, practical application, and must describe results that had significant, verifiable and preferably quantifiable impact on the performance of the client organization. The work on the 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 O.R.

To enter the 1998 competition you must:

1. Submit an abstract not exceeding 300 words of a paper on an actual success story of O.R. by **February 20, 1998** to François Julien, Faculty of Administration, University of Ottawa, Ottawa, Ontario, K1N 6N5 TELEPHONE: (613) 562-5800 ext. 4788; FAX: (613) 562-5164 E-MAIL: JULIEN@ADMIN.UOTTAWA.CA
2. Be a resident of Canada.
3. Include 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.
4. Include 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 O.R. application was put into effect.

Finalists will be selected by February 27 1998. They must submit a more detailed written report by **March 27, 1998** and make an oral presentation of the paper at the CORS/INFORMS Joint Conference in Montréal, **April 26 to 29, 1998.**

The winner(s) will be selected based upon:

1. The project, which should exemplify the challenging application of the operational research approach to the solution of significant applied problems. While statistical and presentational difficulties are characteristics of almost all applications, they will not be considered a substitute for operational research.
2. The quality of the analysis, of the modelling 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.

A total of \$1800 in prize may be awarded by the committee: however, the committee reserves the right not to award any prize.

For more information, please contact François Julien.

Compétition de la SCRO sur la pratique de la R.O.

Chaque année, La Société Canadienne de Recherche Opérationnelle organise un concours sur la pratique de la recherche opérationnelle au Canada visant à reconnaître l'excellente application de la méthode de la recherche opérationnelle à la résolution de problèmes pratiques. Les critères considérés lors de l'évaluation des soumissions sont l'impact du projet au sein de l'organisation-cliente, la contribution à la pratique de la recherche opérationnelle, la qualité de l'analyse, le niveau de difficulté du problème et la qualité des présentations écrites et orales du projet.

Ce concours a deux objectifs. L'un est de donner aux meilleures applications de la recherche opérationnelle le crédit qu'elles méritent. Le second est d'augmenter la visibilité de la recherche opérationnelle au Canada en encourageant la présentation de communications de qualité à la conférence annuelle de la SCRO.

On s'attend à ce que les soumissions rapportent les résultats d'une étude pratique complétée et qu'elles décrivent des résultats ayant eu un impact important, vérifiable et préférablement quantifiable sur la performance de l'organisation-cliente. Les travaux peuvent s'être déroulés sur plusieurs années, mais une partie doit avoir été exécutée lors des 2 dernières années. Les travaux déjà publiés sont admissibles: cependant, on ne peut décrire un projet qui fut déjà présenté lors d'une compétition sur la pratique de la SCRO précédente.

Les conditions de participation sont les suivantes.

1. Soumettre un résumé d'au plus 300 mots décrivant une application pratique de la recherche opérationnelle avant le **20 février 1998** à François Julien, Faculté d'administration, Université d'Ottawa, Ottawa, Ontario, K1N 6N5, TÉLÉPHONE: (613) 564-5800 poste 4788; FAX: (613) 562-5164, E-MAIL: JULIEN@ADMIN.UOTTAWA.CA
2. Être un résident du Canada.
3. Joindre à l'envoi de l'article une lettre d'un dirigeant de l'entreprise cliente qui a rendu l'application possible, attestant de l'importance de l'application pour son entreprise et consentant à la communication des résultats.
4. Indiquer le numéro de téléphone de ou des auteurs ainsi que les noms, fonction et numéro de téléphone d'au moins un dirigeant de l'entreprise cliente qui a utilisé l'application.

Les finalistes seront choisis au plus tard le 27 février 1998. Ils devront soumettre un rapport écrit plus détaillé sur l'application avant le **27 mars 1998** et ils feront une présentation orale lors de la conférence conjointe SCRO/INFORMS tenue à Montréal du **26 au 29 mai 1998**.

Les gagnants seront choisis en fonction:

1. du projet, qui devra illustrer l'application créative de la recherche opérationnelle à la solution de problèmes appliqués importants. Alors qu'on retrouve des difficultés d'analyse statistique et de présentation dans presque toutes les applications, on ne pourra les substituer à des difficultés d'analyse par la recherche opérationnelle.
2. de la qualité de l'analyse, de la modélisation et de la mise en oeuvre des résultats au sein de l'organisation-cliente.
3. de l'importance de l'impact des résultats et des recommandations sur la performance de l'organisation-cliente.
4. des présentations écrite et orale, dont une partie centrale est un "historique" décrivant le développement du projet de son début à sa fin, mettant en relief les défis posés aux analystes.
5. la compétition est dotée d'une bourse totale de 1800\$. Cependant, le comité se réserve le droit de ne pas donner de prix.

Pour plus de renseignements, veuillez contacter François Julien.

Concours du Meilleur Étudiant 1997/98

Critères

- Contribution de l'article au domaine de la Recherche Opérationnelle, par le développement d'une méthodologie ou à une autre discipline, par une application de Recherche Opérationnelle.
- Originalité.
- Style, clarté, organisation et concision de l'article.

Éligibilité

Le (ou la) candidat(e) doit être enregistré(e) en tant qu'étudiant(e) à temps pleins une école ou université canadienne au niveau baccalauréat, maîtrise ou doctorat pendant les années académiques 1996-97 ou 1997-98. Les canadiens(iennes) qui font leurs études à l'étranger sont aussi admissibles. Les candidats(es) de niveau baccalauréat sont éligibles au concours dans deux catégories: Ouvert à tous et de niveau baccalauréat.

Prix

Le (ou la) gagnant(e) du concours ouvert à tous recevra un trophée et un voyage au prochain Congrès annuel de la SCRO et pendant lequel le (ou la) gagnant(e) présentera son article. Les frais raisonnables de transport par avion (à partir du point d'entrée au Canada), d'hôtel, du Congrès de même que banquet seront couverts par la SCRO.

L'auteur du meilleur article provenant des candidatures au baccalauréat recevra également un trophée. Cependant, dans l'éventualité où un(e) étudiant(e) gagnerait le concours ouvert à tous, aucun prix ne sera remis dans la catégorie niveau baccalauréat. Dans le cas d'un concours très serré, les articles ne recevant pas le prix pourraient se voir attribuer une mention honorifique.

Instructions

Présenter, avant le 15 Mars 1998, un article d'au plus 40 pages (en 4 copies), avec:

1. un résumé d'au plus 150 mots,
2. le nom, l'adresse et le numéro téléphone de l'auteur,
3. le nom de l'université de même que celui du superviseur, s'il y a lieu, et
4. une lettre du superviseur attestant que le participant est bien le premier auteur de l'article soumis au concours,

au président du concours:

Dr. Michael Carter
Mechanical and Industrial Engineering
5 King's College Road
University of Toronto
Toronto, Ontario
CANADA M5S 3G8

1997/98 Student Paper Competition**Criteria**

- 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.

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 1996-97 or 1997-98 academic years. Canadians studying abroad also qualify. Undergraduate entries are eligible for the open (overall) award as well as for the undergraduate trophy.

Awards

The overall winner of the open competition will receive a trophy and a trip to the CORS conference, where he/she will be entitled to present his/her paper. Air fare (from the port of entry for foreign entry), accommodation expenses, and conference and banquet fees will be covered by CORS.

The author of the best undergraduate paper will receive a trophy. However, if an undergraduate wins the open competition, no undergraduate prize will be awarded. In the case of close competition, papers not winning an award may receive honourable mention.

Instructions:

Submit four copies of a paper, up to 40 pages long, together with:

1. abstract of 150 words or less,
2. author's name, address, and phone number,
3. academic institution and supervisor's name, if applicable,
4. a letter from the supervisor indicating that the participant is the first author of the paper,

before March 15, 1998, to the Chairman of the competition:

Dr. Michael Carter
Mechanical and Industrial Engineering
5 King's College Road
University of Toronto
Toronto, Ontario
CANADA M5S 3G8

MEETINGS AND CONFERENCES**CORS / SCRO Business Meetings**

- 98 Mar 27 4th Council Meeting, Montréal.
 98 Apr 26 - 29 5th Council Meeting, Annual General Meeting, 1st Meeting of 97/98 Council,
 at the 40th Congrès Annuel SCRO - CORS Annual Conference, Montréal.

CORS / SCRO Annual Conferences

- 98 Apr 26-29 40th Congrès Annuel SCRO - CORS Annual Conference, Montréal,
 Québec. General Chair: Paul H. Mireault. See the footer.
 99 Jun 7-9 41st Congrès Annuel SCRO - CORS Annual Conference, Cleary
 International Centre, Windsor, Ont. General Chair: Richard Caron, email:
 rcaron@uwindsor.ca.
 2000 Spring 42nd Congrès Annuel SCRO - CORS Annual Conference, Alberta. General
 Chair: Erhan Erkut, email: erhan.erkut@ualberta.ca.

Other Conferences

- 98 May 19-22 Symposium on Industrial Engineering and Management: Canadian Society for
 Mechanical Engineering (CSME) Forum, Ryerson Polytechnic University,
 Toronto, Ontario, Canada. J. A. Buzacott, Tel: (416) 736-2100, ext. 77939,
 email: jbzacot@bus.yorku.ca
 <www.ryerson.ca/mech-eng/csme.forum.98>.
 98 May 31-Jun 3 3rd International Conference on Multi-Objective and Goal Programming,
 Québec City, Canada. Contact Jean-Marc Martel, Fax: 1-418-656-2624, E-
 mail: mopgp98@fsa.ulaval.ca. <www.fsa.ulaval.ca:80/mopgp/>
 98 Jun 27-30 Teaching Management Sciences with Spreadsheets, Amos Tuck School of
 Business, Dartmouth College, Hanover, NH. <www.dartmouth.edu/tuck/tmss>
 98 Jun 28-Jul 1 INFORMS Tel Aviv, Hilton/Tel Aviv University. Contact: Jacob Hornik,
 Faculty of Management, School of Business Administration, Tel Aviv
 University, Tel Aviv 69978 Israel, Phone: (972) 3-6408098, Fax: (972) 3-
 6409983, E-mail: hornik@post.tau.ac.il, www.informs.org/Conf/TelAviv98/.
 Abstract Deadline: 5 December 1997.
 98 Jul 8-10 PAREO '98, Versailles, France. Contact: Annick Baffert, Laboratoire Prism –
 CNRS URA 1525, Université de Versailles-Saint Quentin en Yvelines, 45
 Avenue des États-Unis, 78035 Versailles Cedex, France. Phone: (+33 1) 39
 25 40 56, Fax: (+33 1) 39 25 40 57, E-mail: Annick.Baffert@prism.uvsq.fr,
www.prism.uvsq.fr/public/blec/PAREO.html.
 98 Jul 12 - 15 EURO XVI, Brussels, Belgium. Abstract Deadline: 15 Dec 1997. Contact:
 Jaques Teghem, MATHRO/F.P.Ms 9, rue de Houdain-B-7000 Mons-Belgium,
 Fax: +32-65-374689, email: euro@mathro.fpms.ac.be,
<http://image.fpms.ac.be/euro16.html>.

- 98 Jul 12-16 SCI'98/ ISAS'98 WORLD MULTICONFERENCE ON SYSTEMICS, CYBERNETICS AND INFORMATICS, Orlando, Florida. WWW: <<http://www.iiis.org>>, Conference Chair: Nagib Callaos IIS 6220 S. Orange Blossom Trail, Suite 173, Orlando, FL 32809, USA. Fax: +1 (407) 856-6274. E-mail: SCI98@aol.com.
- 98 Aug 9-12 2nd International Conference on Engineering Design and Automation, Aston Wailea Resort, Maui, Hawaii. Contact: Hamid R. Parsaei, Tel: 502-852-1416, Fax: 502-228-6868, email: hrpars01@ulkyvm.louisville.edu.
- 98 Aug 17-19 ISORA'98, Kunming, China. Symposium Chair: Prof. Xiangsun Zhang. Organizing Committee Chair: Prof. Kan Cheng. Three (English) copies of extended abstract (ten pages) by April 1, 1998 to Dr. Xiaodong HU Institute of Applied Mathematics Chinese Academy of Sciences P. O. Box 2734, Beijing 100080 P.R. China (Fax: +86-10-6254-1689, Email: isora@amath3.amt.ac.cn).
- 98 Aug 31-Sep 3 OR '98, Zurich, Switzerland. Contact: Prof. P. Kall, Institut für Operations Research der Universität Zürich, OR 98, Moussonstrasse 15, CH-8044 Zürich, e-mail: kall@ior.unizh.ch, <www.or98.ethz.ch>. Abstract Deadline: 15 January 1998.
- 98 Aug 31-Sep 4 IX CLAIO - 27 JAIIO, Buenos Aires, ARGENTINA. Contacts: Tel (54)(1) 371-5755, Fax FAX/TE: (54)(1) 372 3950, WWW: <www.uba.ar/wwws/sadio> or <www.dc.uba.ar/ixclaiio>. E-mail: <ixclaiio@sadio.edu.ar> or <jaiio@sadio.edu.ar>. Chair: Irene Loiseau.
- 98 Sep 24-26 12th JISR-IIASA Workshop on Methodologies and Tools for Complex System Modeling and Integrated Policy Assessment Modeling and IFIP WG 7.6 - IIASA Workshop on Advances in Modeling: Paradigms, Methods and Applications. WWW: <www.iiasa.ac.at/~marek/amap98> and <www.iiasa.ac.at/~marek/csm98>. E-mail: <amap@iiasa.ac.at> or <csm98@iiasa.ac.at>.
- 99 August 16-20 IFORS '99, Friendship Hotel, Beijing, China. Contact: Professor Kan Cheng: Fax +86 10 254 1689, email cheng@amath3.amt.ac.cn

WWW Conference Listings

CORS/SCRO Conference Page: <<http://www.cors.ca/meetings/confer.htm>>

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

IFORS Conferences: <<http://www.ifors.org/leaflet/conferences.html>>

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

SIAM Conference Home Page: <<http://www.siam.org/conf.htm>>

Harvey Greenberg's list: <<http://www-math.cudenver.edu/~hgreenbe/otherweb.html>>

Michael Trick's list: <<http://mat.gsia.cmu.edu/confer.html>>

Congrès conjoint INFORMS / SCRO-CORS du printemps 1998

(40e Congrès annuel de la SCRO)

Montréal, Québec, du 26 au 29 avril 1998

« www.crt.umontreal.ca/mtl98/ »

The Next Issue

The next issue of the Bulletin will appear in mid March. It will feature an invited article by J. Pintér on Global Optimization in Canada. As it will be the pre-conference issue, expect a schedule of CORS events and a profile of candidates for the CORS offices. Please send your contributions to the Bulletin, especially news on the activities of local sections and members to:

Richard J. Caron, CORS Bulletin Editor
Dept. of Economics, Mathematics & Statistics
University of Windsor
401 Sunset Avenue
Windsor, Ontario N9B 3P4
email: rcaron@uwindsor.ca
fax: 519-971-3649

The deadline for submission is March 1, and the preferred method of submission is by a WORD or WP attachment to an e-mail. The bulletin is produced using Word 7.0.

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Ads cost \$120 per page, proportional for fractional pages. Logos and prepared layouts can be accommodated. Direct inquiries to the Editor.	Le coût d'une annonce est de 120\$/page et varie en proportion pour les annonces de moindre longueur. Les annonces peuvent contenir des logos et des schémas. Contacter le rédacteur pour toute autre information.

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