

What's Inside

From the President

- 1 In Praise of IFORS!

Editorial

- 2 From the Editors!

OR Impact

- 2 A New Approach to Predicting Time to Churn of Mobile Phone Users

OR for Development

- 4 Humanitarian Logistics Planning for Disaster Relief
- 5 OR in Africa

Book Review

- 7 INFORMS Analytics Body of Knowledge

Summer Schools

- 8 Call for Applications: IFORS-ELAVIO Scholar
- 9 Report on the ORTASA School, Benin, Africa

OR Society in Focus

- 10 OR60 – British OR Society's Diamond Anniversary Conference

Feature

- 12 Women in Science

Conferences

- 13 11th Triennial APORS International Conference
- 14 XIX CLAIO: OR in Latin America
- 14 INFORMS 2018 Annual Meeting in Phoenix
- 15 International Conference of Operations Research (OR)
- 16 PSAI 2018: Trends in Statistical Development in OR
- 17 International Conference on Computational and Experimental Science and Engineering

Editorial Box

In Praise of IFORS!

Mike Trick <trick@cmu.edu>

Over the past three years, I have used this column to highlight various aspects of IFORS and the operational research word. With the title "In praise of...", I have talked about volunteers, conferences, national societies, regional groupings, and much more. In this, my final column as President of IFORS, I celebrate what makes IFORS itself unique and important to the OR world.

IFORS is an unusual body as an international organization. We are a society of societies, with no individual members. We are a far smaller organization than many of our constituent societies: our US society INFORMS, our UK society ORS, and our European regional society EURO and perhaps some other national societies have more than our one part-time staff member (the invaluable Mary Magrogan, Secretary of IFORS). We rely on a very small core set of volunteers, having no individual members to draw on.

But despite our size, I believe IFORS has a critical role to play in the world of OR. By supporting national societies, our field now has dozens of strong societies adapted to the particular needs of the countries they reside in. OR has numerous healthy conference series, large and small, so every researcher and practitioner can find a conference that is

just right for their needs. By having strong national societies, IFORS can

concentrate on nurturing nascent

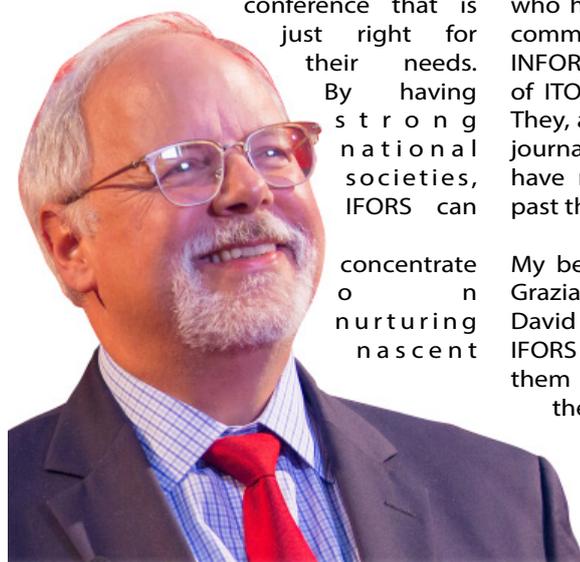
societies where OR is just developing, particularly in less-developed regions.

Over the past three years, IFORS has gained members (Russia and Colombia), has held a successful conference (Québec City) and has begun planning for Seoul in 2020 and Chile in 2023, has improved its flagship journal (International Transactions in Operational Research), has supported the growing OR movement in Africa through the African Federation of Operational Research Societies, and much more. While the end of International Abstracts of Operations Research is one regret of mine, we have developed a system where those abstracts are still available and searchable, providing a unique database on past publications. IFORS has done a lot of good for the OR.

This could not have been done without the concerted effort of the IFORS Administrative Committee: Nelson Maculan (Past President), Richard Hartl (Treasurer), Luciana Buriol (Vice President), Guillermo Durán (ALIO), David Chang Won Lee (APORS), Jacek Błażewicz (EURO), Karla Hoffman (NORAM), Graham Rand (Publications), and Mary Magrogan (Secretary). Special thanks to Elise del Rosario, former President of IFORS who worked tirelessly on the website and newsletter (now ably handed by Luciana), Sue Merchant, who headed our Developing Countries committee before being elected to the INFORMS board, Celso Rubeiro, Editor of ITOR, and Ruel Tan, our webmaster. They, along with conference organizers, journal editors, and other volunteers, have made IFORS successful over the past three years.

My best wishes to incoming President Grazia Speranza and Vice President David Lee for continued IFORS success. IFORS isn't done with me yet: I will join them and the new Vice Presidents on the AC as Past President for three more years.

It has been an honor to be IFORS President and I thank the OR world for this opportunity. 



From the Editors!

With great pleasure another issue of IFORS News is being delivered! Again, important world OR news is reported here.

The issue begins with a message from the President Michael Trick who is finishing his term as President of IFORS, but forever with us as part of the big OR family embraced by IFORS.

In the section OR Impact you can read about predicting time-to-churn of prepaid mobile telephone customers using social network analysis. In the OR for Development we have two articles in this issue. The article Humanitarian Logistics Planning for Disaster Relief describes briefly the work developed by the authors and reported in two articles, and one of them won the 2018 EURO Award for the Best EJOR Paper (EABEP) in the category Innovative Applications of OR. In the article OR in Africa, Hans W. Ittmann shares with us some of his findings about the map of OR in Africa – he wrote this following our request, after a very interesting talk he gave about this topic during AFORS 2018. Hans also prepared a book review for INFORMS Analytics Body of Knowledge. On summer schools, we have a call for scholars for ELAVIO 2019 in Lleida, Spain, July 1-5, and we have a report of a very nice OR school hosted in Benin, Africa, November 20-29, 2018. The UK and the Mexican OR societies shared with us news about their annual events: of special mention, the British OR Society celebrated 60 years, congratulations! As a feature article, Luce Brotcorne and Ivana Ljubic discuss reasons why the number of female students in Computer Science and Engineering is low. Finally, reports on events are presented in the Conferences section (which now has a section editor: Gerhard Wilhelm Weber, thanks Willi!). In this section, the regional conferences from APORS, CLAIO and NORAM are reported, as well as other important OR events.



Hope you enjoy our December issue!

Luciana Buriol, editor <buriol@inf.ufrgs.br> 

First let me say that it is a real pleasure to be supporting Luciana on a temporary basis as co-editor whilst a new editor-in-chief for IFORS News is identified. My awareness of the global OR community has grown greatly since the start of my involvement in undertaking editorial work for IFORS News in 2017. As with each issue I learn more about the great work my profession delivers around the world, I have never been prouder to introduce myself as an operational researcher.

It would be remiss of me not to exploit this my first editorial to promote my free language editing service: *the obex project* (www.theobexproject.co.uk). Founded in 2016, *the obex project* believes that every operational researcher who is a non-native English speaker seeking publication in an English language journal should have access to free language editing support that will improve the quality of their manuscript and help them to get published.

James Bleach, co-editor <managingeditor@theobexproject.co.uk> 

Call for an editor-in-chief and associate editors for the IFORS Newsletter

The aim of the IFORS Newsletter is to share news from OR groups and societies from all over the world.

The newsletter appears quarterly. IFORS is currently seeking to recruit a number of new volunteers from the global OR community to help in the production of this publication.

The current editor-in-chief of the Newsletter will continue in this role until a new editor is identified. Moreover, to make the job more manageable, we plan to have associate editors for each section of the Newsletter. Each associate editor, would need to identify and edit one article every three months. We need associate editors for the following areas: OR Impact, OR for Development, Association Governance and Management, and OR Society in Focus. To review past articles from each of these sections, please see <http://ifors.org/category/newsletter/>. The editor-in-chief is responsible mainly for collecting the final articles from the associate editors and defining the order they will be presented within each issue. 

A New Approach To Predicting Time To Churn Of Mobile Phone Users

Aimee Backiel, KU Leuven, Belgium; Bart Baesens <bart.baesens@kuleuven.be>, KU Leuven, Belgium and Southampton University, UK; and Gerda Claeskens, KU Leuven, Belgium.

Background. It is important for mobile phone companies not only to attract new customers but to retain existing ones if they are to maximise their profitability. The availability of no-contract (pre-paid) mobile subscriptions and convenient number portability make it easier for customers to switch and so the accurate prediction of likely churners (leavers) is vital, so that retention measures can be applied.

Churn prediction is an established application of data mining in which historical data about previous customers can be used to classify current customers as likely churners or not [1]. Traditional churn prediction models rely on local customer attributes but this can often be incomplete for prepaid subscriptions, which can be purchased and used anonymously. To overcome this, social network analysis can be used to build models based on calls between customers rather than customer attributes. Customers are not independent as their behaviour depends on the behaviour of those around them [2]. Thus the aim of this study was to investigate whether social network analysis can predict churn better than a local prediction model.

With a saturated mobile phone market, acquiring new customers is expensive and so providers must focus more on retaining current customers. Previous studies have estimated that the average churn rate for mobile customers was 2.2% per month: the data set used in this study, provided by a major Belgian telecommunications provider, indicates a churn rate of 2.9% per month. It has also been estimated that attracting a new customer may be five to six times more expensive than retaining an existing customer. Additionally, established customers are less sensitive to competition and generate greater profits at lower costs. As profitability is the driver behind customer retention, the models in this study were evaluated using an expected maximum profitability measure.

Customer Retention. It is well known that service attributes, such as call quality, tariff level, handset, brand image and subscription duration all influence the probability of churn, as does the ease of keeping an existing mobile number on transfer. In addition, the marketing literature links customer loyalty, customer satisfaction and switching costs to decreased churn and greater profitability. Thus strengthening customer loyalty by focusing on service attributes that meet as does the ease of keeping an existing mobile number on transfer. In addition, the marketing literature links customer loyalty, customer satisfaction and switching costs to decreased churn and greater profitability. Thus strengthening customer loyalty by focusing on service attributes that meet customer's demands should be an



integral part of a provider's business strategy. However, it is not always feasible to improve service attributes. More targeted campaigns may have a better return for the carrier, such as ranking customers according to their probability of churn and sending promotions, such as a bonus credit, directly to those at highest risk so as to discourage churn. The bonus has an associated cost, but in exchange, the customer will extend their commitment for some period of time. *Deciding which customers should receive such a promotion is the main topic of the remainder of this paper.*

Approach. The data used in this study includes customer information and call detail records. As is commonly the case with prepaid customers, no personal information is available and so a key element of this study was to make accurate predictions without this knowledge. Thus the two types of data, customer and call details, are stored separately, but an anonymized phone number can be used to link a customers from the first dataset to their calls in the second dataset. The dataset includes 1.7 million prepaid mobile customers over six months from May 2010 to October 2010. About 300,000 were removed because they did not make or receive any calls during the six month observation period.

The customer information, referred to as Local Features, included plan data, reload amounts, handset attributes, and counts and times of various categories of calls or text messages. In total, there are 111 local attributes recorded in the dataset, summarised in Table 1.

Features	Contents
Account	start date; plan; language; handset features
Reload	number and cost in 60 days; date last reload; card swapped in 30 days
Usage	Usage in 60 days: number and duration of calls; number of texts and contacts
Usage details	incoming/outgoing; day/night; day of week; <30 secs/<60 secs etc.

Table 1: Summary of Available Data

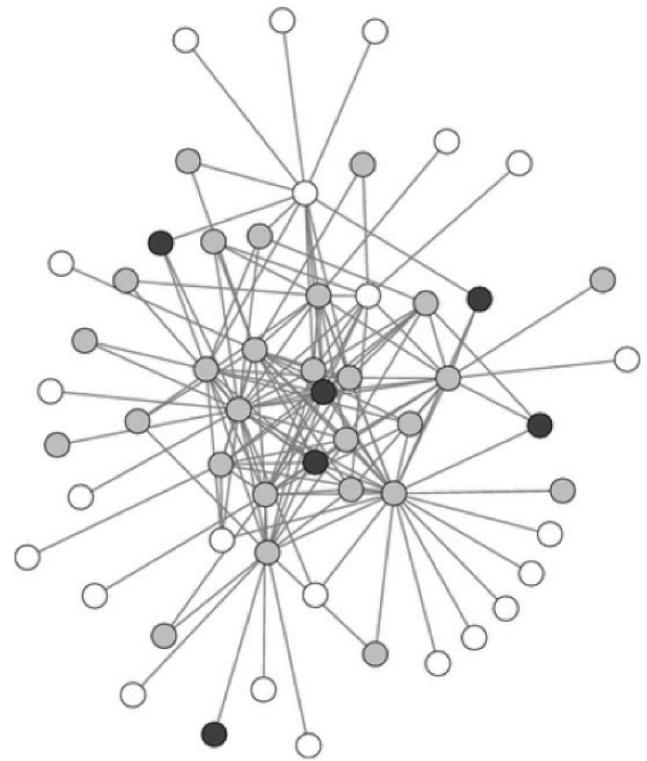
Analysis. The first step was to identify known churners. Given the relatively short period of available data, just 6 months, it was decided to identify churners as those who had not made or received a call/text for more than 30 days. The second step was to develop a training set, using customers and call records for the first month of observation, in order to derive network attributes. Thus the customer dataset of 1.4 million members and the call dataset of nearly 200 million calls/texts were combined to form a network where the customers are nodes and the edges represent calls between customers. A Java application was developed to process the data, store the network structure, and extract the network features.

Social network analysis and traditional models approach prediction from different perspectives. Traditional approaches are based on the premise that similar instances are likely to belong to the same class, and therefore use local attributes belonging to the instances. Social network analysis, on the other hand, assumes instances which are linked within a network are likely to belong to the same class, even if their individual attributes are different. One simple yet powerful concept in social network analysis is *homophily*, the principle that contact between similar people occurs at a higher rate than among dissimilar people. Statistical analysis and testing of this data set concluded that *homophily* was present, so adding network information is likely to improve predictive power. The effect can be seen in Figure 1:

It can be seen that the dark grey nodes had several neighbours who had previously churned (later confirmed as the most significant factor in predicting churn).



Outcome. Cox proportional hazards (Cox PH) models were built with network attributes, local attributes, and both types of attributes combined, 15 in all. All models were estimated in SAS, which is accomplished with an iterative maximization process. The results showed that those models trained on network features outperformed those trained only on local features and there was less difference in the performance among similar model types. Thus the ROC and Lift curves in Figure 2 (which demonstrate goodness of fit) are shown for just the Cox PH models.



▲ Figure 1: Cluster of churners in the network. White nodes did not churn during the study, light grey nodes churned during the first month of the study, and dark grey nodes churned later in the study.

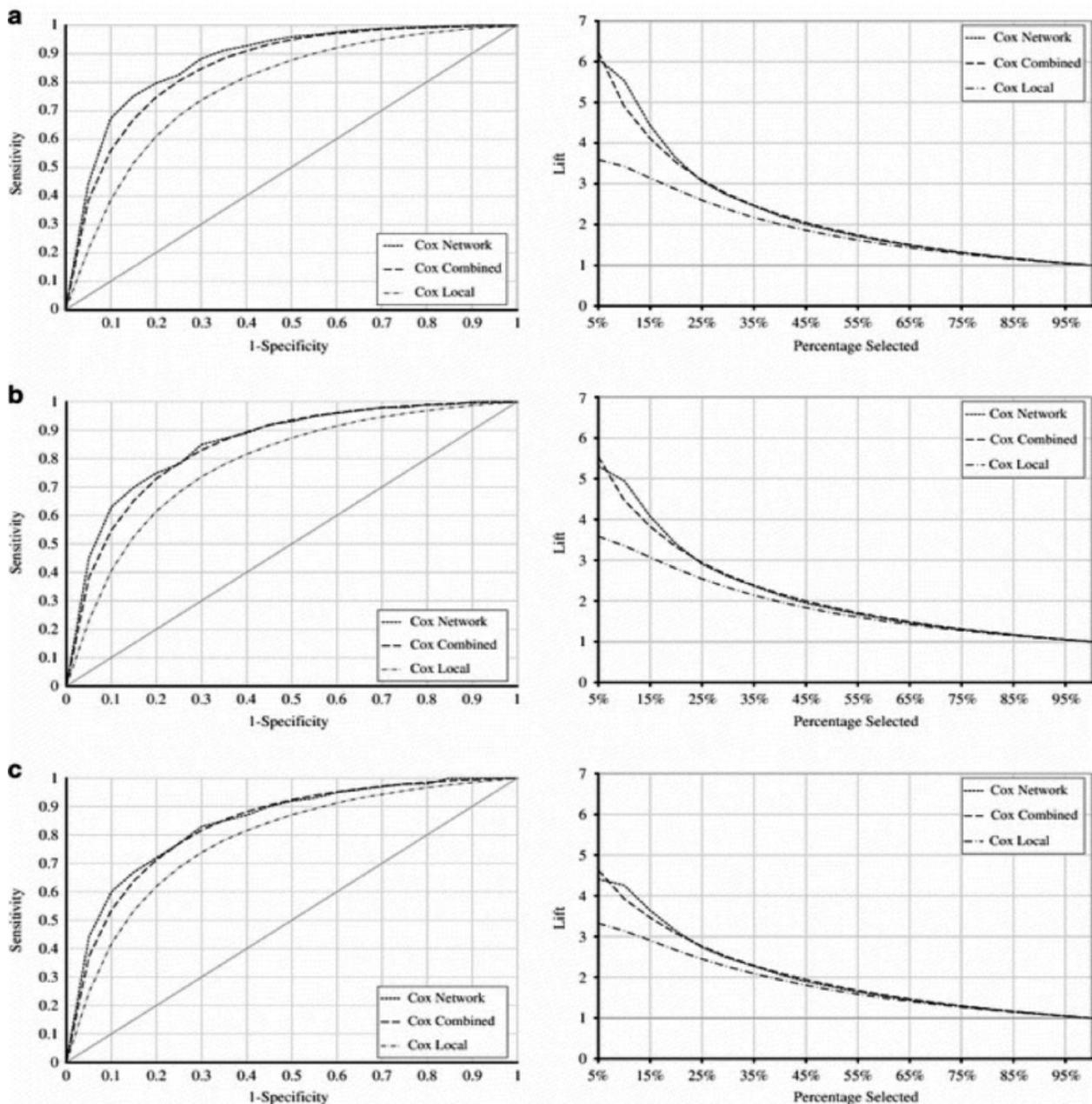
More details of the models used in the comparison, together with the comparison results are given in [3].

Figure 2 (Shown on p.5): Comparison of Models: ROC plots and Lift Charts for Cox PH models (a = Month 1 b = Month 2 and c = Month 3)

These results allow a company to use data generated in one month to make more accurate—and more profitable—predictions about churn in the coming months, thus indicating the presence of valuable information in customers' social networks. The approach allows for highly targeted marketing campaigns which can be used to intervene with a smaller subset of customers in a timely manner, resulting in reduced costs and higher levels of retention, estimated at more than 0.15 Euros per customer for this carrier, compared to traditional models. With a total customer base of 1.4 million customers, this would increase profits by 210,000 Euros.

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▲ Figure 2 Comparison of Models: ROC Plots and Lift Charts.
 (a) Month 1 ROC Plot and Lift Chart.
 (b) Month 2 ROC Plot and Lift Chart.
 (c) Month 3 ROC Plot and Lift Chart.

OR for *Development Section*

Humanitarian Logistics Planning for Disaster Relief

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In July 2013, Brazil's Civil Defense agency contracted the country's postal service to pre-position strategic stocks for disaster relief in order to rapidly get aid to victims. Many OR researchers in this field from Turkey, Spain, Mexico and other IFORS countries, know from hard experience and research that the prepositioning and then supply of emergency relief after a disaster is a huge planning and operational challenge.



Alistair Clark

Douglas Alem

Alfredo Moreno

These challenges were highlighted in a Brazilian context by the terrible floods and landslides in the *Mountainous Region* of upstate Rio de Janeiro in 2011 in which nearly a thousand people died and many more made homeless. This tragedy and research in humanitarian logistics already underway at the University of the West of England (UWE) motivated a partnership between UWE and the Federal University of São Carlos in Brazil, supported by a *Newton Research Collaboration Grant* from the UK's *Royal Academy of Engineering*, the *Brazilian National Council for Scientific and Technological Development* (CNPq), and the *São Paulo State Research Support Foundation* (FAPESP). The research has been twice published in the *European Journal of OR* (EJOR): Alem, et al., (2016) Moreno, et al., (2018). The first article won the 2018 *EURO Award for the Best EJOR Paper* (EABEP) in the category *Innovative Applications of OR*. The two articles extensively acknowledge, reference and characterise previous research, so the *EURO Award* is a recognition of the work of the innovative contribution of many IFORS-country researchers in humanitarian logistics.

After a natural disaster, such as an earthquake or flooding, emergency relief aid needs to get to victims as fast as possible. OR can help in the planning of relief, both before a possible disaster strikes and after it actually does, by adapting commercial supply chain models. Of course, the criteria are different, emphasizing the speed of supply, rather than its short-term cost (although relief agencies do have to operate within limited budgets). The conditions are different too: the surprise of a disaster means that a lot of data is uncertain or unknown – for example, the location, number and needs of victims, what are their needs, the availability of emergency supplies, and amount of disruption to transportation routes.

This urgency and the huge amount of uncertainty prompted the use of stochastic optimisation over a range of likely and possible scenarios. A standard model with a minimax-regret objective seeks to avoid worst-case outcomes, provides stable and robust solutions, but can be conservative. In contrast, our research also used two alternative state-of-art risk measures that can search for stochastically non-dominated

solutions: Conditional Value-at-Risk (CVaR) and Semideviation (SD).

Both CVaR and SD use a weight $\varphi \in [0, 1]$ to trade off expected value and risk. Conditional value-at-risk (CVaR) uses the expected cost of exceeding VaR at a confidence level u (e.g., 95%) where VaR is the maximum possible loss if one excludes worse scenarios whose probability is less than $(1 - u)$ (e.g., 5%) over the horizon. As u increases, fewer worse scenarios are taken into account. Semideviation (SD) measures fluctuations below the mean. Both CVaR and SD are mean-risk models whose objective function produce risk-neutral solutions for $\varphi = 0$, solutions that are totally risk-averse for $\varphi = 1$, or in between for $0 < \varphi < 1$.

These modelling approaches were tested with 40 scenarios and 17 instances/cases, generated with world-wide historical data and from the 2011 Rio de Janeiro floods and landslides. The results found that compared to the risk-neutral results, the overall trend of the CVaR and SD risk-averse models

was to increase pre-positioning costs and bring down the variability of post-disaster supply costs. Remarkably, our findings indicated that there is an opportunity to improve fairness in distribution through CVaR and SD models, which can be a critical issue when resources are scarce.

In conclusion, we found that the two models do help plan and organise relief effectively

and efficiently in most scenarios. They also provide insights into how this depends on the type of disaster and resources and further insights and pointers to the impact of single-factor changes, for example, levels of pre-positioning.

However, although tested on real data, the models are still to be used in practice in a disaster situation.

References

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▲ Typical Aftermath of the 2011 Floods and Landslides in upstate Rio de Janeiro, Brazil.

Source: Agência Brasil, a public Brazilian news agency, reproduced from <https://commons.wikimedia.org/wiki/File:EnchentesRio2011.JPG> under the Creative Commons Attribution 3.0 Brazil License

1. Introduction

The African continent consists of 54 countries with a combined population of 1.2 billion. These countries represent almost a third of the total number of countries in the world today. Next year the International Federation of Operations Research Societies (IFORS) will celebrate its sixtieth anniversary, and yet only three national societies from the African continent are currently members of IFORS. This is despite continuous efforts, especially over the last twenty years or so, by both IFORS and the European Association of Operational Research Society (EURO) to promote OR in Africa, to stimulate the interest in OR and the use of OR. Many conferences have been held, sponsored inter alia by IFORS and EURO, as well as OR workshops, courses, etc. Have these efforts been in vain or can Africa be considered as a fertile ground for OR and the expansion of the international OR community?

In 2016 the African Federation of Operational research Societies (AFROS) was launched in Nairobi, Kenya. This was an initiative to represent African OR societies and other interested parties. Subsequently the first AFROS conference was held from 2-4 July 2018 in Tunis, Tunisia. These developments can be considered as the first steps towards the formation of an African regional grouping like other existing regional groupings, namely, APORS, ALIO, EURO and NORAM. However, before that can happen, the membership of AFROS, in terms of national OR societies, needs to increase. This short article endeavors to give a view of the state of OR in Africa.



▲ Students from Zimbabwe with their "Statistics and Operations Research" T-shirts

2. Africa's Potential

Africa is today still largely misunderstood and ignored by the international community. The perception is that Africa is part of the third world, underdeveloped, with little prospect of growth and development. The magnitude of the mismatch between the global perception of Africa and the on-the-ground reality is captured in a recent publication *"Africa's Business Revolution: How to Succeed in the World's Next Big Growth Market"* by McKinsey. Based on interviews with many prominent people in Africa, it gives a strategic guide to business in this "forgotten" continent. As explained



in this publication things are quite different, there are many positives in Africa with great prospects for the future.

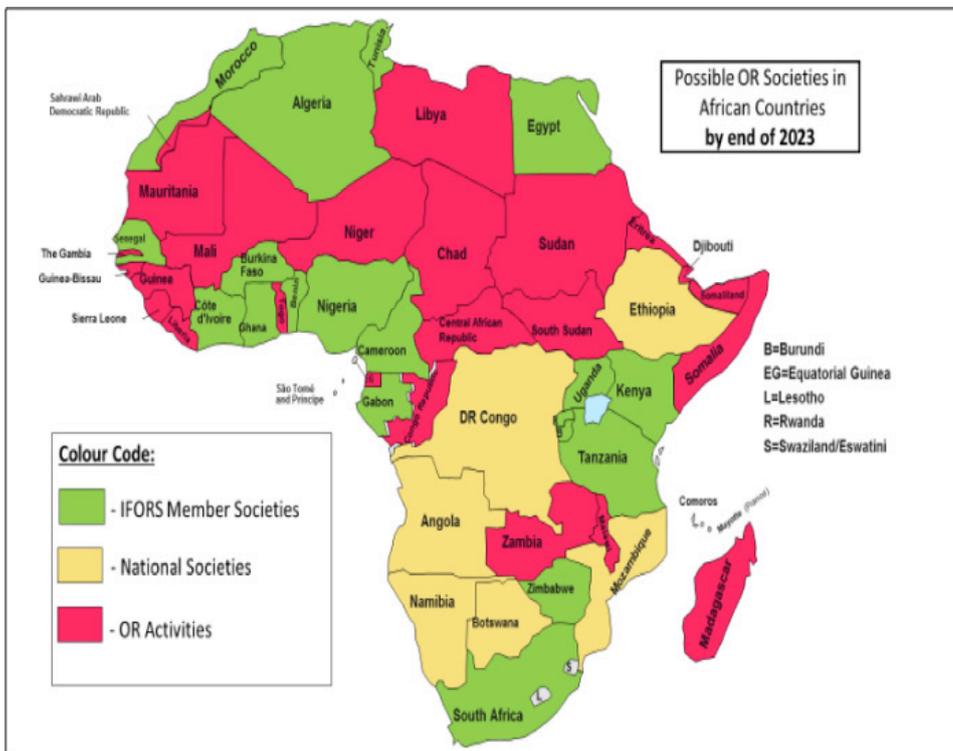
One of the perception gaps, which will be of interest to operations researchers, is the growing importance of technology. It is shown that *"although Africa historically lagged the rest of the world, this young continent, with a median age of around 20, has become an eager adopter and innovator in all things digital and mobile. There are already 122 million active users of mobile financial services in Africa. The number of smartphone connections is forecast to double from 315 million in 2015 to 636 million in 2022—twice the projected number in North America and not far from the total in Europe. Over the same period, mobile data traffic across Africa is expected to increase sevenfold"*. This is just one example of what is happening in Africa, and by not focusing on this huge continent there is the risk of missing out on, what the authors of the book call, one of the 21st century's great growth opportunities. The OR community cannot ignore Africa.

3. Current African IFORS members societies

3.1 South Africa - ORSSA

The Operations Research Society of South Africa (ORSSA), is the oldest OR society in Africa, and was established in 1969. South African involvement in OR goes back to World War II. Basil Schonland, a professor in geophysics from the University of the Witwatersrand in Johannesburg, joined other scientists at the outbreak of World War II in the United Kingdom and was appointed Superintendent of the British Army Operational Research Group (AORG) in 1943. A South African (RR Tusenuis) also attended the first OR conference held in 1957 in England. ORSSA is a fully fledged and active society with six chapters, a quarterly newsletter, a bi-annual journal and an annual conference. ORSSA became a member of IFORS in 1972.

The National University of Science and Technology (NUST) in Zimbabwe is very active in OR. Zimbabwe joined ORSSA as the sixth chapter of the society in 2016. This is an interim arrangement since the aim of the Zimbabweans is to establish their own national society. See the photo of "OR passionate" students from Zimbabwe.



▲ A possible scenario of how Africa could look by 2023

3.2 Tunisia - TORS

In Tunisia the Tunisian Operations Research Society (TORS) was established in 2013 and joined IFORS the following year. There are two other societies in Tunisia where there is an overlap with TORS, namely the Tunisian Decision Aid Society (TDAS) and the Tunisia Management Science Society (TMSS). TORS is an active OR society and held its third conference in June 2018. In addition, the first AFROS conference was hosted very successfully by the Tunisians.

It is interesting to note that some years ago, TMSS was a member of IFORS but the membership lapsed. In addition, the two societies, TORS and TDAS, are co-operating closely, and there have been discussions about the possibility of the two societies merging.

3.3 Nigeria – INFORN

OR has a long history in Nigeria going back to the eighties. The Institute of Operations Research of Nigeria (INFORN) was established in 2006. It provides a vehicle for professionals in Operations Research in Nigeria to interact, develop the profession, and advance its practice through developing methods and applications for improved systems performance in Nigeria. In 2015 INFORN joined IFORS.

In 2014 there was a group that broke away from INFORN and this group established a separate society named the Institute of Operational Research and Management Science (IORMS). It is also a formally recognized OR society in Nigeria, but it is not affiliated to IFORS.

4. Other societies and groupings

4.1 Eastern Africa – ORSEA

Five countries, Kenya, Tanzania, Uganda, Rwanda and Burundi, are members of the Eastern African Operations Research Society (ORSEA). This society was established in 2003. After their first conference in 2003 ORSEA has

held annual conferences (except for one year), alternating the conference location between Kenya, Tanzania and Uganda. The society has its own, open access, journal. Seven editions of the journal have been published. On its tenth anniversary in 2014 ORSEA published a book titled: Operations Research in Developing Countries: The Case of Eastern Africa, containing case studies from that region.

4.2 OR Groupings

There have been several OR groupings established in the last twenty years in Africa. None of them are active any more except for one: Operations Research Practice in Africa (ORPA). ORPA originated in Western Africa and emerged as an initiative aimed at promoting the use of OR approaches in decision-making in Africa, as well as conducting

research and sharing experiences on the use of OR in the continent. The 1st ORPA conference was held in Ouagadougou, Burkina Faso in 2005 and was supported by IFORS and EURO. Subsequent ORPA conferences have been held in London, Cape Town, Washington, Dakar and Algiers. This is an initiative that has proved very successful in promoting OR across Africa.



▲ Eritrean students at the Operations Research Society of South Africa conference in 2003

5. OR in the Rest of Africa

In most of the African countries not mentioned up to now there are some OR activities, ranging from little to substantial involvement in OR. One would find, to one's surprise, that there are individuals in almost all African countries that have been exposed to OR. When looking at OR in Africa the focus is largely on whether OR is taught at universities, the reason being that experience has shown that more professional societies are established through academics taking the lead.

The following are examples of countries where OR is alive and well: Senegal, Morocco, Algeria, Egypt and several countries in West Africa. >>

>> OR presentations from these countries at workshops and conferences were of a high standard and quality. There is also evidence of dedicated OR academics in various African countries. On the flip side it is, however, noticeable that many OR academics from Africa teach at universities outside of Africa.

The Operations Research Society of Egypt (ORSE) was a member of IFORS but this lapsed, and it seems the society does not exist anymore. The political upheaval that has plagued Egypt for so long seemingly contributed to this situation, but it has not affected OR education and the practice of OR in the country. There are several other countries in Africa where political instability has impacted OR. A vivid example is the case of Eritrea. In 2002-2003 there were five students from Eritrea who did post graduate studies in OR at Stellenbosch University in South Africa. They attended the ORSSA conference during that period and were clearly very passionate and excited about returning to their country given their exposure to OR. Some joined universities as lecturers, etc. In a recent interaction with one of them, it was indicated that all five students have now left Eritrea. Four are in the USA and one is in the UK, with the reason being, I quote, *"the main reason for all of us to leave Eritrea was that the political situation of our country has been terrible, especially after 2001"*. See the photo of the five students at a conference in South Africa.

Book Review

INFORMS Analytics Body of Knowledge

Hans W. Ittmann <hittmann01@gmail.com>, University of Johannesburg

INFORMS Analytics Body of Knowledge by James J. Cochran (Editor), 2019, John Wiley and Sons, pp. 370, ISBN-13: 978-1119483212 (Print) and ISBN-10: 1119483212 (eBook), 127.85 US dollar (Paperback), 139.76 US dollar (Kindle).

The book *INFORMS Analytics Body of Knowledge* (INFORMS ABOK) was published recently and is a welcome addition to the growing analytics literature. The title is fascinating in the sense that many readers would want to know what is meant by a body of knowledge. The editor clarifies what it is in the start of the preface: *"A body of knowledge (BOK) is a comprehensive compilation of the core concepts and skills with which a professional in a specific discipline should be familiar. BOKs are generally produced and maintained by members of an academic society or professional association, and a BOK serves as the means by which the academic society or professional association communicates its vision, both internally and externally."*

The Institute for Operations Research and the Management Sciences (INFORMS) in the United States, the largest international association of

6. Possible Future

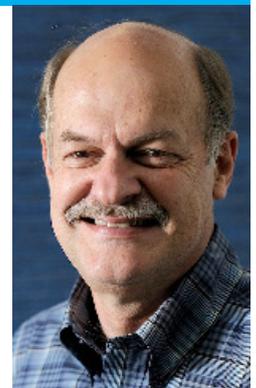
Based on the information presented above, one can now create various possible future scenarios of how Africa could look in five- or ten-years' time as regards OR activities. The figure below is one such scenario giving the number of IFORS member societies in African countries; the number of national societies and countries where only OR activities are observed. This is only a possibility! The challenge for all of us as operations researchers, both within Africa and elsewhere, is to make this a reality. It can be done but it will require hard work and dedication.

7. Conclusion

Despite its massive size, the African continent is currently not well represented in IFORS. There are many reasons for this. Some of these may include:

- The political instability in many African countries;
- Government obstacles towards the establishment of professional OR societies;
- The long distances in Africa as well as the high cost of air travel in Africa;
- The lack of funds and financial support;
- Long-term sustainability of OR initiatives;
- Perceived lack of opportunities for OR academics and practitioners;
- etc.

Whether the above points are valid or not, the reality is that OR can impact enormously on the lives of those in African countries, as well as the industries and economies of African countries. Channels such as formal OR societies would be ideal to help address and solve these issues. 🌐



operations research (OR) and analytics professionals and students, produced the book. There are nine chapters in the book covering a wide spectrum of topics on analytics. Each chapter is written by a different author, except in one instance where an author of one chapter is also the co-author of another chapter. The authors are some of the most respected members of INFORMS, all experts on the various topics covered and all from prominent institutions. There is an appendix titled *Writing and Teaching Analytics with Cases* authored by the editor himself.

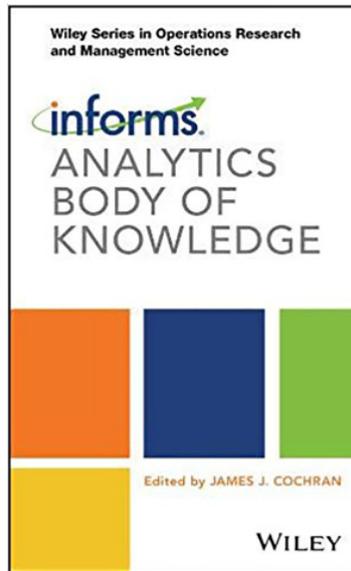
Any book on analytics is inevitably going to provide a definition of analytics. It is stated upfront that the INFORMS definition of analytics, namely *"the scientific process of transforming data into insight for making better decisions"*, is used as the foundation for the book. However, many of the experts give their own view, interpretation and understanding of how they see and understand analytics. This is deliberate and enriches the presented content, enabling the reader to form his or her own view of what analytics is since there are so many angles to it!

It is only appropriate that Chapter 1 introduces analytics. Initially, a different perspective on analytics is provided, namely that analytics is considered broadly “as a process by which a team of people helps an organization make better decisions (the objective) through the analysis of data (the activity)”. A conceptual framework for analytics is then outlined as a continuous cycle where the analysis of data produces insights that informs better decision-making. Two approaches, a data-centric and a decision-centric one, are presented. In the data-centric approach, one gains insight into the data through the analysis of the data, which can then provide inputs into the decision-making process. The decision-centric approach starts with the decision that is required, using subject matter expertise and domain knowledge to relate decision variables to the target objective. It is not stated explicitly, but the problem to be solved needs to be defined and formulated upfront. The three main analytics categories, *descriptive*, *predictive*, and *prescriptive*, are defined and discussed. The considerations of how to use analytics within an organization is briefly touched upon, as well as the ethical implications of using analytics. Most of what is presented in this chapter is at a high, overview level.

Chapter 2 deals with how to get started with analytics. The main tasks are outlined. These are: selecting the target problem; assemble the team of analysts; prepare the data; selecting the analytics tools; and executing. Most of these are discussed in more detail in subsequent chapters. The chapter concludes with several real-world examples that had impact. These can be considered as *success stories*. Experience, as this reviewer can attest too, has shown the importance of *success stories*. The value, when marketing, of completed projects that proved to be beneficial to clients cannot be underestimated. Chapter 3 addresses the composition of the analytics team. What the needed skills are, how to manage the analytics team, how to best organise the analysts and data scientists, and where an analytics team should be located within an organisation (be it within the IT department, the strategy group, shared services, finances, etc.), are some of the issues addressed in this chapter. Where appropriate, more detail on an issue is provided..

The entire Chapter 4 is devoted to data and justifiably so given the absolute necessity of proper, relevant and good data for analytics. How many practitioners have not had the experience of clients indicating that *data is not a problem?* Only to find and realize that data is the biggest hurdle in trying to make progress! All aspects relating to data are discussed in detail and covered comprehensively. The chapter provides the reader with great insight and understanding of data types, data sources and how data should be prepared and modelled, while pitfalls in how data should be handled is highlighted. A whole section is devoted to data management with reference to data capturing, the needs and the role of data stewards, what metadata is as well as master data management. Data warehousing, as a data storage mechanism, is also discussed.

Chapter 5 and 6 are interlinked since both address problem-solving approaches. There are similarities and overlaps between these two chapters. A high-level framework is provided for



analytical solution methodologies in Chapter 5. Three main solution methodologies are presented and discussed, namely macro-solution methodologies, micro-solution methodologies and thirdly method-related methodologies. This framework is not that well-known, at least not to this reviewer. Under macro-solution methodologies four main methodologies are covered, namely: the scientific research methodology; the operations research project methodology; the Cross-Industry Standard Process for Data Mining (CRISP-DM) methodology; and the software engineering methodology. Most readers would be familiar with the OR project methodology but getting exposure to the other three is useful. The micro-solution methodologies are categorized into three main groups, namely those for exploration

and discovery, those for using models (OR techniques) where techniques to find solutions are independent of data, and those using models (statistical) where techniques to find solutions are dependent on data. Chapter 6 is entirely concerned with modelling, and most of what is covered is the standard operations research techniques that most readers should be familiar with or would have been exposed to before. The first few sections focus on models, and specifically, why models are appropriate, the type of models one gets (descriptive, predictive and prescriptive), and the fact that models can be characterized by whether they are deterministic or stochastic. Some statistical concepts that are relevant are outlined and then a whole range of OR techniques, methodologies and approaches to modelling different problem types are presented briefly. In some cases, examples are used for illustrative purposes.

The relatively new and fast-growing area of machine learning is the topic of Chapter 7. A brief introduction is given followed by a description of supervised, unsupervised and reinforcement learning. All aspects concerning model development (machine learning algorithms) are presented. This is followed by an overview of supervised learning algorithms where methods described include: K-Nearest Neighbours (KNN); regression; Classification and Regression Trees (CART); time series forecasting; decision trees; Support Vector Machines (SVM); artificial neural networks; and ensemble methods. Similarly, unsupervised learning algorithms with methods designed to identify the latent structures in data, are presented. Models in this case include: kernel density estimation; association rule mining; Principal Components Analysis (PCA); clustering methods; and bag-of-words or vector space models.

The successful completion and implementation of analytics projects is heavily dependent on strong project management, deployment of the appropriate skills at the different stages during the project, as well as proper life cycle management. The analytics methodology that is described in Chapter 8 is based on the popular and accepted Cross Industry Standard Process for Data Mining (CRISP-DM) methodology. >>

>> The six components of this methodology, which are: business understanding; data understanding; data preparation; modelling; evaluation; and deployment, maps well onto the INFORMS Certified Analytics Professional (CAP) Job Task Analysis (JTA). This is used in outlining the various project stages, the different steps and how these should be managed. Many of the older members of the OR generation are possibly not that familiar with this methodology, but it makes sense to link it to the INFORMS CAP approach. The chapter is concluded by emphasising the critical overarching aspects of life cycle management, namely documentation, communication, testing and metrics

Many different skills are required in the analytics industry. An outline of key role players, or groups, in this industry are presented in Chapter 9 and their roles are briefly outlined. There is a shortage of skills in this industry at present. It is critical to have a good understanding of the talent needs in

this industry. In the appendix the value of test cases used in teaching and how these can be used to provide students with insight into the practice of analytics is outlined. Different aspects related to test cases are touched upon in the chapter.

In summary, the INFORMS ABOK is well-researched, well-structured and is a comprehensive source of the body of knowledge of analytics. All practitioners can be expected to benefit from being exposed to what is contained in every chapter of the book. For the practitioner many things will be reaffirmed, and will be familiar, but there are also many new things to be learnt and assimilated. The broad objective of the book *“to provide those interested in the development and application of the tools of analytics with an understanding of what analytics is and how analytics can be used to solve complex problems, make better decisions, and formulate more effective strategies”*, is more than adequately achieved. This book is therefore highly recommended! 🌐

Summer Schools

Call for Applications: IFORS-ELAVIO Scholar

Call for Participation in ELAVIO XXIII, Lleida, Spain
July 1-5, 2019



IFORS is pleased to announce the travel-sponsorship of one participant to join the XXIII ELAVIO - Latin-American Summer School in Operations Research.

The ELAVIOs are schools supported by ALIO (the Latin-Iberoamerican Association of Operations Research) and mainly are addressed to young researchers and postgraduate students (both at the PhD and master level) from Latin-Iberoamerican countries. However, Ph.D. students from all over the world with excellent skills and special interest in the areas of Operations Research, Informatics, and Applied Mathematics are also welcome to apply.

ELAVIO XXIII will be held in 2019 in Spain from July 1st to July 5th, in Lleida located between Barcelona (160 km) and Madrid (450 km). Lleida is a Spanish city having the oldest University foundation in Catalonia and the third oldest of Spain. In addition, it is a touristic destination for skiing in the Pyrenees and visiting the Boi Valley hosting an important concentration of Romanic style

churches (Humanity heritage recognition). The event will be held at the University of Lleida, in the Cappont Campus, by the river Segre crossing the city.

Registration for ELAVIO XXIII and the Opening Ceremony will take place on Sunday, June 30th at the student's Residence located in the same Campus where participants will have accommodation. Over the following 5 days, a range of mini-courses and tutorials on advanced topics of specific interest will all be held at the Faculty of Law, Economics and Tourism. Closing Ceremony will take place on Friday afternoon

Research topics of the school include, but are not limited to:

- Combinatorial optimization; linear, nonlinear and integer programming.
- Stochastic optimisation, stochastic processes and probabilistic models.

- Metaheuristics and its applications.
- Discrete, continuous and agent based simulation.
- Big data analytics and related OR methods.
- Applications of operational research to problem solving in areas such as sustainability, health care, logistics, sports, agroindustry, engineering, telecommunications, finance and production, big data, cutting and packing problems.

The official languages of the school are: English, Spanish and Portuguese. Talks and lectures will be in either of the languages (in all the cases with English slides). Candidates selected MUST be proficient in both English and Spanish or Portuguese.

Chairs of the ELAVIO XXIII Organizing Committee:

1. EWG ORAFM coordinator and ELAVIO General Chair Prof. Lluís M. Plà Aragonès <Impla@matematica.udl.cat>
- 2 ALIO President and ELAVIO Chair. Prof. Guillermo Durán, <gduran@dm.uba.ar>
3. SEIO President and ELAVIO Chair. Prof. Emilio Carrizosa Priego <emilio.carrizosa.seio@gmail.com>

IFORS sponsors a fellowship for a young researcher from a developing country to attend the Summer School for Young Scholars (ELAVIO).

Requirements for applicants to the fellowship are:

- To have done work in the specific fields to be studied that year at the Institute.
- To be a PhD or Master student, or to have completed

PhD no more than 2

- To come from a developing country.
- To be able to present some of his/her work and answer questions in English.
- To be highly recommended by their advisor in their area of work.
- The chosen candidate will be required to submit a final report to IFORS regarding the impact of their participation.

Young reserachers interested in applying for travel grant must send the following documents (pdf file format) to Rosiane de Freitas (Vice-President of IFORS for ALIO, rosiane@dcc.ufam.com.br), Guillermo Durán (ALIO President, gduran@dm.uba.ar) and Lluís M. Plà Aragonès (ELAVIO General Chair, Impla@matematica.udl.cat):

- a short curriculum vitae;
- a recommendation letter from his/her advisor;
- summary (max. 2 pages) of a work to present at the school in case of acceptance.

Important dates:

- 31/01/2019 deadline for applications;
- 28/02/2019 - publication of results;
- 20/03/2019 - deadline for confirming participation;
- 1-5/07/2019 - ELAVIO XXIII.

The accepted candidate will receive the travel grant from IFORS and the accommodation grant from ELAVIO. 🌐

Report on the ORTASA School, Benin, Africa

Jules Degila <jules.degila@imsp-uac.org>



▲ Picture taken with the audience of the second day of the school.

The Operations Research Techniques and Applications School for Africa (ORTASA) was held in Dangbo, Republic of Benin, from Nov. 20th to 29th. The school gathered both scholars and practitioners and was organized by the African Center of Excellence in mathematical sciences and applications (ACE-MSA) hosted by the Institute of Mathematics and Physical Sciences (IMSP), with the supports of the Ministry of Higher education of the Republic of Benin and IFORS. The main objective

was to put together academics and professionals from different fields of research to review and discuss OR techniques and methods applicable to their areas of intervention, particularly to health, climate and environment, telecommunications, logistics, and finance. The different topics and discussions were animated by six Subjects Matter Experts from South Africa, France, Canada and Brazil. >>



▲ Picture taken in front of some IMSP buildings.

>> There were in total 75 participants from 11 countries (Benin, Burkina Faso, Burundi, Cameroon, Ivory Coast, Ghana, Guinea, Mali, Niger, Nigeria, Senegal and Togo). The school is part of the ACE effort to promote the use of mathematics and Computer Science to address the sub-region development challenges as explained at the opening ceremony by Dr. Jules Degila, the local main organizer.

The first lecture entitled mathematical formulations of Operations Research (OR) problems was delivered by Luciana Buriol from Federal University of Rio Grande do Sul, Porto Alegre, Brazil, and Vice President of IFORS.



▲ The room was well attended during the whole school.

Dr Buriol opened the series of lectures with mathematical modelling along with some classic OR problems formulation such as the knapsack problem. She also introduced linear, integer and mixed programming problems and some of their applications. The second lecture was given by Dr Sheetal Silal, from university of Cape Town, and focused on mathematical modeling of diseases in Africa with a variety of disease propagation modeling scenarios. The third presenter, Dr. Kathleen Vaillancourt introduced the climate mitigation challenge to the audience. Many references on operational research applications of optimization models to energy and climate, and the need for having "technico-economic" models were described. Different scenarios' analyses approach and energy systems representation in linear programming models were also presented, along with their link to the climate policies definition. Dr Adam Ouorou presentation followed on telecommunication network design and optimization with many real-

world applications to optical fiber and wireless networks. Videos were shown to encourage the participants on how to identify the optimization problems they might be dealing with.

The last two lecturers were Dr. Tekogan Hemazro, Senior Director, Head of Fixed Income Quantitative

Analysis and Professor Andrea Cynthia Santos, from University of Troyes, respectively on OR in Finance and logistics involving disaster management. Dr. Hemazro presented Finance problems as excellent application area for Operation Research practitioners

and discussed instances such as tactical asset allocation problems, strategic problems modeling, optimal strategy (Portfolio construction), financial engineering, valuation of financial instruments (options, derivatives), market imperfections identification and risks' evaluation. Most used techniques such as Monte Carlo simulation methods were discussed. Prof. Santos closed the series of lectures by presenting her work on Logistics response to large-scale disasters. Key issues, data treatment and cases studies are discussed during the last six hours. Accessibility, vehicle routing and location-allocation problems were applied. Many references were given to the audience.

The participants were very pleased with the different topics addressed in the school and strongly expressed their wishes that this type of school that gathered both academics and professionals around OR applications be renewed every year. IMSP is willing to organize it again. 🌐

OR Society in Focus

OR60 – British OR Society’s Diamond Anniversary Conference Ian Mitchell < ian.mitchell@beis.gov.uk >



▲ OR1-Onwards – photo with Professor Graham Rand.

OR60 was a gem. Conferences boost knowledge, expand networks of friends and acquaintances and share ideas by “together placing”, if I remember the Latin correctly. High profile anniversaries, silver at 25 years and diamond at 60 attract greater numbers of presenters and participants so give more value. They also encourage a review of what has gone before.

Conference Chair Mr Graham Rand opened the three days with a summary of the OR conferences from OR1 in 1958. Lancaster University has been a focus for OR, and to many is the spiritual home of OR. Pat Rivett, a President of the OR Society, became the first Professor of OR in the UK at Lancaster University in 1964.

With more than 35 streams over three days any one participant’s experience is likely to be near unique. My journey included plenaries by *Professor Anna Nagurney* on network systems and *Professor Peter Checkland’s* Parthian Shot (Friendly). The applications of network topologies showed commonalities in diverse areas such as perishables in blood banking, energy, food supply and the dynamics of traffic. Discussion of traffic networks brought to mind the importance of perceptions of a situation by individual drivers shaping the networks’ behaviour.

Peter Checkland’s description of the progress from Holism, with OR directly linked to policy during World War 2, moving towards Reductionism, where OR is thought of only as a set of techniques, and back again through Problem Structuring was striking. A small orange book, 1963’s *OR for Managers* by Pat Rivett and Russ Ackoff, was one of the 5 waypoints on this

journey and *Professor Jonathan Rosenhead’s* “Rational Analysis for a problematic world” was another. The fifth waypoint, the work of Sir Geoffrey Vickers VC is now on my to be sought out and read list.

OR60’s facets reflected my experiences in private, volunteer and public sectors. Dr Paul Syms traced the roots of defence studies from maps sketched in the sand centuries ago to the computer wargames that we worked on, creating virtual battles for better understanding. Complementing this *Mr Phil Jones* described experiences making best use of capabilities in the circumstances prevailing on actual operations.

Roadmapping a future for power generation by *Mr Les Collier* and *Mr John-Patrick Richardson*, from National Nuclear Laboratory explained time-based plans that define and show where a business is, where it wants to go, and how it plans to get there. Such pictures are “well worth a 1000 words.” *Dr. Graham Wall* of the Portsmouth Centre for Operational Research and Logistics (CORL) showed animations of simulated offshore winds and tidal flows to find the best sites. *Professor Jian-Bo Yang*, *Mrs Ting Wu* and *Professor Dong-Ling Xu* presented on decentralized energy systems. Both used Multi-Criteria approaches to complement other methods: this seemed to be holistic OR in action.

Mr Tony O’Connor’s demi plenary covered a half century of Government OR, explaining how the Civil Service Department led by *Mr Ken James* with 20 analysts grew to the current 700 members of the Government OR Service (OR) Service spread across some 25 organisations.

A coach drive through increasingly hilly terrain led to a cruise on Lake Windermere in the Lake District National Park, followed by a dinner with close up magic. OR is a socio-technical process - the social programme gave time to talk as well as to enjoy the views. Besides making new contacts I renewed acquaintance with people across all my three decades as an OR practitioner as employee, independent consultant and civil servant. In meeting them I also met their new colleagues and so our networks grew.

Wednesday started early with *Making an Impact's* Breakfast networking session. Going to the Lakes was a useful preparation for the Grand Challenges session. Mr *Liam McAleese* of the Lake District National Parks introduced its "Natural capital" including 3,000 miles of rights of way across 44,000 hectares and Scafell Pike, the highest English summit. I joined the discussion on how OR could help understand at a local scale the movements people make and how to help encourage such healthy activity when they return home. As one participant remarked "The questions always make you think."

Mr *Jeff Jones* approached his own question "Whatever happened to rational Government?" commenting on the race between education and catastrophe, mixing humour with observation.

The President's Medal presentations showcased OR applied to a range of problems; improving historic waterways, Health in Sheffield and repurposing the US Radio Spectrum, which won.

The main conference dinner was illustrated by pictures from previous conferences on the massive screens at both ends of the hall. Several familiar faces,

some looking particularly youthful, flickered into and out of view. After the Dinner the Ceilidh, dancing with instructions baked in, was well supported and most enjoyable.

On Thursday I listened to Mrs *Viv Raven* on how OR skills and techniques are used in policy costings and design, at the heart of decisions and policy making in government with an illustrative example of a new tax for horses and carts. Ms *Hala Elsayed*, Mr *Richard Jackson* and Mr *Lee Zhao's* presentation of work with Systems Thinking on the Department for International Trade (DIT) Export Support System Model gave a whole system end to end view; a good way to understand the roles of the various forms of support and their effects over time.

Professor *Val Belton* spoke on learning from and for MCDA, including a new way to elicit weights. Then it was my turn. I presented a compilation of Professor *Pat Rivett's* remarks from the 1964 BBC series "Basis for Decision" featuring Stafford Beer, Sir Charles Goodeve, Keith Tocher and Ronnie Shephard. Much of what he said then and the enthusiastic way he said it still resonates today. OR60 at Lancaster was an ideal time to share this with the Society; the compilation was on the pendrive along with a keynote paper explaining its recovery. Mr *Gerard Doyle* presented his work with Professor Anthony Staines on iPrep -Improving Perioperative Efficiency and Patient Throughput with a cohesive service. Mr *John Hopes*, the President of the OR Society, closed the conference with a series of challenges for us to prepare the way for our successors.

Congratulations to **Graham Rand**, the **Conference Committee** and the **OR Society** for a truly diamond experience. **Roll on OR100!** 🌐



▲ Lake trip by the conference community.

Women in Science

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Luce Brotcorne - INRIA



Ivana Ljubic - ESSEC



Review of the Panel discussion “Women in science” held during the EURO 2018 Conference in Valencia.

Learning from history it appears that even though the participation of women in science starts as early as 2300 BCE (with the famous astronomer Enheduanna), the role of women in science has always been hidden. Nowadays, despite all technological and intellectual advancements in the society, and anti-discrimination attempts implemented by the governments, employers and policy makers, the decline of the number of female students/researchers/professionals in Computer Science (CS) and Engineering is alarming. At the same time, there is an increasing demand for jobs in CS-related fields, so there is a pertinent issue of gender diversity. In the US, for example, where women now represent 47% of the workforce (as compared to 38% in the 1970s) less than 20% of engineers/computer scientists are female. The question is WHY aren't more women involved in CS, and can we counteract this negative trend?

According to the participants of the panel “Women in Science” (professors Cynthia Barnhart from the MIT, Elena Fernandez from the UPC, Barcelona, M. Grazia Speranza from the University of Brescia, and Nuria Oliver, Director of Research at Vodafone) the lack of women in CS may be contributed to a lack of female role models that attract the girls in this particular domain. A typical image of a computer scientist or an engineer depicted on news/TV/movies is often stereotypic and biased, and as such it does not appear very inspiring for women. Generally speaking, a computer scientist is a male code developer (a “hacker”), surrounded by screens and junk food, working in his basement!! Needless to say, the messages from the media need to be changed about what it is to be a computer scientist/mathematician/

engineer, explaining the diversity of possibilities and opportunities to work in the field.

Actions are in progress at some of the top US universities (Berkeley, MIT, Stanford) to attract more female students in CS. The first one concerns the way of teaching: in the first year, at some universities the students are split into two groups, based on their previous programming experience. That helps female students, majority of whom lacks programming experience at the beginning of the program, to catch up with their male colleagues a year later. Furthermore, universities are stressing the applications of Computer Science to Society as opposed to just programming. The second action focuses on working in teams as collaborative work seems to be more attractive to women. Finally, the third one consists of reframing the curriculums and designing new multi-disciplinary degrees (such as CS and Urban Study Planning, CS and Computational Biology, CS and Economics) illustrating the positive impact of Computer Science on the environment or society.

Learning from these experiences is positive but the societies definitively need to do more. The reinforcement of female roles and integration of women in technology goes beyond education and society, these issues have to be addressed at home, starting from the very young age. Both girls and boys need to share common values and to learn to work together. Women need to work on growing their self-confidence and men need to grow their respect for women. Finally, another way to de-gender technology would be to teach all five pillars of “Computational Thinking” (Programming, Data, Networks, Algorithms and Hardware), in the same way we teach reading and writing, starting from the day one at schools. 🌍



11th Triennial APORS International Conference

Sunity Shrestha Hada <sunity.shresthahada7@gmail.com>



▲ Delegates from Nepal, Malaysia, Korea, with Sung-Joo Park (founder member of APORS); from left to right: Francis Miranda (Philippines), Lai Soon Lee (Malaysia), Adibah Shuib (Malaysia), Sunity Shrestha Hada (Nepal), Sung-Joo Park (South Korea), Chang Won Lee (South Korea), Tanka Nath Dhamala (Nepal).

Background

The Operational Research Society of Nepal (ORSN) hosted the 11th triennial APORS international conference at Kathmandu on 6-9 August 2018. ORSN website www.apors2018-nepal.org is available through the website of the International Federation of Operational Research Societies (IFORS).

The 11th triennial APORS international conference held at Hotel Radisson on August 6-9 of 2018 has been successfully completed. The theme of the conference was **"Operations Research and Development"**. The aim of the conference was to bring OR practitioners, experts and academic within the APORS community and throughout the world together to share theoretical development and practical applications of OR and related areas.

The Speakers, delegates and participants

A total of 159 abstracts were submitted through the on line submission system from 23 countries. Approximately 108 abstracts were registered on line and were scheduled in the conference plan, 92 papers among them were presented including the keynote/ plenary speech, the IFORS distinguished lecture (IDL), the IFORS Tutorial Lecture (ITL), invited papers and the technical papers. In total there were 151 delegates among whom 64 were from Nepal and remaining 87 people were foreign delegates. Including the organizing committee members, guests, volunteers, and administration & finance staff, 210 people were involved in the conference.

The delegates in the conference

The details of the Nepali and foreign delegates are as below:

SN	Country	Number of Delegates
1	Nepal	64
2	India	19
3	China	17
4	South Korea	8
5	Japan	6
6	Malaysia	4
7	Iran	2
8	Philippines	2
9	Sri Lanka	1
10	North America (USA, Canada, Mexico)	6
11	Europe	22
TOTAL		151
Europe: UK, France, Germany, Czech Republic, Sweden, Switzerland, Turkey, Austria, Denmark and Spain		

The OR theme and the streams

With the theme of the conference being "Operations Research and Development" the papers submitted were classified in various streams. The streams were Location, Network, Programming, Game Theory, Supply Chain and Logistics, Multi Criteria and Dynamic Modeling, VRP and Scheduling, Probability and Stochastic, Queuing, Business, Finance, Economics and Management.

The Sessions

The inaugural session of the conference was on 6th August 2018 from 9:00 to 10:00 AM. with the chief guest Dr. Ram Kumar Phuyal, a member of National Planning Commission of Nepal.

There were two keynote papers presented by *Edward H. Kaplan* and *Matthias Ehrgott*. The IFORS IDL and ITL were represented by *Leo Liberti* and *James McGregor Smith* respectively. In addition, there were 9 papers presented in **plenary sessions**. There were in total 10 **invited sessions** with 36 papers. And, there were 43 papers in 6 **technical sessions**. Two papers were presented as **web presentation** from Germany. A founder member of APORS, *Prof. Dr. Sung-Jo Park* graced the conference which was significant highlight of the event.

In the **valedictory Session** the IFORS flag was handed over to *Sunity Shrestha Hada* by *Chang Won Lee*, the IFORS vice president representing APORS. >>

>> The appreciation Pen was handed over by *Chang* to *Tanka Nath Dhamala* and *Govinda Tamang* for outstanding performance in the conference.

As per the **APORS custom**, a farewell dinner with cultural show and the city tour was organized which was wonderful and successful. The tour was organized to visit Bhaktapur Durbar Square and Sanga Mahadev.

Major Achievements of the Conference

The conference provided ample opportunity for Nepali delegates and researchers to interact and networking with foreign delegates. The foreign delegates, contributing in a rich exchange of ideas and thoughts will support capacity development of Nepali academic in operations research area.

The conference also contributed to tourism promotion



▲ Keynote speaker Prof. Dr. Edward H. Kaplan.

of Nepal which was in accordance with the aim “VISIT NEPAL 2020” of the Nepal Tourism Board, Nepal. 🌐

XIX CLAIO: OR in Latin America

David Mauricio <dms_research@yahoo.com >



The *XIX Latin Iberian American Conference on Operations Research, CLAIO*, was held between September 24 and 27 in Lima, Peru, jointly organized by: the National University of San Marcos UNMSM; the *Peruvian Society of Operation Research, SOPIOS*; and the *Latin Iberian American Association of Operations Research Societies, ALIO* (<http://www.sopios.org.pe/claio2018>).

The conference was attended by 427 researchers, students and practitioners from several countries, including Argentina, Chile, Brazil, Colombia, Equator, Mexico, Peru, Portugal, Spain, United States of America, Uruguay and many others, including from as far away as India. Around 370 contributions were presented in the conference, including 141 short papers that were published in the conference proceedings. These ranged from contributions to methods and algorithms to relevant applications in many fields, such as industrial management, health systems management, natural resources, logistics and supply chain management, and financial analysis. *CLAIO* is the most important Operational Research event held in Latin America and the excellent contributions presented show the important development that the discipline is having

in the region.

The inaugural plenary lecture was given by *Celso Ribeiro*, from Fluminense Federal University, who presented “Biased random-key genetic algorithms: components, evolutionary dynamics and applications”. At the inaugural ceremony, the president of *CLAIO* and *SOPIOS*, *David Mauricio*, together with the co-chairs *Nelson Maculan* (virtually) and *Alex Papa*, the president of UNMSM, *Orestes Cachay*, and the president of ALIO, *Jaime Miranda*, welcomed the attendees. The conference also included plenary lectures by other distinguished researchers including: *Andrés Weintraub*, from the University of Chile; *Julia Pahl* from the University of Southern Denmark; and *Jesus Velasquez*, from DecisionWare & DO Analytics. *Paulo Roberto Oliveira*, from the Federal University of Rio de Janeiro gave the closing plenary. In addition, several keynote sessions explored the diversity of topics in Operational Research and its implications in areas such as agriculture, supply chain, computational algorithms, and natural resources. The conference also included the *EURO Distinguished Lecture*, which was given by *Luce Brotcorne*, from INRIA, who presented “How to integrate customer’s behavior within pricing”.

The conference also included the *IFORS Distinguished Lecture*, which was given by *Edoardo Amaldi*, from Politecnico de Milano, who presented “A bi-level approach to optimizing Internet routing”. In addition, *CLAIO* also had an *IFORS Tutorial Lecture* given by *Dohoon Kim*, from Kyung Hee University, South Korea, who presented to the audience on “Management science for the businesses platform in Industry 4.0”. *IFORS* presence at *CLAIO* was significant and important.

The conference allowed for many interactions among attendees. Participants at the conference banquet enjoyed Peruvian food, traditional music and a Peruvian Paso horse show. Conference attendees also had the opportunity to explore Lima and its museums.

ALIO, the Latin America Association also held its meeting at *CLAIO*, where the new Executive Committee was introduced and the location for the next *CLAIO* was confirmed: we all look forward to *CLAIO 2020* in Madrid, Spain. 🌐



▲ Welcome to CLAIO 2018! From left to right: Rosiane de Freitas (Vice President of ALIO; Brazil); Jaime Miranda (President of ALIO; Chile), Domingos Cardoso (Vice President for Events of ALIO; Portugal); Rosa Delgado (Secretary of the Executive Committee of ALIO; Peru).

INFORMS 2018 Annual Meeting in Phoenix Ashley Kilgore <akilgore@informs.org>



▲ Plenary audience at INFORMS 2019 Phoenix.

INFORMS hosted more than 6,000 of the world’s leading OR and analytics professionals, including the field’s next generation of leaders, at 2018 *INFORMS Annual Meeting* in Phoenix, AZ from November 4-7 (<http://meetings2.informs.org/wordpress/phoenix2018/>).

The theme was “*Smart City and Sustainable Communities*”, providing an opportunity for attendees to learn about cutting-edge trends in the OR, analytics and big data sectors. Grace Lin, Vice President of Asia University, Taiwan, served as General Chair of the meeting and Kathryn Stecke, professor with the University of Texas, Dallas, served as Program Chair.

The meeting featured some of the world’s brightest minds from the public and private sectors, from Fortune 500 companies and some of the most respected universities around the globe, from local, state and federal government agencies, all charged with saving lives, saving money and solving some of most complex problems the world faces.

Plenary and keynote speakers included:

- **Russell Allgor**, Chief Scientist at Amazon,
- **Jorge Calzada**, former Director, National Grid Advanced Data & Analytics Department,
- **Brenda Dietrich**, Cornell University,
- **Kenneth Fletcher**, President, Kestrel Hawk Consulting,
- **Anna Nagurney**, Director, the Virtual Center for Supernetworks, Department of Operations and

Information Management, University of Massachusetts,

- **Erica Plambeck**, Stanford University,
- **Mario Veiga Pereira**, CEO, PSR,
- **Eva Tardos**, Cornell University,
- **Garrett van Ryzin**, Marketplace Labs, Lyft; and Cornell Tech,
- Reprises of the **INFORMS Franz Edelman Award**, **Wagner Prize**, and **UPS George D. Smith Prize**.

The conference presented a wide and diverse range of plenary presentations, panels, tutorials and other types of presentations by and for academics, industry experts, students and representatives of government agencies. To learn more about the keynote and plenary presentations, and a number of other sessions, check out daily [eNews articles](#) provided by INFORMS’ student writers.

Melissa Moore, Executive Director of INFORMS, shared an update on many exciting new milestones for INFORMS in 2018 during the Member Meeting, held Tuesday evening. INFORMS has made it a priority to focus on diversity and inclusion, recognizing that INFORMS is stronger because of our different backgrounds, perspectives and experiences. Where diversity includes embracing people no matter their gender, race, age, ethnicity, professional path and more, inclusion is how INFORMS leverages differences to infuse programs and committees with new perspectives and energy to take us to new heights.



▲ Plenary Speaker Prof. Dr. Anna Nagurney.

INFORMS has also seen significant changes to publication of its magazines, *OR/MS Today* and *Analytics*, to make their content more accessible and engaging, and to INFORMS' 16 journals, enabling INFORMS to significantly increase production speed, enhancing the tremendous value and impact of the journals. Both Annual Meeting and Business Analytics Conference held earlier this year achieved record attendance. In addition, INFORMS added new regional analytics conferences this year, starting with Seattle and Chicago, providing new ways to reach practitioners and organizations not yet involved with INFORMS and help showcase the depth and breadth of how INFORMS can help.

Melissa Moore shared some exciting INFORMS initiatives: the launching of the new INFORMS podcast *Resoundingly Human* and the publication of the *INFORMS Analytics Body of Knowledge*. *Resoundingly Human* is a monthly podcast highlighting the incredible contributions of INFORMS members using OR and analytics to change our world. Two special episodes were recorded, now available for download. The *INFORMS Analytics Body of Knowledge* is an effort several years in the making and is the first-ever body of knowledge about analytics.

Earlier this year, INFORMS also launched an advocacy program, raising awareness and interest among decision makers on Capitol Hill on how OR/analytics can better serve the public interest in policymaking, governmental operations, or returns on research investment in these fields. INFORMS has also launched a new NSF Liaison Committee with the primary focus of making sure that OR/analytics remain supported by the National Science Foundation. Finally, INFORMS has established a new way for members to be involved and support and enrich the future of the profession. Members can now donate to INFORMS Scholarship Fund, establish a named endowment or scholarship, honor the memory of legacies of the profession, and more.

On Sunday evening, attendees were invited to celebrate excellence in profession at 2018 INFORMS Awards Ceremony. Here, INFORMS presented some of its most prestigious awards to recognize leading contributions from OR and analytics practitioners, students, and academics:

- **Bonder Scholarship for Applied Operations Research in Military Applications:** Phillip Jenkins, *U.S. Air Force*,
- **Bonder Scholarship for Applied Operations Research in Health Services:** Gian-Gabriel P. Garcia,

University of Michigan,

- **Saul Gass Expository Writing Award:** Richard Cottle, *Stanford University*,
- **INFORMS Case Competition:** Maxine Cohen, *NYU Stern*; Daniel Guetta, *Columbia Business School*; and Wenqiang Xiao, *NYU Stern*,
- **Prize for the Teaching of OR/MS Practice:** Sanjay Ahire, *University of South Carolina*
- **John von Neumann Theory Prize:** Dimitri P. Bertsekas, *MIT*; and John N. Tsitsiklis, *MIT*,
- **George E. Kimball Medal:** Bruce Golden, *University of Maryland - College Park*; and Candace Arai Yano, *University of California, Berkeley*,
- **INFORMS Impact Award:** Laura Albert, *University of Wisconsin - Madison*; Kenneth C. Fletcher, *Kestrel Hawk Consulting Inc.*; Sheldon H. Jacobson, *University of Illinois*; Adrian J. Lee, *Central Illinois Technology and Education Research Institute*; and Alexander Nikolaev, *University at Buffalo (SUNY)*,
- **INFORMS President's Award:** James Cochran, *University of Alabama*.

INFORMS also presented four special student awards:

- **Undergraduate Operations Research Prize:** Kayla Cummings, *Pomona College*,
- **Doing Good with Good O.R. Student Competition:** Ignacio Rios, *Stanford University*,
- **George B. Dantzig Dissertation Prize:** Daniel Freund, *Cornell University*,
- **George E. Nicholson Student Paper Competition:** Viet Anh Nguyen, *École Polytechnique Fédérale de Lausanne*.



▲ Plenary Speaker Prof. Dr. Kenneth Fletcher.

To learn more please visit the [Prizes & Awards](#) page of www.informs.org. In addition, many of INFORMS Subdivisions and Communities presented their own [awards](#) throughout the meeting.

INFORMS Pro Bono Analytics program partnered with St. Mary's Food Bank Alliance, a food bank and distribution network, and coordinated a volunteering initiative for attendees to build snack packs for Phoenix's homeless population and help make a positive impact in the conference host city. This effort would not have been possible without the financial support of INFORMS members, sponsors and exhibitors, and conference community contributing nearly \$11,000 to fund the activity.

Thanks to the generous attendees and Pro Bono Analytics committee, more than 1,000 snack packs were assembled! They were picked up mid-day Tuesday by St. Mary's Food Bank and have been distributed to homeless individuals on the streets of Phoenix. 🌍



International Conference of Operations Research (OR)

Hatice Çalik <hatice.calik@univ-lorraine.fr>

This year, the International Conference of Operations Research (OR) was held on 12-14 September, 2018 in the lively 'Châtelain' area of Brussels, the capital and the hidden treasure of Belgium and of Europe. The conference was co-organized by the Belgian and German OR (ORBEL and GOR) societies with the support of Université Libre de Bruxelles (ULB), and the chair of the organizing committee was Prof. Bernard Fortz (ULB).

The conference attracted 574 participants from 35 different countries. The conference hosted 2 plenary and 8 semi-plenary speakers, and 404 talks in 125 sessions. The participants had the opportunity to listen to many inspiring presentations on emerging theoretical, methodological, and applied topics (<https://www.or2018.be>).

The scientific part of the conference started with the opening plenary talk, the annual *EURO Plenary*, by Prof. Ivana Ljubic from ESSEC Business School, Paris. The focus of her talk was new branch-and-cut algorithms for solving mixed-integer bilevel linear programs. During the opening session, the GOR Master Awards, GOR PhD awards, and GOR company award were also announced. The Master awardees of this year are Patrick Gemander from Friedrich-Alexander-Universität (*The Clique-Problem under Multiple-Choice Constraints with Cycle-Free Dependency Graphs*), Magdalena Paulina Lippenberger from Technische Universität München (*An Adaptive Large Neighborhood Search for Routing and Scheduling Carsharing Service Requests*), and Daniel Schermer from Technische Universität Kaiserslautern (*Algorithms for the Vehicle Routing Problem with Drones*).

The GOR PhD awardees of this year are Dr. rer. pol. Ann-Kathrin Rothenbächer from Johannes Gutenberg-Universität Mainz (Contributions to Branch-and-Price-and-Cut Algorithms for Routing Problems), Dr. rer. oec. Marc Maiwald from Universität Duisburg-Essen (Robust Evacuation Planning for Urban Areas), Dr. rer. pol. Maximilian Schiffer from RWTH Aachen (Logistics networks with intermediate stops – Designing innovative and green solutions), and Dr. rer. nat. Jonas Schweiger from Technische Universität Berlin (*Exploiting structure in non-convex quadratic optimization and gas network planning under uncertainty*).

The OR 2018 conference also hosted a semi-plenary talk by Dr. Henrik Imhof from Sixt GmbH & Co. Autovermietung KG, the holder of this year's GOR company award, on Optimization, Data Science, and Machine Learning in Car Rental Revenue Management. This was not the only semi-plenary talk of the conference. The participants enjoyed talks by many other achieved speakers, namely, Prof. Miguel F. Anjos, Prof. Nadia Brauner, Prof. Richard Hartl, Prof. Arie Koster, Prof. Stefan Pickl, Prof. Francisco Saldanha da Gama, and Prof. Greet Vanden Bergh. It was truly hard to choose among the semi-plenary talks that were given in four parallel sessions, as well as between the talks in other invited and contributed parallel sessions.

The social program of the conference started with an informal Get-Together event on the evening of 11 September at the conference venue. This was a very



▲ At OR 2019: old and new friendship celebrated. From left to right: Joanna Berlińska (Poznan, Poland), Stefan Kupfer (Magdeburg, Germany), Süreyya Özögür Akyüz (Istanbul, Turkey), Gerhard-Wilhelm Weber (Poznan, Poland), Peter Hieber (Munich, Germany), Arik Sadeh (Holon, Israel), Marco Lübbecke (Aachen, Germany).

good opportunity to get to know the conference venue and to chat with colleagues before the actual conference began. The evening of the first day of the conference provided a warm welcome to those who couldn't make it to the Get-Together, with a reception held at the Solbosch Campus of ULB.

Probably, the most interesting social event of the conference was the Gala Dinner held inside the Belgian Comic Strip Centre located in the historical old town of Brussels. The building of this museum was designed by Victor Horta, the world-famous Art Nouveau architect of Belgium, and originally it was used as a department store. After its restoration, in the late 80s, the building was opened as a museum dedicated to Belgian comics (<https://www.comicscenter.net>). The attendees of the Gala Dinner had the chance to enjoy many masterpieces by Belgian comic strip artists. The Gala Dinner was followed by a very special DJ Party led by DJ KrazyBen (Bernard Fortz; see Picture 1) inside the museum. Although the party lasted until 2am, the morning sessions of the last day were well attended.

The conference ended with closing remarks, several conference announcements (e.g., OR 2019 in Dresden, Germany, introduced by its host, and EURO 2019 in Dublin, Ireland (<https://www.euro2019dublin.com/>) introduced by the Program Committee chair Prof. Luis Gouveia and Gerhard 'Willi' Weber).

The closing plenary talk of Prof. Holger Hoos from Universiteit Leiden provided discussion on algorithm selection and configuration techniques, auto-tuning and automated machine learning. He pointed out the impact of these techniques in solving discrete optimization problems in terms of solution time as well as solution quality.

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In conclusion, OR 2018 was a very successful and well organized conference, and will be remembered for the precious scientific knowledge and beautiful memories that were exchanged. 🌐



PSAI 2018: Trends in Statistical Development

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The Philippine Statistical Association, Inc. <<http://www.psa.ph>> under the leadership of the National Statistician and Philippine Statistics Authority <<https://psa.gov.ph>> head *Dr. Lisa Grace Bersales*, recently celebrated its 2018 Annual Conference with the theme: Emerging Trends in Statistical Development. The event took place during September 19-21, 2018 at the Bohol Tropics Resort, Tagbilaran City, Bohol, Philippines. The theme resonates in solidarity with the 50th Founding Anniversary of the Philippine Social Science Council, Inc. <<https://www.pssc.org.ph>>: 50 Year Legacy of the Social Sciences in Changing Times.

The annual conference was attended by more than 400 participants mostly from local government units, regional line agencies and academes from all over the Philippines. It happens annually in different regions as voted upon by the participants and as approved by the national organizing committee led by *Dr. Carmelita N. Ericta*.

The conference particularly stressed the role of Operations Research and the use of different models in addressing the present problems affecting developing countries like the Philippines. A whole day of training was given on the first day of the conference with topics focused on Spatial Statistics, Infographics, Descriptive and Exploratory Techniques in R and Correcting Misconceptions in Statistics for the K-12 Curriculum. The different training sessions took place simultaneously in different venues within the resort.

The training workshop on Spatial Statistics given by *Mr. Dennis P. Dizon*, a statistician from Geodata Systems Technologies, Inc., focused on the contextualization of data analysis with location. Participants were taught how to calculate and map basic spatial statistics using ArcGIS and other common statistical applications such as MS Excel and R. He tackled spatializing data, turning location data into points, turning area data into polygons, finding the center, measuring compactness, measuring orientation, measuring geographic distribution in MS Excel, identifying patterns and identifying clusters. He also introduced the use of ArcGIS in presenting data. Infographics was delivered by *Prof. GianLouisse A. Roy*, a lecturer of the University of the Philippines School of Statistics (UPSS). His lecture enabled the participants to learn how to clearly and concisely present data to a general audience in an interesting and insightful way; he also taught them some tips and tricks in creating information dissemination materials using infographics. Descriptive and Exploratory Techniques in R were discussed by *Ms. Charlene Mae Y. Celoso*, another lecturer of UPSS. The seminar is an introduction to data science analytics using descriptive statistics and exploratory data analysis (EDA) in R, a free software for statistical computing and graphics. During the workshop, the participants were taught how to use the software. The descriptive techniques included the use of tables, charts and generalizations applied to the data provided, and the exploratory techniques involved visual displays and resistant statistics in investigating the collected and transformed data to reveal patterns, peculiarities and relationships. Finally, the training on Correcting Misconceptions in Statistics for the K-12 Curriculum was delivered by *Dr. Josefina V. Almeda*, the director of the Philippine Statistical Research and Training



▲ Milagros R. Baldemor (2nd from the right) together with PSAI President Dr. Lisa Grace Bersales (3rd from the right) and other trainers and participants in the PSAI Annual Conference (photo taken after the closing program).

Institute (PSRTI) <<https://psrti.gov.ph>>. Her lecture elucidated common statistical concepts by discussing the underlying theories and correcting common misconceptions. Topics included hypothesis testing, p-value, and Slovin's formula. She presented different cases like misconceptions about Statistics, its major fields, the sources of errors in data collection, sampling errors, survey operations, graphical presentations, and summary measures.

The highlight of the opening ceremony of the two-day Annual Conference on September 20-21, were the **Keynote Speeches** of *Dr. Rosemarie G. Edillon*, Undersecretary of the Planning and Policy National Development Office of the National Economic Development Authority, and *Dr. Lisa Grace Bersales*, the PSAI President herself. In her speech, Dr. Edillon delivered a significant line to ponder upon – that “*Knowledge is the oil of tomorrow*”. Dr. Bersales' speech tackled the “*Emerging Trends of the Philippine Statistical Development Program (PSDP) 2018-2013: Focus on Measuring Sustainable Tourism*” a strategy for Sustainable Development Goals.

A panel discussion on the Data Privacy Act, a current issue in the Philippines, moderated by the former National Statistics Office administrator *Dr. Carmelita N. Ericta*, was held by experts in the field namely: *Mr. Kelvin K. Magtalas* - Information Systems Analyst of the National Privacy Commission, *Ms. Teresita P. Lisama* – Deputy Director of the Knowledge Management Group of the Bangko Sentral ng Pilipinas, *Mr. Danny C. Cheng* – Data Protection Officer, De La Salle University and Director of Academic Relations, ISACA Manila Chapter and *Dr. Ana Maria L. Tabunda*, Treasurer and Research Director of Pulse Asia Research, Inc.

During the closing program, the winner of the **2018 Best Student Paper Competition**, *Ms. April Joy Lorenzo* of Pangasinan State University whose paper was entitled “*Pattern Recognition of Suicidal Ideation*”, was awarded a cash prize of PhP25,000 (USD500) by the Chairperson of the Board of Judges, *Dr. Joselito Magadia* of UPSS. Furthermore, *Dr. Lisa Grace Bersales* gave tokens of appreciation in recognition to the conference sponsors from government and private sectors for without them, the annual conference wouldn't have been successful. 🌐



International Conference on Computational and Experimental Science and Engineering

Burcu Gürbüz <burcu.uskudar@edu.tr>



The 5th International Conference on Computational and Experimental Science and Engineering" (ICCESEN 2018) was successfully held in Kemer-Antalya, Turkey, last October 12-16, 2018 (<http://www.iccesen.org/>). Organizing committee members of the conference were from various universities in Turkey, led by Prof. Dr. Iskender Akkurt (Süleyman Demirel University, Isparta, Turkey). The conference hosted around 500 registered participants from about 45 different countries. The ICCESEN 2018 was detailed into ten different themes (<http://www.iccesen.org/page/topics>); this associated *Operational Research (OR)* with emerging interdisciplinary studies. These studies included recent advances in technology and medicine, endorsed by *OR* methods such as Optimization, in all its directions and forms, Data Mining, Machine and Deep Learning, *OR* Computation and Artificial Intelligence.

The five-day conference was established very well within a hospitable frame, where participants had the time to meet old and new friends, to share their experiences, to exchange their ideas and to collaborate for future studies. The conference contributed with some important success to *OR* working groups due to the diversity of the studies and the friendly environment that was provided.

The conference was highlighted by the following topics of the given talks of the invited speakers:

- Prof. Dr. Numan Akdoğan (Gebze University of Technology, Turkey): "Recent Advances in Nanotechnology and Shapeable Magnetoelectronics", where he explained the concept of *nanotechnology* and informed the participants about the new developments on the topic;
- Prof. Dr. Oleg Burdakov (Linköping University, Sweden): "Regularized Monotonic Regression", in which Prof. Burdakov mentioned the resulting "Smoothed Monotonic Regression (SMR)". He explained that SMR is a convex quadratic optimization problem. Also, SMR, where the set of observations is completely (linearly) ordered. Prof. Burdakov described that Smoothed Pool-Adjacent-Violators (SPAV) algorithm is designed for solving the SMR;
- Prof. Dr. Madjid Fathi (University of Siegen, Germany):

"A Knowledge based Concept for Mechanical Therapy instead of Chemical Therapy", where he introduced recent developments on cancer treatments with related clinical results;

- Prof. Dr. Amir Hussain (Edinburg Napier University, UK): "Cognitive Big Data Analytics for Cybersecurity Applications";
- Prof. Dr. Sushil Kumar Kansal (Pajcab University, India): "Visible Light Photo catalysts: Preparation, Characterization and Application for the Treatment of Organic Pollutants in Aqueous Phase";
- Prof. Dr. Ravindra Nuggehalli (New Jersey Institute of Technology, USA): "Research Opportunities and Challenges in Materials Science & Engineering-An Overview", where examples from the energy sector as well as the device sector were discussed;
- Prof. Dr. Ahmad Umar (Najran University, Saudi Arabia): "Semiconductor nanomaterials for Sensors and environmental remediation applications";
- Prof. Dr. Gerhard-Wilhelm Weber (Poznan University of Technology, Poland, along with Prof. Dr. Vilda Purtçuoğlu (METU, Ankara, Turkey)): "Voxel-MARS and CMARS: Early Warning of Alzheimer's Disease by Classification of Structural Brain MRI".

Prof. Dr. Gerhard-Wilhelm Weber was one of the plenary speakers (see above); in fact, Prof. Dr. Vilda Purtçuoğlu actively participated in discussions following presentations on behalf of Prof. Weber at the conference. In that talk, the importance of *OR* in neuroscience and its contributions to the practices of diagnosing neurodegenerative diseases with computer-aided systems based on brain image analysis was explained. This research benefits from the new tools of Data Mining, of Statistical, Machine and Deep Learning, and of Artificial Intelligence, called *CMARS*, *RCMARS*, *RMARS*, *CGPLM* and *RCGPLM*. In another contribution of Prof. Weber stochastic optimal control under regime switches, paradigm shifts jumps and delay was introduced with its newest and upcoming applications in finance, economics and medicine. >>

>> The importance of the OR community and OR innovation was emphasized, particularly in EURO and our worldwide OR community of IFORS. Indeed, it is of great importance to meet with representatives of other dynamic fields of science and technology, to present to them modern OR and seek future points of exchange and collaboration. This is what we aimed for at ICCESEN 2018, and what is intended by the special issue "Advances of Optimization in Science, Economics, Engineering and Medicine" of the journal *Optimization Methods and Software* on the occasion of ICCESEN 2018.

The success of ICCESEN in its 5th year encouraged the organizers to coordinate another scientific event at the same time - "The 1st International Conference on Sustainable Sciences and Technology (ICSuSaT 2018)" (<http://icsusat.net/>). The topics of ICSuSaT 2018 were organised into the themes of: natural sciences, social sciences, engineering sciences, applied sciences, and medical sciences (<https://icsusat.net/topics>). The variety of topics gave an opportunity for the attendees to broaden their horizons. Besides the scientific excellence of the conference, participants enjoyed the warm weather, the Mediterranean Sea and the beauty of Antalya. The gala dinner for both of the conferences provided a great occasion for the participants to experience traditional folk dances as well as to socialize and to network.



▲ Gala dinner with Prof. Dr. Madjid Fathi, Prof. Dr Ravindra Nuggehalli, Prof. Dr Shaheer Akhtar, Prof. Dr. Iskender Akkurt, Prof. Dr. Oleg Burdakov and Prof. Dr. Ahmed Kumar (from left to right).

Both conferences provided a special ambience and international platform, with a particular outreach to the Middle East and South Asia, to interconnect the attendees and share news on OR studies, OR meetings and the newest, most fascinating trends that right now are entering our community. The participants of ICCESEN 2018 and ICSuSaT 2018 were also informed about the upcoming OR meeting in Dublin, Ireland: EURO 2019 (<https://www.euro2019dublin.com/>), and cordially invited to it. 🌐

Regional Correspondents

ALIO	Annibal Parracho
APORS	Degang Liu
EURO	Gerhard Wilhelm Weber, Sarah Fores
NORAM	Grace Lin, Melissa Moore

Section Editors

OR Impact	Sue Merchant/John Ranyard
Conferences	Gerhard Wilhelm Weber
Book Review	Hans Ittmann

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Australia	Erhan Kozan
Austria	Karl Doerner
Belarus	Vladimir Golovko
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China	Degang Liu
Colombia	Jairo Rafael Montoya Torres
Croatia	Snjezana Pivac
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Denmark	Sanne Wohlk
Finland	Jussi Hakanen

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Slovenia	Lidija Zadnik-Stirn
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