

## Editorial

On May 26, 2020, the international community of operational researchers and decision scientists learned of the sudden and unexpected death of **Professor Gregory Kersten**. Gregory was a professor at Concordia University in Montreal, one of the founders and the former president of the INFORMS Section on Group Decision and Negotiation (GDN), editor in chief of the *GDN* journal, and a member of editorial boards of many other journals, including *Control and Cybernetics*. He was considered the father of electronic negotiations, but his research interest and work were far broader.

Gregory began his research career with operations research and then focused on its applications to the field of group decision and negotiation. The models of negotiations he designed were implemented into software negotiation support systems, such as NEGOPLAN, which he designed together with a group of his colleagues from the University of Ottawa and Carleton University. His interest in web-based international negotiations led to the initiation of the InterNeg Research Project, transformed later into InterNeg Research Center, which became an international forum for those interested in developing software-supported electronic international negotiations. Within InterNeg, he designed an electronic transactions platform called Invite, which became an implementation space for many negotiation and auction support systems, including his own, INSPIRE, the first electronic negotiation system in the world.

Dozens of universities worldwide were involved in electronic negotiation experiments, which Gregory organized. Participation in these experiments allowed thousands of students to develop their skills in negotiating and decision making by using negotiation and auction support systems. The experiments provided a large amount of data, used by Gregory and by his collaborators in numerous studies, focused not only on the use and usefulness of software support in international negotiations, but also on their behavioural aspects. The latter included issues such as national and organisational culture, negotiators' bargaining style, motivational profiles and cognitive capabilities, as well as the impacts of these aspects on the negotiation process and results. His studies inspired many researchers in his own as well as younger generations.

Apart from being an accomplished researcher, Gregory was also a teacher and collaborator, working with many researchers from the group decision and negotiation community. He was a keen observer and careful listener and always provided detailed feedback that helped many to improve their work. For many researchers, disputes with him were the starting points for future joint studies.

Born in Poland, Gregory also helped to develop an interest in group decisions and negotiation within the Polish research community. He gave seminars at, among others, SGH Warsaw School of Economics, University of Economics in Katowice and University of Bialystok. He also conducted joint research and was a co-author of many research papers with Polish colleagues.

We, a group of researchers representing the Polish community of scientists collaborating with Gregory, have prepared a Special Issue of the *Control and Cybernetics* journal, devoted to Gregory Kersten and his academic legacy. We identified contributors (Polish and international) who collaborated with Gregory or were directly inspired by him and his research. Nine papers were accepted for this Special Issue. We thank all the contributors for their important and valuable submissions, the content of which we sketch out briefly in the following paragraphs.

The issue opens with the paper entitled "E-negotiation design and engineering". This paper is an excerpt from a chapter of Gregory's unfinished book, devoted to electronic negotiations, which was his major field of research interest. The excerpt is preceded by a general introduction to the entire book, where Gregory introduces the reader to the nuances of the preliminary work required for a successful design of electronic negotiation systems. The focus is on the development of negotiation protocols, implemented in software systems, that integrate various support mechanisms, offered to the negotiating parties. Critical constructs of such negotiation protocols are defined, i.e., decision and choice, language, and process. Various types of protocols and their main properties are then discussed in detail. The excerpt ends with a short discussion of protocol design in view of negotiation dynamics, i.e., the negotiation phases and related states and activities that may occur within these phases.

Gregory always argued that in the design and construction of negotiation support systems, software engineers and negotiation analysts should take into consideration both the technical issues, related to the mathematical models for decision support, and the behavioural as well as cognitive factors that are linked to the needs, capabilities, and requirements of system users. All of the remaining papers address these issues accordingly.

In his article, entitled "Design science research approach in studying e-negotiations: models, systems, experiments", ShiKui Wu acknowledges Gregory's unique role as a pioneer in e-negotiation research. This review paper presents research work in e-negotiation modelling, system design and development, and experimental studies, which were provided and inspired by Gregory. It also offers some guidelines and directions for future research in e-negotiations.

The following two papers present the research results based on electronic negotiation experiments, designed in the INSPIRE negotiation support system. In the paper "Concession crossover in electronic negotiations", Real Carbonneau, Rustam Vahidov and Bo Yu investigate the phenomenon of concession crossover in online negotiations with multiple issues. Four concession prediction models

-the naïve, random, anti-naïve and max-potential model - have been utilised for testing and supporting the crossover effect based on the data set from INSPIRE experiments. The authors suggest that negotiators should expect their counterparts to switch issues while making concessions at some point and be prepared for this.

The problem of understanding the principal's preferences by negotiating agents is taken up by Krzysztof Piasecki\* in the paper entitled "A fuzzy ranking of negotiation packages for INSPIRE negotiation support system". A well-known Mosico-Fado bilateral negotiation case is used, in which the preferences of principals are visualised in the form of circles of different sizes. This manner of preference impartation may be misunderstood by the agents. Thus, the premise of "an agent's understanding" is replaced by a more general premise of "any agent's understanding", and hence the use of a multitude of agents (and their advisors) in building the negotiation scoring system on behalf of the principal is introduced. Consequently, a fuzzy-set based method with the use of scoring intervals for ranking of negotiation packages for INSPIRE negotiation support system is proposed.

The next two papers focus on developing formal decision support tools to be applied in negotiation and multiple criteria decision problems. The aim of the paper "Basketball contract: applying the SIPRES method in the process of evaluating the negotiation template" by Dorota Górecka and Patrycja Gulak-Lipka is the presentation of a novel method, called SIPRES, which can be used to evaluate negotiation templates. The SIPRES method combines the key elements of the revised Simos procedure and the ZAPROS method to elicit a negotiator's preferences over some reference solutions. The usefulness and advantages of the proposed framework are discussed in the context of contract negotiations for basketball players. The paper introduces a new standpoint in the scientific discourse about applying alternative multiple criteria decision aiding methods in order to evaluate negotiation templates other than the one implemented in the INSPIRE system.

The paper entitled "Using the FITradeoff method to solve a shopping mall location problem in the northeast countryside of Brazil" was written by Manoel Lucas Sousa Ribeiro, Lucia Reis Peixoto Roselli, Eduarda Asfora Frej, Adiel T. de Almeida and Danielle Costa Morais. It shows how the multiple criteria decision aiding technique, developed earlier by the research team led by Adiel T. de Almeida, may be implemented for solving a real-life decision-making problem. The method they apply was designed to ease the process of preference elicitation using an alternative holistic mechanism and visualisation. It was also implemented in a specially designed decision support system. The authors outline the context of the decision-making problem, particularly relevant from

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\*Professor Krzysztof Piasecki, a prominent member of the here relevant, but also much broader scientific community, both locally and internationally, passed away on July 14th, 2021, just when this issue was in printing (eds.).

the viewpoint of north-eastern Brazil, and its structure. Then they describe in detail the subsequent stages of problem-solving and decision support offered by their method and system. The authors note that the issues of design of preference elicitation mechanism that would meet cognitive capabilities were also often raised by Gregory in his recent works, in which he experimentally studied the effects of errors in preference elicitation on the results of decision making and negotiation processes.

The next two papers address the behavioural issues that may play a role in negotiations and in the use of negotiation support systems. In their work entitled "Toward assisted rationality switching in negotiations", Weronika Niececka and Tomasz Szapiro argue that the classical assumptions of rationality are often violated in negotiations. In order to more deeply understand this phenomenon, they develop both the conceptual and the mathematical descriptions aimed at explaining such violations, referred to as pulsing rationality. Using the elements of permutation theory, the paper shows that any rationality pulsation is an assembly of cycles and that these cycles are the compositions of the finite number of transpositions of adjacent levels in the hierarchical structure of decision-maker's needs. This work is also related to the results in the area of the impact of rationality assumptions on efficiency, and their implications for negotiation support systems that Gregory had studied in his paper with Sunil Noronha ("Rational agents, contract curves, and inefficient compromises").

In the paper "Toward cognitive negotiation support systems: a model of behavioural assessment of multiple criteria decision-making methods for pre-negotiation preparation", Ewa Roszkowska and Tomasz Wachowicz investigate the impact of some selected behavioural factors on the recommendation for future use of a specific multiple criteria decision aiding tool that can be implemented in the negotiation support system in order to build the negotiation offer scoring system. The authors analyse the effects of the decision maker's subjective perception of ease of use, time requirements, interface, preference representation, and efficiency of three multiple criteria methods, i.e., AHP, SMART, and TOPSIS, on the choice regarding the future use of this method. The study is based on data from online decision-making experiments and is performed with the application of the logistic regression model. The results show that the user's positive experience with using a particular method and the adequacy in representing the user's preferences by this method have the highest impact on the method's choice for future use.

The last two papers study the general frameworks for analysis of the decision-making problems in specific situations and contexts. In the article "Objectives of an enterprise. Bi-criteria analysis and negotiation problems", Lech Kruś and Jan Gadomski propose a model of decision-making for a firm, in which two conflicting groups of interests coexist. The model is based on a specific micro-economic representation of enterprise functioning. The solution leads to a Pareto front of the two-criteria optimisation problem, which can provide grounds for possible negotiations between the involved groups of interests. Such investi-

gations of efficient contracts refer to the notions presented by Gregory and his colleagues in their earlier work on "Analytic basis for decision support in negotiations", such as safe contracts, no-concession contracts, and efficient contracts.

Finally, a related economic model is proposed by Kinga Siuta and Daniel Kaszyński in the paper "Principal-agent problem in supply chain management - simulation based framework". Here, an agent acts on behalf of the company owner, i.e., the principal, in a supply chain management domain in the face of a supplier's default uncertainty. This setting can lead to the conflict of interests between the principal and the agent. The paper shows a way to construct a contract that avoids, or at least minimizes the agency problems. The analysis performed assumes the rationality of both parties involved in the negotiation process. The presented work is focused on a specific application area. It is closely related to one of the last research papers published by Gregory ("How do I tell you what I want? Agent's interpretation of principal's preferences and its impact on understanding the negotiation process and outcomes"), where the challenges of communication between the principal and the agent and their influence on negotiation process were studied.

The multitude of problems, issues and contexts raised in the papers that comprise this special issue show how broad and inspiring Gregory Kersten's research was and remains. For the authors, their contributions are a tribute paid to Him as a colleague, friend, co-author, collaborator, teacher and mentor. But most importantly, we would like this special issue to be a stimulating and inspiring trigger for a younger generation of researchers to begin their own studies of the issues close to Gregory's interests, these issues remaining so vital for the times we live in. The promise of negotiation, collaboration, understanding and support should be offered to people to help resolve conflicts, no matter how daunting and intractable they may appear to be.

The Guest Editors