

From the Editors

Copulas, Group Preferences, Multilevel Defenders,
Sharing Rewards, and Communicating Analytics

L. Robin Keller

Operations and Decision Technologies, The Paul Merage School of Business, University of California, Irvine, Irvine, California 92697,
lrkeller@uci.edu

Kelly M. Kophazi

Institute for Operations Research and the Management Sciences, Hanover, Maryland 21076, kelly.kophazi@informs.org

We review the past year and this Editor-in-Chief's editorship for the last six annual volumes in this issue's "From the Editors" column, which is coauthored with Managing Editor Kelly M. Kophazi, and then we preview this issue's research articles. Our first article, by Dorota Kurowicka is on "Conditionalization of Copula-Based Models." The next three papers address groups or teams. First is "A Note on a Group Preference Axiomatization with Cardinal Utility," by Luis C. Dias and Paula Sarabando. Next, Andrew Samuel and Seth D. Guikema address "Resource Allocation for Homeland Defense: Dealing with the Team Effect." Then, Arthur Carvalho and Kate Larson present a way for "Sharing Rewards Among Strangers Based on Peer Evaluations." Finally, Jeffrey M. Keisler and Patrick S. Noonan provide guidance for decision analysis practice in "Communicating Analytic Results: A Tutorial for Decision Consultants."

Key words: decision analysis; additive model; agency theory; analysis; Bayesian belief nets; communication of decision analysis insights; copula; decision consulting; fair division; game theory; group utility functions; homeland security; iterative proportional fitting; local dependence function; marginal replacement; mixed derivative measure of interaction; modeling; multiattribute utility theory; peer-prediction methods; risk assessment; scoring rules; editorial

So what do we do? Anything. Something. So long as we just don't sit there. If we screw it up, start over. Try something else. If we wait until we've satisfied all the uncertainties, it may be too late.

Lee Iacocca

Our opening quote from the former automobile company executive Lee Iacocca helps us recall our effort over a decade ago to found the new journal of *Decision Analysis*. At the time we faced many uncertainties about what would happen. We were buoyed by John Little's encouragement to "put a stake in the ground" right away to claim the field of decision analysis. Having staked our claim, instead of just "sitting there," it is gratifying to look back on nine years of publication. When Volume 9 is completed this December, Robin Keller will have hit the term limit of two three-year terms as Editor-in-Chief, following the three-year term of founding Editors-in-Chief Don Kleinmuntz and Robert Clemen. The mem-

bers of her editorial board¹ will also complete their terms at the end of December.

The INFORMS Board of Directors appointed Rakesh K. Sarin of the University of California, Los Angeles as the incoming Editor-in-Chief at its summer 2012 board meeting, based on the recommendation of the editor search committee appointed by INFORMS.² This mandatory appointment of a new editor is one way that INFORMS journals remain

¹See the journal site at <http://www.informs.org/Journal/DA/Editorial-Office> for contact information and photos of the editorial office team, including Production Editor Kimberly Anoweck. Editorial board member photos are at <http://www.informs.org/Pubs/DA/Promo-Folder/PHOTOS>.

²The search committee members were Robert Clemen (chair), Vicki Bier, James S. Dyer, and Frederic H. Murphy (as the liaison from the INFORMS Publications Committee). The call for nominations was posted at <http://www.informs.org/Pubs/DA/NEWS/Call-for-Nominations-Editor-in-Chief-Decision-Analysis>.

highly ranked and up-to-date. The new Editor-in-Chief will assume office on January 1, 2013, and will appoint a new editorial board.

This column, coauthored with Managing Editor Kelly M. Kophazi, contains our annual review from the perspective of the journal's editorial office. We aim to serve readers and authors throughout the world through publications in our archival journal. *Decision Analysis* publishes papers on theory, assessment methodologies, experiments, surveys, and applications.³

Most *Decision Analysis* issues contain regularly submitted papers, published in order of acceptance. In the June 2012 issue, we published the special issue on "Games and Decisions in Reliability and Risk," with guest editors Jason R. W. Merrick, Fabrizio Ruggeri, and Refik Soyer. See Merrick et al. (2012) for the editorial column for the special issue. See Keller et al. (2011a) for the Call for Papers. The last special issue was the one in honor of Michael H. Rothkopf on auctions, in March 2010; see Bordley et al. (2010) for a summary of the papers in that issue. Recent articles by the editors summarizing the papers in each issue of regularly submitted papers include Keller (2011a, b; 2012), Keller et al. (2011b), and Keller and Kophazi (2011). Full text versions of these editorials are available, along with the "About the Authors" section (containing author biographies and photos) from our journal's online site.⁴ Prior "From the Editor" columns under this editorship include Keller (2007a, b, c; 2008a, b; 2009a, b; 2010), Keller et al. (2007, 2008, 2009, 2010), and Keller and Kophazi (2008, 2009, 2010).

Many countries are represented by our corresponding authors. In the past year, from May 1, 2011, through the end of April 2012, we had submissions⁵

from corresponding authors from 25 countries, compared with 29 countries in the prior year (May 1, 2010, through April 2011). There were 12 new countries last year, and 16 countries from the prior year were not represented last year. The number of countries represented increases if all the coauthors on the submitted papers are included. Since we began using the ScholarOne Manuscripts online submission system (formerly called Manuscript Central) in January 2008, the total number of countries of corresponding authors is 48.

Decision Analysis is covered by the Social Science Citation Index, beginning with Volume 6, Issue 1 (March 2009). Based on this coverage, our journal's first impact factor (counting the average number of citations of each paper published in the journal in a specific time period) is in the summer 2012 *Journal Citation Report*.⁶ *Decision Analysis* has an impressive impact factor of 2.143 in the management category, ranking it in the top 25%, as 38th out of 166 journals. For all the journals (including all INFORMS journals) which are hosted on the HighWire site that holds our archives, see the useful feature that gives rankings of *Decision Analysis* papers that are most often cited and most often downloaded.⁷ These rankings are based on citations to online articles from HighWire-hosted articles only, not all citations from any works published anywhere.

We announce each issue's authors and paper titles via emails to Decision Analysis Society⁸ members, journal news articles in *Decision Analysis Today: The Newsletter of the INFORMS Decision Analysis Society*,⁹ and postings on the Decision Analysis Web forum.¹⁰ We distribute a flyer promoting the journal at conferences, and we encourage you to distribute it among your colleagues.¹¹

We have a good turnaround time for our reviews, with the average turnaround time to a one-round

³ We encourage teams who have been honored with the DAS (Decision Analysis Society) Practice Award to prepare papers for the journal. See <http://www.informs.org/Recognize-Excellence/Community-Prizes-and-Awards/Decision-Analysis-Society/DAS-Practice-Award>.

⁴ Journal archives: <http://da.journal.informs.org/>. The old *Decision Analysis* website at <http://da.pubs.informs.org> now resolves to <http://www.informs.org/Journal/DA>. Past issues are archived by HighWire Press®, which also offers the option to request free *Decision Analysis* eTOCs (e-mailed Table of Contents) alerts.

⁵ *Decision Analysis* submission and review website: <http://mc.manuscriptcentral.com/deca>.

⁶ See http://thomsonreuters.com/products_services/science/science_products/a-z/journal_citation_reports/.

⁷ See <http://decision.highwire.org/reports/most-read> and <http://decision.highwire.org/reports/most-cited>.

⁸ See <http://www.informs.org/Community/DAS>.

⁹ See <http://www.informs.org/Community/DAS/Newsletter>.

¹⁰ See <http://www.syncopation.com/forums/viewforum.php?f=7>.

¹¹ See <http://www.informs.org/Community/DAS/Decision-Analysis-Journal-for-the-Decision-Analysis-flyer>.

decision (of reject, revise, or accept) being 24 days.¹² Of those papers, 89% received a first decision within 60 days and 100% within 120 days.¹³ For papers submitted since we began using ScholarOne Manuscripts (January 2008), the average number of days until the final decision (including time that the paper is with the author for revision) was 79 days. The median was 40 days, with a minimum of 0 days and a maximum of 615 days. Papers are with referees for an average of 27 days (for original submissions) and 22 days (for revisions).

Now we turn to the first article, by Dorota Kurowicka, on "Conditionalization of Copula-Based Models." Copulae provide a way to construct joint probability distributions with arbitrary one-dimensional margins. Kurowicka (2012) presents a new type of conditionalization of copula-based models, motivated by modeling risk in civil aviation with a copula-based model in the form of a continuous nonparametric Bayesian belief net. Her primary result enables a simplified means for conditionalizing on more than one univariate margin in a normal copula model. In a prior *Decision Analysis* paper on copulae, Kotz and van Dorp (2010) examined generalized diagonal band copulae with two-sided generating densities. Kurowicka's (2012) article is related to her prior work on air transport safety in Ale et al. (2006, 2009, 2010) and her 2006 book with Roger Cooke on uncertainty analysis (Kurowicka and Cooke 2006).

Prior *Decision Analysis* papers on probabilities include Abbas et al. (2008) on two probability assessment methods; Baillon (2008) on eliciting probabilities using exchangeable events; Bordley (2011) on updating probabilities based on outcomes of partially similar events; Bordley (2009) on combining the opinions of experts who partition events differently; and Bickel (2010), Johnstone (2007), Kilgour and Gerchak (2004), and Schervish et al. (2009) on probability scoring rules.

The next three papers address decisions by groups or teams. First is "A Note on a Group Preference Axiomatization with Cardinal Utility," by Luis C. Dias

and Paula Sarabando. Arrow (1951) and Keeney (1976) examined the possibility (or not) of aggregating the preferences of individuals into an ordinal (by Arrow) or cardinal (by Keeney) group preference function that would satisfy certain desirable conditions, including a nondictatorship condition. Dias and Sarabando (2012) propose stronger formulations of such a nondictatorship condition. The new formulations are designed to limit the maximum influence that an individual could have over the group. Strategic coalitions of individuals are also examined.

Prior papers in *Decision Analysis* involving judgments across groups of people include Wang et al. (2011) and Predd et al. (2008) on combining probability assessments. A related prior paper is Merrick (2008) on getting the right mix of experts.

Even comedian George Carlin devoted some thought to group decision making, saying, "Who decides when the applause should die down? It seems like it's a group decision; everyone begins to say to themselves at the same time, 'Well, okay, that's enough of that.'" Even though applause by a crowd may not be a conscious collaboration by a group of people (meriting the construction of a group utility function), Carlin's quote can be seen from a game theory perspective with each audience member making a self-interested decision that has an effect on the whole group. This leads us to our next article.

Andrew Samuel and Seth D. Guikema address "Resource Allocation for Homeland Defense: Dealing with the Team Effect." Taking a principal-agent perspective, a single principal (such as the U.S. Congress) and its multiple agents (federal, state, and local security agencies) defend against homeland attackers. Modeling the interaction among the levels of the defenders via a game model, Samuel and Guikema (2012) show that since resources are limited and defenders at different levels have private information on local risks and possible defensive actions and can take self-interested actions, "ignoring the within-team defender interactions...leads to a suboptimal resource allocation" (p. 238). The paper by Samuel and Guikema (2012) builds upon Guikema's prior work on resource allocation (Guikema 2003, 2006, 2009).

Prior papers in *Decision Analysis* have examined terrorism detection and national security using game theory or decision analysis methods. Using game

¹² This includes those papers rejected without going to referees and papers under all associate editors (both the official ones and the ad hoc ones).

¹³ See <http://www.informs.org/Find-Research-Publications/Journals/Author-Portal/Journal-Review-and-Submission-Statistics>.

theory, Haphuriwat et al. (2011) presented a model of terrorist decision making to examine the role of nuclear detection technologies in deterring nuclear terrorism, extending prior work on cargo screening from Merrick and McLay (2010). Other related papers include Bakır (2008) on cargo screening, Barrett (2010) on chlorine truck attacks, Caswell et al. (2011) on a strategy to prevent or delay another country from acquiring nuclear weapons, Feng and Keller (2006) on potassium iodide distribution, Hausken and Zhuang (2011) on governments' and terrorists' choices between attacking the enemy and defending against an attack, and von Winterfeldt and O'Sullivan (2006) on surface-to-air missile attacks. Prior game theory papers in *Decision Analysis* include van Binsbergen and Marx (2007), Cobb and Basuchoudhary (2009), Cavusoglu and Raghunathan (2004), Lippman and McCardle (2004), and Rothkopf (2007).

Next, Arthur Carvalho and Kate Larson present a way for "Sharing Rewards Among Strangers Based on Peer Evaluations." Carvalho and Larson (2012) examine how to fairly share a joint reward, depending on how each stranger evaluates the other people's performances. The mechanism rewards a person based on how others evaluate him or her, and based on how truthful he or she is in evaluating others. To promote truthfulness, the mechanism uses a peer-prediction method built upon strictly proper scoring rules. The paper by Carvalho and Larson (2012) is related to their prior work in Carvalho and Larson (2011).

Prior papers in *Decision Analysis* on probability scoring rules include Bickel (2010), Johnstone (2007), Kilgour and Gerchak (2004), and Schervish et al. (2009).

Before we turn to our final article, which is on the practice of decision analysis, it is time for our *Trivia question*: Which associate editor of *Decision Analysis* worked as a decision analyst at Procter & Gamble? Hint: For the list of associate editors, see the journal's website: <http://www.informs.org/Pubs/DA/Editorial-Board>. Once you have made your guess, see the footnote for the trivia answer.¹⁴

¹⁴ *Trivia answer*: George Wu, a professor of behavioral science at the University of Chicago, worked as a decision analyst at Procter & Gamble before graduate school, according to his website: http://www.chicagobooth.edu/faculty/bio.aspx?person_id=12825987072.

In our final article, Jeffrey M. Keisler and Patrick S. Noonan provide guidance for decision analysis practice in "Communicating Analytic Results: A Tutorial for Decision Consultants." Keisler and Noonan (2012) present standard communication practices in decision analysis consulting and describe how communication can be improved, for both technical communication skills and organizational communication skills. Keisler is a member of the *Decision Analysis* editorial board. His prior contribution to *Decision Analysis* is Keisler (2004) on portfolio decision analysis. The paper by Keisler and Noonan (2012) builds on both authors' interests in communicating information to improve decision making in organizations (Keisler 1992, Noonan 2013).

The paper by Keefer et al. (2004) contains a survey of decision analysis applications. Other papers in *Decision Analysis* related to practice include Bana e Costa et al. (2008) on electricity transmission, Brothens et al. (2009) on radioactive liquid process waste, Brown (2009) and Gregory et al. (2005) on public policy, Cantor (2004) on medical decision analysis applications, Ewing and Baker (2009) on green buildings, Ewing et al. (2006) on military base realignment and closure, McCardle et al. (2009) on fund raising, Sevillano et al. (2012) on avoiding Somali pirates, and Mild and Salo (2009) on resource allocation for infrastructure maintenance.

As we conclude, we want to ensure that all authors and readers know that we routinely use the Ithenticate Professional Plagiarism Prevention software to check if a submitted manuscript has significant word-for-word overlap with other published works. Corresponding authors agree to the following plagiarism warning when submitting a paper to any INFORMS-published journal:

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¹⁵ For more information, see <http://www.informs.org/Find-Research-Publications/INFORMS-Journals/Author-Portal/Publications-Policies/Guidelines-for-Copyright-Plagiarism>.

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