

## Guest editorial

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# Special issue dedicated to the 60th birthday of Etienne E. Kerre

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The year 2005 is marked by the 40th anniversary of fuzzy set theory, as it was in 1965 that Lotfi Zadeh published his famous seminal paper that fostered the rise of a whole new community, researching theory and applications of fuzzy sets and systems. Throughout the years, fuzzy logic was frequently met with skepticism, not in the least because of its often misunderstood name. Nevertheless, our research community survived and grew to its full potential thanks to a few brave researchers who did ground breaking work in those early years – the pioneers of fuzzy logic. One of those pioneers is Etienne E. Kerre.

Etienne was born on May 8, 1945 in Zele, Belgium, studied mathematics at Ghent University and obtained his PhD degree there in 1970 for research on “Low Energy Electron Diffraction”.

Soon after, he started research in fuzzy set theory, founding the Fuzziness and Uncertainty Modelling Research Unit in 1976, while in 1978 he organized and taught the first “free course” on the theory of fuzzy sets. Etienne soon gained a reputation as a passionate and gifted lecturer, and currently teaches mathematical analysis to the undergraduates in computer science as well as fuzzy set theory at the graduate and postgraduate level in mathematics and computer science.

Celebrating his 60th birthday on May 8, 2005, Etienne has a very rich research career to look back on. His extensive list of over 350 publications shows an evolving interest in a wide variety of topics, including fuzzy topology, fuzzy databases, fuzzy logical opera-

tors, fuzzy rough sets, and many, many more. Indeed, the overview of Etienne’s research output is a good reflection of many important topics and problems that puzzled our community the past decades; realizing this inspired us to compose this special issue.

Etienne is known to be very concerned with the young people carrying out research under his supervision. Their worries deprive him of sleep, their successes make him immensely proud, helping them in their research and their careers is his highest priority. We therefore decided to present a compilation of Etienne’s work in terms of the twenty researchers who so far have completed their PhD under Etienne’s guidance.

In particular, a call for papers was targeted at those past PhD students, inviting them to submit research papers describing recent results they and their collaborators obtained within the wide domain of fuzziness and uncertainty modelling. Many enthusiastic reactions ensued, and, after a thorough and rigorous reviewing process, made possible by the efforts of fifteen anonymous referees, seven original contributions were accepted for publication. They cover several of the theoretical and applied domains Etienne has helped shape – including fuzzy database and ER models, interval-valued fuzzy set theory, fuzzy techniques for image processing, and fuzzy relational calculus – and most of all, they are written according to the rigorous and elegant mathematical tradition so characteristic of Etienne’s style.

Finally, we tracked down each of those twenty people to see how they have fared in life after their PhD. Some

have long said farewell to the “fuzzy community” to take up various important positions in the industrial and public sector, in Belgium as well as abroad. We let their resumes speak for themselves.

Chris Cornelis,  
Martine De Cock  
*The Guest-editors*

**Antoine Van Schooten** [1] was the first student to finish a PhD in 1989 under the guidance of Etienne with a thesis on “The Development and Implementation of a Fuzzy Relational Database System Tool”. Antoine left the academic world to hold important research and managing positions in the steel industry. Currently, he is the vice-president of Stahlwerke Bremen in Germany. Antoine appreciates Etienne’s extensive knowledge and intelligence, his enthusiasm, the way he always encouraged him during his work, the fact that Etienne always took the time to discuss, but more than ever: “although Etienne is a real ‘big name’, he has always remained with ‘both feet on the ground’ and most importantly: he is really a very good friend!”

**Peter Ottoy** [2] obtained his PhD in mathematics in 1989 with a thesis on “Neighbourhood Structures for Fuzzy Topological Spaces”. Next, Peter joined the steel producing company Sidmar in Belgium. First he was employed in the Department of Systems and Models, and since 2002 he holds the position of TMP-coordinator. Since 2001, he is also a guest lecturer on industrial statistics at the Department of Industrial Management at Ghent University. From his PhD days, Peter remembers Etienne’s unwavering optimism and perseverance, and his exceptional qualities as a lecturer, as well as the long discussions (concerning mathematics – most of the time, anyway) they had together.

**Da Ruan** [3] obtained his PhD degree in 1990 with a thesis entitled “A Critical Study of Widely Used Fuzzy Implication Operators and Their Influence on the Inference Rules in Fuzzy Expert Systems”. Currently he is a principal investigator at The Belgian Nuclear Research Centre. Da still greatly enjoys a fruitful cooperation with Etienne on diverse domains such as the international FLINS conference series on applied computational intelligence (of which Etienne has been honorary chairman, program chairman and advisor), the bilateral China-Flanders cooperation, and the book they co-authored on fuzzy set theory and approximate reasoning.

**Ali Nouh** [4] obtained his PhD in mathematics in 1991 at El-Mansoura University in Egypt, under the supervision of Etienne Kerre. His thesis is entitled: “Some Special Mappings Between Fuzzy (Bi)topological Spaces”. Afterwards, Ali took up a position in the Department of Mathematics of the Faculty of Science at El-Mansoura University.

**Guoqing Chen** [5] received his PhD in 1992 with a dissertation entitled “Design of Fuzzy Relational Databases Based on Fuzzy Functional Dependency”. Presently, he is a professor of Information Systems,

and deputy dean of the School of Economics and Management at Tsinghua University in Beijing, China. His research interests include fuzzy logic in information systems, business intelligence and data mining, fuzzy databases, and IT management. He deems highly of Etienne’s supervision to his doctoral study and considers to be inspired in many ways by Etienne’s enthusiasm for scholarly pursuit, warm-heartedness to students and friends, and devotion to excellence in teaching and research.

**Gert de Cooman** [6] earned his PhD in Engineering in 1993. His thesis was entitled: “Evaluation Sets and Mappings – An Order-Theoretic Approach to Vagueness and Uncertainty”. Currently, he is a member of the SYSTeMS group of Ghent University, where he holds a permanent position as research professor in uncertainty modelling and systems science. He is also, as president of the International Society for Imprecise Probability, Theory and Applications, actively involved in the organisation of the biennial ISIPTA conferences and summer schools. His research interests are in the mathematical and philosophical aspects of uncertainty modelling, in imprecision in probability theory, and the study of uncertainty in systems.

**Bart Cappelle** [7] obtained a PhD in mathematics with a thesis on “Structure and Reliability Functions – a Lattice Theoretical Approach to Reliability Theory” in 1994. The idea to develop a reliability theory based on a lattice approach was stemming from the DOW Chemical-project, where a model was developed to reduce redundant or irrelevant data in a chemical plant’s control room. Currently, he is country operations manager with the ABN AMRO Bank; his mathematical background is of significant relevance in his job. Challenging projects like Euro, off-shoring, process optimisation, mega-deals, due diligences, etc. could, however, never replace those wonderful PhD years with phenomenal phone and office discussions.

**Mohammad El-Gayyar** [8] obtained a master’s degree in applied mathematics from Assuit University in Egypt, and a PhD degree in mathematics with a thesis on “A Study of Fuzzy Smooth Structures and some Applications” from Ghent University in 1994. Currently, he is working as an assistant professor in the Department of Mathematics of the Faculty of Engineering at Suez Canal University in Port Said, Egypt. He has been seconded as an assistant professor to the Ministry of Education, Faculty of Teachers in Hail, Saudi Arabia. He has no hesitation in saying that he has immensely benefited from working under the guidance of Prof. Etienne Kerre. Etienne’s patience, skill, and mind have

left a deep mark on his character; and he has always felt a much better person since he met Etienne. For Mohammad, apart from his eminence as a scholar, Etienne is a fascinating, lovable, thoughtful and warm-hearted human being.

**Bernard De Baets** [9] holds a master's degree in mathematics, and obtained his PhD in mathematics from Ghent University in 1995 with a thesis on "Solving Fuzzy Relational Equations: an Order-Theoretic Approach". He is currently a professor of Applied Mathematics at the Faculty of Bioscience Engineering at Ghent University. He owes eternal gratitude to Etienne for having been introduced to order theory.

**Elena Tsiporkova** [10] earned her PhD in mathematics in 1995 with a thesis entitled "On the Fuzzification of Multivalued Mappings". She is currently a postdoctoral fellow in the Computational Biology Division of the Department of Plant Systems Biology at the Flanders Inter-university Institute for Biotechnology/Ghent University.

**Bartel Van de Walle** [11] received his PhD in mathematics in 1997 with a thesis on "The Existence and Characterization of Fuzzy Preference Structures". Currently, he is assistant professor of Information Systems at Tilburg University in the Netherlands and visiting research professor at the New Jersey Institute of Technology in the United States.

**Xuzhu Wang** [12] obtained a PhD degree in mathematics with a thesis on "A Comparative Study of the Ranking Methods for Fuzzy Quantities" in 1997. He got a professor position in the Department of Mathematics at Taiyuan University of Technology, Taiyuan, Shanxi, China in 1998. Currently, his research area is fuzzy decision making including: ordering of fuzzy numbers, fuzzy choice functions, fuzzy preference structures, etc. Etienne impressed him deeply with his extensive knowledge in mathematics and strict attitude towards research. His friendship made Xuzhu's stay in Belgium a great pleasure.

**Hugo Janssen** [13] has a M.Sc. degree in Mathematics as well as in Actuarial Science. From 1994 until 2000, he was a member of Etienne's research group. In close collaboration with Prof. Dr. Gert de Cooman and under Etienne's supervision, he prepared his thesis on "An Order-Theoretic and Behavioural Study of Possibilistic Processes", for which he received his PhD in mathematics in 1999. Afterwards, in 2003, he obtained the Degree of Advanced Studies – Master in Artificial Intelligence from the Catholic University of Leuven in Belgium. Currently, he is working as a teacher in computer science.

**Leen Kuijken** [14] obtained a master's degree in mathematics from Ghent University, as well as a postgraduate degree in business administration from the Catholic University of Leuven. She received her PhD from Ghent University in 2000 with a thesis on "Axiomatics and Models for Fuzzy Incidence Geometries". After her PhD, she got a job as a financial consultant at SimCorp Benelux NV, where she is currently manager of sales, presales – market support and marketing. From her PhD days, she remembers especially Etienne's unfaltering positive thinking.

**Martine De Cock** [15] completed her PhD on "A Thorough Study of Linguistic Modifiers in Fuzzy Set Theory" in 2002. Currently, she is a professor in the Department of Applied Mathematics and Computer Science at Ghent University, carrying out research on the use of fuzzy set theory for web intelligence. Words fall short to express her gratitude to Etienne for opening the door to a life as an academic researcher for her, and allowing her to live that life with great freedom from the very beginning.

**Mike Nachtegaal** [16] received his PhD in mathematics in 2002. His thesis was entitled "Fuzzy Morphology and Fuzzy Logic Filtering Techniques in Image Processing". He is currently a doctor-assistant at Ghent University. His research focusses on fuzzy techniques in image processing. He is co-manager of FLINS conferences as well as of the Soft Computing in Image Processing Working Group. Mike especially enjoyed and appreciated the continued stimulation of Etienne to explore the fuzzy galaxy.

**Jurgen Martens** [17] obtained a PhD from the Catholic University of Leuven in 2004, under the supervision of Ferdi Put and Etienne Kerre, with a thesis on "A Fuzzy Set and Stochastic System Theoretic Technique to Validate Simulation Models". Currently, he is operations research analyst at SN Brussels Airlines, the Belgian national air carrier. From Etienne, Jurgen acquired a sense of precision in mathematical and linguistic statements, without introducing an overload of notation. It is an art to accurately describe things with as few words and symbols as possible!

**Chris Cornelis** [18] earned his PhD in computer science in 2004 with a thesis on "Two-Sidedness in the Representation and Processing of Imprecise Information". At present he is a postdoctoral fellow of the Special Research Fund at Ghent University. Chris' interests include various models of imprecision (fuzzy rough sets, bilattices, L-fuzzy sets), data mining, approximate reasoning, and is currently focussing on personalized information access. Chris is especially grate-

ful to Etienne for the support, the endorsement and the freedom he received during his research.

**Dietrich Van der Weken** [19] joined the Fuzziness and Uncertainty Modelling Research Group in September 2000, where he had the opportunity to prepare a PhD thesis under Etienne's supervision, entitled "The Use and the Construction of Similarity Measures in Image Processing" (2004). Currently, he is working as a postdoctoral researcher in this research group. He considers himself very lucky to have become a PhD student of professor Kerre. Etienne's enthusiasm and love for research were an inexhaustible source for him to keep working on his PhD. Also the constructive criticism and punctuality had a large influence on the value of Dietrich's research. And of course, last but not least, Etienne's invariable sense of humour has always been a welcome distraction during the time they have been working together.

**Glad Deschrijver** [20] was the 20th student to finish a PhD thesis under Etienne's guidance. It is entitled "A Thorough Study of the Basic Operators in Intuitionistic Fuzzy Set Theory". Glad is still working as a research assistant in Etienne's group. His research interests include the mathematics of different models of imprecision, including interval-valued fuzzy sets, intuitionistic fuzzy sets in the sense of Atanassov, L-fuzzy sets and bilattices. He is currently doing research on triangular norms and related operators in interval-valued fuzzy set theory. Glad particularly appreciates the freedom and the support he received and still receives from Etienne.

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