

ORGANIZED BY

Research Group of
Artificial Intelligence and Approximate Reasoning
Led by Humberto Bustince

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Vicerrectorado de Investigación

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Third International Workshop of
Artificial Intelligence.
Aggregation Functions and Extensions of
Fuzzy Sets in Computer Vision

DECEMBER 11, 12

2008

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PAMPLONA – NAVARRA – SPAIN
Universidad Pública de Navarra





International Workshop of
Artificial Intelligence.
Aggregation Functions and Extensions of
Fuzzy Sets in Computer Vision

**III International Workshop of
Artificial Intelligence.
Aggregation Functions and Extensions
of Fuzzy Sets in Computer Vision**

Pamplona
December 11, 12
2008

The main goal of this workshop is, following the work of the two previous ones, to open new lines of research in Artificial Intelligence. In this sense some of the most relevant national and international researchers are expected to take part.

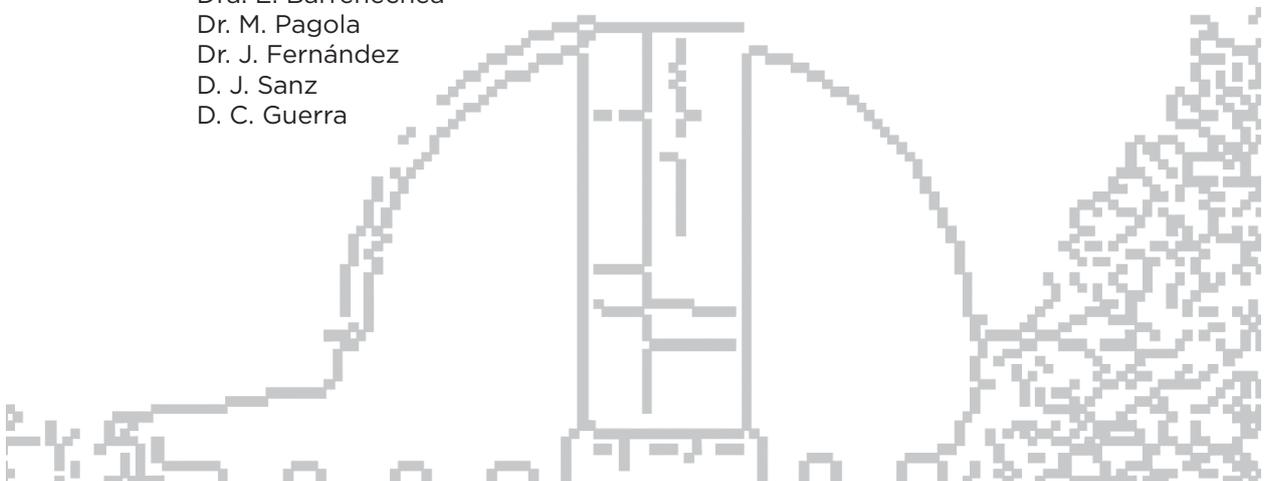
This year we specially focus on three main lines, the first one is related with Aggregation Functions, the second one is Computer Vision and the third one is about Semantic Web.

This workshop has been organized by the research group of Artificial Intelligence and Approximate Reasoning of the Public University of Navarra.

We would like to thank the collaboration of Vicerrectorado de Investigación , la Escuela Técnica Superior de Ingenieros Industriales y de Telecomunicación, el departamento de Automática y Computación of the Public University of Navarra, the MEC of the Spanish Government and the enterprise Dreambox Animática.

Organizing Committee:

Dr. H. Bustince
Dra. E. Barrenechea
Dr. M. Pagola
Dr. J. Fernández
D. J. Sanz
D. C. Guerra



WORKSHOP PROGRAM

Thursday 11, December

9:30 H OPENING

10 - 11:30 H PANEL DISCUSSION 1:

ON A GENERALIZATION OF MIGRATIVITY FOR AGGREGATION FUNCTIONS

Speakers: T. Calvo, B. De Baets, J. Fodor, R. Mesiar, J. Montero, J. Fernandez and H. Bustince

Short presentation of the problem and moderation: R. Mesiar

11:30 - 12 H Coffee Break

12 - 13:30 H PANEL DISCUSSION 2:

INTERVAL-VALUED MIGRATIVITY

Speakers: M. Baczynski, B. De Baets, J. Fodor, R. Mesiar, J. Montero and H. Bustince

Short presentation of the problem and moderation:

M. Baczynski

13:30 - 15 H Lunch

15 - 16:30 H KEYNOTE SPEECHES:

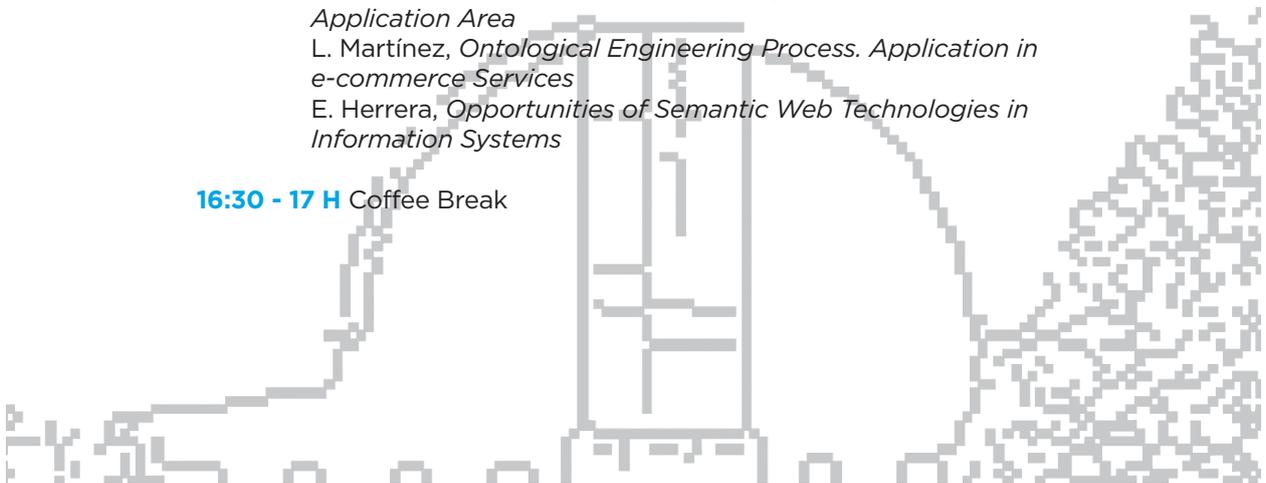
SEMANTIC WEB

V. Loia, *Semantic Web: State of Art, Open Problems and Application Area*

L. Martínez, *Ontological Engineering Process. Application in e-commerce Services*

E. Herrera, *Opportunities of Semantic Web Technologies in Information Systems*

16:30 - 17 H Coffee Break



17 - 18:30 H KEYNOTE SPEECHES:

IMAGE PROCESSING

J. Chamorro and D. Sánchez, *Semantic Characterization of Low and Medium Level Features in Images using Fuzzy Logic*

C. López, *Edge Detection based on Gravitatory Forces*

M. Pagola, *Unknowledge Functions and Thresholding*

S. Cubillo, *Some Extensions of Fuzzy Sets in Image Processing*

Friday 12, December

9 - 10:30 H PANEL DISCUSSION 3:

OWA OPERATORS IN DIMENSION TWO, K_α OPERATORS AND APPLICATION TO IMAGE REDUCTION

Speakers: T. Calvo, B. De Baets, J. Fodor, F. Herrera, R. Mesiar, J. Montero, J. Fernandez and H. Bustince

Short presentation of the problem and moderation:

J. Montero

10:30 - 11:00 H Coffee Break

11 - 11:45 H KEYNOTE SPEECHES:

J.L. García Lapresta, *Centered OWA Operators in Voting*

A. Pradera, *Handling of Contradictory Information by Aggregation Functions*

11:45 - 13 H PANEL DISCUSSION 4:

NEW TRENDS ON IMAGE PROCESSING USING FUZZY SETS AND THEIR EXTENSIONS

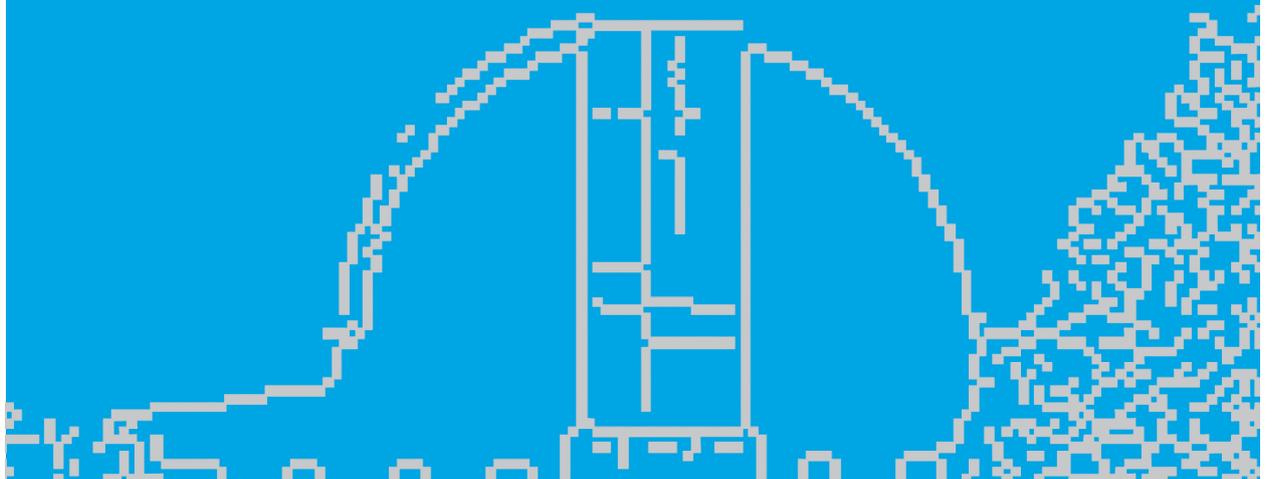
Speakers: P. Melo-Pinto, P. Couto, J. Chamorro, D. Sánchez, S. Cubillo and GIARA

Short presentation of the problem and moderation:

P. Melo-Pinto



INVITED RESEARCHERS



Dr. Michal Baczyński

M. Baczyński was born in Katowice, Poland in 1971. He received the M.Sc. and Ph.D. degrees, both in mathematics, from the Department of Mathematics, Physics and Chemistry, University of Silesia in Katowice, Poland, in 1995 and 2000, respectively. He is currently working in the Institute of Mathematics at the same University, where he is an Assistant Professor. His research interests include fuzzy logic connectives (especially fuzzy implications), fuzzy systems and functional equations. He has published a monograph on fuzzy implications and more than 20 papers in the refereed international journals with impact factor and conference proceedings. He is also a regular reviewer for many international journals and conferences. His other hobbies include tennis, skiing and travelling.

Dra. Tomasa Calvo

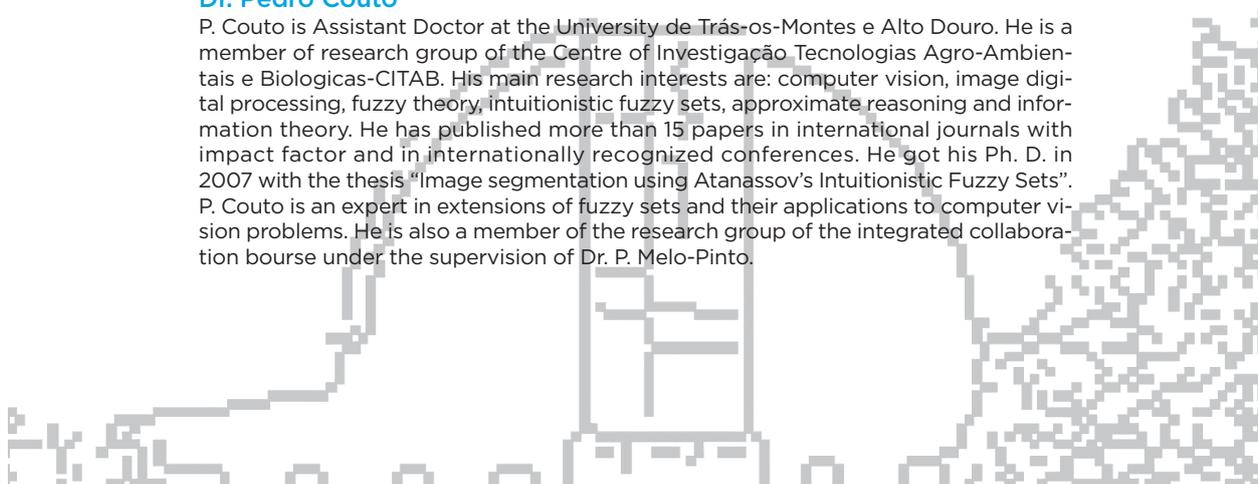
T. Calvo received the Ph.D. degree from the University of Madrid, Spain, in 1989. She was a Professor of mathematics at the University of Balearic Islands, Spain. Since 2000, she has been a Full Professor of mathematics at the University of Alcalá, Spain. Her major research interests are in the area of uncertainty modelling, including fuzzy logic, several types of aggregation techniques, nonadditive measure and integral theory, and functional equations. She is the author of more than 50 journal papers and chapters in edited volumes. She was a Guest Editor of three special issues of international journals and is a member of the European Association for Fuzzy Logic and Technology.

Dr. Jesús Chamorro

J. Chamorro received the MS and PhD degrees, both in Computer Science, from the University of Granada in 1995 and 2001 respectively. Since 1996, he is member of the Computer Science Department at the University of Granada where he is now an Associate Professor. He has participated in several projects from the Spanish Research Council (CICYT) and he has more than 40 publications in conference proceedings and in international journals with impact factor. His research interests include motion analysis and optical flow estimation, information retrieval from image databases, soft computing image processing, and biomedical image analysis.

Dr. Pedro Couto

P. Couto is Assistant Doctor at the University de Trás-os-Montes e Alto Douro. He is a member of research group of the Centre of Investigação Tecnologias Agro-Ambientais e Biológicas-CITAB. His main research interests are: computer vision, image digital processing, fuzzy theory, intuitionistic fuzzy sets, approximate reasoning and information theory. He has published more than 15 papers in international journals with impact factor and in internationally recognized conferences. He got his Ph. D. in 2007 with the thesis "Image segmentation using Atanassov's Intuitionistic Fuzzy Sets". P. Couto is an expert in extensions of fuzzy sets and their applications to computer vision problems. He is also a member of the research group of the integrated collaboration bourse under the supervision of Dr. P. Melo-Pinto.



Dra. Susana Cubillo

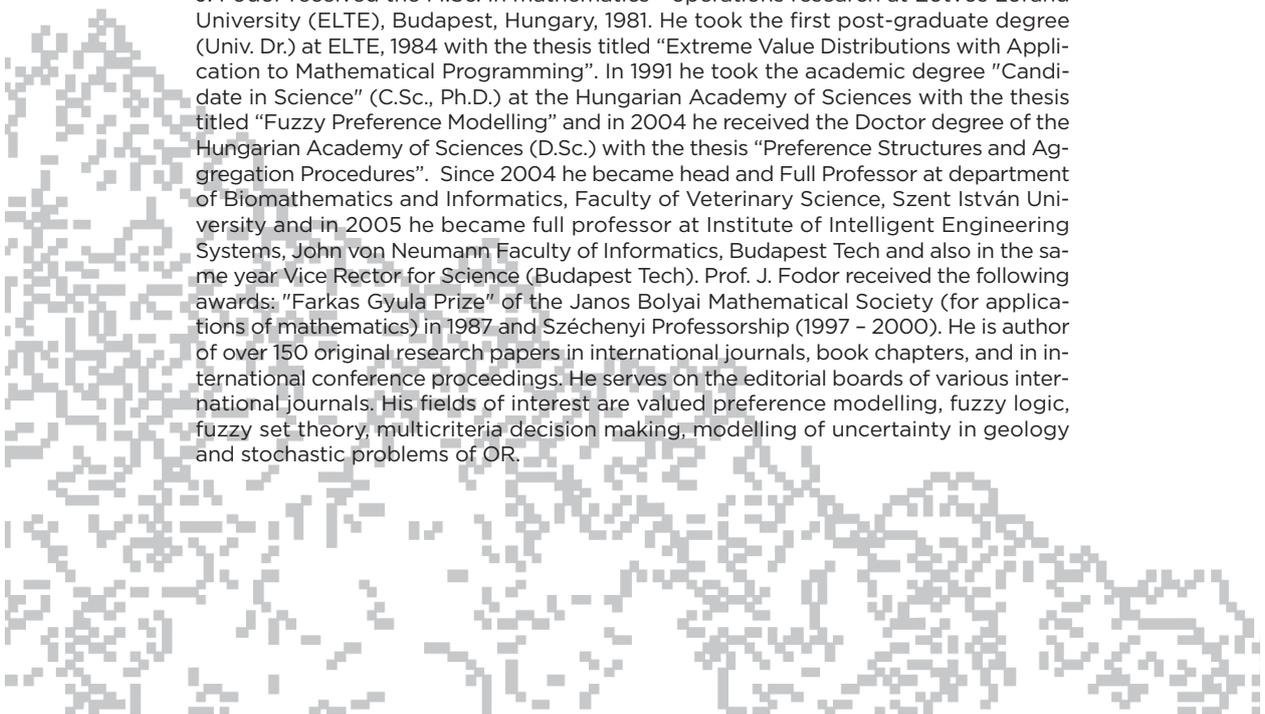
S. Cubillo received the Ph.D. degree in computer science, in 1993, from the Polytechnic University of Madrid (Spain), where she is at present a Associate Professor of the Department of Applied Mathematics of the Computer Sciences Faculty. She has been the main researcher or a member of the teams of several projects, and has published more than 40 papers in international journals and conferences. Her current main research interests are in the fields of approximate reasoning, fuzzy sets, Atanassov's intuitionistic fuzzy sets, and soft computing.

Dr. Bernard De Baets

B. De Baets received the M.Sc. degree in mathematics, the postgraduate degree in knowledge technology, and the Ph.D. degree in mathematics (all summa cum laude) from Ghent University, Ghent, Belgium, in 1988, 1991, and 1995, respectively. He is a Full Professor of applied mathematics, Ghent University, where he is leading KERMIT, the research unit on knowledge-based systems. He is an Honorary Professor of Budapest Tech, Hungary. His publications comprise more than 140 papers in international journals and about 40 book chapters. He serves on the editorial boards of various international journals, in particular as Co-Editor-in-Chief for Fuzzy Sets and Systems. He coordinates EUROFUSE, the EURO Working Group on Fuzzy Sets. He is a member of the Board of Directors of EUSFLAT, the Technical Committee on Artificial Intelligence and Expert Systems of IASTED, and of the Administrative Board of the Belgian OR Society. Prof. De Baets received a Government of Canada Award in 1988.

Dr. János Fodor

J. Fodor received the M.Sc. in mathematics - operations research at Eötvös Loránd University (ELTE), Budapest, Hungary, 1981. He took the first post-graduate degree (Univ. Dr.) at ELTE, 1984 with the thesis titled "Extreme Value Distributions with Application to Mathematical Programming". In 1991 he took the academic degree "Candidate in Science" (C.Sc., Ph.D.) at the Hungarian Academy of Sciences with the thesis titled "Fuzzy Preference Modelling" and in 2004 he received the Doctor degree of the Hungarian Academy of Sciences (D.Sc.) with the thesis "Preference Structures and Aggregation Procedures". Since 2004 he became head and Full Professor at department of Biomathematics and Informatics, Faculty of Veterinary Science, Szent István University and in 2005 he became full professor at Institute of Intelligent Engineering Systems, John von Neumann Faculty of Informatics, Budapest Tech and also in the same year Vice Rector for Science (Budapest Tech). Prof. J. Fodor received the following awards: "Farkas Gyula Prize" of the Janos Bolyai Mathematical Society (for applications of mathematics) in 1987 and Széchenyi Professorship (1997 - 2000). He is author of over 150 original research papers in international journals, book chapters, and in international conference proceedings. He serves on the editorial boards of various international journals. His fields of interest are valued preference modelling, fuzzy logic, fuzzy set theory, multicriteria decision making, modelling of uncertainty in geology and stochastic problems of OR.



Dr. José Luis García-Lapresta

J.L. García-Lapresta received his M.S. degree in Mathematics by the University Autònoma of Barcelona, 1981. He read his Ph. D. Thesis in 1991 in Mathematics, at the University of Barcelona. The dissertation title was “Finitely Deductive Logics. Cardinality Restrictions in the Property of Deduction”. He is Associate Professor at the University of Valladolid. He has published more than 25 papers in international journals and he is co-author of more than 12 book chapters. Also, he has participated in more than 120 international conferences. His main research interests are in the fields of: Preference modelling, social choice, decision making

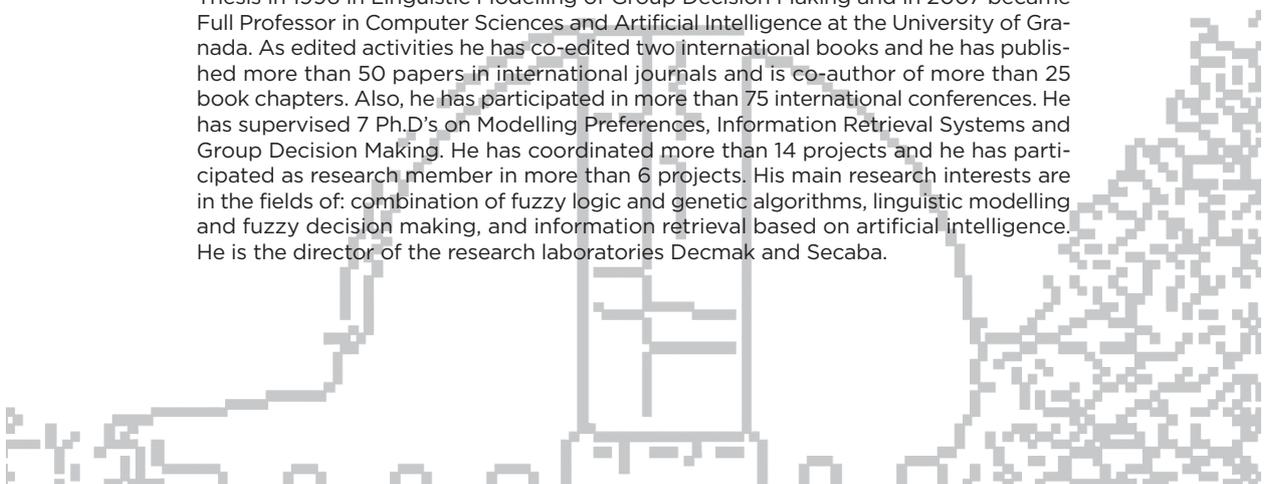
Dr. Francisco Herrera

F. Herrera received his M.S. degree in Maths in 1988 and Ph.D. in Math in 1991, both from the University of Granada, Spain. He is currently a Full Professor in the Department of Computer Science and Artificial Intelligence at the University of Granada. He is the head of the research group “Soft Computing and Intelligent Information Systems” and director of the Lab Evolutionary and Fuzzy Data Mining and Intelligent Systems. He has published more than 140 papers in international journals and is co-author of the book “Genetic Fuzzy Systems: Evolutionary Tuning and Learning of Fuzzy Knowledge Bases” (World Scientific, 2001). He has supervised 18 Ph.D’s on Soft Computing topics (among others sub-topics, computing with words, genetic fuzzy systems, decision making, genetic algorithms, memetic algorithms, subgroup discovery, instance selection, ...). As edited activities he has co-edited four international books published by Springer and has co-edited 16 special issues in international journals on different Soft Computing topics, such as, “Preference Modelling”, “Computing with Words”, “Ant Colony Optimization”, “Real Coded Genetic Algorithms”, “Fuzzy Modelling” and “Genetic Fuzzy Systems”.

His research areas of interest are: Knowledge extraction based on evolutionary learning, genetic fuzzy systems, data preparation, subgroup discovery, computing with words, aggregation, decision making, ant colony optimization, real coding genetic algorithms, memetic algorithms.

Dr. Enrique Herrera-Viedma

E. Herrera received his M.S. degree in Computers Science in 1993. He read his Ph. D. Thesis in 1996 in Linguistic Modelling of Group Decision Making and in 2007 became Full Professor in Computer Sciences and Artificial Intelligence at the University of Granada. As edited activities he has co-edited two international books and he has published more than 50 papers in international journals and is co-author of more than 25 book chapters. Also, he has participated in more than 75 international conferences. He has supervised 7 Ph.D’s on Modelling Preferences, Information Retrieval Systems and Group Decision Making. He has coordinated more than 14 projects and he has participated as research member in more than 6 projects. His main research interests are in the fields of: combination of fuzzy logic and genetic algorithms, linguistic modelling and fuzzy decision making, and information retrieval based on artificial intelligence. He is the director of the research laboratories Decmak and Secaba.



Dr. Vincenzo Loia

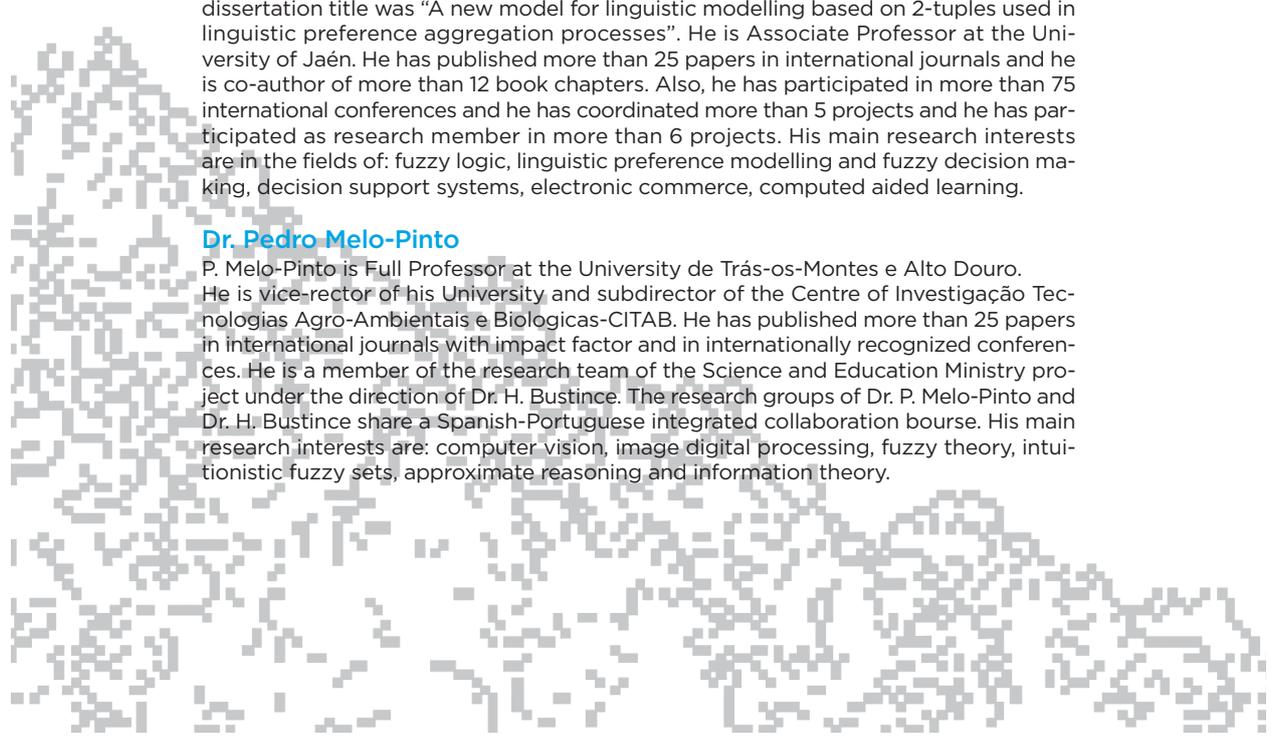
V. Loia received the PhD in Computer Science from the University of Paris VI, France in 1989, and the bachelor degree in Computer Science from the University of Salerno in 1984. From 1989 he is Faculty member at the University of Salerno where he teaches Operating Systems based Systems and Multi Agent-based Systems. His current position is as Professor of Computer Science and chairman of the Department of Mathematics and Computer Science. He was principal investigator in a number of industrial R&D projects and in academic research projects. He is author of over 100 original research papers in international journals, book chapters, and in international conference proceedings. He edited four research books around agent technology, Internet, and soft computing methodologies. He is co-founder of the Soft Computing Laboratory and founder of the Multi Agent Systems Laboratory, both at the Department of Mathematics and Computer Science. His current research interests focus on merging soft computing and agent technology to design technologically complex environments, with particular interest in Web Intelligence applications. He is chair of the Task Force "Intelligent Agents" of Emergent Technologies Technical Committee (ETTC), IEEE Computational Intelligence Society. He is also member of the International Technical Committee on Media Computing, IEEE Systems, Man and Cybernetics Society. From 2000, Dr. Loia has been involved as member of Program Committee for over 30 international conferences by IEEE Society.

Dr. Luis Martínez

L. Martínez received his M.S. degree in Computers Science, by the University of Granada, July 28th, 1993. He read his Ph. D. Thesis in 1999 at University of Granada. The dissertation title was "A new model for linguistic modelling based on 2-tuples used in linguistic preference aggregation processes". He is Associate Professor at the University of Jaén. He has published more than 25 papers in international journals and he is co-author of more than 12 book chapters. Also, he has participated in more than 75 international conferences and he has coordinated more than 5 projects and he has participated as research member in more than 6 projects. His main research interests are in the fields of: fuzzy logic, linguistic preference modelling and fuzzy decision making, decision support systems, electronic commerce, computed aided learning.

Dr. Pedro Melo-Pinto

P. Melo-Pinto is Full Professor at the University de Trás-os-Montes e Alto Douro. He is vice-rector of his University and subdirector of the Centre of Investigação Tecnologias Agro-Ambientais e Biologicas-CITAB. He has published more than 25 papers in international journals with impact factor and in internationally recognized conferences. He is a member of the research team of the Science and Education Ministry project under the direction of Dr. H. Bustince. The research groups of Dr. P. Melo-Pinto and Dr. H. Bustince share a Spanish-Portuguese integrated collaboration bourse. His main research interests are: computer vision, image digital processing, fuzzy theory, intuitionistic fuzzy sets, approximate reasoning and information theory.



Dr. Radko Mesiar

R. Mesiar, obtained his PhD. from the same university in 1979 and in 1983 he became the Associate Professor at the Slovak Technical University Bratislava. Since 1995, he became the leading researcher at the Slovak Academy of Sciences, Institute of Mathematics, Bratislava and at the Czech Academy of Sciences, Institute of information theory and automation, Prague. In 1996, he defended the thesis "Triangular norms: theory and applications" and received the DSc. title (the highest scientific degree in Slovakia and Czech Republic). Since 1998 he became a full professor at Slovak University of Technology, Bratislava. Prof. Mesiar is the vice-head of the Department of Mathematics of the Faculty of Civil Engineering, Slovak University of Technology Bratislava, since February 1, 2000. In the same time, he is a leading researcher at the Institute of Information and Automation of the Czech Academy of Sciences in Prague (since July 1, 1995). Prof. Mesiar is author of more than hundred eighty scientific papers in mathematics. He presented his results at more than 70 international conferences. His main fields of interest are the fuzzy sets, fuzzy logic, non-additive measures and integrals, triangular norms, aggregation operators, ergodic theory and entropy.

Dr. Javier Montero

J. Montero is a Full Professor at the Department of Statistics and Operational Research of the Complutense University of Madrid. He got his Ph.D. in 1981 with the thesis "N-personal decisions with fuzzy opinions". His main research interests are the following: decision making theory, aggregation models for decision making with fuzzy uncertainty, fuzzy classification and remote perception. He has published more than 35 papers in international journal of high impact factor, apart from several chapters in reference books. He has taken part in the most relevant international meetings, more than 60. He has been the organizer of FLINS 2008, one of the most important conferences in the fuzzy logic area.

Dra. Ana Pradera

A. Pradera received the MS degree in mathematics at the Complutense University of Madrid and the PhD degree in Computer Science at the Technical University of Madrid. She is Associate Professor of the Computer Science Department at the Rey Juan Carlos University where she is now an Associate Professor. She has participated in several projects and she has more than 15 publications in conference proceedings and in international journals with impact factor. Her research interests include aggregation functions, implication operators.

Dr. Daniel Sánchez

D. Sánchez received the M.S. and Ph.D. degrees, both in computer science, in 1995 and 1999, respectively, from the University of Granada, Granada, Spain. He has been an Associate Professor with the Department of Computer Science and Artificial Intelligence, University of Granada, since 2001. He has participated and is currently a member of the teams of several projects, and has published more than 40 papers in international journals and conferences. His current main research interests are in the fields of knowledge discovery and data mining, relational databases, information retrieval, fuzzy sets theory, and soft computing.

