

Advances in Intelligent Systems and Computing

Volume 239

Series Editor

Janusz Kacprzyk, Warsaw, Poland

For further volumes:

<http://www.springer.com/series/11156>

Álvaro Herrero · Bruno Baruque
Fanny Klett · Ajith Abraham
Václav Snášel · André C.P.L.F. de Carvalho
Pablo García Bringas · Ivan Zelinka
Héctor Quintián · Emilio Corchado
Editors

International Joint Conference SOCO'13-CISIS'13 -ICEUTE'13

Salamanca, Spain, September 11th–13th, 2013
Proceedings

Editors

Álvaro Herrero
Department of Civil Engineering
University of Burgos
Burgos, Spain

André C.P.L.F. de Carvalho
Department of Computer Science
University of Sao Paulo
Sao Carlos, Brazil

Bruno Baruque
Department of Civil Engineering
University of Burgos
Burgos, Spain

Pablo García Bringas
DeustoTech Computing
University of Deusto
Bilbao, Spain

Fanny Klett
German Workforce ADL Partnership
Laboratory
Waltershausen, Germany

Ivan Zelinka
VŠB-TU Ostrava
Department of Computer Science
Faculty of Elec. Eng. and Computer Science
Ostrava, Czech Republic

Ajith Abraham
Machine Intelligence Research Labs
(MIR Labs)
Scientific Network for Innovation
and Research Excellence
Auburn, Washington, USA

Héctor Quintián
Universidad de Salamanca
Salamanca, Spain

Václav Snášel
Department of Computer Science
VŠB-TU Ostrava
Faculty of Elec. Eng. and Computer Science
Ostrava, Czech Republic

Emilio Corchado
Universidad de Salamanca
Salamanca, Spain

ISSN 2194-5357
ISBN 978-3-319-01853-9
DOI 10.1007/978-3-319-01854-6
Springer Cham Heidelberg New York Dordrecht London

ISSN 2194-5365 (electronic)
ISBN 978-3-319-01854-6 (eBook)

Library of Congress Control Number: 2013946039

© Springer International Publishing Switzerland 2014

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

This volume of Advances in Intelligent and Soft Computing contains accepted papers presented at SOCO 2013, CISIS 2013 and ICEUTE 2013, all conferences held in the beautiful and historic city of Salamanca (Spain), in September 2013.

Soft computing represents a collection or set of computational techniques in machine learning, computer science and some engineering disciplines, which investigate, simulate, and analyse very complex issues and phenomena.

After a through peer-review process, the 8th SOCO 2013 International Program Committee selected 40 papers which are published in these conference proceedings, and represents an acceptance rate of 41%. In this relevant edition a special emphasis was put on the organization of special sessions. Four special sessions were organized related to relevant topics as: Systems, Man, and Cybernetics, Data Mining for Industrial and Environmental Applications, Soft Computing Methods in Bioinformatics, and Soft Computing Methods, Modelling and Simulation in Electrical Engineering.

The aim of the 6th CISIS 2013 conference is to offer a meeting opportunity for academic and industry-related researchers belonging to the various, vast communities of Computational Intelligence, Information Security, and Data Mining. The need for intelligent, flexible behaviour by large, complex systems, especially in mission-critical domains, is intended to be the catalyst and the aggregation stimulus for the overall event.

After a through peer-review process, the CISIS 2013 International Program Committee selected 23 papers which are published in these conference proceedings achieving an acceptance rate of 39%.

In the case of 4th ICEUTE 2013, the International Program Committee selected 11 papers which are published in these conference proceedings.

The selection of papers was extremely rigorous in order to maintain the high quality of the conference and we would like to thank the members of the Program Committees for their hard work in the reviewing process. This is a crucial process to the creation of a high standard conference and the SOCO, CISIS and ICEUTE conferences would not exist without their help.

SOCO'13, CISIS'13 and ICEUTE'13 enjoyed outstanding keynote speeches by distinguished guest speakers: Prof. Hojjat Adeli - Ohio State University (USA), Prof. Hujun Yin - University of Manchester (UK), and Prof. Manuel Graña – University of Pais Vasco (Spain).

SOCO'13 has teamed up with the International Journal of Neural Systems (WORLD SCIENTIFIC), Integrated Computer-Aided Engineering (IOS PRESS), Computer-Aided Civil and Infrastructure Engineering (IOS PRESS), Neurocomputing (ELSEVIER), Journal of Applied Logic (ELSEVIER), Applied Soft Computing (ELSEVIER) and DYNA (FEDERACION ASOCIACIONES INGENIEROS INDUSTRIALES ESPANA) journals for a suite of special issues and fast track including selected papers from SOCO'13.

For this CISIS'13 special edition, as a follow-up of the conference, we anticipate further publication of selected papers in a special issue of the prestigious Logic Journal of the IGPL Published by Oxford Journals.

Particular thanks go as well to the Conference main Sponsors, IEEE-Sección España, IEEE Systems, Man and Cybernetics-Capítulo Español, AEPIA, Ayto. of Salamanca, University of Salamanca, World Federation of Soft Computing, MIR Labs, IT4 Innovation Centre of Excellence, The International Federation for Computational Logic, Ministerio de Economía y Competitividad (TIN 2010-21272-C02-01), Junta de Castilla y León (SA405A12-2), INMOTIA, REPLENTIA, and HIDROGENA, who jointly contributed in an active and constructive manner to the success of this initiative. We want also to extend our warm gratitude to all the Special sessions chairs for their continuing support to the SOCO, CISIS and ICEUTE Series of conferences.

We would like to thank all the special session organizers, contributing authors, as well as the members of the Program Committees and the Local Organizing Committee for their hard and highly valuable work. Their work has helped to contribute to the success of the SOCO 2013, CISIS 2013 and ICEUTE 2013 events.

September, 2013

The editors
 Álvaro Herrero
 Bruno Baruque
 Fanny Klett
 Ajith Abraham
 Václav Snášel
 André C.P.L.F. de Carvalho
 Pablo García Bringas
 Ivan Zelinka
 Héctor Quintián
 Emilio Corchado

SOCO 2013

Organization

General Chair

Emilio Corchado

University of Salamanca, Spain

Honorary Chair

Alfonso Fernández Mañueco

Mayor of Salamanca, Spain

Costas Stasopoulos

Director-Elect. IEEE Region 8

Antonio Bahamonde

President of the Spanish Association for Artificial
Intelligence, AEPIA

Pilar Molina

IEEE Spanish Section President, Spain

International Advisory Committee

Ashraf Saad

Armstrong Atlantic State University, USA

Amy Neustein

Linguistic Technology Systems, USA

Ajith Abraham

Machine Intelligence Research Labs -MIR Labs,
Europe

Jon G. Hall

The Open University, UK

Paulo Novais

Universidade do Minho, Portugal

Antonio Bahamonde

President of the Spanish Association for Artificial
Intelligence (AEPIA)

Michael Gabbay

Kings College London, UK

Isidro Laso-Ballesteros

European Commission Scientific Officer, Europe

Aditya Ghose

University of Wollongong, Australia

Saeid Nahavandi

Deakin University, Australia

Henri Pierreval

LIMOS UMR CNRS 6158 IFMA, France

Industrial Advisory Committee

Rajkumar Roy	The EPSRC Centre for Innovative Manufacturing in Through-life Engineering Services, UK
Amy Neustein	Linguistic Technology Systems, USA
Francisco Martínez	INMOTIA, Spain

Program Committee Chair

Emilio Corchado	University of Salamanca, Spain
Fanny Klett	Director of German Workforce Advanced Distributed Learning Partnership Laboratory, Germany
Ajith Abraham	Machine Intelligence Research Labs (Europe)
Vaclav Snasel	University of Ostrava, Czech Republic
André C.P.L.F. de Carvalho	University of São Paulo, Brazil

Program Committee

Abdelhamid Bouchachia	Bournemouth University, UK
Abraham Duarte	Universidad Rey Juan Carlos, Spain
Alberto Freitas	University of Porto, Portugal
Alexis Enrique Marcano Cedeño	Polytechnic University of Madrid, Spain
Alfredo Cuzzocrea	ICAR-CNR and University of Calabria, Italy
Álvaro Herrero	University of Burgos, Spain
Ana Figueiredo	Instituto Superior de Engenharia do Porto, Portugal
Andrea Schaerf	University of Udine, Italy
Angel Arroyo	University of Burgos, Spain
Anna Bartkowiak	University of Wroclaw, Poland
Antonio Bahamonde	University of Oviedo, Spain
Antonio Peregrin	University of Huelva, Spain
Ashish Umre	University of Sussex, UK
Ashraf Saad	Armstrong Atlantic State University, USA
Aureli Soria-Frisch	Starlab Barcelona S.L., Spain
Ayeley Tchangani	Université de Toulouse, France
Benjamin Ojeda Magaña	Universidad de Guadalajara, Mexico
Benoit Otjacques	Centre de Recherche Public - Gabriel Lippmann, Luxembourg
Borja Sanz	S3Lab - University of Deusto, Spain
Bruno Baruque	University of Burgos, Spain
Camelia Chira	Babes-Bolyai University, Romania
Carlos Laorden	DeustoTech Computing - S3Lab, University of Deusto, Spain
Carlos Pereira	ISEC, Portugal
Cesar Analide	University of Minho, Portugal
Cesar Hervas	University of Córdoba, Spain

Crina Grosan	Babes-Bolyai University, Romania
Daniel Novak	CVUT, Czech Republic
Daniela Perdukova	Technical University of Košice, Slovak Republic
Daniela Zaharie	West University of Timisoara, Romania
David Griol	University Carlos III of Madrid, Spain
David Oro	Herta Security, Spain
Dilip Pratihar	Indian Institute of Technology Kharagpur, India
Donald Davendra	VŠB-Technical University of Ostrava, Czech Republic
Dragan Simic	University of Novi Sad, Serbia
Eduardo Solteiro Pires	UTAD University, Portugal
Eleni Mangina	University College Dublin, Ireland
Ernesto Damiani	University of Milan, Italy
Esteban García-Cuesta	University Carlos III of Madrid, Spain
Eva Volna	University of Ostrava, Czech Republic
Fatos Xhafa	Polytechnic University of Catalonia, Spain
Florentino Fdez-Riverola	University of Vigo, Spain
Francesco Marcelloni	University of Pisa, Italy
Francesco Moscato	Second University of Naples, Italy
Francisco Herrera	University of Granada, Spain
Frank Klawonn	Ostfalia University of Applied Sciences, Germany
George Georgoulas	TEI of Epirus, Greece
Georgios Ch. Sirakoulis	Democritus University of Thrace, Greece
Gerald Schaefer	Loughborough University, UK
Giuseppe Cicotti	University of Naples, Italy
Gregg Vesonder	AT&T Labs - Research
Gregorio Sáinz	CARTIF Centro Tecnológico, Spain
Héctor Quintián	University of Salamanca, Spain
Henri Pierreval	LIMOS-IFMA, France
Hongbo Liu	Dalian Maritime University, China
Horia-Nicolai Teodorescu	Technical University of Iasi, Romania
Humberto Bustince	UPNA, Spain
Ivan Zelinka	VŠB-Technical University of Ostrava, Czech Republic
Jaroslava Žilková	Technical University of Košice, Slovak Republic
Javier Carbo	University Carlos III of Madrid, Spain
Javier Nieves	University of Deusto, Spain
Javier Sedano	Instituto Tecnológico de Castilla y León, Spain
Jiri Dvorsky	VŠB-Technical University of Ostrava, Czech Republic
Jiri Koziorek	VŠB-Technical University of Ostrava, Czech Republic
Jiri Pospichal	Slovak University of Technology, Slovakia

Jorge Díez	University of Oviedo, Spain
José Riquelme Santos	University of Sevilla, Spain
Jose Gamez	University of Castilla-La Mancha, Spain
Jose Luis Calvo Rolle	University of Coruña, Spain
Jose Luis Casteleiro	University of Coruña, Spain
José M. Benítez	University of Granada, Spain
Jose M. Molina	University Carlos III of Madrid, Spain
José Ramón Villar	University of Oviedo, Spain
José Valente De Oliveira	Universidade do Algarve, Portugal
Josef Tvrđik	University of Ostrava, Czech Republic
Jose-Maria Pena	Polytechnic University of Madrid, Spain
Juan Álvaro Muñoz Naranjo	University of Almería, Spain
Juan Manuel Corchado	University of Salamanca, Spain
Juan Gomez Romero	University Carlos III of Madrid, Spain
Laura García-Hernández	University of Córdoba, Spain
LenkaLhotska	Czech Technical University in Prague, Czech Republic
León Wang	University of Kaohsiung, Taiwan
Luciano Stefanini	University of Urbino "Carlo Bo", Italy
Luis Correia	University of Lisbon, Portugal
Luís Nunes	Instituto Universitário de Lisboa, Portugal
Luis Paulo Reis	University of Minho, Portugal
M. Chadli	University of Picardie Jules Verne, France
Maciej Grzenda	Warsaw University of Technology, Poland
Manuel Graña	University of Basque Country, Spain
Marcin Paprzycki	IBS PAN and WSM, Poland
Marco Cococcioni	University of Pisa, Italy
Maria João Viamonte	Instituto Superior de Engenharia do Porto, Portugal
Maria Jose Del Jesus	University of Jaén, Spain
María N. Moreno García	University of Salamanca, Spain
Mario Giovanni C.A. Cimino	University of Pisa, Italy
Mario Koeppen	Kyushu Institute of Technology, Japan
Marius Balas	Aurel Vlaicu University of Arad, Romania
Martin Macas	Czech Technical University in Prague, Czech Republic
Martin Stepnicka	University of Ostrava, Czech Republic
Mehmet Emin Aydin	University of Bedfordshire, UK
Michael Vrahatis	University of Patras, Greece
Michal Wozniak	Wroclaw University of Technology, Poland
Miguel Angel Patricio	University Carlos III of Madrid, Spain
Milos Kudelka	VŠB-Technical University of Ostrava, Czech Republic
Miroslav Bursa	Czech Technical University in Prague, Czech Republic
Mitiche Lahcene	University of Djelfa, France

Mohammed Eltaweel	Arab Academy for Science, Technology & Maritime Transport, Egypt
Nineta Polemi	University of Pireaus, Greece
Noelia Sanchez-Marroño	University of Coruña, Spain
Oliviu Matei	North University of Baia Mare, Romania
Oscar Fontenla-Romero	University of Coruña, Spain
Oscar Luaces	University of Oviedo, Spain
Paulo Moura Oliveira	UTAD University, Portugal
Paulo Novais	University of Minho, Portugal
Pavel Brandstetter	VŠB-Technical University of Ostrava, Czech Republic
Pavel Kromer	VŠB-Technical University of Ostrava, Czech Republic
Pavol Fedor	Technical University of Košice, Slovak Republic
Pedro M. Caballero Lozano	CARTIF Centro Tecnológico, Spain
Petr Novak	VŠB-Technical University of Ostrava, Czech Republic
Petr Palacky	VŠB-Technical University of Ostrava, Czech Republic
Petr Pošík	Czech Technical University in Prague, Czech Republic
Petrica Claudiu Pop	North University of Baia Mare, Romania
Raquel Redondo	University of Burgos, Spain
Richard Duro	University of Coruña, Spain
Robert Burduk	Wroclaw University of Technology, Poland
Roman Senkerik	TBU in Zlin, Czech Republic
Rosa Basagoiti	Mondragon University, Spain
Rui Sousa	University of Minho, Portugal
Sara Silva	INESC-ID, Portugal
Sebastián Ventura	University of Córdoba, Spain
Stefano Pizzuti	ENEA, Italy
Sung-Bae Cho	Yonsei University, South Korea
Tzung-Pei Hong	National University of Kaohsiung, Taiwan
Urko Zurutuza	Mondragon University, Spain
Valentina Casola	University of Naples "Federico II", Italy
Valentina Emilia Balas	Aurel Vlaicu University of Arad, Romania
Verónica Tricio	University of Burgos, Spain
Vicente Martín-Ayuso	Polytechnic University of Madrid, Spain
Wei-Chiang Hong	Oriental Institute of Technology, Taiwan
Wilfried Elmenreich	University of Klagenfurt, Austria
Zdenek Peroutka	Regional Innov. Center for Elect. Eng. (RICE), Czech Republic
Zita Vale	GECAD - ISEP/IPP, Portugal

Special Sessions

Systems, MAN, and Cybernetics

Emilio Corchado	University of Salamanca, Spain (Organiser)
Héctor Quintián	University of Salamanca, Spain (Organiser)
Jiri Dvorsky	VŠB-Technical University of Ostrava, Czech Republic
Mario Giovanni C.A. Cimino	University of Pisa, Italy
Miroslav Bursa	Czech Technical University in Prague, Czech Republic
Robert Burduk	Wroclaw University of Technology, Poland
Valentina Casola	University of Naples "Federico II", Italy

Data Mining for Industrial and Environmental Applications

Alicia Troncoso	Pablo de Olavide University of Seville, Spain (Organiser)
Francisco Martínez Álvarez	Pablo de Olavide University of Seville, Spain (Organiser)
María Martínez-Ballesteros	University of Sevilla, Spain (Organiser)
Jorge García-Gutiérrez	University of Sevilla, Spain (Organiser)
Cristina Rubio-Escudero	University of Sevilla, Spain
Daniel Mateos	University of Sevilla, Spain
José C. Riquelme	University of Sevilla, Spain

Soft Computing Methods in Bioinformatics

Camelia Chira	Instituto Tecnológico de Castilla y León, Spain & Babes-Bolyai University, Romania (Organiser)
José Ramón Villar Flecha	University of Oviedo, Spain (Organiser)
Emilio Corchado	University of Salamanca, Spain (Organiser)
Javier Sedano	Instituto Tecnológico de Castilla y León, Spain (Organiser)
Antonio Mucherino	University of Rennes 1, France
Carlos Prieto	Instituto de Biotecnología de León, Spain
Carmen Vidaurre	Technical University Berlin, Germany
Elena Bautu	University of Constanta, Romania
Horacio Pérez-Sánchez	Catholic University of Murcia, Spain
Mihaela Breaban	Al.I.Cuza University of Iasi, Romania
Nima Hatami	University of California, Italy
Sameh Kessentini	Universite de Technologie de Troyes, France
Sorin Ilie	University of Craiova, Romania

Soft Computing Methods, Modelling and Simulation in Electrical Engineering

Ajith Abraham	Machine Intelligence Research Labs, Europe (Organiser)
Václav Snášel	VŠB-Technical University of Ostrava, Czech Republic (Organiser)
Pavel Brandstetter	VŠB-Technical University of Ostrava, Czech Republic (Organiser)
Abdelhamid Bouchachia	Bournemouth University, UK
Abraham Duarte	University Rey Juan Carlos, Spain
Ana Figueiredo	Instituto Superior de Engenharia do Porto, Portugal
Daniela Perdukova	Technical University of Košice, Slovak Republic
Giuseppe Cicotti	University of Naples, Italy
Gregg Vesonder	AT&T Labs - Research
Ivo Neborak	VŠB-Technical University of Ostrava, Czech Republic
Jan Vittek	University of Žilina, Slovak Republic
Jaroslava Zilkova	Technical University of Košice, Slovak Republic
Jesus Garcia	University Carlos III of Madrid, Spain
Jiri Koziorek	VŠB-Technical University of Ostrava, Czech Republic
Libor Stepanec	POLL, Ltd., Czech Republic
Martin Kuchar	POLL, Ltd., Czech Republic
Milan Zalman	Slovak University of Technology in Bratislava, Slovak Republic
Oliviu Matei	North University of Baia Mare, Romania
Pavol Fedor	Technical University of Košice, Slovak Republic
Pavol Spanik	University of Žilina, Slovak Republic
Pedro M. Caballero Lozano	CARTIF Centro Tecnológico, Spain
Petr Palacky	VŠB-Technical University of Ostrava, Czech Republic
Petr Chlebis	VŠB-Technical University of Ostrava, Czech Republic
Rui Sousa	University of Minho, Portugal
Sara Silva	INESC-ID, Portugal
Stanislav Rusek	VŠB-Technical University of Ostrava, Czech Republic
Tatiana Radicova	Slovak University of Technology in Bratislava, Slovak Republic
Urko Zurutuza	Mondragon University, Spain
Verónica Tricio	University of Burgos, Spain
Vitezslav Styskala	VŠB-Technical University of Ostrava, Czech Republic
Zdenek Peroutka	University of West Bohemia, Czech Republic
Zita Vale	GECAD - ISEP/IPP, Portugal

Organising Committee

Emilio Corchado	University of Salamanca, Spain
Álvaro Herrero	University of Burgos, Spain
Bruno Baruque	University of Burgos, Spain
Héctor Quintián	University of Salamanca, Spain
Roberto Vega	University of Salamanca, Spain
Jose Luis Calvo	University of Coruña, Spain
Ángel Arroyo	University of Burgos, Spain
Laura García-Hernández	University of Córdoba, Spain

CISIS 2013

Organization

General Chair

Emilio Corchado University of Salamanca, Spain

Honorary Chair

Alfonso Fernández Mañueco Mayor of Salamanca, Spain
Costas Stasopoulos Director-Elect. IEEE Region 8
Antonio Bahamonde President of the Spanish Association for Artificial
Intelligence, AEPIA
Pilar Molina IEEE Spanish Section President, Spain

International Advisory Committee

Antonio Bahamonde President of the Spanish Association for Artificial
Intelligence (AEPIA)
Michael Gabbay Kings College London, UK
Ajith Abraham Machine Intelligence Research Labs - MIR Labs
Europe

Program Committee Chair

Emilio Corchado University of Salamanca, Spain
Ajith Abraham VSB-Technical University of Ostrava,
Czech Republic
Pablo García DeustoTech, Spain
Álvaro Herrero University of Burgos, Spain
Václav Snasel VSB-Technical University of Ostrava,
Czech Republic
Ivan Zelinka VSB-Technical University of Ostrava,
Czech Republic

Program Committee

Alberto Peinado	University of Malaga, Spain
Amparo Fuster-Sabater	Institute of Applied Physics (C.S.I.C.), Spain
Ana I. González-Tablas	University Carlos III of Madrid, Spain
Andre Carvalho	University of Sao Paulo, Brazil
Ángel Arroyo	University of Burgos, Spain
Ángel Martín Del Rey	University of Salamanca, Spain
Antonio Zamora	University of Alicante, Spain
Araceli Queiruga Dios	University of Salamanca, Spain
Bartosz Krawczyk	Wroclaw University Of Technology, Poland
Borja Sanz	S3Lab - University of Deusto, Spain
Bruno Baruque	University of Burgos, Spain
Carlos Pereira	ISEC, Portugal
Carlos Laorden	Deusto Tech Computing - S3Lab, University of Deusto, Spain
Constantino Malagón	Nebrija University, Spain
Cristina Alcaraz	University of Malaga, Spain
Dario Forte	Dflabs, Italy
David G. Rosado	University of Castilla-La Mancha, Spain
Davide Leóncini	University of Genoa, Italy
Debasis Giri	Haldia Institute of Technology, India
Domingo Gomez	University of Cantabria, Spain
Eduardo Carozo Blumsztein	Montevideo University, Uruguay
Enrico Appiani	SELEX Elsag spa, Italy
Enrique De La Hoz De La Hoz	University of Alcalá, Spain
Enrique Daltabuit	UNAM, Mexico
Eva Volna	University of Ostrava, Czech Republic
Fausto Montoya	CSIC, Spain
Félix Brezo	S3lab, University of Deusto, Spain
Fernando Tricas	University of Zaragoza, Spain
Francisco Valera	University Carlos III of Madrid, Spain
Francisco Herrera	University of Granada, Spain
Francisco José Navarro-Ríos	University of Granada, Spain
Gabriel López	University of Murcia, Spain
Gabriel Diaz Orueta	IEEE Spain, Spain
Gerald Schaefer	Loughborough University, UK
Gerardo Rodriguez Sanchez	University of Salamanca, Spain
Guillermo Morales-Luna	CINVESTAV-IPN, Mexico
Gustavo Isaza	University of Caldas, Colombia
Héctor Quintián	University of Salamanca, Spain
Hugo Scolnik	University of Buenos Aires, Argentina
Igor Santos	DeustoTech, University of Deusto, Spain

Igor Ruiz-Agúndez	DeustoTech, University of Deusto, Spain
Isaac Agudo	University of Malaga, Spain
Javier Nieves	University of Deusto, Spain
Javier Areitio	University of Deusto, Spain
Javier Carbo	University Carlos III of Madrid, Spain
Javier Sánchez-Monedero	University of Córdoba, Spain
JesúsDíaz-Verdejo	University of Granada, Spain
Jiri Dvorsky	VŠB-Technical University of Ostrava, Czech Republic
Joan Borrell	UniversitatAutònoma de Barcelona, Spain
Joaquin García-Alfaro	TELECOM Bretagne, France
Jordi Herrera	UniversitatAutònoma de Barcelona, Spain
Jorge López Hernández-Ardieta	University Carlos III of Madrid, Spain
Jose Vicent	University of Alicante, Spain
Jose A Montenegro	University of Malaga, Spain
Jose A. Onieva	University of Malaga, Spain
Jose Daniel Britos	Universidad Nacional de Córdoba, Argentina
Jose Luis Casteleiro	University of Coruña, Spain
Jose Luis Calvo Rolle	University of Coruña, Spain
Jose M. Molina	University Carlos III of Madrid, Spain
José M. Benítez	University of Granada, Spain
Jose Maria Gomez Hidalgo	Optenet, Spain
Josep Ferrer	Universitat de les IllesBalears, Spain
Juan Tena	University of Valladolid, Spain
Juan Corchado	University of Salamanca, Spain
Juan Álvaro Muñoz Naranjo	University of Almería, Spain
Juan E. Tapiador	University Carlos III of Madrid, Spain
Juan JesúsBarbarán	University of Granada, Spain
Juan Manuel GarcíaGarcía	Instituto Tecnológico de Morelia, Mexico
Krzysztof Walkowiak	Wroclaw University of Technology, Poland
Laura García-Hernández	University of Córdoba, Spain
Leocadio G. Casado	University of Almeria, Spain
Luis Hernandez Encinas	CSIC, Spain
Luis Enrique Sanchez Crespo	Sicaman Nuevas Tecnologias, Spain
M ^a Belén Vaquerizo	University of Burgos, Spain
Macià Mut Puigserver	University of the Balearic Islands, Spain
Manuel Graña	University of Basque Country, Spain
Manuel Mollar	University Jaume I, Spain
MariemmaYagüe	University of Malaga, Spain
Michal Wozniak	Wroclaw University of Technology, Poland
Milos Kudelka	VŠB-Technical University of Ostrava, Czech Republic
Mohamed Chawki	International Association of Cybercrime Prevention (AILCC)

Paulo Moura Oliveira	UTAD University, Portugal
Pavel Kromer	VŠB-Technical University of Ostrava, Czech Republic
Pedro Pablo	University of the Basque Country, Spain
Pino Caballero-Gil	University of La Laguna, Spain
Rafael Alvarez	University of Alicante, Spain
Rafael Corchuelo	University of Seville, Spain
Rafael M. Gasca	University of Seville, Spain
Ramon Rizo	University of Alicante, Spain
Raquel Redondo	University of Burgos, Spain
Raúl Durán	University of Alcalá, Spain
Reinaldo N. Mayol Arnao	UPB, Colombia
Ricardo Contreras	University of Concepción, Chile
Robert Burduk	Wroclaw University of Technology, Poland
Roberto Uribeetxeberria	Mondragon University, Spain
Rodolfo Zunino	University of Genoa, Italy
Roman Senkerik	Tomas Bata University, Czech Republic
Rosaura Palma-Orozco	CINVESTAV - IPN, Mexico
Salvador Alcaraz	University Miguel Hernández, Spain
Simone Mutti	Università degli Studi di Bergamo, Italy
SorinStratulat	Universite Paul Verlaine - Metz, France
Teresa Gomes	University of Coimbra, Portugal
Tomas Olovsson	Chalmers University of Technology, Sweden
Tomasz Kajdanowicz	Wroclaw University of Technology, Poland
Urko Zurutuza	Mondragon University, Spain
Valentina Casola	University of Naples "Federico II", Italy
Victoria Lopez	University Complutense of Madrid, Spain
Vincenzo Mendillo	University Central of Venezuela, Venezuela
Walter Baluja García	CUJAE, Cuba
Wei Wang	University of Luxembourg, Luxembourg
WenjianLuo	University of Science and Technology of China, China
Wojciech Kmiecik	Wroclaw University of Technology, Poland
Zuzana Oplatkova	Tomas Bata University, Czech Republic

Organising Committee

Emilio Corchado	University of Salamanca, Spain
Álvaro Herrero	University of Burgos, Spain
Bruno Baruque	University of Burgos, Spain
Diego Martínez	University of Burgos, Spain
Francisco José Güemes	University of Burgos, Spain

Héctor Quintián

Roberto Vega

Jose Luis Calvo

Ángel Arroyo

Laura García-Hernández

University of Salamanca, Spain

University of Salamanca, Spain

University of Coruña, Spain

University of Burgos, Spain

University of Córdoba, Spain

ICEUTE 2013

Organization

Honorary Chairs

Alfonso Fernández Mañueco	Mayor of Salamanca, Spain
Costas Stasopoulos	Director-Elect. IEEE Region 8
Antonio Bahamonde	President of the Spanish Association for Artificial Intelligence, AEPIA
Pilar Molina	IEEE Spanish Section President, Spain

International Advisory Committee

Jean-yves Antoine	Université François Rabelais, France
Reinhard Baran	Hamburg University of Applied Sciences, Germany
Fernanda Barbosa	Instituto Politécnico de Coimbra, Portugal
Bruno Baruque	University of Burgos, Spain
Emilio Corchado	University of Salamanca, Spain
Wolfgang Gerken	Hamburg University of Applied Sciences, Germany
Arnaud Giacometti	Université François Rabelais, France
Helga Guincho	Instituto Politécnico de Coimbra, Portugal
Álvaro Herrero	University of Burgos, Spain
Patrick Marcel	Université François Rabelais, France
Gabriel Michel	University Paul Verlaine - Metz, France
Viorel Negru	West University of Timisoara, Romania
Jose Luis Nunes	Instituto Politécnico de Coimbra, Portugal
Salvatore Orlando	Ca' Foscari University, Italy
Veronika Peralta	Université François Rabelais, France
Carlos Pereira	Instituto Politécnico de Coimbra, Portugal
Teppo Saarenpä	Turku University of Applied Sciences, Finland
Sorin Stratulat	University Paul Verlaine - Metz, France

Program Committee Chair

Emilio Corchado	University of Salamanca, Spain
Bruno Baruaque	University of Burgos, Spain
Fanny Klett	Distributed Learning Partnership Laboratory, Germany

Program Committee

Agostino Cortesi	Universita' Ca' Foscari di Venezia, Italy
Álvaro Herrero	University of Burgos, Spain
Ana Rosa Borges	INESC Coimbra, Portugal
Anabela Gomes	University of Coimbra, Portugal
Ángel Arroyo	University of Burgos, Spain
Carlos Pereira	ISEC, Argentina
DraganSimic	University of Novi Sad, Serbia
Fernanda Correia Barbosa	University of Aveiro, Portugal
Héctor Quintián	University of Salamanca, Spain
Ivan Zelinka	VŠB-Technical University of Ostrava, Czech Republic
Jean-Yves Antoine	UniversitFranois Rabelais de Tours, France
Jiri Dvorsky	VŠB-Technical University of Ostrava, Czech Republic
Jon Mikel Zabala Iturriagoitia	CIRCLE, Lund University, Sweden
Jose Luis Casteleiro	University of Coruña, Spain
Jose Luis Calvo Rolle	University of Coruña, Spain
Laura García-Hernández	University of Córdoba, Spain
Leticia Curiel	University of Burgos, Spain
M ^a Belén Vaquerizo	University of Burgos, Spain
Maria José Marcelino	University of Coimbra, Portugal
Milos Kudelka	VŠB-Technical University of Ostrava, Czech Republic
Pavel Kromer	VŠB-Technical University of Ostrava, Czech Republic
Sorin Stratulat	Universite Paul Verlaine, Metz, France
Vaclav Snasel	VŠB-Technical University of Ostrava, Czech Republic
Verónica Peralta	University of Tours, France
Viorel Negru	West University of Timisoara, Romania
Wolfgang Gerken	Hamburg university of Applied Sciences, Hamburg
Zdeněk Troníček	CTU in Prague, Czech Republic

Special Sessions

Web 2.0

Thomas Connolly	University of the West of Scotland, UK(Organiser)
Gavin Baxter	University of the West of Scotland, UK (Organiser)
Carole Gould	University of the West of Scotland, UK
Gary McKenna	University of the West of Scotland, UK
Mario Soflano	University of the West of Scotland, UK
Thomas Hainey	University of the West of Scotland, UK
Wallace Gray	University of the West of Scotland, UK
Yaelle Chaudy	University of the West of Scotland, UK

Organising Committee

Emilio Corchado	University of Salamanca, Spain
Álvaro Herrero	University of Burgos, Spain
Bruno Baruque	University of Burgos, Spain
Héctor Quintián	University of Salamanca, Spain
Roberto Vega	University of Salamanca, Spain
Jose Luis Calvo	University of Coruña, Spain
Ángel Arroyo	University of Burgos, Spain
Laura García-Hernández	University of Córdoba, Spain

Contents

SOCO 2013

General Track

Evolutionary Computation and Optimization

Parsimonious Support Vector Machines Modelling for Set Points in Industrial Processes Based on Genetic Algorithm Optimization	1
<i>Andrés Sanz-García, Julio Fernández-Ceniceros, Fernando Antoñanzas-Torres, F. Javier Martínez-de-Pisón-Ascacibar</i>	
A Multi-level Filling Heuristic for the Multi-objective Container Loading Problem	11
<i>Yanira González, Gara Miranda, Coromoto León</i>	
Multiple Choice Strategy Based PSO Algorithm with Chaotic Decision Making – A Preliminary Study	21
<i>Michal Pluhacek, Roman Senkerik, Ivan Zelinka</i>	
Optimization of Solar Integration in Combined Cycle Gas Turbines (ISCC)	31
<i>Javier Antoñanzas-Torres, Fernando Antoñanzas-Torres, Enrique Sodupe-Ortega, F. Javier Martínez-de-Pisón</i>	
Performance of Chaos Driven Differential Evolution on Shifted Benchmark Functions Set	41
<i>Roman Senkerik, Michal Pluhacek, Ivan Zelinka, Zuzana Kominkova Oplatkova, Radek Vala, Roman Jasek</i>	
A Neural Network Model for Energy Consumption Prediction of CIESOL Bioclimatic Building	51
<i>Rafael Mena Yedra, Francisco Rodríguez Díaz, María del Mar Castilla Nieto, Manuel R. Arahal</i>	

ACO Using a MCDM Strategy for Route Finding in the City of Guadalajara, México	61
<i>Leopoldo Gómez-Barba, Benjamín Ojeda-Magaña, Rubén Ruelas, Diego Andina</i>	
Microcontroller Implementation of a Multi Objective Genetic Algorithm for Real-Time Intelligent Control	71
<i>Martin Dendaluce, Juan José Valera, Vicente Gómez-Garay, Eloy Irigoyen, Ekaitz Larzabal</i>	
Solving Linear Systems of Equations from BEM Codes	81
<i>Raquel González, Lidia Sánchez, José Vallepuga, Javier Alfonso</i>	
Mean Arterial Pressure PID Control Using a PSO-BOIDS Algorithm	91
<i>Paulo B. de Moura Oliveira, Joana Durães, Eduardo J. Solteiro Pires</i>	
Intelligent Systems	
Empirical Study of the Sensitivity of CACLA to Sub-optimal Parameter Setting in Learning Feedback Controllers	101
<i>Borja Fernandez-Gauna, Igor Ansoategui, Ismael Etxeberria-Agiriano, Manuel Graña</i>	
Optimization Design in Wind Farm Distribution Network	109
<i>Adelaide Cerveira, José Baptista, Eduardo J. Solteiro Pires</i>	
Intelligent Model to Obtain Initial and Final Conduction Angle of a Diode in a Half Wave Rectifier with a Capacitor Filter	121
<i>José Luis Casteleiro-Roca, Héctor Quintián, José Luis Calvo-Rolle, Emilio Corchado, María del Carmen Meizoso-López</i>	
Prosodic Features and Formant Contribution for Speech Recognition System over Mobile Network	131
<i>Lallouani Bouchakour, Mohamed Debyeche</i>	
The Fuzzy WOD Model with Application to Biogas Plant Location	141
<i>Camilo Franco, Mikkel Bojesen, Jens Leth Hougaard, Kurt Nielsen</i>	
Applications	
The Application of Metamodels Based on Soft Computing to Reproduce the Behaviour of Bolted Lap Joints in Steel Structures	151
<i>Julio Fernández-Ceniceros, Ruben Urraca-Valle, Javier Antoñanzas-Torres, Andres Sanz-Garcia</i>	
Bayesian Networks for Greenhouse Temperature Control	161
<i>José del Sagrado, Francisco Rodríguez, Manuel Berenguel, Rafael Mena</i>	

Towards Improving the Applicability of Non-parametric Multiple Comparisons to Select the Best Soft Computing Models in Rubber Extrusion Industry	171
<i>Ruben Urraca-Valle, Enrique Sodupe-Ortega, Alpha Pernía-Espinoza, Andres Sanz-Garcia</i>	

Ear Biometrics: A Small Look at the Process of Ear Recognition	181
<i>Pedro Luis Galdámez, María Angélica González Arrieta</i>	

Classification and Clustering Methods

Enhanced Image Segmentation Using Quality Threshold Clustering for Surface Defect Categorisation in High Precision Automotive Castings	191
<i>Iker Pastor-López, Igor Santos, Jorge de-la-Peña-Sordo, Iván García-Ferreira, Asier G. Zabala, Pablo García Bringas</i>	

Orthogonal Matching Pursuit Based Classifier for Premature Ventricular Contraction Detection	201
<i>Pavel Dohnálek, Petr Gajdoš, Tomáš Peterek, Lukáš Zaorálek</i>	

Text Classification Techniques in Oil Industry Applications	211
<i>Nayat Sanchez-Pi, Luis Martí, Ana Cristina Bicharra Garcia</i>	

Special Sessions

Systems, Man, and Cybernetics

A Domestic Application of Intelligent Social Computing: The SandS Project	221
<i>Manuel Graña, Ion Marqués, Alexandre Savio, Bruno Apolloni</i>	

Clustering of Anonymized Users in an Enterprise Intranet Social Network	229
<i>Israel Rebollo Ruiz, Manuel Graña</i>	

Intelligent Model for Fault Detection on Geothermal Exchanger of a Heat Pump	237
<i>José Luis Casteleiro-Roca, Héctor Quintián, José Luis Calvo-Rolle, Emilio Corchado, María del Carmen Meizoso-López</i>	

Data Mining for Industrial and Environmental Applications

A Comparative Study of Machine Learning Regression Methods on LiDAR Data: A Case Study	249
<i>Jorge Garcia-Gutierrez, Francisco Martínez-Álvarez, Alicia Troncoso, Jose C. Riquelme</i>	

Principal Component Analysis on a LES of a Squared Ribbed Channel	259
<i>Soledad Le Clainche Martínez, Carlo Benocci, Alessandro Parente</i>	

Modeling Structural Elements Subjected to Buckling Using Data Mining and the Finite Element Method	269
<i>Roberto Fernández-Martínez, Rubén Lostado-Lorza, Marcos Illera-Cueva, Bryan J. Mac Donald</i>	
Design and Optimization of Welded Products Using Genetic Algorithms, Model Trees and the Finite Element Method	279
<i>Rubén Lostado-Lorza, Roberto Fernández-Martínez, Bryan J. Mac Donald, Abdul Ghani-Olabi</i>	
Soft Computing Methods in Bioinformatics	
Gene Clustering in Time Series Microarray Analysis	289
<i>Camelia Chira, Javier Sedano, José R. Villar, Carlos Prieto, Emilio Corchado</i>	
Quality of Microcalcification Segmentation in Mammograms by Clustering Algorithms	299
<i>Ramón O. Guardado-Medina, Benjamín Ojeda-Magaña, Joel Quintanilla-Domínguez, Rubén Ruelas, Diego Andina</i>	
Local Iterative DLT for Interval-Valued Stereo Calibration and Triangulation Uncertainty Bounding in 3D Biological Form Reconstruction	309
<i>José Otero, Luciano Sánchez</i>	
Classification of Chest Lesions with Using Fuzzy C-Means Algorithm and Support Vector Machines	319
<i>Donia Ben Hassen, Hassen Taleb, Ismahen Ben Yaacoub, Najla Mnif</i>	
Soft Computing Methods, Modeling and Simulation in Electrical Engineering	
RBF Neural Network for Identification and Control Using PAC	329
<i>Ladislav Körösi, Vojtech Németh, Jana Paulusová, Štefan Kozák</i>	
Analysis of the Effect of Clustering on an Asynchronous Motor Fuzzy Model	339
<i>Pavol Fedor, Daniela Perdukova, Mišél Batmend</i>	
Modelling the Technological Part of a Line by Use of Neural Networks	349
<i>Jaroslava Žilková, Peter Girovský, Mišél Batmend</i>	
Distribution of the Density of Current in the Base of Railway Traction Line Posts	359
<i>Lubomir Ivanek, Stanislav Zajaczek, Václav Kolář, Jiri Ciganek, Stefan Hamacek</i>	
Smart Home Modeling with Real Appliances	369
<i>Miroslav Prýmek, Aleš Horák, Lukas Prokop, Stanislav Misak</i>	

Implementation of Fuzzy Speed Controller in Control Structure of A.C. Drive with Induction Motor	379
<i>Pavel Brandstetter, Jiri Friedrich, Libor Stepanec</i>	

Artificial Neural Network Modeling of a Photovoltaic Module	389
<i>Jose Manuel López-Guede, Jose Antonio Ramos-Hernanz, Manuel Graña</i>	

CISIS 2013

General Track

Applications of Intelligent Methods for Security

A Toolbox for DPA Attacks to Smart Cards	399
<i>Alberto Fuentes Rodríguez, Luis Hernández Encinas, Agustín Martín Muñoz, Bernardo Alarcos Alcázar</i>	

Sensitive Ants for Denial Jamming Attack on Wireless Sensor Network	409
<i>Camelia-M. Pinteá, Petrica C. Pop</i>	

Supervised Machine Learning for the Detection of Troll Profiles in Twitter Social Network: Application to a Real Case of Cyberbullying	419
<i>Patxi Galán-García, José Gaviria de la Puerta, Carlos Laorden Gómez, Igor Santos, Pablo García Bringas</i>	

Deterministic Tableau-Decision Procedure via Reductions for Modal Logic K	429
<i>Joanna Golińska-Pilarek, E. Muñoz-Velasco, Angel Mora</i>	

Real-Time Polymorphic Aho-Corasick Automata for Heterogeneous Malicious Code Detection	439
<i>Ciprian Pungila, Viorel Negru</i>	

Twitter Content-Based Spam Filtering	449
<i>Igor Santos, Igor Miñambres-Marcos, Carlos Laorden, Patxi Galán-García, Aitor Santamaría-Ibirika, Pablo García Bringas</i>	

Content-Based Image Authentication Using Local Features and SOM Trajectories	459
<i>Alberto Peinado, Andrés Ortiz, Guillermo Cotrina</i>	

Anomaly Detection Using String Analysis for Android Malware Detection	469
<i>Borja Sanz, Igor Santos, Xabier Ugarte-Pedrero, Carlos Laorden, Javier Nieves, Pablo García Bringas</i>	

Classification of SSH Anomalous Connections	479
<i>Silvia González, Javier Sedano, Urko Zurutuza, Enaitz Ezpeleta, Diego Martínez, Álvaro Herrero, Emilio Corchado</i>	

Infrastructure and Network Security

Provable Secure Constant-Round Group Key Agreement Protocol Based on Secret Sharing	489
<i>Ruxandra F. Olimid</i>	
Analysis and Implementation of the SNOW 3G Generator Used in 4G/LTE Systems	499
<i>J. Molina-Gil, P. Caballero-Gil, C. Caballero-Gil, Amparo Fúster-Sabater</i>	
Cryptanalysis of the Improvement of an Authentication Scheme Based on the Chinese Remainder Theorem for Multicast Communications	509
<i>Alberto Peinado, Andrés Ortiz, Guillermo Cotrina</i>	
Disclosure of Sensitive Information in the Virtual Learning Environment Moodle	517
<i>Victor Gayoso Martínez, Luis Hernández Encinas, Ascensión Hernández Encinas, Araceli Queiruga Dios</i>	
Using Identity-Based Cryptography in Mobile Applications	527
<i>V. Mora-Afonso, P. Caballero-Gil</i>	
SlowReq: A Weapon for Cyberwarfare Operations. Characteristics, Limits, Performance, Remediations	537
<i>Maurizio Aiello, Gianluca Papaleo, Enrico Cambiaso</i>	
Identification of Degeneracies in a Class of Cryptographic Sequences	547
<i>Amparo Fúster-Sabater</i>	
Design of Nonlinear Filters with Guaranteed Lower Bounds on Sequence Complexity	557
<i>Amparo Fúster-Sabater</i>	
The Isomorphism of Polynomials Problem Applied to Multivariate Quadratic Cryptography	567
<i>Marta Conde Pena, Raúl Durán Díaz, Luis Hernández Encinas, Jaime Muñoz Masqué</i>	
Social News Website Moderation through Semi-supervised Troll User Filtering	577
<i>Jorge de-la-Peña-Sordo, Igor Santos, Iker Pastor-López, Pablo García Bringas</i>	
Secure Android Application in SOA-Based Mobile Government and Mobile Banking Systems	589
<i>Milan Marković, Goran Đjordžević</i>	

Extending a User Access Control Proposal for Wireless Network Services with Hierarchical User Credentials	601
<i>Juan Álvaro Muñoz Naranjo, Aitor Gómez-Goiri, Pablo Orduña, Diego López-de-Ipiña, Leocadio González Casado</i>	
Randomness Analysis of Key-Derived S-Boxes	611
<i>Rafael Álvarez, Antonio Zamora</i>	
A CA Model for Mobile Malware Spreading Based on Bluetooth Connections	619
<i>Ángel Martín del Rey, Gerardo Rodríguez Sánchez</i>	
ICEUTE 2013	
General Track	
Collaborative System for Learning Based on Questionnaires and Tasks	631
<i>Manuel Romero Cantal, Alejandro Moreo Fernández, Juan Luis Castro Peña</i>	
From Moodle Log File to the Students Network	641
<i>Kateřina Slaninová, Jan Martinovič, Pavla Dráždilová, Václav Snašel</i>	
Development of Projects as a Collaborative Tool for Competence Acquisition in the European Space for Higher Education Framework	651
<i>Javier Alfonso, Manuel Castejón, Lidia Sánchez, Raquel González, José Vallepuga</i>	
Yes, We Can (Can We Change the Evaluation Methods in Mathematics?)	659
<i>Ángel Martín del Rey, Gerardo Rodríguez, Agustín de la Villa</i>	
Soft Computing Techniques for Skills Assessment of Highly Qualified Personnel	669
<i>Héctor Quintián, Roberto Vega, Vicente Vera, Ignacio Aliaga, Cristina González Losada, Emilio Corchado, Fanny Klett</i>	
Special Session	
Web 2.0	
Using Web 2.0 Tools to Support the Theoretical Constructs of Organisational Learning	679
<i>Gavin J. Baxter, Thomas M. Connolly</i>	
A Survey of Academics' Views of the Use of Web2.0 Technologies in Higher Education	689
<i>Thomas Hainey, Thomas M. Connolly, Gavin J. Baxter, Carole Gould</i>	

Are Web2.0 Tools Used to Support Learning in Communities of Practice: A Survey of Three Online Communities of Practice	699
<i>Ashley Healy, Thomas Hainey, Thomas M. Connolly, Gavin J. Baxter</i>	
Learning Styles in Adaptive Games-Based Learning	709
<i>Mario Softlano, Thomas M. Connolly, Thomas Hainey</i>	
The Use of Games as an Educational Web2.0 Technology: A Survey of Motivations for Playing Computer Games at HE Level	719
<i>Thomas Hainey, Thomas M. Connolly</i>	
Adopting the Use of Enterprise Mircoblogging as an Organisational Learning Approach	729
<i>Gavin J. Baxter, Thomas M. Connolly</i>	
Author Index	739