# 9th International Multi-Conference on Complexity, Informatics and Cybernetics (IMCIC 2018)

Orlando, Florida, USA 13-16 March 2018

Volume 1 of 2

**Editors:** 

Nagib Callaos T. Grandon Gill Jeremy Horne Belkis Sánchez Michael Savoie

ISBN: 978-1-5108-9700-7

### Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2018) by International Institute of Informatics and Systemics (IIIS) All rights reserved.

Printed with permission by Curran Associates, Inc. (2020)

For permission requests, please contact International Institute of Informatics and Systemics (IIIS) at the address below.

International Institute of Informatics and Systemics (IIIS) 13750 West Colonial Dr. Suite 350-408 Winter Garden, Florida 34787 USA

Contact-us@iiis.org

## Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA

Phone: 845-758-0400 Fax: 845-758-2633

Email: curran@proceedings.com Web: www.proceedings.com

# **CONTENTS**

# Volume I

Contents	
Case Studies and Methodologies	
Bishop, Desmond (Tres) (USA): "ERP Selection: The Lifeblood of an Organization"	1
elearning and Academic Globalization	
Brydia, Robert E.; Vázquez, Jr., José A. (USA): "When the Campus Becomes the Classroom: Texas A&M's Campus Transportation Technology Initiative"	ć
Kusumi, Ariyoshi (Japan): "Proposing an Education System to Judge the Necessity of Nuclear Power in Japan"	12
Poszytek, Paweł; Jeżowski, Mateusz Wit (Poland): "The Index of Higher Education-Business Engagement – A Methodology of the Instrument Monitoring University-Business Relations"	17
Enabling an Intelligent Planet via Cybernetics and Informatics: IPIC	
Li, Xiaoxia; Yang, Qiang; Wang, Jixue; Chen, Zhebo; Yan, Wenjun (China): "Intelligent Fault Pattern Recognition of Aerial Photovoltaic Module Images Based on Deep Learning Technique"	22
Lou, Zhuo; Wang, Jixue; Yang, Qiang; Li, Xiaoxia; Chen, Zhebo; Yan, Wenjun (China): "Pan-Tilt and Flight Attitude Control for UAV Based Inspection System of Photovoltaic Farm"	28
Sun, Yan; Wang, Jixue; Yang, Qiang; Li, Xiaoxia; Yan, Wenjun (China): "Fault Diagnosis of Photovoltaic Module Based on Extreme Learning Machine Technique"	34
Xi, Zhipeng; Wang, Jixue; Yang, Qiang; Li, Xiaoxia; Zheng, Jun; Yan, Wenjun (China): "Optimal Path Planning for UAVs Based on an Improved Bat Algorithm"	40
ICT and Collaborative Enterprise	
Ditibane, Lesego; Huisman, Hester (Magda); Mavetera, Nehemiah (South Africa): "An e-Government Systems Development Methodology Framework"	46
Kozlowski, Rolf; Singer, Thomas; Szczuka, Michael (Germany): "Introducing a Virtualization Concept in Space Operations"	51
Vivanco, Jesús Salvador; González, Martha; Martínez, Ma. Del Carmen (Mexico): "IT Strategies for Globalization Impact in de the SME's (Aguascalientes Mexico Case)"	56

# **ICT Applications in Education**

Adamu, Abdulkadir (UK): "The Potentials of Open and Distance Education in Solving the Problems of Limited Access to Higher Education in Nigeria: National Open University of Nigeria (NOUN)"	60
Ash, George; Kokiko, Charles M.; Turner, Kelly (USA): "A Year of PR: A Collection from an Educational Service Center"	66
Chen, Chau-Kuang; Horner, Adriana Marie; Scott, Michelle; McClure, Stephanie C. (USA): "Evaluating the Construct Validity of Basic Science Curriculum Assessment Instrument for Critical Thinking: A Case-Study"	69
Dudley Smith, Clotilde (USA): "Inter-Professional Approach in the Healthcare Professions"	75
Guaragnella, Cataldo; Palieri, Matteo; De Scisciolo, Graziano; Dentamaro, Giuseppe; Di Lecce, Vincenzo (Italy): "Sound Driven Elderly People Monitoring System. Fostering Co-Working between Higher and Lower Education Systems"	81
La Red Martínez, David L.; Giovannini, Mirtha E.; Báez Molinas, María E.; Torre, Juliana I.; Yaccuzzi, Nelson (Argentina): "Educational Data Mining - An Experience in UTN FRRe"	86
Miranda, Jessica; Martini, Luiz; Miranda, Felipe (Brazil): "AlfaMateca: A Mathematical Literacy Application for the Visually Impaired"	91
Pournaghshband, Hassan (USA): "Students' Motivation in Undergraduate Courses"	95
Rommel, Irina (Germany): "Action-Orientation at German Vocational Schools in the Context of Work Process Knowledge"	99
Stehouwer, R. Scott (USA): "Stories, Metaphors, and True-Life Adventures: Useful Tools in Psychotherapy"	101
Stringer, Joseph; Bowman, Timothy; Vinson, Keith; Warnecke, Catherine; Lewis, Nora; Slattery, William; Lunsford, Suzanne K. (USA): "The Outer Banks Study – Physio-Chemical Parameters for Water Quality Testing in a Professional Development Program for K-12 Teachers-Problem-Based Learning (PBL)"	107
ICT Applications in Health Care and Bio-Medical ICT	
Kissi Mireku, Kingsford; Zhang, Fengli; Gbongli, Komlan; Djimesah, Isaac Edem (China): "Privacy Preservation Data Publishing of Health Insurance Scheme in Ghana Using Identity Base Encryption Scheme"	113
Koch, Walter *; Schachenreiter, Jochen *; Vogt, Klaus **; Koch, Gerda * (* Austria, ** Latvia): "Flipped Classroom – A Flexible Way of Teaching Technology Usage for Diagnostics in the Medical Subdomain ENT"	119

Schafer, Maureen Lucy; Chukwura, Chizoba L. (USA): "Relating Consulting via Research: Evidence-Based Findings Applied to a Formative Evaluation and Curriculum Revision of the Department of Defense's Substance Abuse Common Military Training"	124
Yazawa, Toru (Japan): "Health Wellness Monitoring Using the Scaling Exponent: A Heartbeat Interval Time Series Analysis"	128
ICT Applications in Management Engineering and Engineering Management	
Baracho, Renata Maria Abrantes; Bonatti, Rogério Amaral; Teixeira, Livia Marangon Duffles; Ferreira, Luiz Gustavo Fonseca; Baracho, Francisco Ricardo Abrantes Couy; Lima, Bernardo Cerqueira de; Silva, Cláudio Homero Ferreira (Brazil): "Investments in Renewables Decision Making Based on Tangible and Intangible Criteria"	134
Innovation, Computer Science and Engineering	
Liotine, Matthew (USA): "Partnering for Innovation: Developing a Next-Gen Laboratory for Exponential Technology"	140
Inter-Disciplinary Communication (which includes the communication of disciplinary research to other disciplines)	
Muehlmann, Kay (Austria): "Building Bridges to the Unknown Lands. Social Innovation, Co-Creation and the Role of Communication in Multiplex Social Systems"	144
Academic Globalization	
Ilyas, Mohammad; Bogotch, Ira (USA): "A Globalization Index for Academic Institutions"	149
Authors Index	153

# 9th International Multi-Conference on Complexity, Informatics and Cybernetics (IMCIC 2018)

Orlando, Florida, USA 13-16 March 2018

Volume 2 of 2

# **Editors:**

Nagib Callaos T. Grandon Gill Jeremy Horne Belkis Sánchez Michael Savoie

ISBN: 978-1-5108-9700-7

# **CONTENTS**

# Volume II

Contents	j
Communication and Network Systems, Technologies and Applications	
Abreu, Jorge; Almeida, Pedro; Silva, Telmo; Velhinho, Ana; Fernandes, Sílvia (Portugal): "Using Experts Review to Validate an Interactive TV User Interface for the Unification of Contents"	1
Jayapal, Ranjith; Govindan, Pramod (USA): "Biometric Encryption System for Increased Security"	6
Kodama, Satoshi; Nakagawa, Rei (Japan): "An Approach to Communication for ICN and MANET Using a Softwarized Infrastructure"	12
Manca, Grazia; Boaretto, Elisa; Bille, Laura; Dalla Pozza, Manuela; Marangon, Stefano (Italy): "The Shellfish Monitoring Plans Information System for Automatic Communication between Istituto Zooprofilattico Sperimentale Delle Venezie (IZSVe) and the Public Services in the Northern-East of Italy"	16
Silva, Telmo; Almeida, Pedro; Abreu, Jorge; Oliveira, Eliza (Portugal): "Interaction Paradigms on iTV: A Survey towards the Future of Television"	18
Complexity	
Doherr, Detlev; Jankowski, Andreas (Germany): "Humboldt's Vision of a Smart(er) World"	24
Wahl, Harald; Galler, Rudolf; Reicher, Lukas; Klauser, Christian; Kaufmann, Christian; Mense, Alexander (Austria): "Obtaining Parking Information and Exporting it for Broadcasting Using TPEG, TMC, and DATEX II"	28
Computer Science and Engineering	
Alhayyan, Khalid N. *; Ahmad, Imran ** (* Saudi Arabia, ** Canada): "Real-Time Sentimental Polarity Classification on Live Social-Media"	34
Clark Jr., George W.; Doran, Michael V. (USA): "Machine Learning Security Vulnerabilities in Cyber-Physical Systems"	41
Ghafarian, Ahmad; Hills, Ethan D. (USA): "Forensic Analysis of Windows 10 Volume Shadow Copy Service"	47

Javidi, Giti; Sheybani, Ehsan; Rajabion, Lila (USA): "Moving from Cloud to Fog: Implications and Challenges"	53
Majalca, Ricardo; Acosta, Pedro Rafael (Mexico): "Computational Geometry Estimation of Single Hidden Layer Size in Feedforward Neural Network Classifiers"	59
Melo, Rodrigo; Santana Junior, Clodomir J.; Albuquerque, Caio Victor E.; Campello Oliveira, Sergio (Brazil): "An Performance Analysis of a PSO-Based Algorithm for Swarm Robotics"	66
Pilatasig, Marco; Chacón, Galo; Tapia, Víctor; Silva, Franklin; Acurio, Andrés (Ecuador): "Airflow Station Controlled by PID and Fuzzy Controllers Using a Low Cost Card for Didactic Uses in Controllers' Evaluation"	72
Control Systems, Technologies and Applications	
Buslaev, Alexander; Yashina, Marina (Russian Federation): "Modern Information-Communication Methods of Analysis and Models of Complex Socio-Technical Systems"	77
Doran, Michael V.; Henderson, Alexander; Maynard, Jacob (USA): "The Warehouse Problem: Use of a Simulation and Scale Model to Evaluate Intelligent Control of an Autonomous Vehicle in a Factory"	83
Informatics	
Baracho, Renata Maria Abrantes; Cunha, Izabella Bauer de Assis; Pereira Junior, Mário Lúcio (Brazil): "Information Modeling and Information Retrieval for the Internet of things (IoT) in Buildings"	89
Bechor, Tamir; Zhang, Hengwei; Cruz, Leonard (USA): "Holistic Understanding of Challenges with Autonomous Vehicles"	95
Bialaszewski, Dennis; Dalrymple, Margaret; Harmon, Michael (USA): "A Logistic Regression Model for Student Retention"	100
Espinoza, John *; Buele, Jorge *; Castellanos, Esteban X. *; Pilatásig, Marco *; Ayala, Paulina *; García, Marcelo V. ** (* Ecuador, ** Spain): "Real-Time Implementation of Model Predictive Control in a Low-Cost Embedded Device"	106
Fabiano, Nicola (Italy): "Blockchain and Data Protection: The Value of Personal Data"	112
Kuchibhotla, Hari N.; Garrison-Alexander, Emma (USA): "An Empirical Analysis of Data Security in a University Anchored Community Wireless Database against External Hackers"	116
La Red Martínez, David L.; Acosta, Julio C.; Agostini, Federico (Argentina): "Assignment of Resources in Distributed Systems"	122
Nugent, Paul D. (USA): "Punchlines and Plot Twists. Exploring the Relationships between Consciousness, Cybernetics, and Information Theory"	128

Ramírez-Fuentes, C. A.; Tovar-Corona, B.; Silva-Ramírez, M. A.; Barrera-Figueroa, V.; Garay-Jiménez, L. I. (Mexico): "A Methodology for the Automatic Identification and Classification of EEG Waves Based on Clinical Guidelines"	134
Rioga, Danielle do Carmo Pimenta; Baracho, Renata Maria Abrantes (Brazil): "The BPMN as a Tool for the Development of the Information Flow of the Reception Sector and Welcome Program of Minas Gerais Federal University"	139
Zlatareva, Neli; Swaim, Nathan; Fitzgerald, Marc; Bagheri-Marani, Shiva; Watkins, Janine (USA): "Building an Application Agent for the Semantic Web: A Case Study"	145
Case Studies and Methodologies	
Alexakis, Emmanouil; Kapassa, Evgenia; Touloupou, Marios; Kyriazis, Dimosthenis; Georgopoulos, Andreas; Moropoulou, Antonia (Greece): "Computer-Aided Innovative Methodology for Management and Personalized Representation of Big Data in Cultural Heritage"	151
Fernandes, Ramon; Onisto, Haroldo (Brazil): "Component-Based System Design Guided by an Apparent-Ontology: A Case Study in Ultrasound Imaging"	155
Cybernetics (Communications and Control)	
Bayaga, Anass (South Africa): "Predicting and Explaining Security and Control of Mobile Payment Transaction: Financial/Health Institution"	160
ICT Applications in Risk Management and Engineering	
Porto, Marcelo Franco; Franco, José Ricardo Queiroz; Correa, Luiza Giori Barcellos; Alves, Lucas Vinicius Ribeiro; Baracho, Renata Maria Abrantes (Brazil): "BIM as a Structural Safety Study Tool in Case of Fire - BIMSCIP"	166
ICT Applications in Social and Political Systems	
Porto, Marcelo Franco; Nunes, Nilson Tadeu Ramos; Vianna de Carvalho, Izabela Ribas; Teixeira, Raphael Bruno Alves; Fonseca, Marina Oliveira; Alves, Lucas Vinicius Ribeiro; Baracho, Renata Maria Abrantes (Brazil): "Comparative Analysis between Routing Methods Systems Applied to the Rural School Transport Problem in Brazil"	172
Invited Papers associated to Inter-Disciplinary Communication	
Barroso, Leônidas Conceição (Brazil): "The Second Half of My Life (Invited Paper)"	177
Rioga, Danielle do Carmo Pimenta; Baracho, Renata Maria Abrantes (Brazil): "A Reflection about Integrating Research, Education, and Problem Solving – Seeds of the 9 <sup>th</sup> IMCIC 2018 (Invited Paper)"	181

# **Invited Papers associated to Plenary Keynote Addresses**

Lunsford, Suzanne K.; Zhai, Lei; Slattery, William (USA): "Real World Experience: Developing Novel Sensors - An Interdisciplinary Approach (Invited Paper)"	185
Lunsford, Suzanne K.; Slattery, William (USA): "On-Line E-Portfolios in Higher Education - A Multidisciplinary Approach (Invited Paper)"	190
van der Stap, Nanda *; Blair, Risa ** (* Netherlands, ** USA): "The Benefits of Peer Feedback in an Online Environment (Invited Paper)"	195
Inter-Disciplinary Communication (which Includes the Communication of Disciplinary Research to Other Disciplines)	
Fernandes, Ramon; Onisto, Haroldo; Medeiros Jr., Johannes (Brazil): "Collaborative Design Decision Assisted by Modeling & Simulation: A Cardiac Pacemaker Case Study"	199
<b>Authors Index</b>	205