



Recent Advances in Computer Science

Proceedings of the 19th International Conference on
Computers (part of CSCC '15)

Zakynthos Island, Greece, July 16-20, 2015

Edited by

Xiaodong Zhuang

Associate Editors

Eduardo Mario Dias

Vladimír Vašek

J. Angela Jennifa Sujana

Dr. Abdel-Badeeh M. Salem

José Machado

Dorota Jelonek

Nikos Bardis

V. V. Kozlov

Miroslav Voznak

N. Rajesh Jesudoss Hynes

Scientific Sponsors



RECENT ADVANCES in COMPUTER SCIENCE

**Proceedings of the 19th International Conference on Computers
(part of CSCC '15)**

**Zakynthos Island, Greece
July 16-20, 2015**

RECENT ADVANCES in COMPUTER SCIENCE

**Proceedings of the 19th International Conference on Computers
(part of CSCC '15)**

**Zakynthos Island, Greece
July 16-20, 2015**

Copyright © 2015, by the editors

All the copyright of the present book belongs to the editors. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the editors.

All papers of the present volume were peer reviewed by no less than two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.

Series: Recent Advances in Computer Engineering Series | 32

ISSN: 1790-5109

ISBN: 978-1-61804-320-7

RECENT ADVANCES in COMPUTER SCIENCE

**Proceedings of the 19th International Conference on Computers
(part of CSCC '15)**

**Zakynthos Island, Greece
July 16-20, 2015**

Organizing Committee

Editor:

Prof. Xiaodong Zhuang, Automation & Engineering College, Qingdao University, China

Associate Editors:

Prof. Dr. Eduardo Mario Dias

Prof. Vladimír Vašek

Prof. J. Angela Jennifa Sujana

Prof. Dr. Abdel-Badeeh M. Salem

Prof. José Machado

Prof. Dorota Jelonek

Prof. Nikos Bardis

Prof. V. V. Kozlov

Assoc. Prof. Miroslav Voznak

Dr. N. Rajesh Jesudoss Hynes

Organizing Committee:

Prof. Kleanthis Psarris, The City University of New York, USA (General Chair)

Prof. Pierre Borne, IEEE France Section Chair, IEEE Fellow, Ec Centr de Lille, France (General Chair)

Prof. Panos M. Pardalos, University of Florida, USA (Co-Chair)

Prof. George Vachtsevanos, Georgia Institute of Technology, Atlanta, Georgia, USA (Co-Chair)

Prof. Tadeusz Kaczorek, IEEE Fellow, Warsaw University of Technology, Poland (Co-Chair)

Prof. Nikos Mastorakis, Technical University of Sofia, Bulgaria (Program Chair)

Prof. Branimir Reljin, University of Belgrade, Belgrade, Serbia (International Liaisons)

Prof. Aida Bulucea, University of Craiova, Craiova, Romania (Publicity Chair)

Prof. Valeri Mladenov, Technical University of Sofia, Bulgaria (Publications Chair)

Prof. Imre Rudas, Obuda University, Budapest, Hungary (Tutorials Chair)

Prof. Vladimir Vasek, Tomas Bata University, Zlin, Czech Republic (Special Sessions Chair)

Prof. Anca Croitoru, Al.I. Cuza University, Iasi, Romania (Workshops Chair)

Steering Committee:

Prof. Yuriy S. Shmaliy, IEEE Fellow, Universidad de Guanajuato, Mexico

Prof. Alaa Khamis, IEEE Robotics and Automation Egypt-Chapter Chair, Egypt

Prof. Ioannis Stathopoulos, Technical University of Athens, Greece

Prof. Charalambos Arapatsakos, University of Thrace, Greece

Prof. Fragkiskos Topalis, Technical University of Athens, Greece

Prof. Klimis Ntalianis, Technological Educational Institute of Athens, Greece

Prof. Eduardo Mario Dias, University of Sao Paulo, Brazil

Prof. Miroslav Voznak, VSB-Technical University of Ostrava, Czech Republic

Prof. Abdel-Badeeh M. Salem, Ain Shams University, Cairo, Egypt

Prof. Nikolaos Bardis, M.Inst. of Univ. Educ. (ASEI), Hellenic Army Academy, Athens, Greece

Prof. Antoanela Naaji, Vasile Goldis Western University Arad, Romania

Prof. Elena Zamiatina, Perm State University, Perm Krai, Russia

Prof. Pan Agathoklis, University of Victoria, Canada

Prof. George Tsekouras, M.Inst. of Univ. Educ. (ASEI), Hellenic Naval Academy, Athens, Greece

Prof. Claudio Talarico, Gonzaga University, Spokane, USA

International Scientific Committee:

Prof. Lotfi Zadeh (IEEE Fellow, University of Berkeley, USA)

Prof. Leon Chua (IEEE Fellow, University of Berkeley, USA)

Prof. Michio Sugeno (RIKEN Brain Science Institute (RIKEN BSI), Japan)

Prof. Dimitri Bertsekas (IEEE Fellow, MIT, USA)

Prof. Demetri Terzopoulos (IEEE Fellow, ACM Fellow, UCLA, USA)

Prof. Georgios B. Giannakis (IEEE Fellow, University of Minnesota, USA)
Prof. Abraham Bers (IEEE Fellow, MIT, USA)
Prof. Brian Barsky (IEEE Fellow, University of Berkeley, USA)
Prof. Aggelos Katsaggelos (IEEE Fellow, Northwestern University, USA)
Prof. Josef Sifakis (Turing Award 2007, CNRS/Verimag, France)
Prof. Hisashi Kobayashi (Princeton University, USA)
Prof. Kinshuk (Fellow IEEE, Massey Univ. New Zeland),
Prof. Leonid Kazovsky (Stanford University, USA)
Prof. Narsingh Deo (IEEE Fellow, ACM Fellow, University of Central Florida, USA)
Prof. Kamisetty Rao (Fellow IEEE, Univ. of Texas at Arlington, USA)
Prof. Anastassios Venetsanopoulos (Fellow IEEE, University of Toronto, Canada)
Prof. Steven Collicott (Purdue University, West Lafayette, IN, USA)
Prof. Nikolaos Paragios (Ecole Centrale Paris, France)
Prof. Nikolaos G. Bourbakis (IEEE Fellow, Wright State University, USA)
Prof. Stamatios Kartalopoulos (IEEE Fellow, University of Oklahoma, USA)
Prof. Irwin Sandberg (IEEE Fellow, University of Texas at Austin, USA),
Prof. Michael Sebek (IEEE Fellow, Czech Technical University in Prague, Czech Republic)
Prof. Hashem Akbari (University of California, Berkeley, USA)
Prof. Lei Xu (IEEE Fellow, Chinese University of Hong Kong, Hong Kong)
Prof. Paul E. Dimotakis (California Institute of Technology Pasadena, USA)
Prof. Martin Pelikan (UMSL, USA)
Prof. Patrick Wang (MIT, USA)
Prof. Wasfy B Mikhael (IEEE Fellow, University of Central Florida Orlando, USA)
Prof. Sunil Das (IEEE Fellow, University of Ottawa, Canada)
Prof. Nikolaos D. Katopodes (University of Michigan, USA)
Prof. Bimal K. Bose (Life Fellow of IEEE, University of Tennessee, Knoxville, USA)
Prof. Janusz Kacprzyk (IEEE Fellow, Polish Academy of Sciences, Poland)
Prof. Sidney Burrus (IEEE Fellow, Rice University, USA)
Prof. Biswa N. Datta (IEEE Fellow, Northern Illinois University, USA)
Prof. Mihai Putinar (University of California at Santa Barbara, USA)
Prof. Wlodzislaw Duch (Nicolaus Copernicus University, Poland)
Prof. Michael N. Katehakis (Rutgers, The State University of New Jersey, USA)
Prof. Pan Agathoklis (Univ. of Victoria, Canada)
Dr. Subhas C. Misra (Harvard University, USA)
Prof. Martin van den Toorn (Delft University of Technology, The Netherlands)
Prof. Malcolm J. Crocker (Distinguished University Prof., Auburn University, USA)
Prof. Urszula Ledzewicz, Southern Illinois University , USA.
Prof. Dimitri Kazakos, Dean, (Texas Southern University, USA)
Prof. Ronald Yager (Iona College, USA)
Prof. Athanassios Manikas (Imperial College, London, UK)
Prof. Keith L. Clark (Imperial College, London, UK)
Prof. Argyris Varonides (Univ. of Scranton, USA)
Dr. Michelle Luke (Univ. Berkeley, USA)
Prof. Patrice Brault (Univ. Paris-sud, France)
Prof. Jim Cunningham (Imperial College London, UK)
Prof. Philippe Ben-Abdallah (Ecole Polytechnique de l'Universite de Nantes, France)
Prof. Ichiro Hagiwara, (Tokyo Institute of Technology, Japan)
Prof. Akshai Aggarwal (University of Windsor, Canada)
Prof. Ulrich Albrecht (Auburn University, USA)
Prof. Alexey L Sadovski (IEEE Fellow, Texas A&M University, USA)
Prof. Amedeo Andreotti (University of Naples, Italy)
Prof. Ryszard S. Choras (University of Technology and Life Sciences Bydgoszcz, Poland)
Prof. Remi Leandre (Universite de Bourgogne, Dijon, France)
Prof. Moustapha Diaby (University of Connecticut, USA)

Prof. Brian McCartin (New York University, USA)
Prof. Anastasios Lyrantzis (Purdue University, USA)
Prof. Charles Long (Prof. Emeritus University of Wisconsin, USA)
Prof. Marvin Goldstein (NASA Glenn Research Center, USA)
Prof. Ron Goldman (Rice University, USA)
Prof. Ioannis A. Kakadiaris (University of Houston, USA)
Prof. Richard Tapia (Rice University, USA)
Prof. Milivoje M. Kostic (Northern Illinois University, USA)
Prof. Helmut Jaberg (University of Technology Graz, Austria)
Prof. Ardeshir Anjomani (The University of Texas at Arlington, USA)
Prof. Heinz Ulbrich (Technical University Munich, Germany)
Prof. Reinhard Leithner (Technical University Braunschweig, Germany)
Prof. M. Ehsani (Texas A&M University, USA)
Prof. Sesh Commuri (University of Oklahoma, USA)
Prof. Nicolas Galanis (Universite de Sherbrooke, Canada)
Prof. Rui J. P. de Figueiredo (University of California, USA)
Prof. Hiroshi Sakaki (Meisei University, Tokyo, Japan)
Prof. K. D. Klaes, (Head of the EPS Support Science Team in the MET Division at EUMETSAT, France)
Prof. Emira Maljevic (Technical University of Belgrade, Serbia)
Prof. Kazuhiko Tsuda (University of Tsukuba, Tokyo, Japan)
Prof. Nobuoki Mano (Meisei University, Tokyo, Japan)
Prof. Nobuo Nakajima (The University of Electro-Communications, Tokyo, Japan)
Prof. P. Vanderstraeten (Brussels Institute for Environmental Management, Belgium)
Prof. Annaliese Bischoff (University of Massachusetts, Amherst, USA)
Prof. Fumiaki Imado (Shinshu University, Japan)
Prof. Sotirios G. Ziavras (New Jersey Institute of Technology, USA)
Prof. Marc A. Rosen (University of Ontario Institute of Technology, Canada)
Prof. Thomas M. Gatton (National University, San Diego, USA)
Prof. Leonardo Pagnotta (University of Calabria, Italy)
Prof. Yan Wu (Georgia Southern University, USA)
Prof. Daniel N. Riahi (University of Texas-Pan American, USA)
Prof. Alexander Grebennikov (Autonomous University of Puebla, Mexico)
Prof. Bennie F. L. Ward (Baylor University, TX, USA)
Prof. Guennadi A. Kouzaev (Norwegian University of Science and Technology, Norway)
Prof. Geoff Skinner (The University of Newcastle, Australia)
Prof. Hamido Fujita (Iwate Prefectural University(IPU), Japan)
Prof. Francesco Muzi (University of L'Aquila, Italy)
Prof. Claudio Rossi (University of Siena, Italy)
Prof. Sergey B. Leonov (Joint Institute for High Temperature Russian Academy of Science, Russia)
Prof. Lili He (San Jose State University, USA)
Prof. M. Nasseh Tabrizi (East Carolina University, USA)
Prof. Alaa Eldin Fahmy (University Of Calgary, Canada)
Prof. Gh. Pascovici (University of Koeln, Germany)
Prof. Pier Paolo Delsanto (Politecnico of Torino, Italy)
Prof. Radu Munteanu (Rector of the Technical University of Cluj-Napoca, Romania)
Prof. Ioan Dumitrache (Politehnica University of Bucharest, Romania)
Prof. Miquel Salgot (University of Barcelona, Spain)
Prof. Amaury A. Caballero (Florida International University, USA)
Prof. Maria I. Garcia-Planas (Universitat Politecnica de Catalunya, Spain)
Prof. Petar Popivanov (Bulgarian Academy of Sciences, Bulgaria)
Prof. Alexander Gegov (University of Portsmouth, UK)
Prof. Lin Feng (Nanyang Technological University, Singapore)
Prof. Colin Fyfe (University of the West of Scotland, UK)
Prof. Zhaohui Luo (Univ of London, UK)

Prof. Wolfgang Wenzel (Institute for Nanotechnology, Germany)
Prof. Weilian Su (Naval Postgraduate School, USA)
Prof. Phillip G. Bradford (The University of Alabama, USA)
Prof. Hamid Abachi (Monash University, Australia)
Prof. Josef Boercsoek (Universitat Kassel, Germany)
Prof. Eyad H. Abed (University of Maryland, Maryland, USA)
Prof. Andrzej Ordys (Kingston University, UK)
Prof. T Bott (The University of Birmingham, UK)
Prof. T.-W. Lee (Arizona State University, AZ, USA)
Prof. Le Yi Wang (Wayne State University, Detroit, USA)
Prof. Oleksander Markovskyy (National Technical University of Ukraine, Ukraine)
Prof. Suresh P. Sethi (University of Texas at Dallas, USA)
Prof. Hartmut Hillmer (University of Kassel, Germany)
Prof. Bram Van Putten (Wageningen University, The Netherlands)
Prof. Alexander Iomin (Technion - Israel Institute of Technology, Israel)
Prof. Roberto San Jose (Technical University of Madrid, Spain)
Prof. Minvydas Ragulskis (Kaunas University of Technology, Lithuania)
Prof. Arun Kulkarni (The University of Texas at Tyler, USA)
Prof. Joydeep Mitra (New Mexico State University, USA)
Prof. Vincenzo Niola (University of Naples Federico II, Italy)
Prof. S. Y. Chen, (Zhejiang University of Technology, China and University of Hamburg, Germany)
Prof. Duc Nguyen (Old Dominion University, Norfolk, USA)
Prof. Tuan Pham (James Cook University, Townsville, Australia)
Prof. Jiri Klima (Technical Faculty of CZU in Prague, Czech Republic)
Prof. Rossella Cancelliere (University of Torino, Italy)
Prof. Wladyslaw Mielczarski (Technical University of Lodz, Poland)
Prof. Ibrahim Hassan (Concordia University, Montreal, Quebec, Canada)
Prof. Erich Schmidt (Vienna University of Technology, Austria)
Prof. James F. Frenzel (University of Idaho, USA)
Prof. Vilem Srovnal, (Technical University of Ostrava, Czech Republic)
Prof. J. M. Giron-Sierra (Universidad Complutense de Madrid, Spain)
Prof. Rudolf Freund (Vienna University of Technology, Austria)
Prof. Alessandro Genco (University of Palermo, Italy)
Prof. Martin Lopez Morales (Technical University of Monterey, Mexico)
Prof. Ralph W. Oberste-Vorth (Marshall University, USA)
Prof. Photios Anninos, Democritus University of Thrace, Greece

Additional Reviewers

Bazil Taha Ahmed

James Vance

Sorinel Oprisan

M. Javed Khan

Jon Burley

Xiang Bai

Hessam Ghasemnejad

Angel F. Tenorio

Yamagishi Hiromitsu

Imre Rudas

Takuya Yamano

Abelha Antonio

Andrey Dmitriev

Valeri Mladenov

Francesco Zirilli

Ole Christian Boe

Masaji Tanaka

Jose Flores

Kazuhiko Natori

Matthias Buyle

Frederic Kuznik

Minhui Yan

Eleazar Jimenez Serrano

Konstantin Volkov

Miguel Carriegos

Zhong-Jie Han

Francesco Rotondo

George Barreto

Moran Wang

Alejandro Fuentes-Penna

Shinji Osada

Kei Eguchi

Philippe Dondon

Dmitrijs Serdjuks

Deolinda Rasteiro

Stavros Ponis

Tetsuya Shimamura

João Bastos

Genqi Xu

Santoso Wibowo

Tetsuya Yoshida

José Carlos Metrôlho

Universidad Autonoma de Madrid, Spain

The University of Virginia's College at Wise, VA, USA

College of Charleston, CA, USA

Tuskegee University, AL, USA

Michigan State University, MI, USA

Huazhong University of Science and Technology, China

Kingston University London, UK

Universidad Pablo de Olavide, Spain

Ehime University, Japan

Obuda University, Budapest, Hungary

Kanagawa University, Japan

Universidade do Minho, Portugal

Russian Academy of Sciences, Russia

Technical University of Sofia, Bulgaria

Sapienza Universita di Roma, Italy

Norwegian Military Academy, Norway

Okayama University of Science, Japan

The University of South Dakota, SD, USA

Toho University, Japan

Artesis Hogeschool Antwerpen, Belgium

National Institute of Applied Sciences, Lyon, France

Shanghai Maritime University, China

Kyushu University, Japan

Kingston University London, UK

Universidad de Leon, Spain

Tianjin University, China

Polytechnic of Bari University, Italy

Pontificia Universidad Javeriana, Colombia

Tsinghua University, China

Universidad Autónoma del Estado de Hidalgo, Mexico

Gifu University School of Medicine, Japan

Fukuoka Institute of Technology, Japan

Institut polytechnique de Bordeaux, France

Riga Technical University, Latvia

Coimbra Institute of Engineering, Portugal

National Technical University of Athens, Greece

Saitama University, Japan

Instituto Superior de Engenharia do Porto, Portugal

Tianjin University, China

CQ University, Australia

Hokkaido University, Japan

Instituto Politecnico de Castelo Branco, Portugal

Table of Contents

<u>Plenary Lecture 1: Error Estimation in the Decoupling of Ill-Defined and/or Perturbed Nonlinear Processes</u>	19
<i>Pierre Borne</i>	
<u>Plenary Lecture 2: Applications of Linear Algebra in Signal Processing, Wireless Communications and Bioinformatics</u>	21
<i>Erchin Serpedin</i>	
<u>Plenary Lecture 3: Reliability Life Cycle Management for Engineered Systems</u>	22
<i>George Vachtsevanos</i>	
<u>Plenary Lecture 4: Augmented Reality: The Emerging Trend in Education</u>	24
<i>Minjuan Wang</i>	
<u>Plenary Lecture 5: Application of Multivariate Empirical Mode Decomposition in EEG Signals for Subject Independent Affective States Classification</u>	26
<i>Konstantinos N. Plataniotis</i>	
<u>Plenary Lecture 6: State of the Art and Recent Progress in Uncertainty Quantification for Electronic Systems (i.e. Variation-Aware or Stochastic Simulation)</u>	28
<i>Luca Daniel</i>	
<u>The Evolution of Customer Relationship Management System</u>	29
<i>Dorota Jelonek</i>	
<u>Big Data Analytics of Social Media</u>	34
<i>Peter Wlodarczak, Jeffrey Soar, Mustafa Ally</i>	
<u>Design of Methodology for Connecting Enterprise Architect with Development Solutions and Necessary Application Framework</u>	40
<i>J. Sedivy, R. Borkovec, P. Coufal</i>	
<u>New Challenges in Smart Campus Applications</u>	44
<i>Attila Adamkó, Tamás Kádek, Lajos Kollár, Márk Kósa, János Pánovics</i>	
<u>Machine-Learning - An Overview of Optimization Techniques</u>	51
<i>Pedro Oliveira, Filipe Portela, Manuel Filipe Santos, António Abelha, José Machado</i>	
<u>The Personalized Recommendation Technology for Online Courses with Combinational Algorithm</u>	57
<i>Minjuan Wang, Jun Xiao, Bingqian Jiang, Junli Li</i>	

<u>Theoretical Analysis and Experimental Evaluation of Bandwidth Amplification Attacks to Legitimate Websites</u>	63
<i>Dimitrios P. Iračleous, Kristofer E. Bourro, Nikolaos Doukas</i>	
<u>Digital Image Segmentation Inspired by Carrier Immigration in Physical P-N Junction</u>	68
<i>Xiaodong Zhuang, Nikos E. Mastorakis</i>	
<u>Designing Engaging Mobile Learning for K-12 Classrooms</u>	75
<i>Minjuan Wang, Melissa Calderwood, Yong Chen, Junli Li</i>	
<u>How to Break Down the Security of an Efficient Modular Exponentiation Algorithm</u>	81
<i>David Tinoco Varela</i>	
<u>Objective Stimulus Features for Predicting Human Judgments of Visual Pattern Goodness: An Empirical Comparison</u>	86
<i>Godfried T. Toussaint</i>	
<u>Extending Cloud Computing and Learning for Mobility</u>	92
<i>Phil Robisch, Rebecca J. Kirsininkas, Minjuan Wang</i>	
<u>Research on the Analytics Model Design of Online Learning Behavior</u>	97
<i>Jun Xiao, Minjuan Wang, Lamei Wang, Bingqian Jiang</i>	
<u>Student Anxiety Awareness through a Bio-Feedback Device as a Significant Support to Educational Activities</u>	103
<i>Hippokratīs Apostolidis, Thrasyvoulos Tsiatsos, Minjuan Wang</i>	
<u>Bio-Inspired Algorithms for Attack of Block Ciphers</u>	108
<i>T. Mekhaznia, A. Zidani</i>	
<u>Influence of Mesh Quality and Density on Numerical Calculation of Heat Exchanger with Undulation in Herringbone Pattern</u>	115
<i>Václav Dvořák, Jan Novosád</i>	
<u>Sampling Time Dependency of Chaotic Ueda Oscillator as the Generator of Random Numbers for Heuristic</u>	121
<i>Roman Senkerik, Michal Pluhacek, Zuzana Kominkova Oplatkova</i>	
<u>The Application of Business Intelligence Systems in the Support of Decision Processes in the International Enterprises</u>	127
<i>Leszek Ziara</i>	
<u>The Concept of a Model of the Separation of the User Interface Layer from the Database Layer in B2B System</u>	131
<i>M. Łobaziewicz</i>	

<u>Implementing the Green Transport Strategy Using Balanced Scorecard and Analytic Network Process</u>	139
<i>D. Staš, R. Lenort, P. Wicher, D. Holman</i>	
<u>Information Technologies in Logistics Services. Case Study</u>	145
<i>Izabela Krawczyk-Sokołowska, Katarzyna Łukasik</i>	
<u>The Development of E-Business Services in Poland</u>	151
<i>Elzbieta Wyslocka, Renata Biadacz</i>	
<u>Fourth Dimension of Spatial Description in Business Processes</u>	157
<i>Cezary Stępnia</i>	
<u>Design and Implementation of the Korean Style Plug-In Using the Wordpress</u>	163
<i>Jeongseok Ji, Jaesic Kim, Youngwan Kim, Sungjin Jung, Chaehyun Lee, Dongsu Kim, Yonggoon Kim, Miyoung Bae, Yangwon Lim, Hankyu Lim</i>	
<u>A Comparison of Open-Source CMS - Focused on the CMS Market Place in Korea -</u>	167
<i>Yangwon Lim, Youseck Yang, Hyeonpyo Hong, Geunwoo Ahn, Jeongwoo Lee, Eunju Park, Jihyeon Hwang, Yonggoon Kim, Hankyu Lim</i>	
<u>Support for Reports and Forms Printing in wxWidgets GUI Toolkit</u>	170
<i>Michal Bližňák, Tomáš Dulík, Roman Jašek</i>	
<u>Automation of Modern Marketing Tools</u>	177
<i>Dagmara Bubel</i>	
<u>System for Professionals – Monitoring Employers’ Demands for Key Competences in Wielkopolska</u>	184
<i>M. Szafranski, M. Goliński</i>	
<u>Data Assimilation Method Coupled with the Numerical Simulation of the Ocean Dynamics</u>	192
<i>Konstantin P. Belyaev, Andrey A. Kuleshov, Clemente A. S. Tanajura, Natalia P. Tuchkova</i>	
<u>Implementation of a Kinetically-Based Algorithm for Porous Medium Flow Simulation on Hybrid Supercomputers</u>	197
<i>Andrew A. Kuleshov, Natalia G. Churbanova, Anastasiya A. Lyupa, Marina A. Trapeznikova</i>	
<u>Efficient Distribution Conversion Algorithm in Low Power TRNGs for Embedded Security Applications</u>	201
<i>Blerim Rexha, Dren Imeraj, Ehat Qerimi, Arbnor Halili</i>	
<u>Successive Elimination Algorithm for Truncated Gray-Coded Bitplane Matching Based Motion Estimation</u>	206
<i>Ilseung Kim, Jechang Jeong</i>	

<u>Improving Programming Courses Using Aptitude Testing and Learning Styles</u>	211
<i>Eva Milková, Karel Petránek</i>	
<u>Interactive Teaching Tools for Visualizing Geometrical 3D Objects Using Pseudo Holographic Images</u>	215
<i>M. Ciobanu, A. Ploscar, I. Dascal, I. Virag, A. Naaji</i>	
<u>Implications of Domain-Driven Design in Complex Software Value Estimation and Maintenance Using DSL Platform</u>	219
<i>Nikola Vlahovic</i>	
<u>Comparative Advantages of Software Industry in Developing Countries: Study of Structure, Market Strategies and Software Development Approaches in Croatian Software Companies</u>	227
<i>Nikola Vlahovic, Ljubica Milanovic Glavan, Anja Frankovic</i>	
<u>The Application of Computer Technology in Optimizing the Conditions of Directional Breaking of Fibrous Collagen Linkages</u>	234
<i>Shalbuev Dm. V., Zharnikova E. V., Radnaeva V. D.</i>	
<u>Building Rich User Profile Based on Intentional Perspective</u>	238
<i>Sara Alaoui, Younès El Bouzekri El Idrissi, Rachida Ajhoun</i>	
<u>Augmented Reality in Radiofrequency Ablation of the Liver Tumours</u>	243
<i>Lucio Tommaso De Paolis, Francesco Ricciardi, Cosimo Luigi Manes</i>	
<u>Management of Intangible Assets within Health Care Industry. A Comparative Study between Sweden and Poland</u>	249
<i>Dorota Jelonek, Amra Halilovic</i>	
<u>Automatic Acquisition, Processing and Analysis of Data System, Using the AHP Multi-Criteria Method</u>	254
<i>Sorin Borza, Carmen Simion</i>	
<u>Port Operation – Increase of Automated Systems, Decline of Workforce Jobs?</u>	259
<i>Aureo E. P. Figueiredo, Ricardo de D. Carvalhal, Sérgio Hoeflich, Letícia Figueiredo, Sergio L. Pereira, Eduardo M. Dias</i>	
<u>Implementation of Track and Trace System for Medication in the Largest Hospital Complex in Brazil</u>	267
<i>Elcio B. Da Silva, Maria L. R. P. Dias, Eduardo M. Dias, Sergio L. Pereira</i>	
<u>A Tabu Search Using Guide Trees-Based Neighborhood for the Multiple Sequence Alignment Problem</u>	275
<i>Tahar Mehenni</i>	

<u>Computational Automation in Modern Personalized Medicine - AirPROM Project Perspective</u>	281
<i>Michal Kierzyńska, Marcin Adamski, Andreas Fritz, Dmitriy Galka, Ian Jones, Dieter Maier, Andrew Wells</i>	
<u>Intrusion Detection System in Area of Interest Using a Background Subtraction-Based Tracking Algorithm</u>	286
<i>Hanbyul Chae, Kicheon Hong</i>	
<u>Exploratory Social Network Analysis with Pajek: Case Study on Student Group Performance</u>	292
<i>Lionel Khalil, Marie Khair, Tina Daaboul, Marie-Joelle El Hajje</i>	
<u>Warden 3: Security Event Exchange Redesign</u>	298
<i>Pavel Kachá, Michal Kostěnek, Andrea Kropáčová</i>	
<u>Ransomware</u>	304
<i>Jan Kolouch, Andrea Kropáčová</i>	
<u>Face Depth Estimation Using Differential Evolution and Iterative Soft Thresholding Algorithm</u>	308
<i>K. Punnam Chandar, T. Satya Savithri</i>	
<u>Multi-Lane Traffic Flow Models Accounting for Different Lane Changing Motivations</u>	314
<i>M. N. Smirnova, D. A. Pestov, A. I. Bogdanova, N. N. Smirnov, A. B. Kiselev, V. F. Nikitin, V. V. Tyurenkova</i>	
<u>Potential of Pervasive Computing through Embedded Systems and Internet Technologies: Research of Customer Perspective</u>	320
<i>Nikola Vlahović, Jovana Zoroja, Vesna Bosilj Vukšić</i>	
<u>Exploiting the Interpretability of Fuzzy Rule-Based Classifiers for Analyzing Hyperspectral Remotely Sensed Data</u>	327
<i>Dimitris G. Stavrakoudis, Stelios K. Mylonas, Charalampos A. Topaloglou, John B. Theocharis, Paris A. Mastorocostas</i>	
<u>Depth Estimation from Single Face Image Using Modified Differential Evolution</u>	335
<i>K. Punnam Chandar, T. Satya Savithri</i>	
<u>The Use of Virtual Laboratory Works at the Teaching of Natural Sciences Subjects</u>	340
<i>Yevgeniya A. Daineko, Madina T. Ipalakova, Viktor G. Dmitriyev, Andrey D. Giyenko, Nazgul K. Rakhimzhanova</i>	
<u>Benefits of Knowledge Engineering for E-Learning Systems</u>	343
<i>Abedl-Badeeh M. Salem, Thakaa Z. Mohamad</i>	

<u>Decision Support System for Predicting Football Game Result</u>	348
<i>João Gomes, Filipe Portela, Manuel Filipe Santos</i>	
<u>Prediction of Potential Organ Donation after Irreversible Brain Damage</u>	354
<i>Luís Torres, Filipe Portela, Manuel Filipe Santos, António Abelha, José Neves, José Machado</i>	
<u>Semantify Educational Resources Using SKOS and Learning Object Ontologies</u>	360
<i>Georgia D. Solomou, Dimitrios A. Koutsomitropoulos, Aikaterini K. Kalou, Sotirios D. Botsios</i>	
<u>Big Data Solutions to Support Intelligent Systems and Applications</u>	366
<i>Luciana Lima, Filipe Portela, Manuel Filipe Santos, António Abelha, José Machado</i>	
<u>Proposed Runtime Decision Making Framework for Autonomic Software Systems</u>	371
<i>Sandeep Kumar Chauhan, Arun Sharma, P. S. Grover</i>	
<u>Modular System for Gathering and Classification of SIP Attacks</u>	376
<i>J. Safarik, M. Voznak, J. Slachta, L. Macura, F. Rezac, J. Rozhon</i>	
<u>A Four-State Markov Chain and its Application in Packet Loss Modelling for Speech Quality Estimation of IP Telephony</u>	382
<i>J. Rozhon, F. Rezac, M. Voznak, J. Safarik, J. Slachta, L. Macura</i>	
<u>Experimental Analysis of the Effects of Turbulent Jets in Shallow Water Bodies</u>	388
<i>Robles L. Isidro, Palacio P. Arturo, Rodríguez V. Alejandro</i>	
<u>Design of M2M Service Capability for Access to Location Information</u>	394
<i>Ivaylo I. Atanasov, Evelina N. Pencheva</i>	
<u>Performance Estimation of Non-Comparison Based Sorting Algorithms Under Different Platforms and Environments</u>	400
<i>Mentor Hamiti, Diellza Nagavci</i>	
<u>Reduced Permissions Schema for Malware Detection in Android Smartphones</u>	406
<i>Ahmed H. Mostafa, Marwa M. A. Elfattah, Aliaa A. A. Youssif</i>	
<u>Fetal Heart Rate Estimation from Phonocardiograms Using an EMD Based Method</u>	414
<i>Dragos Daniel Taralunga, Mihaela Ungureanu, Bogdan Hurezeanu, Rodica Strungaru</i>	
<u>Soft-Error-Rate Adaptive Intervals for Low Overhead Checkpoint</u>	418
<i>Wentao Jia, Chunyuan Zhang, Kun Jiang</i>	
<u>A Novel Technique to Detect and Recognize Faces in Multi-View Videos</u>	427
<i>Steven Lawrence Fernandes, G. Josemin Bala</i>	
<u>A Comparative Study to Recognize Surgically Altered Images</u>	434
<i>Steven Lawrence Fernandes, G. Josemin Bala</i>	

<u>Extraction of Blood Vessels and Optic Disc Segmentation for Retinal Disease Classification</u>	440
<i>Jestin V. K.</i>	
<u>Fuzzy Logic Based Performance Analysis of Various Multiplier Architectures</u>	445
<i>Vardhana M.</i>	
<u>Renovation CoReVDO® Methodology of Collaborative Requirements Validation in Distributed Organizations</u>	449
<i>Sourour Maalem</i>	
<u>Interactive Image Search for Mobile Devices</u>	457
<i>Komal V. Aher, Sanjay B. Waykar</i>	
<u>Benefits of New Laboratory Tools in Research and Education</u>	463
<i>Gabriela Gladiola Andruseac, Mădălina Poștaru, Corina Cheptea, Anca-Irina Galaction</i>	
<u>A Probabilistic Clustering-Based Adaptive Histogram Thresholding Method for Fast Segmentation of Color Images</u>	469
<i>Abolfazl Mirkazemy, S. Enayatolah Alavi, Gholamreza Akbarizadeh</i>	
<u>Big Data Analytics in Prevention, Preparedness, Response and Recovery in Crisis and Disaster Management</u>	476
<i>Dontas Emmanouil, Doukas Nikolaos</i>	
<u>Identifying Peer-to-Peer Traffic Based on Traffic Characteristics</u>	483
<i>S. R. Patil, Suraj Sanjay Dangat</i>	
<u>Influence of IT on Micro Enterprises to Pursue Strategic Growth</u>	488
<i>Satya Shah, Syed Hassan</i>	
<u>Binarization and Recognition of Characters from Historical Degraded Documents</u>	497
<i>Bency Jacob, S. B. Waykar</i>	
<u>Adaptive Analysis of Characteristic Nodes Using Prediction Method in DTN</u>	502
<i>A. Yoon-Hyung Dho, Kang-Whan Lee</i>	
<u>Cyber Diversity for Security of Digital Substations under Uncertainties: Assurance and Assessment</u>	507
<i>E. Brezhnev, V. Kharchenko, J. Vain, A. Boyarchuk</i>	
<u>Green Computing within the Context of Educational and Research Projects</u>	513
<i>Vyacheslav Kharchenko, Oleg Illiashenko, Chris Phillips, Jüri Vain</i>	
<u>Evolution of Software Quality Models: Usability, Security and Greenness Issues</u>	519
<i>Oleksandr Gordieiev, Vyacheslav Kharchenko, Mario Fusani</i>	

[Simulation on Friction Welding Of MgAZ31 / AA 6061 T6 Joints](#)

524

N. Rajesh Jesudoss Hynes, P. Shenbaga Velu

[Authors Index](#)

529

Plenary Lecture 1

Error Estimation in the Decoupling of Ill-Defined and/or Perturbed Nonlinear Processes



Professor Pierre Borne (IEEE Fellow)

Co-authors Amira Gharbi, Mohamed Benrejeb

Centre de Recherche en Informatique Signal et Automatique de Lille, CRISTAL

Ecole Centrale de Lille

France

E-mail: pierre.borne@ec-lille.fr

Abstract: This lecture deals with the definition of the attractors characterizing the precision of decoupling control laws for a nonlinear process in presence of uncertainties and/or bounded perturbations. This approach is based on the use of aggregation techniques and the definition of a comparison system of the controlled process.

Brief Biography of the Speaker: Pierre BORNE received the Master degree of Physics in 1967 and the Master of Electrical Engineering, the Master of Mechanics and the Master of Applied Mathematics in 1968. The same year he obtained the Diploma of "Ingenieur IDN" (French "Grande Ecole"). He obtained the PhD in Automatic Control of the University of Lille in 1970 and the DSc in physics of the same University in 1976. Dr BORNE is author or co-author of about 200 Publications and book chapters and of about 300 communications in international conferences. He is author of 18 books in Automatic Control, co-author of an english-french, french-english « Systems and Control » dictionary and co-editor of the "Concise Encyclopedia of Modelling and Simulation" published with Pergamon Press. He is Editor of two book series in French and co-editor of a book series in English. He has been invited speaker for 40 plenary lectures or tutorials in International Conferences. He has been supervisor of 76 PhD Thesis and member of the committee for about 300 doctoral thesis . He has participated to the editorial board of 20 International Journals including the IEEE, SMC Transactions, and of the Concise Subject Encyclopedia . Dr BORNE has organized 15 international conferences and symposia, among them the 12th and the 17 th IMACS World Congresses in 1988 and 2005, the IEEE/SMC Conferences of 1993 (Le Touquet – France) and of 2002 (Hammamet - Tunisia) , the CESA IMACS/IEEE-SMC multiconferences of 1996 (Lille – France) , of 1998 (Hammamet – Tunisia) , of 2003 (Lille-France) and of 2006 (Beijing, China) and the 12th IFAC LSS symposium (Lille France, 2010) He was chairman or co-chairman of the IPCs of 34 international conferences (IEEE, IMACS, IFAC) and member of the IPCs of more than 200 international conferences. He was the editor of many volumes and CDROMs of proceedings of conferences. Dr BORNE has participated to the creation and development of two groups of research and two doctoral formations (in Casablanca, Morocco and in Tunis, Tunisia). twenty of his previous PhD students are now full Professors (in France, Morocco, Tunisia, and Poland). In the IEEE/SMC Society Dr BORNE has been AdCom member (1991-1993 ; 1996-1998), Vice President for membership

(1992-1993) and Vice President for conferences and meetings (1994-1995, 1998-1999). He has been associate editor of the IEEE Transactions on Systems Man and Cybernetics (1992-2001). Founder of the SMC Technical committee « Mathematical Modelling » he has been president of this committee from 1993 to 1997 and has been president of the « System area » SMC committee from 1997 to 2000. He has been President of the SMC Society in 2000 and 2001, President of the SMC-nomination committee in 2002 and 2003 and President of the SMC-Awards and Fellows committee in 2004 and 2005. He is member of the Advisory Board of the "IEEE Systems Journal" . Dr. Borne received in 1994, 1998 and 2002 Outstanding Awards from the IEEE/SMC Society and has been nominated IEEE Fellow the first of January 1996. He received the Norbert Wiener Award from IEEE/SMC in 1998, the Third Millennium Medal of IEEE in 2000 and the IEEE/SMC Joseph G. Wohl Outstanding Career Award in 2003. He has been vice president of the "IEEE France Section" (2002-2010) and is president of this section since 2011. He has been appointed in 2007 representative of the Division 10 of IEEE for the Region 8 Chapter Coordination sub-committee (2007-2008) He has been member of the IEEE Fellows Committee (2008- 2010) Dr BORNE has been IMACS Vice President (1988-1994). He has been co-chairman of the IMACS Technical Committee on "Robotics and Control Systems" from 1988 to 2005 and in August 1997 he has been nominated Honorary Member of the IMACS Board of Directors. He is since 2008 vice-president of the IFAC technical committee on Large Scale Systems. Dr BORNE is Professor "de Classe Exceptionnelle" at the "Ecole Centrale de Lille" where he has been Head of Research from 1982 to 2005 and Head of the Automatic Control Department from 1982 to 2009. His activities concern automatic control and robust control including implementation of soft computing techniques and applications to large scale and manufacturing systems. He was the principal investigator of many contracts of research with industry and army (for more than three millions €) Dr BORNE is "Commandeur dans l'Ordre des Palmes Académiques" since 2007. He obtained in 1994 the french " Kulman Prize". Since 1996, he is Fellow of the Russian Academy of Non-Linear Sciences and Permanent Guest Professor of the Tianjin University (China). In July 1997, he has been nominated at the "Tunisian National Order of Merit in Education" by the Republic of Tunisia. In June 1999 he has been nominated « Professor Honoris Causa » of the National Institute of Electronics and Mathematics of Moscow (Russia) and Doctor Honoris Causa of the same Institute in October 1999. In 2006 he has been nominated Doctor Honoris Causa of the University of Waterloo (Canada) and in 2007 Doctor Honoris Causa of the Polytechnic University of Bucharest (Romania). He is "Honorary Member of the Senate" of the AGORA University of Romania since May 2008 He has been Vice President of the SEE (French Society of Electrical and Electronics Engineers) from 2000 to 2006 in charge of the technical committees. He is the director of publication of the SEE electronic Journal e-STA and chair the publication committee of the REE Dr BORNE has been Member of the CNU (French National Council of Universities, in charge of nominations and promotions of French Professors and Associate Professors) 1976-1979, 1992-1999, 2004-2007 He has been Director of the French Group of Research (GDR) of the CNRS in Automatic Control from 2002 to 2005 and of a "plan pluriformations" from 2006 to 2009. Dr BORNE has been member of the Multidisciplinary Assessment Committee of the "Canada Foundation for Innovation" in 2004 and 2009. He has been referee for the nominations of 24 professors in USA and Singapore. He is listed in the "Who is Who in the World" since 1999.

Plenary Lecture 2

Applications of Linear Algebra in Signal Processing, Wireless Communications and Bioinformatics



Professor Erchin Serpedin

Department of Electrical and Computer Engineering
Texas A&M University
USA

E-mail: serpedin@ece.tamu.edu

Abstract: In this talk, we will review some of the most important applications of linear algebra in signal processing, wireless communications and bioinformatics, and then outline some of the major open problems which might benefit by the usage of linear algebra concepts and tools.

Brief Biography of the Speaker: Dr. Erchin Serpedin is currently a professor in the Department of Electrical and Computer Engineering at Texas A&M University in College Station. He is the author of 2 research monographs, 1 textbook, 9 book chapters, 105 journal papers and 175 conference papers. Dr. Serpedin serves currently as associate editor for the Physical Communications Journal (Elsevier) and EURASIP Journal on Advances in Signal Processing, and as Editor-in-Chief of the journal EURASIP Journal on Bioinformatics and Systems Biology edited by Springer. He is an IEEE Fellow and his research interests include signal processing, biomedical engineering, bioinformatics, and machine learning.

Plenary Lecture 3

Reliability Life Cycle Management for Engineered Systems



Professor George Vachtsevanos

Professor Emeritus

Georgia Institute of Technology

USA

E-mail: george.vachtsevanos@ece.gatech.edu

Abstract: Engineered systems are becoming more complex and by necessity more unreliable resulting in detrimental events for the system itself and its operator. There is evidence to support the contention that industrial and manufacturing processes, transportation and aerospace systems, among many others, are subjected to severe stresses, external and internal, that contribute to increased cost, operator workload, frequent and catastrophic mishaps that require the development and application of new and innovative technologies to improve system reliability, safety, availability and maintainability. These requirements are not true only for strictly engineered systems but are often discussed in business and finance, biological systems and social networks. We introduce in this talk a systematic and verifiable methodology to improve system reliability, reduce operating costs and optimize system design or maintenance practices. The enabling technologies build upon modeling tools to represent critical system functions, a prognostic strategy to predict the long-term behavior of systems under stress, reliability analysis methods exploiting concepts of probabilistic design and an optimization algorithm to arrive at optimum system design for improved reliability. We demonstrate the efficacy of the approach with examples from the engineering domain.

Brief Biography of the Speaker: Dr. George Vachtsevanos is currently serving as Professor Emeritus at the Georgia Institute of Technology. He served as Professor of Electrical and Computer Engineering at the Georgia Institute of Technology from 1984 until September, 2007. Dr Vachtsevanos directs at Georgia Tech the Intelligent Control Systems laboratory where faculty and students began research in diagnostics in 1985 with a series of projects in collaboration with Boeing Aerospace Company funded by NASA and aimed at the development of fuzzy logic based algorithms for fault diagnosis and control of major space station subsystems. His work in Unmanned Aerial Vehicles dates back to 1994 with major projects funded by the U.S. Army and DARPA. He has served as the Co-PI for DARPA's Software Enabled Control program over the past six years and directed the development and flight testing of novel fault-tolerant control algorithms for Unmanned Aerial Vehicles. He has represented Georgia Tech at DARPA's HURT program where multiple UAVs performed surveillance, reconnaissance and tracking missions in an urban environment. Under AFOSR sponsorship, the Impact/Georgia Team is developing a biologically-inspired micro aerial vehicle. His research work has been supported over the years by ONR, NSWC, the MURI Integrated Diagnostic

program at Georgia Tech, the U.S. Army's Advanced Diagnostic program, General Dynamics, General Motors Corporation, the Academic Consortium for Aging Aircraft program, the U.S. Air Force Space Command, Bell Helicopter, Fairchild Controls, among others. He has published over 300 technical papers and is the recipient of the 2002-2003 Georgia Tech School of ECE Distinguished Professor Award and the 2003-2004 Georgia Institute of Technology Outstanding Interdisciplinary Activities Award. He is the lead author of a book on Intelligent Fault Diagnosis and Prognosis for Engineering Systems published by Wiley in 2006.

Plenary Lecture 4

Augmented Reality: The Emerging Trend in Education



Professor Minjuan Wang

San Diego State University
USA

E-mail: mwang@mail.sdsu.edu

Abstract: Augmented Reality (AR) is the layering of virtual information over the real, 3-D world to produce a blended reality. AR has been considered a significant tool in education for many years. It adds new layers of interactivity, context, and information for learners which can deepen and enrich the learning experience. The combination of real and virtual allows the student to engage in learning about a topic from multiple perspectives and data sources at levels that are not always available in traditional classroom settings and interactions.

As the usage of mobile devices in formal settings continues to rise, so does the opportunity to harness the power of augmented reality (AR) to enhance teaching and learning. Many educators have experimented with AR, but has it proven to improve what students grasp and retain? Is AR just another fun way to engage students, with little transformation of learning? This plenary speaking will introduce augmented reality as an emerging trend in education, provide an overview of its current development, explore examples of curriculum integration, and also suggest approaches for success.

Brief Biography of the Speaker: Dr. Minjuan Wang (Professor of San Diego State University; Distinguished Research Professor of Shanghai International Studies University)

Homepage: <http://www.tinyurl.com/minjuan>

Minjuan is Professor of Learning, Design, and Technology at San Diego State University (California, USA), and distinguished professor of Shanghai International Studies University (Shanghai, China). She was recently selected as the “Oriental Scholar” by the Municipal Educational Committee of Shanghai). In addition, she and her American colleagues obtained a four-year 1.3 million grant to study environment protection (including the Golden monkeys) in Fanjingshan, Guizhou province.

Minjuan’s work has been highly interdisciplinary, covering the field of education, technology, computer science, geography, and communication. In her 14 years at SDSU, she teaches Designing and Developing Learning for the Global Audience, Mobile Learning Development, Technologies for Course Delivery, and Methods of Inquiry. Her research specialties focus on online learning, mobile learning, Cloud Learning, and intelligent learning (as part of the Intelligent Camps initiative launched by British Telecom). Minjuan is the Editor-in-Chief of a newly established journal-- EAI Transactions on Future Intelligent Educational Environments. She also serves on the editorial boards for four indexed journals: Open Education Research,

International Journal on E-Learning (IJEL), the Open Education Journal, and Journal of Information Technology Application in Education.

As a winner of several research awards, Minjuan is recognized as one of the high impact authors in blended and mobile learning. She has more than 80 peer-reviewed articles published in indexed journals, such as Educational Technology Research and Development, IEEE Transactions on Education, and British Journal of Educational Technology. She was a keynote and invited speaker to 11 international conferences. In addition, she is also an accomplished creative writer and an amateur flamenco dancer. Her recent Novel--Walking in this Beautiful World—has inspired many young people around the world.

Plenary Lecture 5

Application of Multivariate Empirical Mode Decomposition in EEG Signals for Subject Independent Affective States Classification



Prof. Konstantinos N. Plataniotis

Department of Electrical and Computer Engineering
University of Toronto
CANADA

E-mail: kostas@ece.utoronto.ca

Abstract: Physiological signals, EEG in particular, are inherently noisy and non-linear in nature which are challenging to work with using conventional linear signal processing methods. In this paper, we are adopting a new signal processing method, Multivariate Empirical Mode Decomposition, as a preprocessing method to reconstruct EEG signals according to its instantaneous frequencies. To test its effectiveness, we applied this signal reconstruction technique to analyze EEG signals for a 2-dimensional affect states classification application. To evaluate the proposed EEG signal processing system, a three-class classification experiment was carried out on the “Emobrain” dataset from eINTERFACE’06 with K-nearest neighbors (KNN) and Linear Discriminate Analysis (LDA) as classifiers. A leave-one-subject out cross validation process was used and an averaged correct classification rate of 90.77% was achieved. Another main contribution of this paper was inspired by the growth of non-medical grade EEG headsets and its potential in advanced human-computer interface design. However, to reduce cost and invasiveness, consumer grade EEG headsets have far less number of electrodes. In this paper, we used emotion recognition as a case study, and applied Genetic Algorithm to systematically select the critical channels (or sensor locations) for this application. The results of this study will shed light on the sensor configuration challenges faced by most consumer-grade EEG headset design projects.

Brief Biography of the Speaker: Konstantinos N. (Kostas) Plataniotis received his B. Eng. degree in Computer Engineering from University of Patras, Greece and his M.S. and Ph.D. degrees in Electrical Engineering from Florida Institute of Technology Melbourne, Florida. He was with the Computer Science Department at Ryerson University, Ontario, Canada from July 1997 to June 1999. Dr. Plataniotis is currently a Professor with The Edward S. Rogers Sr. Department of Electrical and Computer Engineering at the University of Toronto in Toronto, Ontario, Canada, where he directs the Multimedia Laboratory. He is a founding member and the inaugural Director – Research of the Identity, Privacy and Security Institute, IPSI, (www.ipsi.utoronto.ca). Kostas was the Director (January 2010- June 2012) of the Knowledge Media Design Institute, KMDI, (www.kmdi.utoronto.ca) at the University of Toronto.

Dr. Plataniotis was the Guest Editor for the March 2005 IEEE Signal Processing Magazine special issue on “Surveillance Networks and Services”, and the Guest Editor for the EURASIP Applied

Signal Processing Journal's special issue on "Advanced Signal Processing & Pattern Recognition Methods for Biometrics". He is a member of the IEEE Periodicals Review and Advisory Committee (2011-2013); he has served as a member of the 2008 IEEE Educational Activities Board; he chaired the IEEE EAB Continuing Professional Education Committee, and he served as the 2008 representative of the Computational Intelligence Society to the IEEE Biometrics Council. Dr. Plataniotis chaired the 2009 Examination Committee for the IEEE Certified Biometrics Professional (CBP) Program (www.ieeebiometricscertification.org) and he served on the Nominations Committee for the IEEE Council on Biometrics. He was a member of the Steering Committee for the IEEE Transaction on Mobile Computing, an Associate Editor for the IEEE Signal Processing Letters as well as the IEEE Transactions on Neural Networks and Adaptive Systems and he has served as the Editor-in-Chief for the IEEE Signal Processing Letters from January 1, 2009 to December 31, 2011. Dr. Plataniotis chaired the IEEE Toronto Signal Processing and Applications Toronto Chapter from 2000 to 2002, he was the 2004-05 Chair of the IEEE Toronto Section and a member of the 2006 as well as 2007 IEEE Admissions & Advancement Committees. He served as the Technical Program Committee Co-Chair for the 2013 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2013) and he is the Vice President – Membership for the IEEE Signal Processing Society (2014-2016). Dr. Plataniotis is a Fellow of IEEE, Fellow of the Engineering Institute of Canada, a registered professional engineer in the province of Ontario, and a member of the Technical Chamber of Greece.

The recipient of numerous grants and research contracts as the principal investigator, he speaks internationally and writes extensively in his field and he has been a consultant to a number of companies. He has served as lecturer in 12 short courses to industry and continuing education programs; he is a contributor to seventeen books, the co-author of "Color Image Processing and Applications", Springer Verlag, 2000, (ISBN-3-540-66953-1) and "WLAN Positioning Systems: Principles & applications in Location-based Services", Cambridge University Press, 2012 (ISBN 978-0-521-9185-2), "Multi-linear Subspace Learning: Reduction of multi-dimensional data", CRC Press, 2013, (ISBN: 978-14398557243). He is the co-editor of "Color Imaging: Methods and Applications", CRC Press, September 2006, (ISBN 084939774X) and the Guest Editor of the IEEE/Wiley Press volume on "Biometrics: Theory, Methods and Applications" published in October 2009 (ISBN: 9780470247822). Dr. Plataniotis has published more than 400 papers in refereed journals and conference proceedings. In 2005 he became the recipient of the IEEE Canada Engineering Educator Award for "contributions to engineering education and inspirational guidance of graduate students". Dr. Plataniotis is the joint recipient of the "2006 IEEE Trans. on Neural Networks Outstanding Paper Award" for the published in 2003 "Face recognition using kernel direct discriminant analysis algorithms", IEEE Trans. on Neural Networks, Vol. 14, No 1, 2003.

Plenary Lecture 6

State of the Art and Recent Progress in Uncertainty Quantification for Electronic Systems (i.e. Variation-Aware or Stochastic Simulation)



Professor Luca Daniel

Electrical Engin. & Computer Science
Massachusetts Institute of Technology (MIT)
Cambridge, MA, USA
E-mail: luca@mit.edu

Abstract: On-chip and off chip fabrication process variations have become a major concern in today's electronic systems design since they can significantly degrade systems' performance. Existing commercial circuit and MEMS simulators mostly rely on the well known Monte Carlo algorithm in order to predict and quantify such performance degradation. However during the last decade a large variety of more sophisticated and efficient alternative approaches have been proposed to accelerate such critical task. This talk will first review the state of the art of most modern uncertainty quantification techniques including intrusive and sampling-based ones. It will be shown in particular how parameterized model order reduction, and low-rank tensor based representations can be used to accelerate most uncertainty quantification tools and to handle the curse of dimensionality. Examples will be presented including amplifiers, mixers, voltage controlled oscillators with tunable micro-electro-mechanical capacitors and phase locked loops.

Brief Biography of the Speaker: Luca Daniel is an Associate Professor in the Electrical Engineering and Computer Science Department of the Massachusetts Institute of Technology (MIT). Prof. Daniel received the Ph.D. degree in Electrical Engineering from the University of California, Berkeley, in 2003. In 1998, he was with HP Research Labs, Palo Alto. In 2001, he was with Cadence Berkeley Labs.

Dr. Daniel research interests include development of integral equation solvers for very large complex systems, stochastic field solvers for large number of uncertainties, and automatic generation of parameterized stable compact models for linear and nonlinear dynamical systems. Applications of interest include simulation, modeling and optimization for mixed-signal/RF/mm-wave circuits, power electronics, MEMs, nanotechnologies, materials, MRI, and the human cardiovascular system.

Prof. Daniel has received the 1999 IEEE Trans. on Power Electronics best paper award; the 2003 best PhD thesis awards from both the Electrical Engineering and the Applied Math departments at UC Berkeley; the 2003 ACM Outstanding Ph.D. Dissertation Award in Electronic Design Automation; 5 best paper awards in international conferences, 8 additional nominations for best paper award; the 2009 IBM Corporation Faculty Award; and the 2010 IEEE Early Career Award in Electronic Design Automation.