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Advances in Data Networks, Communications, Computers and Materials

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Proceedings of the 11th WSEAS International Conference on Data Networks, Communications, Computers (DNCOCO '12)

Proceedings of the 5th WSEAS International Conference on Materials Science (MATERIALS '12)

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All papers of the present volume were peer reviewed by no less that two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.
See also: http://www.worldses.org/review/index.html

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World Scientific and Engineering Academy and Society

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Preface

This year the 11th WSEAS International Conference on Data Networks, Communications, Computers (DNCOCO '12) and the 5th WSEAS International Conference on Materials Science (MATERIALS '12) were held in Sliema, Malta, September 7-9, 2012. The conferences provided a platform to discuss data networks, network design, wireless networks, digital broadcasting, data engineering, information security, wireless communications, cryptology, military communications, programming languages, operating systems, hardware engineering, mobile computing, nanotubes and nanowires, semiconductor processing, management of materials, biometerials etc with participants from all over the world, both from academia and from industry.

Their success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of these conferences are published in this Book that will be sent to international indexes. They will be also available in the E-Library of the WSEAS. Extended versions of the best papers will be promoted to many Journals for further evaluation.

Conferences such as these can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

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Plenary Lecture 1

Development of Cryptographic and Testing Applications by Using Shift Registers

Assistant Professor Mirella Amelia Mioc
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Abstract: In many research areas as computational biology, medicine, pattern recognition and data compression, large amounts of data are analised to solve the increasingly complex problems.
Enormous successes have been achieved through continuous developing of the Information technology.
Many applications using shift registers can be developed in cryptography, testing, coding theory and wireless system communication.
By studying the use of the LFSR (Linear Feedback Shift Register) in Galois Fields GF(2n) it was demonstrated that for a better security it is useful to operate with arithmetic's modulo n degree irreducible polynomial.
Built-in self-tests are the kernel of any modern reliability tests. Their applications are ranging from cryptography and bit-error-rate measurements, to wireless communication systems employing spread spectrum or code division multiple access techniques. However the strict time constraints limit the complexity of the tests as such, that multiple compression methods via a parallel LFSR signature analyzer exist.
It is important to understand the available tradeoff options and find ways to attain better error detection at level computational cost.
There are many possibilities to simulate different projects using Advances Field Programmable Gate Array (FPGA) technologies and Electronic Design Automatic (EDA) tools.
For simulating a system and observing the results it is possible to create test benches in VHDL or Verilog.

Brief Biography of the Speaker: Mirella Amelia Mioc graduated in 1981 the Faculty of Electrotehnics, Computer Science, of the „Traian Vuia" Polytehnic Institute of Timisoara.
Presently she is Assistant Professor in the Department of Computer Science from „Politehnica" University of Timisoara.
The main field of interest consists of analizing the use of shift registers in cryptography and coding theory, the subject of her PhD.
Her scientific activity concerns: Number Theory,Numerical Methods for mathematics,Information Theory,Programming languages: Pascal, C, C++, Lisp, ML, Java, Fundamental concepts of programming languages,Study of using shift registers in cryptography and coding theory.
She is the author of:3 books about Programming Languages Pascal and C, 4 guiding laboratories - Numerical Methods and Programming Languages, 27 scientific papers published in conference proceedings and journals in country and abroad.
She performed scientific activities in some foreign univesities:Technische Universität Berlin, Germany, Technical University of Budapest, Hungary, Université Libre de Bruxelles, Belgium, Université de Liège, Belgium, Université Pierre et Marie Curie (VI) of Paris, France.
She participated in several EU founded projects in TEMPUS, LEONARDO and ERASMUS and also took part in some grants and agreements in research.
She was member in the implementations team of the Project "WETEN – Western-Eastern Teacher Education Network", 145035 - TEMPUS – 2008 – LT – JPTHN in the period 2009 – 2011.
She has papers presented in WSEAS Conferences in 2008, 2009 and also published in WSEAS Journals.
She was invited Plenary Speaker in WSEAS Conference in Rhodes in July 2009.

Plenary Lecture 2

Developing a Global Quality Management System to Transforming Technology into Effective Management Strategy

Professor Kakuro Amasaka
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Abstract: To be successful in the future a global marketer must develop an excellent quality management system that can impress consumers and continuously provide excellent quality products in a timely manner through corporate management for manufacturing in the 21st century. The author proposes a Global Quality Management System for transforming technology called “New JIT, new management technology principle” into effective management strategy. This system contains hardware and software systems, as next generation technical principles, for transforming management technology into a management strategy. The hardware system consists of the Total Development System (TDS), Total Production System (TPS) and Total Marketing System (TMS). These are the three core elements required for establishing new management technologies in the marketing, engineering, and production divisions. To improve the work process quality of all divisions concerned with development, production, and sales, the author hereby proposes “Science TQM” (TQM by utilizing “Science SQC”) as a software system.
The author believes that the effectiveness of New JIT for the advanced management strategy using High Linkage Model “Advanced TDS, TPS & TMS” has been demonstrated as described herein based on the author’s verification conducted at Toyota.

Brief Biography of the Speaker: Dr. Amasaka became a professor of the School of Science and Engineering, and the Graduate School of Science and Engineering at Aoyama Gakuin University, Tokyo, Japan in April 2000. His specialties include: production engineering (Just in Time, JIT and Toyota Production System, TPS), multivariate statistical analysis and, reliability engineering.. Recent research conducted includes: “Science SQC, new quality control principle”, "Science TQM, new quality management principle", "New JIT, new management technology principle”, “Customer Science”, “Kansei Engineering” and numerical simulation (Computer Aided Engineering, CAE).
Positions in academic society and important posts: He is the author of a number of papers on strategic total quality management, as well as the convener of JSQC, JOMSA, and other publications (e.g. POMS in USA and EurOMA in Europe). He has been serving as the vice chairman of JSPM (2003-2007) and JOMSA (2008-2010), the director of JSQC (2001-2003), and the commissioner of the Deming Prize judging committee (2002-present). Now, he is inaugurated as the vice chairman (2009-2010) and the chairman of JOMSA (2011-present).
Patents and prizes: He acquired 72 patents concerned with quality control systems, production systems, and production engineering and measurement technology. He is a recipient of the Aichi Invention Encouragement Prize (1991), Nikkei Quality Control Literature Prizes (1992, 2000, 2001and 2010), Quality Technological Prizes (JSQC, 1993 and 1999), SQC Prize (JUSE, Union of Japanese Scientists and Engineers, 1976) and Kansei Engineering Society Publishing Prize (2002).

Plenary Lecture 3

Minimizing Uncertainty of Mechanical Properties of Composite Material

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Abstract: New technology emerged in super composites such as Kevlar® that supported experimental and theoretical studies in measuring the response to simulated heavy-ion cosmic radiation. Fiber Reinforced Polymer (FRP) and Kevlar® material combined are excellent space radiation shielding materials in comparison with polyethylene, Lucite (PMMA), and aluminum. Among other useful properties, FRP and composites are non-magnetic and corrosion resistant, making them viable and sustainable space materials. By testing and analyzing various types of material, it provided a better understanding in terms of protection from radiation in both space and during exposure to radioactive situations. In addition, producing inflatable yet durable structures by analyzing the mechanical properties of FRP and other composites could potentially yield substantial benefits to support International Space Station's (ISS) missions. This ongoing research provided more exploration into the failure modes necessary to utilize FRP and various composites to their fullest potential and to minimize uncertainty. This research further expanded the FRP and composites knowledge base by identifying material strengths and weaknesses through conducting experimental versus theoretical studies. Based on an overview of these results, simplified criteria or standards can be developed. The application of these criteria or standards will be demonstrated through practical analysis and design examples.

Brief Biography of the Speaker: Stella B. Bondi was born in Athens, Greece in 1955. She obtained her undergraduate degree in Civil Engineering and graduated from Old Dominion University, Norfolk, Virginia, USA in 1999. She continued her studies at Old Dominion University where she earned a Master's in Engineering Management in 2003 and a PhD in Engineering Management in 2007. She is a tenure track Assistant Professor at Frank Batten College of Engineering & Technology at Old Dominion University in Norfolk, Virginia (USA). Before she became an Assistant Professor, Dr. Bondi had worked for over 22 years in the consulting engineering industry. She is currently conducting extensive research in composite materials further exploring the effects of reliability and uncertainty.

Plenary Lecture 4

Aerospace Materials: Opportunities, Bottlenecks, and Challenges

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Abstract: Studies show that aerospace products operate in very aggressive environments characterized by high temperature, high pressure, large stresses on individual components, the presence of oxidizing and corroding atmosphere, as well as internally created or externally ingested particulate materials that induce erosion and impact damage. Consequently, during operation, the materials of individual components degrade. In addition, the impact of maintenance costs for both civil and military aircraft was estimated at least two to three times greater than initial purchase values, and this trend is expected to increase. As a result, for viable product realisation and maintenance, a spectrum of issues regarding novel processing technologies, innovation of new materials, performance, costs, and environmental impact must constantly be addressed. One of these technologies, namely the cold-gas dynamic-spray process has enabled a broad range of coatings and applications, including many that have not been previously possible or commercially practical, hence its potential for new aerospace applications. Therefore, the purpose of this paper is to summarise the state of the art of this technology alongside its theoretical and experimental studies, and explore how the cold-gas dynamic-spray process could be integrated within a framework that finally could lead to more efficient aircraft maintenance. Based on the paper's qualitative findings supported by authorities, evidence, and logic essentially it is argued that the cold-gas dynamic-spray manufacturing process should not be viewed in isolation, but should be viewed as a component of a broad framework that finally leads to more efficient aerospace operations.

Brief Biography of the Speaker: Ionel Botef graduated in 1977 from the Polytechnic Institute of Bucharest, Romania, with a Masters in Mechanical and Manufacturing Engineering. In the 1980s he worked as a senior engineer with Turbomecanica, a manufacturer of aircraft engines, where, for example, he coordinated the technology for SPEY 512-14 DW aircraft engine, a cooperation programme with Rolls-Royce, UK. In the 1990s he moved to South Africa where he achieved his PhD from the Electrical and Information Engineering, University of the Witwatersrand, Johannesburg. From 1998 he has been a full time academic with the School of Mechanical, Industrial, and Aeronautical Engineering, University of the Witwatersrand, Johannesburg.His research interests focus on interdisciplinary research that include company integration, information systems, manufacturing processes and systems, materials science, software engineering, and computational techniques.

Plenary Lecture 5

Evaluation and Modeling of Rheologically Complicated Materials

Professor Berenika Hausnerová
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Abstract: Rheology constitutes an approach essential for the research and development of several issues arising during processing of rheologically complicated materials as highly filled polymer melts or cement suspensions. Attention will be given to the development of alternative experimental technique of centrifugation as well as experimental findings intercepting the rheological specifics of such materials including yield stress. The non-monotonous dependence of viscosity on shear rate or stress implies a necessity to create relevant rheological model for flow simulations, since models currently employed are still not satisfactory for the description of flow peculiarities of materials based on filler characterized with an irregular particle shape, broad particle size distribution, and particle sizes with enhanced tendency to form agglomerates.

Brief Biography of the Speaker: Berenika Hausnerova PhD is a full professor in technology of macromolecular compounds at the Centre of Polymer Systems, Tomas Bata University in Zlin, Czech Republic. Her area of expertise is rheology of highly filled polymers used in powder injection moulding, where she published 40 papers in impacted journals and 80 conference papers, and (co)supervised more than 20 projects. Her work has been acknowledged with “Werner von Siemens Excellence Award” (1999) and stipend „For Women in Science” by L'Oréal, UNICEF and Academy of Sciences of the Czech Republic (2006). She is a member of The Society of Rheology (since 1996), Society of Plastics Engineers (since 2001) and European Powder Metallurgy Association (since 2007). She served as an organizer and/or chairman at several international events (e.g. The Polymer Processing Society Meetings in Zlin 2004, Gothenburg 2007, Larnaca 2009).