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Vijay Nath
Editor

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Editor
Vijay Nath
Department of Electronics &
Communication Engineering
Birla Institute of Technology, Mesra
Ranchi, Jharkhand
India

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Preface

In the direction of the cashless world, computing systems play a major role in terms of reliability, robustness, correctness and performance. This conference gives the ideas how to work in electronic media safely and securely. Second point, the manufacturing companies contribute a major role in the development of the country. However, it is facing several challenges such as rapid product development, flexibility, low to medium volume, transportation and low cost. Many advanced/unconventional technologies/tools/software are being developed worldwide to face these challenges. Among these technologies, IC design and manufacturing has become more popular due to the ability of precise work. For the research, development, sharing knowledge and exchange ideas in current trends, the first International Conference on Microelectronics, Computing & Communication Systems (MCCS-2015) was organized by Indian Society of VLSI Education (ISVE), Ranchi, at Advanced Regional Telecom Training Centre (ARTTC) near Jumar River, Hazaribagh Road, Ranchi, from 14 to 15 November 2015. In this conference, around 150 papers were received and 50 chapters in pedagogy (Washington Accord) in which 33 reviewed, registered and presented papers/chapters were accepted for publication in conference proceeding of Springer book series Lecture Notes in Electrical Engineering. Pedagogy pattern of chapters provides new ideas to learner to enhance their knowledge and scope of employability. Since this platform provides outcome-based learning, this is beneficial to students, researchers, professors and industrial people to recognize or evaluate the value of his/her current job. All the papers/chapters have been blind-reviewed by three expert reviewers, and detailed comments were passed to the concerned authors with decisions. All the presentation sessions were reviewed by six-member expert committee.

The conference on “Investigations on the Logic Performance of Hybrid CMOSFETs Comprising p-Ge/n-InGaAs MOSFETs with Barrier Layers” began with welcome address by Dr. Vijay Nath, General Chair of the conference, and a keynote address by Prof. Abhijit Biswas, Institute of Radio Physics & Electronics, Kolkata University.

The theme of the first session was Recent Trends in Microelectronics, device & circuits, and the session featured talks by Prof. A.A. Khan, former VC, Ranchi University. Future Scopes of Communication System was presented by Sh. Prasad Vijay Bhushan Pandey, Chairman ISVE & DGM, ETR BSNL, Ranchi. The session on Signal Processing consisted of talks by Prof. J.K. Mandal, Kalyani University, and Prof. D. Acharya, President, ISTM, Kolkata. Dr. Soma Mandal, Institute of Radio Physics & Electronics, Kolkata University, delivered her lecture on “Electrical Equivalent Model for Gene Regulatory System”.

The Spokesperson for the session on Telecommunication Systems & Switching was Sh. Prasad Vijay Bhushan Pandey who was holding the position of DGM ETR BSNL Jharkhand Ranchi Circle and chairman ISVE Ranchi. The spokespersons for the session on Electronics System Design and Manufacturing (ESDM) were Prof. Vijay Nath, BIT, Mesra, Ranchi, and Prof. S.P. Tiwari, IIT Jodhpur. The spokesperson for Biomedical Instrumentation was Prof. Anand Kumar Thakur, SSMC Ranchi University. The session on Environmental Science and Engineering consisted of talks by Prof. K.K. Khatua, NIT Rourkela. This conference included oral session, poster sessions, tutorials, invited talks, keynote address by renowned scientists, professors and industries related to the theme of the conference. In this conference, original theoretical, practical, experimental simulations, development, applications, measurement- and testing-based papers were invited on wide areas from electrical, electronics, computer, communication, information technology, biomedical instrumentations, aerospace applications and environmental science and engineering, etc. The main aim of the conference was to bring together scientists, researchers, engineers, professors, industries that exchange and share their knowledge, experiences, technological developments and researches in current trends.

The sub-area of the conference covered were microelectronic devices, MEMS, VLSI design, IC technology, IC fabrication and testing, VLSI signal processing, VLSI for wireless communication & bioengineering, VLSI for electronic system design and manufacturing, image processing, digital signal processing, embedded system, robotics, electric power system, hybrid vehicles, renewable energy, green energy, cloud computing, algorithm development and implementation, computer networks, ICT applications, computer architecture, information security, data mining, mobile communication and computing, ad hoc network, wireless sensor network, EMI and EMC, satellite communication, fibre optics communication and optical networks, quantum dots, telemedicine, RFID and telemetry systems, aerospace, and environmental science and engineering, etc.

Totally, 33 papers represent in this volume the cover theme of the conference, i.e. design, simulation, verification, implementation and applications of micro- and nanoelectronics, computing and communication systems. In the first session, **Microelectronics, device & circuits**, papers were presented under the chairmanship of Dr. A.A. Khan and session chair persons were Dr. K.K. Senapati, Dr. Aminul Islam, Dr. J.K. Mandal, Dr. Soma Berman, Dr. P.R. Thakura and Dr. Abhijit Biswas. Shahiruddin et al. presented their paper on Single-Mode Negative Dispersion Hexagonal Photonic Crystal Fiber. Rifaqat Ali et al. described A Secure

Three-Factor Remote User Authentication Scheme Using Elliptic Curve Cryptosystem. S. Selvi et al. demonstrated the Implementation of Fingerprint-Based Biometric System and Its Integration with HRMS Application at RDCIS, SAIL. Rasika Dhavse et al. described Fabrication and Investigation of low voltage programmable flash memory gate stack. Sushma Kamlu et al. defined an Effective Method for Maintenance Scheduling of Vehicles Using Neural Network. Susmita Mandal et al. described her view on universally verifiable certificate less signature scheme for MANET. Abhijit Biswas et al. presented paper on impact of sidewall spacer layers on the analog/RF performance of nanoscale double gate junctionless transistors. R.C. Barik et al. described A Novel Data Encryption Approach in the Grid-Structured Binary Image. Bhattu.Hari Prasad Naik et al. explained the Analysis of Electromagnetic Wave Using Explicit FDTD in TM Mode with Extrapolation.

In the second session, **VLSI Signal Processing**, papers were presented under the chairmanship of Dr. Abhijit Biswas and session chair persons were Dr. J.K. Mandal, Dr. Soma Berman, Dr. P.R. Thakura, Prof. D. Acharjee and Dr. N. Chattoraj. S.S. Panigrahi et al. described A DEA-Based Evolutionary Computation Model for Stock Market Forecasting. Monalisa Dutta et al. demonstrated the Electrical Equivalent Model for Gene Regulatory System. Sneha Jain et al. described the Colour Image Segmentation Techniques: A Survey. Parivesh Pandey et al. presented his survey on Wireless Image Sensor Networks: A Review. Suprojit Nandy et al. demonstrated their strategy on Design of a Low-Cost Heart Rate Monitoring System.

In the third session, **ICT**, papers were presented under the chairmanship of Dr. J. K. Mandal and session chair persons were Dr. R.K. Lal, Dr. Soma Berman, Dr. Abhijit Biswas, Dr. N. Chattoraj and Dr. S.K. Mahapatra. A. Uma et al. demonstrated their approach for Design of DA-Based FIR Filter Architectures Using LUT Reduction Techniques. K. Rajalakshmi et al. described fractional delay FIR filter architecture using numeric strength reduction techniques. Yogesh Kumar Sharma et al. presented their work on Lifetime Enhancement of WSN Based on Modified Heterogeneous Leach Protocol. N. Chattoraj et al. described Modeling and Investigation of Electrothermally Actuated Micro-gripper. Vijay Nath et al. described an ultra-low-power Internet-controlled home automation. Kamalini Devi et al. described their work on Depth-Averaged Velocity Distribution for symmetrical and asymmetrical compound channels. Vijay Nath et al. demonstrated their design work for A 0.533-dB Noise Figure, 7-mW Narrowband Low-Noise Amplifier for Global Positioning System Application. Deepak Prasad et al. described the Design of Ultra-Low-Power CMOS Class E Power Amplifier. Shaligram Prajapat et al. described the mechanism of cryptic mining for automatic variable key-based cryptosystem.

In the fourth session, **Hybrid Electronics & Space Engineering**, papers were presented under the chairmanship of Dr. K.K. Khatua and session chair persons were Dr. A.K. Tiwary, Dr. Sukalyan Chakraborty, Prof. Shahiruddin, Prof. D. Acharjee, Dr. Abhijit Biswas and Dr. P.R. Thakura. Abha Sharma et al. explained the Improved Clustering for Categorical Data with Genetic Algorithm.

Niranjan Raj et al. described the Balanced Wrapper Design to Test the Embedded Core Partitioned into Multiple Layer for 3D SoC Targeting Power and Number of TSVs. Abhijit Biswas et al. described the Investigations on the Logic Performance of Hybrid CMOSFETs Comprising p-Ge/ n-InGaAs MOSFETs with Barrier Layers. Tara Prasanna Dash et al. showed the Design and Simulation of Strained-Si/SiGe Channel p-MOSFETs. Bhabnai Shankar Das et al. demonstrated the application of Lateral Distribution Method and Modified-Lateral Distribution Method to compound channel having converging floodplain. Tara Prasanna Dash et al. defined the Silicon–Germanium Channel heterostructure p-MOSFETs. Vijay Nath et al. demonstrated the strategy of Digital Hardware Design and IC Technology in Pedagogy. Ranjan Mishra et al. defined the Antenna Path Loss Propagation Model in the Dehradun Valley at 1800 MHz in L-Band. Rajesh Kumar Lal et al. described technique for Reduction of Dark Current in QWIP. Md Maqubool Hosain showed the Design of Circular Disc Monopole Antenna for UWB application.

Authors and editors have taken utmost care in presenting the information and acknowledging the original sources whenever necessary. Editors express their gratitude towards the authors, organizers of IC-MCCS and staff of Springer (India) for publication of this research book/proceeding possible. Readers are requested to provide their valuable feedback on the quality of presentation and inadvertent error or omission of information if any. We expect that the book will be welcomed by students as well as practising engineers/researchers/professors.

Ranchi, India

Vijay Nath

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About the Editor

Dr. Vijay Nath received his bachelor's degree in Physics and master's degree in Electronics from DDU Gorakhpur University, India, in 1998 and 2001, respectively. He received a PGDCN from MMMUT (MMMEC), Gorakhpur (gold medallist), in 1999. He received his Ph.D. in VLSI Design & Technology from Dr. RML Avadh University, Faizabad, in association with CEERI, Pilani, in 2008. He was a member of the faculty in the Department of Electronics, DDU Gorakhpur University, Gorakhpur (2002–2006). In 2006, he joined as a faculty in the Department of Electronics and Communication Engineering, BIT, Mesra, Ranchi, India. Currently, he is Professor-In-Charge of VLSI Design Lab, Department of ECE, BIT, Mesra, Ranchi. His research interests include low-power VLSI circuits, mixed CMOS VLSI circuits, MEMS and NEMS sensors, CMOS signal-processing circuits, ASICs, embedded system designs, intelligent instrumentations, smart cardiac pacemaker and early-stage detection of cancer. He has to his credit more than 100 publications in international journals and conferences. He is a member of several reputed professional and academic bodies including IETE, ISVE and IEEE. He has completed several R&D projects of Government of India funded by DST, DRDO, MHRD and MoCIT. He has ongoing project of Government of India funded by RESPOND, ISRO. He has developed VLSI Design course in pedagogy (e-learning) funded by MHRD on the pattern of Washington Accord.