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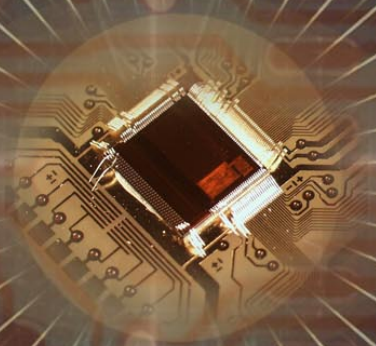

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Proceedings of the 7th WSEAS International Conference on Application of Electrical Engineering (AEE'08)

Host and Sponsor: Norwegian University of Science and Technology Faculty of Information Technology, Mathematics and Electrical Engineering

NTNU
Det skapende universitet

Trondheim, Norway, July 2-4, 2008

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Preface

This book contains the proceedings of the 7th WSEAS International Conference on Application of Electrical Engineering (AEE'08) which was held in Trondheim, Norway, July 2-4, 2008. This conference aims to disseminate the latest research and applications in Devices, Circuits, Network Theory and Applications, Power Systems and Electric Machinery, Instrumentation and Measurement, Electronics and Signal Processing, Microprocessors, Computer Applications of Electr.Eng. (EE) in Aerospace Engineering and Technology and other relevant topics and applications.

The friendliness and openness of the WSEAS conferences, adds to their ability to grow by constantly attracting young researchers. The WSEAS Conferences attract a large number of well-established and leading researchers in various areas of Science and Engineering as you can see from **http://www.wseas.org/reports**. Your feedback encourages the society to go ahead as you can see in **http://www.worldses.org/feedback.htm**

The contents of this Book are also published in the CD-ROM Proceedings of the Conference. Both will be sent to the WSEAS collaborating indices after the conference: **www.worldses.org/indexes**

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Expanded and enhanced versions of papers published in this conference proceedings are also going to be considered for possible publication in one of the WSEAS journals that participate in the major International Scientific Indices (Elsevier, Scopus, EI, ACM, Compendex, INSPEC, CSA .... see: www.worldses.org/indexes) these papers must be of high-quality (break-through work) and a new round of a very strict review will follow. (No additional fee will be required for the publication of the extended version in a journal). WSEAS has also collaboration with several other international publishers and all these excellent papers of this volume could be further improved, could be extended and could be enhanced for possible additional evaluation in one of the editions of these international publishers.

Finally, we cordially thank all the people of WSEAS for their efforts to maintain the high scientific level of conferences, proceedings and journals.

Table of Contents

Keynote Lecture

Next Generation Broadband Access Networks: Metro-Access Integration and Optical-Wireless Convergence

Professor Leonid G. Kazovsky
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Abstract: Because of emerging multimedia applications, such as video-on-demand, video conferencing, interactive gaming, IPTV and e-learning, bandwidth demands from end users are constantly increasing. The copper wire technologies (e.g. cable and DSL) bridging users and the Internet have been stretched to their bandwidth limits, and become the so-called first/last mile bottleneck. To address current bottleneck of the Internet infrastructure, passive optical networks (PONs) and wireless mesh networks have been proposed as the most efficient approaches for broadband access services. Fiber is an ideal replacement for the copper wires in the access networks. TDM PONs are currently being deployed by service providers all over the world. Meanwhile, next-generation PONs are being investigated to provide better services for triple play (voice, data and video). To support more users and more bandwidth, next generation optical access will move toward higher bit rate and more wavelengths. The challenging issue is how to migrate from current TDM PONs to future WDM PONs in a scalable and cost-efficient manner. Meanwhile, the integration of metro and access networks will provide a transparent and efficient infrastructure for broadband service in metropolitan areas. Even though fibers can provide broadband services, PONs are constrained with a fixed infrastructure and limited coverage. For future mobile broadband applications, ubiquitous access networks are highly desirable. Due to recent advances in wireless technologies, wireless access such as wireless mesh networks (WMNs) becomes a promising solution to fulfill emerging mobile services. In the future, convergence of optical and wireless technologies is inevitable for quadruple play (voice, data, video and mobility). However, as the traffic behavior and channel quality of these two technologies are far from each other, seamlessly integrating PONs and WMNs presents a very challenging task. This talk discusses next generation broadband access networks, and in particular, the integration of metro and access networks and the convergence of optical and wireless technologies. The network architecture, routing algorithm and enabling technologies for next generation broadband access networks are presented in detail. This first part of this talk will review current TDM PON standards and next generation broadband optical access technologies. Evolutionary approaches to migrate from TDM to WDM PONs in a scalable and efficient manner are demonstrated with two SUCCESS (Stanford University Access Network) projects. The second part of this talk discusses the integration of optical metro rings with passive optical networks. A flexible metro-access architecture is proposed for resource sharing and dynamic bandwidth allocation in the integrated network. The third part of this talk presents a converged optical and wireless network for broadband, ubiquitous access services. The network consists of a passive optical backhaul and a wireless mesh, combining the advantages of both optical and wireless technologies – the high capacity of optical fibers and the flexibility of wireless mesh. Taking into consideration the hybrid network architecture, an integrated routing algorithm is developed to achieve load balancing and improved network performance. Finally, this talk concludes with a discussion of research issues in future optical and wireless access networks.

Short Biography of the Speaker: Dr. Leonid G. Kazovsky is a Professor in the Department of Electrical Engineering at Stanford University. He founded Photonics and Networking Research Laboratory (PNRL) at Stanford University in 1990 and has been leading the PNRL since then. Prior to joining Stanford, Prof. Kazovsky was with Bellcore (now Telcordia) doing research on WDM, high-speed and coherent optical fiber communication systems. While on Bellcore assignments or Stanford sabbaticals, Prof. Kazovsky worked at the Heinrich Hertz

Institute, Berlin, Germany; Hewlett-Packard Research Laboratories, Bristol, England; Scuola Superiore St. Anna, Pisa, Italy; and Technical University of Eindhoven, the Netherlands. Through research contracts, consulting engagements, and other arrangements, Prof. Kazovsky worked with many industrial companies and U.S. Government agencies including Sprint, DEC, GTE, AT&T, IVP, Lucent, Hitachi, KDD, Furukawa, Fujitsu, Optivision, and Perimeter on the industrial side; and NSF, DARPA, Air Force, Navy, Army, and BMDO on the government side. He also helped to launch several startup companies in the Silicon Valley. He was the author or coauthor of two books, 190 journal technical papers, and 260 conference papers. Prof. Kazovsky serves or served on Editorial Boards of leading journals (IEEE Transactions on Communications, IEEE Photonics Technology Letters, Wireless Networks) and on Program Committees of leading conferences (OFC, CLEO, LEOS, SPIE, and GLOBECOM). He also serves or served as a reviewer for various IEEE and IEE Transactions, Proceedings, and Journals; funding agencies (NSF, OFC, ERC, NRC, etc.) and publishers (Wiley, MacMillan, etc.).

Plenary Lecture I
Discovery of Faults in Electrical Machines Using Data Mining Tools

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Federal University of Rio Grande do Norte,
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Abstract: Data mining is predicted to be one of ten emerging technologies that will change the world. According to the Gartner Group, "Data mining is the process of discovering meaningful new correlations, patterns and trends by sifting through large amounts of data stored in repositories, using pattern recognition technologies as well as statistical and mathematical techniques." With the rapid development of devices and computer technology, more and more on line systems have been installed to monitor the running conditions of machines groups, which resulted in the massive quantities of accumulative data. Now, many large-scale databases and data warehouses have come into being, some even arrived at the level of TB. And many researchers are faced with the urgent problem, as how make full use of such data, and whether it is feasible to extract valuable knowledge and condition monitoring. Maintenance costs represent a significant percent of industrial products' cost. The induction motor (IM) is the most commonly used type of ac motor. Examples are found in pumps, refrigerator compressors and so on. IMs are vulnerable problems as temperature, undesirable vibrations, unbalance of stator currents and broken bars, usually detected when the equipment is already broken, and sometimes, with irreversible damages. Data mining is a powerful technology with great potential to help researchers in faulty discovering. With the development of artificial intelligence and database technology, some machine learning algorithms including case-based learning, decision trees, genetic algorithm and pattern recognition tools are available in application now. In addition, advanced microprocessor manufacturing technology makes it possible to support the large-scale data analysis and processing. In this plenary speaker, it is outlined the basic notions in this area, define some key ideas and problems, and motivate their importance. Different data mining tools are explained as well some applications in real world problems.

Plenary Lecture II
3D Level Set Anysotropic Etching Profile Evolution Simulations

Professor Branislav Radjenovic
Vinca Institute of Nuclear Sciences
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E-mail: bradjeno@vin.bg.ac.yu

Abstract: Level set method, introduced by Osher and Sethian , is a highly robust and accurate computational technique for tracking of moving interfaces in etching, deposition and photolithography processes. It originates from the idea to view the moving front as a particular level set of a higher dimensional function, so the topological merging and breaking, sharp gradients and cusps can form naturally, and the effects of curvature can be easily incorporated. The corresponding equations of motion for the propagating surfaces, which resemble Hamilton-Jacobi equations with parabolic right-hand sides, can be solved using methods for solving hyperbolic conservation laws, ensuring in that the way correct entropy-satisfying solution . In this lecture we describe an application of the sparse field method for solving level set equations in 3D plasma etching simulations. Also, some examples of the profile evolution during anisotropic wet etching of silicon with potassium hydroxide (KOH) etchant are presented.

Plenary Lecture III

From Micro to Nano: The development of nanoelectronics and its trend

Professor Lili He
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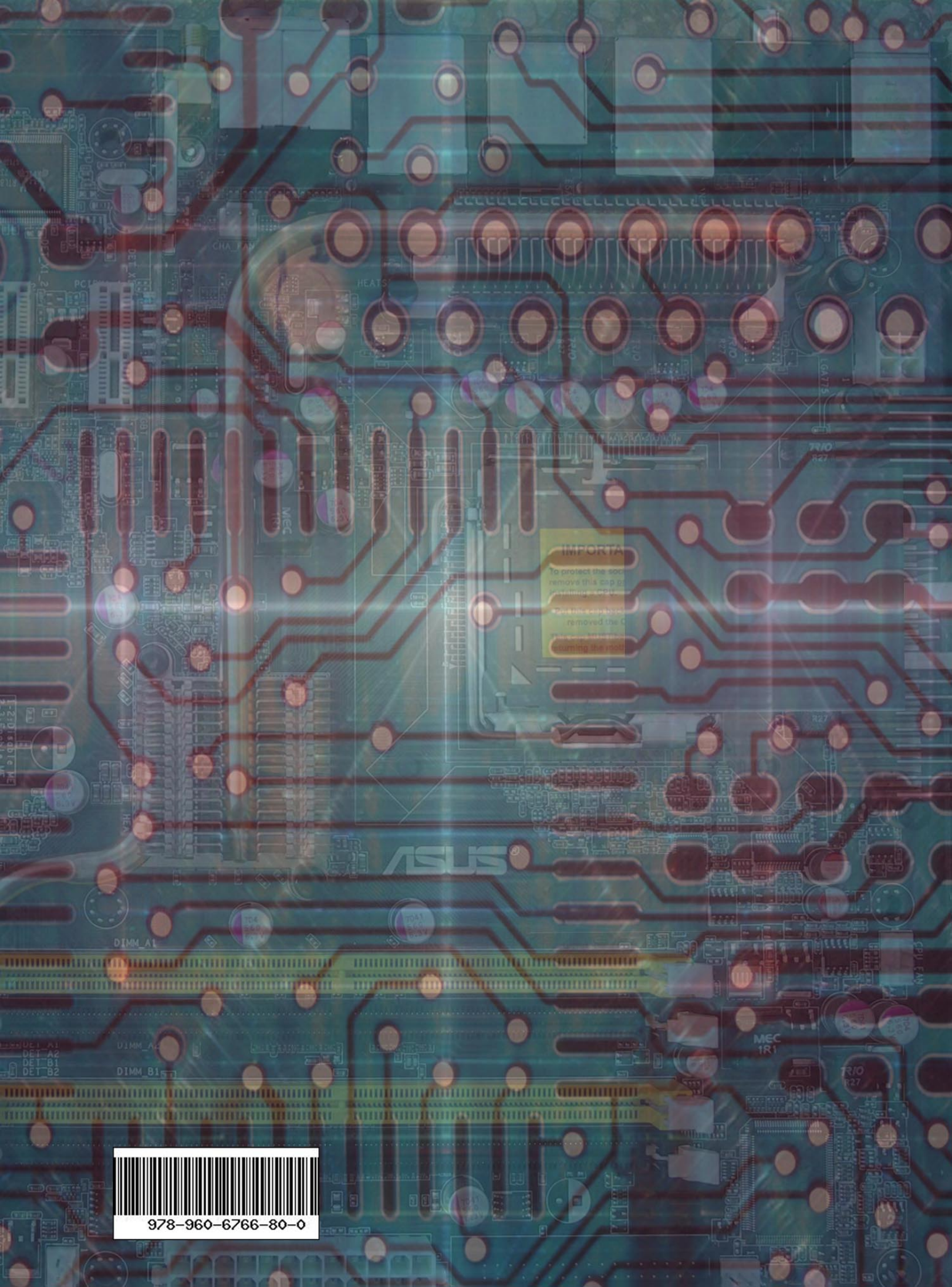
Abstract: Nanoelectronics is becoming a very important research area in past decades. Certain progresses has made in the practical application more recently which shows an attractive future of wider application. This talk will present a summary review of current development of nanoelectronics. In particular, Monte Carlo simulation of quantum transport in nano-scale transistor, as one of the important research areas of nanoelectronics, will be discussed. Numerical simulations are used to predict the charge transport through a ballistic nano-transistor. Two carrier transport models are primarily used here; the numerical simulation of the ballistic Boltzmann equation and the Non-equilibrium Green's function formalism for quantum transport. The aim of this work is to develop an accurate Monte Carlo based quantum transport simulator that provides a physically rigorous treatment of charge transport and phase breaking inelastic scattering in nano-scaled devices. Further we highlight the role played by high dielectric stacks in such nano-MOSFETs and the dramatic lowering of electron mobility in the channel. In second part of this talk, certain experimental data in the synthesis and characterization of indium selenide (In_2Se_3) nanowires (NWs), and the fabrication of prototype memory devices using these NWs, will be presented. As most nanoelectronics device is still in its infancy, it is very hard to be clearly predicted which aspects of nanoelectronics currently under research will lead to mature field and eventually to practical applications, and thus impact our daily life as microelectronics has done. This talk will present some most recent experimental data in nanoelectronic device, and computer simulation results in nanoscale device, and eventually an overview of recent path from micro to nano electronics.

Author Index



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