Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Proceeding of
The International Workshop on the Development Trend in Microelectronic Devices and Technology
(IWDMDT 2013)

University of Science, VNU HCM & SHTP Lab, Vietnam
April 25th, 2013

Organizers:

Sponsors:

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

About 1st ICEBA

It is the IWDMDT2013 that was held on Building I, VNUHCM- University of Science, Ho Chi Minh city, Vietnam in April 25, 2013

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

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LIST OF OPENING SPEECH

1.Opening address by the host: President, University of Science,VNU.HCM

2. Speech by the President, Department of Science &Technology, HCMC

3. Speech by the President, Saigon Hi-Tech Park, HCMC

4. Speech by the main sponsor, President of UVP Co. Ltd.

MOU SIGNING CEREMONY

between
University of Science,VNU.HCM
and
Saigon Hi- Tech Park

KEYNOTE SPEAK

Conference Hall, Building I

08:40 - 09:00	Keynote 1: Dr. Dinh Van Anh (University of Saskatchewan, Canada) Title: *Development trend in microelectronics research, a case study in Canada*
09:05 - 09:25	Keynote 2: Dr. Iftikhar A. Gul (Semico, USA and SHTP Labs) Title: *Semiconductor technologies and markets*
09:30 - 09:50	Keynote 3: Dr. Nguyen Duc Thai (Savvi, Biotech Vietnam Enterprise) Title: *Biosensors: Exploration for Applications in Vietnam*

Keynote 1:

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam
Title: **Development trend in microelectronics research, a case study in Canada**

Author(s): Dinh Van Anh

Institution(s): University of Saskatchewan, Canada

Speaker: Dinh Van Anh

Academic title: Ph.D

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Abstract:

A quick review of CMOS device and the process technology trend which govern the operation of the transistors. Reducing the length of the transistor to 7 or 5 nm will reach many limitations and change device characteristics. These create a road block and new technologies must be sought to replace CMOS. In the next 10 years, the custom functionality driven technology is the driving force of R&D. Canada has recognized the trend and has developed a national system in order to help universities and industries to work together to reduce research cost and shorten the technology production ramp curve. Canadian Microsystems, a non-profit organization funded by the government and industries, provides needed tools for researchers in the Canadian universities to fabricate devices and systems and to train HQP for high tech industries.

Keynote 2:

Title: **Semiconductor technologies and markets**

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Author(s): Iftikhar A. Gul

Institution(s): SHTP LABS

Speaker: Iftikhar A. Gul

Academic title:Ph.D

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Abstract:

Semicondcutor industry is a multi billion dollar industry critically linked to wide range of products and services. The industry itself is very diverse and products and technologies associated with it cover very large fields of dependent or supporting technologies such as computers, cell phones, industrial automation and entertainment elctronics etc. Of all the product categories under this technology, power semicondcutors are critical and provide the best opportunities for production and development in Vietnam. Power semicounductors alone comprise $26 billion dollars in sales world wide and consist of Diodes, Mosfets, IGBTs and other related products. We will discuss the complexities, opportunities and uses of these technologies and their development potential in Vietnam.

Keynote 3:

Title: **Biosensors: Exploration for Applications in Vietnam**

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Author(s): Nguyen Duc Thai

Institution(s): SAVVi, BIOTECH-VN ENTERPRISE

Speaker: Nguyen Duc Thai

Academic title: Director

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Abstract:

There appear to be many important applications for biosensors in Vietnam including medical diagnosis and environmental control. A biosensor has the following features and properties – highly specific for analyte; linear response, tiny and biocompatible; easy to use & durable/repeated use and cost is lower than that of conventional tests. We examine their construction and applications for medical diagnostics, agriculture, food industry, environment monitoring, toxicology tests etc.

Nevertheless, biosensors have not been popular and successful due to the fact that they require multidiscipline approach. We present recent achievements in biosensor technologies, their applications and future trends; we discuss the R&D approach that Vietnam might consider to participate in the biosensor development for future applications.

ORAL PRESENTATION

	Oral Parallel Sessions

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

	Session 1a: **Chair: Dr. Dinh Van Anh (UoS, Canada)** Room: Conference Hall, Building I	**Session 2a:** **Chair: Dr. Hoang Trang (HCMUT,VN)** Room: F102, Building F
10:20 - 10:35	Oral 1.1: Dr. Lam Quang Vinh (HCMUS) Title: *Synthesis Of High Quality CdSe Quantum Dots For Application In Biosensor*	Oral 2.1: Dr. Le Vu Tuan Hung (HCMUS) Title: *Characterization of thin film n-ZnO:In/p-Si heterojuntion and p-ZnO:(In, N)/n-Si heterojunction prepared by dc magnetron sputtering*
10:35 - 10:50	Oral 1.2: Ha Hoang Huy (Saigon Track Corp) Title: *Intelligent Transportation System – A potential market for Vietnamese IC Industry*	Oral 2.2: Nguyen Chi Nhan, MSc (HCMUS) Title: *Design of On-Chip Antenna for UWB Communications Systems*
10:50 - 11:05	Oral 1.3: Berenice Boulay (Central School of Electronic Paris, France) Title: *FPGA Design: Implementation of a game on an FPGA Board*	Oral 2.3: Nguyen Huy Hoang (ULVAC, Japan) Title: *A scope of Technique and Market features on Rare Earth for Vietnam*
	Session 1b: **Chair: Dr. Iftikhar A. Gul (Semico, USA)**	**Session 2b**: **Chair: Dr. Lam Quang Vinh (HCMUS,VN)**
11:05 - 11:20	Oral 1.4: Dr. Bui Trong Tu (HCMUS,VN) Title: *VLSI Research and Education at FETEL*	Oral 2.4: Dr. Hoang Trang (HCMUT,VN) Title: *Reducing Latency In Advanced Router Architecture of NetWork-On-Chip*
11:20 - 11:35	Oral 1.5: Prof. Nguyen Van Hieu (HCMUS) Title: *The study of structural MWQs and fabrication process for UVLEDs*	Oral 2.5: Dr. Phan Bach Thang (HCMUS,VN) Title: *Memristor the missing fourth basic circuit element*
11:35 - 11:50	Oral 1.6: Bui Quoc Anh, MSc (SHTPlabs) Title: *Develop an Elisa kit to detect melamine residues in milk products*	Oral 2.6: Dr. Ho Thanh Huy (OPU, Japan) Title: *Superconductor for devices and single photon detector*

Oral 1.1:

Title: **Synthesis of high quality CdSe quantum dots for application in biosensor**

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Author(s): Vo Thi Ngoc Thuy, Nguyen Thi Ha Trang, Vu Duc Lan, Lam Quang Vinh

Institution(s): University of Natural Sciences, *VNU-HCM*

Speaker: Lam Quang Vinh

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Abstract:

Colloidal semiconductor nanomaterial quantum dots (QDs) have attracted much attention due to their unique advantages, such as small size, nanoscale controllability, strong absorption and fluorescence, narrow FWHM of photoluminescence, sustainable emission spectrum.. One of the most common methods for fabrication is to use TOP (trioctyl phosphine) or TOPO (trioctylphosphine oxide) at high temperature. The final product is insoluble in water and is vulnerable to the remaining toxic solvents that have limitation for biological application. To enhance solubility, ligand exchange can be performed on the nanocrystal surfaces with hydrophobic ligands, which do not alter the properties. Besides, covering shells on the surface of core QDs can further enhance the size uniformity, high and stable quantum yields of QDs. The aim of this study is to develop an aqueous route to synthesis of high quality CdSe and CdSe/ZnS core shell quantum dots (QDs) at low temperature for application in biosensor. This low temperature method for shell growth are readily amenable to scale-up and can provide a route for economical and energy- saving production of quantum dots.

Key words: Cadmium Selenide (CdSe), CdSe/ZnS, fluorescence, low temperature, biosensor.

Oral 1.2:

Title: **Intelligent Transportation System – A potential market for Vietnamese IC Industry**

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Author(s): Ha Hoang Huy

Institution(s): SaigonTrack JSC

Speaker: Ha Hoang Huy

Academic title: Master of E-Management

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Abstract:

Having a modern and safe transportation system is always a strategic goal of every country, including developed and developing ones. Viet Nam is a developing country with a population of 90 billion (approximately), having 1,5 billion registered cars and 35 billion registered motobikes. Today, Viet Nam is facing 2 big problems in transportation: road accidents and traffic congestion. In recent years, besides of trying to extend the transportation network, the government also encourages scientists and bussinesses to participate in building an Intelligent Transportation System which is fit to the fact of Viet Nam's situation in order to improve the quality of national transportation sytem. ITS is an integrated application system which is consist of many electronic, telecomunication and information tecnology products. Main components of ITS: (1) traffic data collection; (2) storage of traffic and GIS data; (3) data analysis and computation, traffic prediction, navigation algorithms, …; (4) control of traffic light and traffic guiding board; (5) providing traffic information service to citizens.This is a big potential market for Viet Nam IC industry!

Oral 1.3:

Title: **FPGA Design: Implementation of a game on an FPGA Board**.

Author(s): Bérénice BOULAY

Institution(s): ECE Paris

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Speaker: Bérénice BOULAY

Academic title: Master student

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Abstract:

I had to implement a game on an FPGA Electronic Board: the Spartan 3. E Board and I had to make this game been displayed on a screen and played with a keyboard. I had to study the functioning of the VGA system and to know the displaying properties of a computer screen (the screen area of 350x400 pixels). I wrote the VHDL code for the display of the Palette. The Palette is 100 pixels wide and 25 pixels high.

Oral 1.4:

Title: **VLSI Research and Education at FETEL**

Author(s): Trong-Tu BUI and Huu-Thuan HUYNH

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Institution(s): Faculty of Electronics and Telecommunications, University of Science, VNU-HCM

Speaker: Trong-Tu BUI

Academic title: Dr, lecturer

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Abstract:

In this presentation, we would like to introduce VLSI design activities at the Faculty of Electronics and Telecommunications (FETEL), HCMUS; they include both VLSI design courses and VLSI research. Difficulties running the cirriculums at the FETEL and our solutions will be shown in the talk. Collaborations and achievements on VLSI design at FETEL will be presented as well.

Oral 1.5:

Title: **The study of structural MWQs and fabrication process for UVLEDs**.

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Author(s): Nguyen Van Hieu, Vu The Dang and Nguyen Huu Trung

Institution(s): University of Science, VNU.HCM

Speaker: Nguyen Van Hieu

Academic title: Assc. Prof. Dr

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Abstract:

AlGaN-based deep UV light emitting diodes have been desired as the new generation high efficient light sources for various environmental applications. The high temperature growth was required for high quality of AlN layers on sapphire substrates. The simulation of barrier-height and well-width dependence of wavelength from AlGaN-based quantum well structures for above 312nm light emitting device applications recently have studied. The quantum well (MQW) sample with 3 layers consisting of 1.5nm-$Al_{0.20}Ga_{0.80}N$ wells/5nm-$Al_yGa_{1-y}N$ barriers and the last barrier of 3nm-$Al_yGa_{1-y}N$ showed the largest emission intensity in this structure. In this work, we report the study of structural MWQs of UVLED depend on wavelenght. The fabrication process for UVLED also propose for MOU group in Japan and Semiconductor Lab in Saigon Hi-Tech Park.

Oral 1.6:

Title: **Develop an elisa kit to detect melamine residues in milk products**

Author(s): Quoc Anh Bui, Duc Thai Nguyen, Thanh Thao Le, Van Giat Le, Thanh Sinh Do

Institution(s): Biotechnology department, R&D Centre, Saigon Hi-Tech Park

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam
Speaker: Quoc Anh Bui

Email: quocanhchem@yahoo.com Handphone: 0919517037

Abstract:

The adulteration of melamine into food is banned but its misuse have been widely reported in milk products and animal feed. The development of a rapid screening immunoassay for monitoring this substances is an urgent requirement. In this research, a hapten of melamine was successfully synthesized by introducing three carbon chain length spacer arm via a reaction between 6-aminocaproic acid and 2-chloro-4,6-diamino-1,3,5-triazine(CAAT). The molecular structure of this hapten was indentified by H1 nuclear magnetic resornance spectrometry. An immunogen was prepared by coupling this hapten to Keyhole limpet hemocyanin (KLH). An enzyme conjugated was prepared by coupling synthesized hapten to Horse raddish peroxidase (HRP). A direct competive ELISA (cELISA) was developed to evaluate assay performance. The results showed that high titer polyclonal antibodies were obtained, and the performance of this cELISA kit showed good specification: IC_{50} of 160 ng mL^{-1}, a LOD of 3.0 ng mL^{-1}, and LOQ of 10ng mL^{-1}. Regarding selectivity performance, no obvious cross-reactivity to common compound was found. This data show that this ELISA kit met the requirement of melamine maximum residues level (1000 ng mL-1 in milk products, 2500 ng mL in animal feed), and could be use in an immunoassay for the rapid and sensitive detection of this banned chemical.

The melamine ELISA kit

Oral 2.1:

Title: **Characterization of thin film n-ZnO:In/p-Si heterojuntion and p-ZnO:(In, N)/n-Si heterojunction prepared by dc magnetron sputtering**

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Author(s): Dao Anh Tuan, Phan Thi Kieu Loan, Le Vu Tuan Hung

Institution(s): The University of Science - HCMC

Speaker: Le Vu Tuan Hung

E-mail: lthung@phys.hcmus.edu.vn Handphone:

Abstract:

In this study, In doped n - type ZnO thin film (ZnO:In or IZO) were deposited on p-Si (100) wafer to fabricate n- ZnO:In/p-Si hetero-junctions, and In-N co-doped p - type ZnO thin film (ZnO:(In, N)) were deposited on n-Si (100) wafer to fabricate p-ZnO:(In, N)/n-Si heterojunctions. Both types of thin films were fabricated by DC magnetron sputtering from the ceramic target ZnO:In. with 2% In doping concentration, the films proved the best electrical and optical properties.

The micro-structural, optical and electrical properties of the n-type and p-type semiconductor thin films were characterized by XRD pattern, RBS method, UV–vis; four-point probe and Hall effect measurement, respectively. Typical rectifying behaviors of diode were observed by the current–voltage (I–V) measurement. It shows fairly good rectifying behavior. The ideality factor and the saturation current of diode is n=11.5, I_s=1.5108.10^{-7} (A) for n-ZnO:In/p-Si hetero-jucntion; n=10.14, I=3.2689.10^{-5} (A) for p-ZnO:(In, N)/n-Si, respectively. Indicating that formation of a diode between n-type thin film and p-Si, as well as between p-type thin film and n-Si.

Oral 2.2:

Title: **Design of On-Chip Antenna for UWB Communications Systems**

Author(s): Nguyen Chi Nhan, Muhammad Raashid Khan, Duong Hoai Nghia, Anh Dinh

Institution(s): Hochiminh National University, University of Science

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam
Speaker: Nguyen Chi Nhan

E-mail: ncnhan@hcmus.edu.vn Handphone:

Abstract:

This paper presents the design and performance of an on-chip antenna for UWB communications systems. The antenna is a miniaturized monopole planar antenna that designed to radiate directly from the silicon die with compact dimensions of (2.6x1.3x0.7)mm^3. The antenna is designed for co-integration with CMOS impulse radio ultra wideband (IR-UWB) pulse generator (6-10GHz) which is designed using 130nm CMOS technology. The designed antenna supports communication between 8.4-10.4GHz with $|S_{11}|$<-10dB and gain of -14 dB. The results have proved the viability of planar antennas on silicon and can lead to the fabrication of highly efficient RF circuits.

Oral 2.3:

Title: **A scope of technique and market features on rare earth for Vietnam**

Author(s): Nguyen Huy Hoang

Institution(s): Chief of Ulvac Vietnam Representative Office

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam
Speaker: Nguyen Huy Hoang

E-mail: Handphone:

Abstract:

It is said that more than 90% amount of rare earth in the world is being exported from China. That means China is the country that controlling the price of Rare-Earth market. Recently, many country include Japan, USA, EU are trying to seek for other supplier outside China to reduce the risk from China on rare earth market.

Vietnam is one of a country that has a quite big amount of rare earth mining. That's why Japan which covers more than half of the world's rare earth demand has launched many policies and action to cooperate with Vietnam on rare earth mining. Many rare earth companies from Japan had come to Vietnam to do the survey on rare earth in recent year, and it shows that Vietnam has a very big advantage on developing rare earth magnet industry. The reason is Vietnam has a huge amount of Nd (**Neodymium**) a very important element to produce Nd-Fe-B magnets. In other hand, Vietnam also has quite big amount of Dy (**Dysprosium**), another important element for improving the quality of Nd-Fe-B magnets.

With the opportunity comes from Japan's rare earth policy, it is said that Vietnam now has a big chance to develop an own rare earth industry especially on producing Nd-Fe-B magnets.

Oral 2.4:

Title: **Reducing Lattency In Advanced Router Architecture of NetWork-On-Chip**

Author(s): Hoang Trang, Pham Dang Lam

Institution(s): Ho Chi Minh City University of Technology

Speaker: Hoang Trang, Pham Dang Lam

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam
Academic title: lecturer

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Abstract:

The scaling of microchip has enabled the large multiprocessor system-on-chip (MPSoc) intergrating hundreds IP cores or systems. The most MPSoc challenges are due to synchronous frequency, infrastructure interconnect and handshack protocols, etc. And the Network-On-Chip (NoC) has been proposed as replacing traditional bus architectures to solve these complexity issues. Many topologies are introduced such as Torus, Mesh 2D, Concentrate Mesh, Flattened Butterfly or Multipdop Express Channel (MESC). In corresponding topology, the interconnect network and router microarchitecture play as central roles in performance of NoC. The packet-switched on-chip interconnect network is a promising communication solution for multi-core architectures in large data. The state-of-the-art packet-switched network relies on complex routers which increase the latency of router. This router latency is also the main problem affecting the performance of network on-chip (NoC). In this paper, we propose the NoC with advance router architecture and new protocol (REQ/ANS) to tackle the router latency. Our experiment results followd the ASIC design flow in 65 nm technology and on FPGA for confirm the better performance compared with the base router architerture in Mesh 2D topoloty.

Keywords: Multiprocessor system-on-chip (MPSoc) Network on-chip (NoC), packet-switched, router latency, ASIC design flow.

Oral 2.5:

Title: **Memristor - The missing fourth basic circuit element**

Author(s): Kim Ngoc Pham, Trung Do Nguyen, Thi Bang Tam Dao, Thi Kieu Hanh Ta, Cao Vinh Tran, Van Hieu Le and Bach Thang Phan

Institution(s): Faculty of Materials Science and Laboratory of Advanced Materials, University of Science, VNU-HCM

Speaker: Bach Thang Phan

Academic title: PhD

E-mail: pbthang@hcmus.edu.vn Handphone: 01217907700

Abstract:

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

The memristor is hailed as the missing fourth basic circuit element, and while there are skeptics, the research being done on the memristor is gaining momentum. The device has two terminals and units of resistance. The property that makes the device so unique is the fact that the resistance of the device at any point in time is a function of the current i(t), that has traveled through the device in the past. Another interesting property is revealed once the device is isolated from any potential difference. The resistance value before isolation will be remembered meaning the memristor is non-volatile. The advantages such as low power consumption, high speed operation, non read out disturbance, simple structure and the high density integration potential made the memristor or resistive random access memory (RRAM) one of the most promising candidates for the next generation non volatile memory. In this report, we will present our results on resistive switching of Cr-doped $SrTiO_3$, ZnO and TiO_2 thin films [1-3]. The obtained results are the first stage in the fabricating project of the first real memristor device in HoChiMinh city.

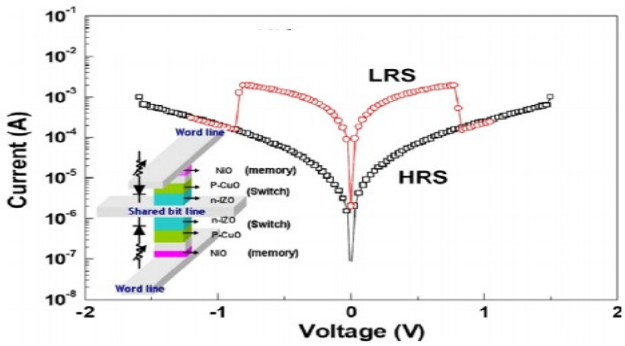

Figure: 2-stack 1D-1R cross-point structure with oxide diodes as switch elements

Oral 2.6:

Title: **Superconductor for devices and single photon detector**

Author(s): Ho Thanh Huy[1,2],Nguyen Van Hieu[1], Ikutaro Yagi[2], Naohito Yoshioka[2], Takekazu Ishida[2]

Institution(s): [1]Department of Physics and Electronics, Faculty of Physics and Engineering Physics, University of Science, Vietnam National University HCMC, Vietnam.

[2]Department of Physics and Electronics, Graduate School of Engineering, Osaka Prefecture University, Japan

Speaker: Ho Thanh Huy

Abstract:

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

The remarkable phenomenon of superconductivity was discovered a century ago by Onnes [1]. This breakthrough opened various potential applications in real world. In the recent studies [2], we have developed a new type of neutron detector based on high-quality ^{10}B-enriched MgB_2 thin film. We are successful to demonstrate that the signal contour reveals the shape of the MgB_2 meander line. The technique developed here would be useful to test the response of MgB_2 arrays. It is also useful to investigate the spatial dependence of the signal amplitude across the strip line. Instead of neutron experiments, the pulsed laser irradiation system provides the efficient means of examining the fabricated detectors without going to the nuclear facilities.

We also present our proposal for developing a new type of single photon detector based on a niobium nitride nanowire, This type of device, known as the superconducting single-photon detector (SSPD) or superconducting nanowire single-photon detector (SNSPD), is single-photon sensitive at visible and infrared wavelengths, with recovery times and timing precision orders of magnitude faster than existing single-photon detectors based on superconducting materials.

POSTER PRESENTATION

09:50 - 10:20 Lobby of the Conference Hall	**-Poster session and Coffee break** (Code: P.xx). Chairs: Dr. Le Vu Tuan Hung, Dr. Huynh Huu Thuan, Dr. Iftikhar Gul Ahmed **-Exhibition technology and products:** ULVAC,UVP, Redsun VN, Saigon Track .

P.01:

Title: **Advanced technique of Flash-ADC/FPGA for nuclear-radiation detection system**

Author(s): Vo Hong Hai

Institution(s): Hochiminh National University, University of Science

Speaker: Vo Hong Hai

Academic title: PhD

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Abstract:

Nuclear-radiation detector and readout electronic for pulse processing and triggering are principle techniques in nuclear and particle physics experiments. In recent years the advanced

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radiation spectroscopic techniques have been developed to meet requirements in detecting the rare events of the experimental nuclear physics, one of which is readout electronic system using embedded-FPGA chip with Digital Pulse Processing (DPP) algorithm and computer LabVIEW interface. The technique aimed at employing some advantages such as better resolution in comparison with traditional analog chain, low cost and a compact design.

In this report, we will discuss the development of readout electronic using the fast analog-digital conversion of Flash Analog-Digital Converter (Flash-ADC) and the embedded Field-Programmable Gate Array (FPGA) technology. The readout electronic is applied for nuclear-radiation detectors which are deployed at Depart of Nuclear Physics-University of Science-Hochiminh. We develop for gamma-ray detectors and cosmic-ray detectors. This work is in the frame work of scientific collaboration for advanced radiation detection development between Department of Nuclear Physics – University of Science-Hochiminh and Nomachi's group – Research Center of Nuclear Physics (RCNP), Osaka University, Japan.

P.02:

Title: **Using a home-made ultra-short pulse I-V measurement system for characterizing charge-trapping behavior in MOS devices**

Author(s): Tran Quang Nguyen[1], Tran Minh Dao[2*], Tran Quang Trung[2]

Institution(s):

[1]Department of Math and Physics, University of Information Technology, Ho Chi Minh City, Vietnam

[2]Department of Solid State Physics, Faculty of Physics, Science University of Ho Chi Minh City, Ho Chi Minh City, Vietnam

Speaker: Tran Quang Nguyen

E-mail: tmdao5@gmail.com Phone: 0936194807

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Abstract:

We have observed charge trapping and de-trapping phenomena at Si-SiO_2 interface in MOSFET K241-Y8A by applying a single, well configured ultra-short gate pulse. The 140µs square pulses with amplitude varying from 0 V to 3.0 V were supplied to gate terminal to measure the I_{DS} –V_{DS}, I_{DS}-V_G characterization during rise time as well as fall time of the pulse. The observed hysteresis of drive current between fall edge and rise edge in I_{DS}-V_G curves establishes a presence of charging and discharging of the traps during fall time and rise time of the pulse, respectively. Drain current in I_{DS} –V_{DS} pulse measurement moreover is significantly higher than under DC condition, since there is much less charge trapping effect with very short pulse width. The experimental results from ultra-short pulse I-V measurements and a theoretical analysis were combined together in quantifying the trapped charge at Si-SiO_2 interface.

P.03:

Title: **Make sterilization device and study the effective of sterilize E.Coli and Coliform bacteria with UV sources**

Author(s): Vu The Dang[1], Thuan Khoa Quoc Toan[2] and Nguyen Van Hieu[3]

Institution(s): SHTP labs, HCMC of Technical Education, University of Science, HCMC

Speaker: Vu The Dang

Academic title: Meg.

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Abstract:

The study was carried out to design and build cabinets which was used to tests E.coli and Coliform bacteria in water samples after radiated by UV lamps, UVLEDs with 365nm wavelength and sunlights. This cabinet have 3 parts. The first part: radiate UV into water

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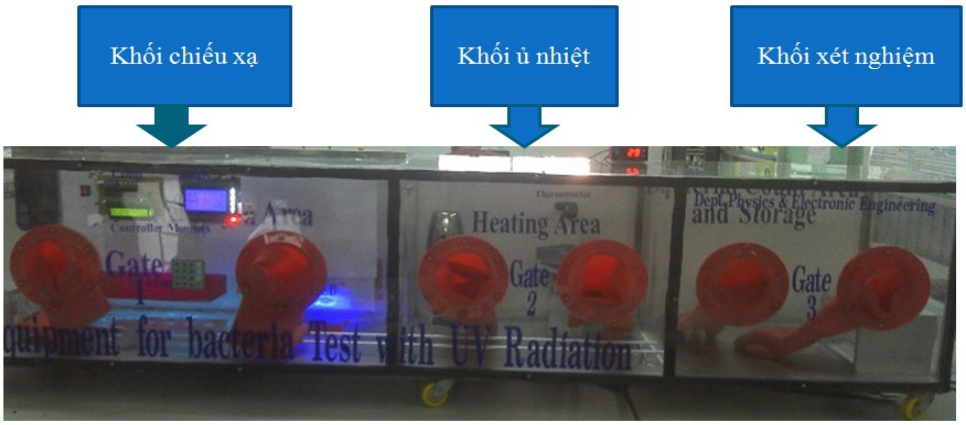
samples with UV lamp and UVLED sources. The second part: growth bacteria in the petrifilm 3M with standard environment conditions. The finnal part: with tools to count and compare number bacteria between non radiation UV samples and after radiation samples.

Method of pulse width modulation is used to control the emission intensity UVLEDs. 3M Petrifilm used for culture, determine the number of bacteria in the samples. The test results E.coli, coliform in water samples showed that the infection has been kill bacteria at different levels depending on the radiation time and the radiation intensity.



Keyword: UV, UVLED, PWM, bacteria, E.coli, coliform

P.04:

Title: **The structure and electrical properties of diode GaN for the new application in high temperature**

Author(s): Tran Le Thien Thuy [1,2,*], Nguyen Manh Hung[1], Nguyen Huu Trung[1]
Nguyen Viet Hung[3] and Nguyen Van Hieu [1,3]

Institution(s):

[1] Faculty of Physics and Engineering Physics, University of Science, VNU-HCM, Vietnam;

[2] Graduate School of Engineering, Tohoku University, Sendai, Japan;

[3] Laboratory for Semiconductors, Saigon Hi-Tech Park Lab, Hochiminh City, Vietnam;

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam
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Abstract:

Recently, GaN diodes are the new electrical devices which can be used to integrate in capacitance sensing circuits to form a capacitance-voltage converter. The measured level voltage indicates the expected operation of the capacitive pressure sensors. The advantage of the GaN diode offers wide band gap; non-intrinsic at much higher temperature or less demand on cooling, high breakdown field, good electron mobility and thermal conductivity as well as high mechanical and thermal stability which suitable for high temperature or high power applications.

In this paper, we studied about the structure and electrical properties for GaN diode by SEM, semiconductor analyzer for I-V curves. Moreover, for GaN diode, the energy band structure, doping concentration, carrier concentrations and I-V were also simulated by using SiLENSe software. The measurement data are in good agreement with simulation results. Finally, we clarified the fabricating simulation of GaN diode by the IntelliSuite software.

P.05:

Title: **Designing mask of electrodes for UVLEDs**

Author(s): Nguyen Huu Trung, Tran Thanh Truc and Nguyen Van Hieu

Institution(s): Faculty of Physics and Engineering Physics, Univ. of Science, VNU-HCM, Vietnam.

Speaker: Nguyen Huu Trung

Academic title: master student, assistant lecturer

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Abstract:

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Designing mask of electrodes for LED (Light Emitting Diode) or UV-LED (Ultra Violet Light Emitting Diode) is an important step in entire fabrication process. Electrodes must satisfy cretrias, such as small resistance, to avoid the power loss and large heat caused in periode of working. In the other hand, shape of electrodes also has a significant influence to the performance of light-emitting function, such as : the I-V, C-V-Tcharacteristics ... of LED/UVLED. For those reasons, goodelectrodes, satisfying all above criteria, play a very important role in improving performance of working as well as longevity of devices.Moreover, the mask will be used to determine the shape of the P-N layers of the LED/UVLED structure. Those show that the designing mask process needs to be properly invested, to be able to manufacture the products with high practical value, produce commercially valuable products. Therefore, the objectives of project will be finding the design rules electrode shape as best as possible, based on theoretical calculations and process simulations.

P.06:

Title: **A Feature Extraction Method Using Pulse-Coupled Neural Network**

Author(s):Trong-Thuc Hoang, Ngoc-Hung Nguyen, Xuan-Thuan Nguyen, and Trong-Tu Bui

Institution(s): The University of Science (VNU-HCMUS), Faculty of Electronics and Telecommunications (FETEL), DSP and Embedded System Laboratory (DESLab).

Speaker: Trong-Thuc Hoang

Academic title: Researcher

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Abstract:

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In this paper, we present two hardware architectures for an image feature vector extraction based on the Pulse-Coupled Neural Network (PCNN) algorithm. They are RAM-based model and pipelined model. Both models can generate a feature vector at the speed of more than 2000 vectors per seccond when using a clock frequency of 50 MHz and the input image size of 128x128 pixels. Based on these architectures, a demonstration recognition system including a camera, a feature vector generation, a search engine and a DVI controller has been built and tested successfully on FPGA chips in order to verify the operation of the algorithm and the architectures.

P.07:

Title: **Studying And Fabricating Tin Thin Films For Superior Fashion Industry**

Author(s): Nguyen The Vu, Dao Anh Tuan, Le Vu Tuan Hung

Institution(s): The University of Science (VNU-HCMUS)

Speaker: Nguyen The Vu

E-mail:

Abstract:

In this report, TiN thin films have been fabricated by DC magnetron sputtering on glass and stainless steel substrates. The effects on optical properties, especially the color of TiN thin

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

films, and structure of thin films such as sputtering power, substrate temperature, thickness of thin films, target - substrate distance were examined. The best condition to prepare thin film: substrate temperature of 200^0C, target - substrate distance of 5cm, sputtering power of 160W, sputtering pressure of 3mTorr, nitrogen components in the mixture 20%.

The Optical properties of the film were investigated by UV− VIS reflectance spectroscopy, the structures of the thin film were determined by X− ray diffraction (XRD), thickness of the thin films was measured by stylus method. The results showed that TiN thin films fabricated successfully with golden color for fashion industry, they prove good adhesion, high corrosion resistance with the environment.

P.08:

Title: **Logic Optimization methods used in synthesis flow for a deep submicron FM Decoder design**

Author(s): Nguyen Thi Thuy Loan, Thi Nguyen Duy Manh

Institution(s): The University of Science (VNU-HCMUS)

Speaker: Nguyen Thi Thuy Loan

E-mail:

Abstract:

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

The accurate modeling of the delay and area in an integrated circuit is essential to achieve design closure for a deep-submicron designs (90 nm and less than). Many optimization steps have a strong influence on the delay and area. As a result, the delay and area estimation on a non-optimized design can be obviously unnecessary; therefore, it leads the optimization is early incorrect in the flow. For example, considering logic duplication and restructuring of a path that appears critically before buffering and cell sizing has been performed, yet easily meets timing after these steps. The additional area penalty incorporated into the design, as a result of this unnecessary optimization step, is extremely difficult to eliminate. On the other hand, deferring such optimizations to a later stage (after placement and buffering) results in an inaccurate area and loading estimation during the placement. This interdependence of individual optimization steps mean that the remedial action typically requires an iterative approach which is extremely time consuming. Furthermore, such iterations do not guarantee any convergence because some optimizations are irreversible.

The following methods are used to accurately predict cell area and cell delay in an integrated circuit that has not yet been completely buffered and sized. These methods consist of two main parts: A continuous-size delay model for standard cells and a continuous adaptive buffering. This section focuses on the following methods of logic optimization that the Magma design system uses : Mapping, Logic restructuring, Area optimization, Cloning, Buffering, Pin swapping, Cell Sizing.

P.09:

Titile: **A density functional theory study of vanadium doped anatase TiO_2**

Authors: Phung Nguyen Thai Hang[1,2], Nguyen Huu Ke[2], Duong Ai Phuong[2] and Le Vu Tuan Hung[2]

Institutions: [1] Tay Nguyen University, [2] University of Science Ho Chi Minh City

Speaker: No (Poster)

Academic title: PhD student

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Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Abstract:

The geometric structure, band structure and density of states of pure and vanadium doped anatase TiO_2 (V-doped anatase TiO_2) were successfully simulated by the plane wave pseudopotential method based on density functional theory (DFT). The calculated results show that the lattice parameters a and c of V-doped anatase TiO_2 are larger than those of pure structure under the same calculated condition. Through the band structure and the density of states, the V-doped TiO_2 has new energy levels in the band-gap region.

P.10:

Title: **Performance Analysis of OFDM System based on Wavelet Packet Transform**

Author(s): Nguyen Thi Hong Thu, Ngo Duc Quyet, Hoang Duc Phu, Dang Le Khoa

Institution(s): Ho Chi Minh City University of Science

Speaker: Nguyen Thi Hong Thu

Academic title: Bachelor

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Abstract:

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

The OFDM systems which has been used in communications have been attained the goal of high-speed data transmission on limited bandwidth. However, there are some disadvantages in traditional OFDM systems, which use Fast Fourier Transform (FFT) such as: high PAPR and the waste of using Cyclic Prefix (CP) which don't carry useful data. To overcome these disadvantages, we use Wavelet Packet Transform (WPT) instead of Fast Fourier Transform in traditional OFDM system.Therefore, our research is going to demonstrate simulation of a typical WPT-OFDM system. In result part, we compare performance in WPT-OFDM and FFT-OFDM and other wavelet filter methods in Wavelet OFDM systems will be showed. Similarly, other modulation techniques used in WPT-OFDM system and their influences will also be mentioned.

P.11:

Title: **The study of doping concentration and components Al in the MQWs $Al_yGa_{1-y}N$ layer for LED 320nm**

Author(s): Huynh Hoang Trung[1] and Nguyen Van Hieu[2,3]

Institution(s):

[1]Faculty of Foundation Sciences, University of Technical Education HCMC, Vietnam;

[2] Faculty of Physics and Engineering Physics, University of Science, VNU-HCM, Vietnam.

[3] SHTP Labs, Saigon Hi-Tech Park, HCM, Vietnam.

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Speaker: Huynh Hoang Trung

Academic title: master, lecturer

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Abstract:

Solid-state light sources are expected to replace the traditional fluorecence and incandescent lamps from the viewpoint of energy saving. Furthermore, the radiation of UVLEDs are useful for application in the medical and biochemical field, purification equipment, sensing fields, and high density optical recording. Recently, N.V.Hieu *et al* reported on the lamp of LED with 365nm of ultraviolet wavelength for E. coli and Coli form bacteria sterilization in running water.

This work reported the simulation study of doping concentration of donor in n-$Al_yGa_{1-y}N$ layer and various doping concentration of acceptor in p-$Al_yGa_{1-y}N$ block layer dependence of wavelength from AlGaN-based quantum well structures for above 320nm light emitting device applications. The structure of UVLED with three multi-quantum wells (MQW) consisting of 5nm-i$Al_yGa_{1-y}N$ barrier/1.5nm-i$Al_{0.20}Ga_{0.80}N$ well/5nm- i$Al_yGa_{1-y}N$ barrier and last barrier of 2nm-$Al_yGa_{1-y}N$ showed the largest emission intensity in this structure.

The components of Aluminum material in the block of $Al_yGa_{1-y}N$ layer is test from 45% to 55% to predict the increasing of radiating wavelength over 320nm. The simulating data were useful for the fabrication process UVLED structure of our MO group in Japan. The fabrication process of UVLED in MOCVD are also propose in SHTP labs.

Keywords: UVLED, AlGaN, MQWs, wavelength

P.12:

Title: **Fabrication of ZnO based on n-ZnO: In/ p-Si and n-ZnO: In/ i-ZnO/ p-Si heterojunction by DC magnetron sputtering**.

Author(s): Phan Thi Kieu Loan, Dao Anh Tuan, Do Thi Nga, Le Vu Tuan Hung.

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Speaker:

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Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Abstract:

Heterojunction thin film diodes n-ZnO: In/ p-Si and n-ZnO: In/ i-ZnO/ p-Si were fabricated by DC magnetron sputtering from the ceramic target ZnO: In. The typical rectifying behaviors of the heterojunction were observed by current-voltage (I – V) measurement. The structure, optical properties of heterojunction were investigated by XRD, SEM, and UV-Vis.

We found that, the resistance of n-i-p heterojunctions of n-ZnO: In/ i-ZnO/ p-Si reach the optimal value at 250^0C on substrate. The I - V characteristic of heterojunction thin film with buffer layer i - ZnO is better than that of thin film without buffer layer. Furthermore, they shows the best crystalline structure. The ZnO based on n-i-p heterojunction with optium properties will be best choice material for light-emitting diodes in the near future.

Key words: heterojunction, n-i-p thin films, the I - V characteristic, typical rectifying behaviors.

P.13:

Title: **Performance of Radio-over-Fiber System Based on Orthogonal Wavelet Division Multiplexing**

Author(s): Truong Nguyen Hanh Nguyen, Nguyen Thi Bich Thuy, Nguyen Vu Linh, Dang Le Khoa

Institution(s): Ho Chi Minh University of Science

Speaker: Truong Nguyen Hanh Nguyen

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Abstract:

Radio-over-Fiber (RoF) is a technology by which information bearing signals using RF carries are delivered by means of optical components and techniques. Better coverage and increased capacity, centralized upgrading and adaptation, higher reliability and lower maintenance costs, support for future broadband applications, and economic access to mobile broadband are among the most important advantages of RoF. Most of the wireless data transmission standards propose Orthogonal Frequency Division Multiplexing (OFDM) as WiFi (IEEE 802.11), WiMAX (IEEE 802.16) or LTE (3 GPP rel. 8). Wavelet transform has been suggested to replace DFT in OFDM systems. While signals in DFT-OFDM systems overlap in the frequency domain only, DWT-OFDM signals overlap in the time domain as well, so there is no need for the CP as in the DFT-OFDM case. Hence, some savings in bandwidth can be achieved. Hereafter DFT-OFDM and DWT-OFDM are referred as OFDM and OWDM (Orthogonal Wavelet Division Multiplexing), respectively. This paper presents the performance analysis of Radio-over-Fiber System Based on DWT-OFDM.

P.14:

Title: **A Design Of Low-Cost Low-Power Muti-Access Full-Hd Upnp Av-Based Video Streaming System For Home Entertainment Applications**

Author(s): Thanh LE, Hong-Thang NGUYEN

Institution(s): Faculty of Electronics and Telecommunication, University of Science

Speaker: Hong-Thang NGUYEN

Academic title: Bachelor of Science

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Abstract:

In this paper, an UPnP (Universal Plug and Play)-based video streaming system for home entertainment applications is implemented. An ARM-based board running a distribution of Linux is used in the system as a streaming server for low cost, low power and high flexibility. With the help of an UPnP AV streaming server software installed on the server, our system has the ability to serve up to six client devices simultanously at Full-High Definition (HD) quality with minimal buffer time. In comparison with commercial products, our system proved a competitive performance but still remained low cost and low power consumption.

P.15:

Title: **Performance Analysis of Wavelet Packet OFDM System in Multipath Fading Channels**

Author(s): Dang Le Khoa, Nguyen Thi Bich Thuy, Truong Nguyen Hanh Nguyen, Nguyen Thi Hong Thu

Institution(s): Ho Chi Minh City University of Science

Speaker : Dang Le Khoa

Academic title: MSc

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Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Abstract—Orthogonal Frequency Division Multiplexing (OFDM) technique has been considered as a good modulation to combat inter-symbol interference (ISI) in the multipath fading channels by using cyclic prefix (CP). However this leads to spectral inefficiency. A very basic drawback of OFDM technique is large peak-to-average power ratio (PAPR) problem. The conventional OFDM technique is based on discrete Fourier transform. This paper presents the performance analysis of OFDM based on Wavelet packet transform. A reconstruction using Wavelet packet in OFDM transceiver counters the degrading effect of ISI without using CP and PAPR. The BER performance comparison between the conventional OFDM and Wavelet Packet Transform (WPT) respectively is analyzed. The analysis is done for various modulations, and simulated over multipath fading channels. Simulation results show that WPT- OFDM is better than FFT-OFDM modulation.

P.16:

Title: **An ASIC-Oriented Design of High Performance Decimation Filter for Oversampling A/D Converters**

Authors: Xuan-Vy LUU, Xuan-Thuan NGUYEN, Duc-Hung Le and Trong-Tu BUI

Institution(s): Ho Chi Minh City University of Science

Abstract:

In this paper, an ASIC-oriented design of high performance decimation filter is proposed. This filter is composed of one Cascaded Integrator Comb (CIC) and three Finite Impulse Response

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(FIR) filters, which is optimized on area, speed, and power consumption. To do that, two special design techniques are employed: a pipelined architecture for the CIC filters and a replacement of multiplications with addition, subtraction, and shifting operations by using Canonic Signed-Digit (CSD) encoding and Advanced Sub-expression Sharing (ASS) algorithm for the FIR filters. The architecture has been verified successfull y on a DE2-115 board of Altera and has been implemented as an ASIC in 90 nm CMOS technology by Synopsys tools. The filter can convert a 500-Mbps single-bit stream to 20-bit samples with the selected decimation factor of 128.

P.17:

Title: **Biosensor Using Nuclear Magnetic Resonance**

Author(s): Pham Ngoc Son

Institution(s): University of Technical Education, Ho Chi Minh City

Speaker: Pham Ngoc Son

Academic title: Poster

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Abstract:

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Nuclear Magnetic Resonance (NMR) is traditionally used in medicine and analytic chemistry. This poster presents a work in progress which utilizes the NMR phenomenon to develop a NMR-based biosensor. The sensor is to detect spores and bacteria which can be harmful to people, animal, and plants. A regular NMR spectroscopy is quite large, heavy, and expensive. This is due to the demand in a homogenous and high intensity magnetic field to cover all the specimen, i.e., requires a large and strong magnetic device. The new biosensor system is small to reduce cost and increase its portability. These two features are important to make the sensor affordable in a number of applications. Consequently, the major challenge of the work is to diminish the NMR biosensor dimension that shrinks the volume of the permanent magnet while maintaining the homogenous field. Subsequently, the quantity of the specimen must be substantial small to fit into the magnetic field. The requirements for a small size NMR sensor poses a difficult task in the detection of an extremely small signal. Devices and systems requirement for the sensor is very demanding adding more challenge to the work.

P.18:

Title: **A PCIe-based FFT Implementation for High-speed Spectrum Analysis**

Author(s): QM-Dang-DO† Xuan-Thuan NGUYEN† Hoang-Dat TRAN† Huu-Thuan HUYNH† and Cong-Kha PHAM‡

Institution(s): †Faculty of Electronics and Telecommunications, The University of Science of Ho Chi Minh City.

‡Faculty of Informatics and Engineering, The University of Electro-Communications.

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Speaker: QM-Dang-DO†

Academic title: Master student

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Abstract:

Peripheral Component Interconnect Express (PCIe) has been become the most important interface on new systems due to very high bandwidth data transfer. In this paper, we present a PCIe-based FPGA implementation for a reconfigurable 16/64/128-point Fast Fourier Transform (FFT) processor. A mixed-radix FFT algorithm together with a modified Single-path Delay Feedback (SDF) and unrolled COordinate Rotation DIgital Computer (CORDIC) structure are proposed to reduce hardware complexity and replace entirely multipliers, respectively. Furthermore, several hardware design techniques such as pipelining, resource sharing etc. are employed to improve the processor performance. The FFT processor is tested on PCIe Stratix IV Development Board with the execution time of 6.64 us for 2560 complex points at 410 MHz.

P.19:

Title: **Research on PCI Express System Architecture**

Author(s): Bui An Dong[1], Nguyen Thi Le Linh[2], Nguyen Huu Thong[2], Nguyen Chi Nhan[2]

Institution(s):

[1]Faculty of Electronics and Telecommunications University of Science , VNU-Hochiminh City, Vietnam

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Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam
Speaker: Nguyen Thi Le Linh

E-mail:

Abstract:

PCI Express (Peripheral Component Interconnect Express) is a high performance, general purpose I/O interconect defined for a wide variety of computing and comunication platforms. Key PCI attributes, such as its usage model, load-store architecture, and software interfaces, are maintaind, whereas its parallel bus implementation is replaced by highly scalable, fully serial interface. In this paper, we discuss the PCI Express system architecture and data transfer process. We exhibited a diagram of the PCI Express system architecture for the design of a PCI Express IP core.

Key words: PCI Express system architecture, PCI Express packet protocol

P.20:

Title: **Design and Simulation of Second Order Delta-sigma Modulation**

Author(s): Nguyen Chi Nhan and Tran Huu Thong

Institution(s): Faculty of Physics and Engineering Physics, University of Science , VNU-Hochiminh City, Vietnam.

Speaker: Tran Huu Thong

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Abstract:

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Delta-sigma modulation converts the analog voltage into a pulse frequency and is alternatively known as Pulse Density modulation or Pulse Frequency modulation. In general, frequency may vary smoothly in infinitesimal steps, as may voltage, and both may serve as an analog of an infinitesimally varying physical variable such as acoustic pressure, light intensity, etc. Because of Specification of our circuit with SNR near 120dB, the second order delta sigma modulation was used.

Key words: Delta-sigma modulation , ADC, SNR

P.21:

Title: **A Framework for Hardware-Software Co-design Embedded Noise Cancellation System**

Author(s): Cao-Quyen Tran, Minh-Triet Luu, Khac-Minh Ho, Duc-Phuc Nguyen, Trong-Tu Bui and Huu-Thuan Huynh

Institution(s): Faculty of Electronics and Telecommunications, University of Science – Ho Chi Minh City, Vietnam

Speaker: Cao-Quyen Tran

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam
Academic title: A Framework for Hardware-Software Co-design Embedded Noise Cancellation System

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Abstract:

Adaptive Noise Cancellation (ANC) systems can effectively suppress noise in non-stationary conditions. However, the drawback of ANC systems is that we need at least two microphones { one for in-put speech and one for reference noise. In this paper, we present the hardware-software co-design of Noise Cancellation (NC) based on Spec-tral Subtraction (SS) algorithm. By using SS method, noise is estimated during non-speech activities and then it is subtracted from speech in

speech activities. Experimental results have proved that high perfor-mance is obtained by using the proposed NC system. In addition, it can process the input speeches with the SNR ratio ranging from -1dB to +20dB.

P.22:

Title: **A Lowpower Design Of Integer Descrete Cosin Transform (Idct) Block For H.264**

Author(s): Bui An Dong, Tran Hoang Tuan, Tran T.Diem Thi

Institution(s): Faculty of Electronics and Telecommunications, University of Science – Ho Chi Minh City, Vietnam

Speaker: Bui An Dong

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Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Abstract:

This paper concentrates on a low-power integer forward DCT architecture for H.264/AVC codecs. 2-D DCT is divided into two 1-D DCT calculations that share memories. In this word, we can use only one 1-D DCT block to perform 2-D DCT transform. Thus, our design is less complex and lower power than conventional methods. The proposed DCT algorithm was verified by Matlab and VCS tool from Synsopsys. Then the design was synthesized by Design Compiler with 90nm CMOS technology. The DCT core requires 56 clock cycles to finish one 4x4 block. At the clock frequency of 100MHz, estimated power dissipation is 85µw of the DCT core area is about 23.450µm^2.

P.23:

Title: **Dental Intraoral System Supporting Tooth Segmentation**

Author(s): Truong Quang Vinh, Bui Minh Thanh, Nguyen Ngoc Tai

Institution(s): Ho Chi Minh City University of Technology (HCMUT)

Speaker: Truong Quang Vinh

Academic title: Dr.

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Abstract:

Venue: Conference Hall, Building I, 227 Nguyen Van Cu Street, District 5, HCMC, Vietnam

Nowadays, embedded systems with ARM microprocessor have become widely used in the medical systems due to the advantages of small size, low power, and high performance. Most of applications is based on image acquisition system which supports the functions of image capturing, displaying, and processing. These kind of systems have many applications in medical systems such as X-ray scanner, Computed tomography (CT) scanner, Magnetic resonance imaging (MRI), and dental imaging.

In this paper, we present an embedded dental imaging system. This device supports dentists for diagnosis by dental images, which is captured from a special dental camera. Besides, it can manage patient records and dentist's diagnosis note. By using embedded system, this device can run independent from computer. The hardware of this device is board Friendly ARM mini2440. Board use CPU S3C2440 has frequently from 400 MHz. Besides, it includes 7inch touch screen LCD and USB ports can connect to camera. The software is developed using QT and lib Open-CV, which operate Linux-OS. The embedded system supports not only camera control, dental image processing and storage but also patient management, diagnosis note which is helpful for dentists. Especially, the segmentation of teeth is important for examining and extracting teeth features from dental images. A teeth segmentation method based on active contour without edge algorithm has been proposed in this paper. Our system is portable, economic and ready to be applied at dental clinics. Moreover, this system can help dentists examine at patient's home and voyages, not only in clinics.

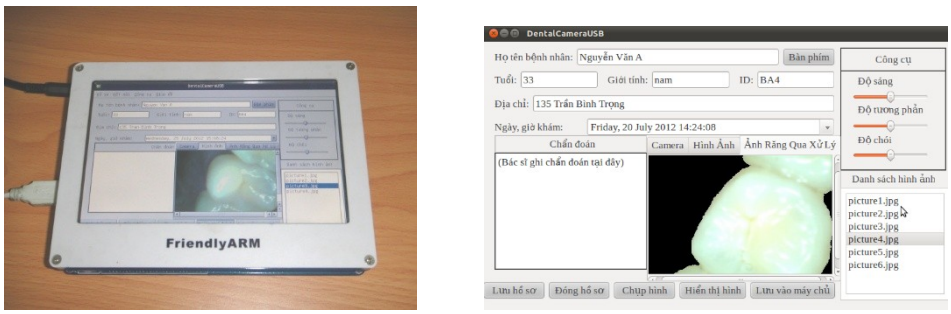

Figure 1. Demonstration of dental intraoral system on Micro2440

P.24:

Title: Denoising IP Core Using Contourlet Transform

Author(s): Truong Quang Vinh, Le Quoc Bao Tri, and Nguyen Ngoc Tai
Institution(s): Ho Chi Minh City University of Technology
Speaker: Trương Quang Vinh
Academic title: Dr.
E-mail: tqv2003@yahoo.com **Handphone:** 0913608088

Abstract:

Image enhancement in video is always a complex problem because the video noise is diverse as Gaussian noise, impulse noise, pepper noise…Denoising and improving image in the real-time is even more difficult because they require heavy computation and they are hardly implemented on the hardware for real-time processing.

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The traditional denoising methods are based on filters in the spatial domain as Mean filter, Gaussian, Median, etc. Modern noise filters usually use image transform tools such as FFT, DCT, or Wavelet to decompose image into coefficients which present both the spatial and frequency characteristics. However, the denoising problem always needs to be improved and enhanced to satisfy the requirements of output image quality.

This paper researches video denoising algorithms using contourlet transform which surpassed wavelet transform. Contourlet is a new emerging transformation method to decompose an image into subbands which are characterized as time, frequency, location, direction, and multi-resolution. Based on these characteristics, contourlet transform is effectively applicable for video and image desnoising. Moreover, we propose a hardware implementation to enhance processing time for denoising. Eventually, the video denoising design was packaged as an IP core with Avalon interface. The IP core is demonstrated in Altera Bitec development kit using Cyclone III FPGA.

(a) Before denoising (PSNR=9.57dB) (b) After denoising (PSNR=16.35)

Figure 1. Test result for the 15th frame of "Foreman" sequence

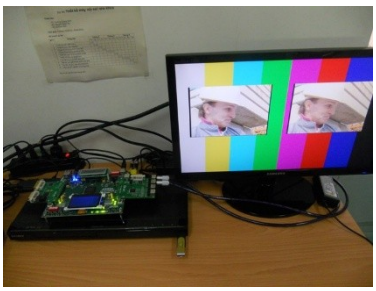

Figure 2. System demonstration for denoising IP Core using Bitec Cyclone III kit.

P.25:

Title: **Implementation of Back Propagation Neural Network In Viet Nam Speech Recognition**

Author(s): Pham Dang Lam, Hoang Trang

Institution(s): Ho Chi Minh City University of Technology

Speaker: Pham Dang Lam

Academic title: lecturer

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Abstract:

The speech recognition technologies have witnessed a stable over the last two decades. The powerful microprocessors help the software developers implement diversity algorithms to solve the speech issues easily on different Operating System (OS). However, the software solutions are not always the best choice for any system required the strick performances. So, the hardware solutions has been proposed to satisfy the speech, intergration, and economy issues. In this paper, we propose approach using the neural network with back propagation algorithm to train and recognize the VietNamese voice . The MFCC data format plays as the input data of training and recognition processs of neural network. Many technologies such as approximation, floating-point calculation, activated functions or neural topologies are also introduced to enhance the measurement uncertainty issue arised by disadvantaged hardware implementation. Our experiment results are done on CMOS 65 nm technology and on FPGA to confirm the performance compared with the corresponding software.

Keywords: Speech, recognition, ASIC design flow, FPGA, CMOS, MFCC, back propagation.

P.26:

Title: **Estimate the residual resistivity ratio (RRR) for $RRhIn_5$ compounds by Igro Pro.**

Author(s): Tran Quoc Thanh, Nguyen Le Hong Nhan, Le Van Men and Nguyen Van Hieu

Institution(s): Dept. of Physics and Electronic Engineering, University of Science, 227 Nguyen Van Cu Str., District 5, HCMC

Speaker: Le Van Men

Academic title: Master student

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Abstract:

The resistivity of rare earth single crystal compounds consists four components as the original resistivity (ρ_0, at 0K) which is not depend on temperature, resistivity of electron-electron interaction ($\rho_{e\text{-}e}$), resistivity of electron-phonon interaction ($\rho_{e\text{-}ph}$) and resistivity of magnon (ρ_{mag}). At very low temperature, $\rho_{e\text{-}ph}$ and ρ_{mag} can be ignored. Moreover, $\rho_{e\text{-}e}$ is proportional with the increasing of temperature as $A.T^2$. Therefore, the resistivity function is approximately linear below 10K. By the measuring resistivity from 2K to 300K and using Igor Pro software, we can fit and find out the values of A and ρ_0.

The residual resistivity ratio (RRR) can be defined by the ratio of the resistivity at room temperature ρ_{RT} and ρ_0. Thus, RRR value shows the defect or quality of rare earth compounds, which is one of the most important parameters for measuring other physical properties and designing the model of electronic devices.

In this work, RRR values of some $RRhIn_5$ compounds are estimated by Igor Pro software to get more information in the crystal structure of compounds.

Keywords: Residual Resistivity Ratio(*RRR*), $RRhIn_s$, Igor Pro, Graphics layout.

P.27:

Title: **The study of 4 DC-probe method for surface resistivity measurement.**

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Abstract: *(preferably detail abstracts, incl. figures and references in ONE A4 page, maximum of 200 words)*

It is very important to evaluate the electrical properties of thin films to study the deposition process parameters (substrate type, ion/electron beam settings, chemical environment, temperature…). The four dc probe method is one of the standard and most widely used method for the measurement of

resistivity of semiconductor. Then, the conductance of semiconductor surfaces are determined by this way. It eliminates the effect introduced by the probe resistance, probe contact resistance and spreading resistance. Therefore, it has more accuracy than the two probe method.

The two outer probes are used for sourcing current and the two inner probes are used for measuring the resulting voltage drop across the surface of the sample. The measurement has also been repeated at different points. If the values of resistivity are the same, it indicates that the material's surface is uniform, represent for the material of the strip.

In this study, the resistivity of some thin films and Si wafers can be known clearly by using the four dc probe method in SHTP laboratories, HCM City.

Keywords: Resistivity, 4dc probe method, thin films

P.28:

Title: **The study of surface and IV curves of LEDs.**

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Abstract:

LEDs is considered the most energy-saving lamps, creating the best lighting performance, generate less heat than conventional lighting devices.

By using the measuring instrument in SHTP Labs as Olympus Microscopes, Scanning Electronic Microscope, Semiconductor Characterization System 4200 – SCS, the size, shape, chemical composition, surface structure of the Led is known. Morover, we can evaluate the quality of Led through understanding determine the structure and characteristics I - V of the Led.

The purpose of this report is determined by the surface structure and characteristics I-V Led to assess the quality of the Led and the success of Led fabrication process.

Keywords: LED structure, Semiconductor Characterization, I-V curves.

P.29:

Title: **Determine some measuring standards for LEDs**

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Abstract:

LEDs cannot be manufactured with consistent optical properties as a result of the production processes involved. Brightness and color can be changed substantially from component to component even in the same production batch. This is why LEDs have to be tested during production and in their final application. Comprehensive optical characterization is also essential during research and development of LEDs and for LED-based products.

In this work, we study the surface of LED and test commonly some kind of LED in the market of Vietnam for comparison. Moreover, the standard of reference measurement system and world standards of developed countries will be checked to those leds are using in Vietnam. We try to test and measure the electrode shape of LEDs, I-V curves, wavelenght and their life time,…

Keywords: LED, measuring standards, electrode shape.