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大阪大学グローバルCOEプログラム「次世代電子デバイス教育研究開発拠点」

国際的人材育成へのさらなる挑戦
Research Internship Program 2010(RIP2010) 開催

●グローバル COE プログラム「次世代電子デバイス教育研究開発拠点」では、2010 年 7 月 1 日から 31 日の 1 ヶ月間に亘り、国際研究交流夏季セミナープログラム Research Internship Program 2010(RIP2010) を開催

RIP2010 の目的は、本拠点の学生が、海外の研究者・学生との共同研究を通じて最先端の電子デバイスの情報を習得し、さまざまな共同作業を体験することで、国際感覚を身につける機会を提供することにある。そのため、世界各国から若手研究者・博士課程学生の参加を募り、11 名の参加者を得て、学内での疑似海外空間を生み出す機会を構築することができた。

今年度は、海外の若手研究者や学生の充実した共同研究の時間を確保し、各研究室での主体的活動を重視することで共通的な活動・行事をできる限り少なくし、7 月 5 日の Orientation、Welcome Party、7 月 16 日の Get-together、7 月 28～29 日の学生主催国際会議 (The 2nd Global COE Student Conference on Innovative Electronic Topics SCIENT 2010) を開催。

各研究室の学生が、海外の若手研究者・博士課程学生との交流を通じて、グローバルな考え方を学び、国際的に活躍できる研究者に成長できることを期待するとともに、このプログラムを通じて国際的人材育成の方策の見通しを得た。

〈 RIP2010 概要 〉
RIP2010 は、7 月 1 日～ 31 日までをコア期間とし、招へいした若手研究者・博士課程学生の各研究室での共同研究の時間を充実させるため、コア期間の前後、最長 3 カ月までの滞在期間を認めた。

主な行事
- 7 月 5 日　オリエンテーション、歓迎パーティ
- 7 月 16 日　Get-together(懇親会)
- 7 月 28 日～29 日　学生主催国際会議 SCIENT2010

GCOE CEDI
Osaka Univ.

Research Internship Program 2010(RIP2010) 参加者リスト

所属研究室	NAME	学校 / 所属	国
伊瀬研究室	Mr. Prashantkumar PATEL	Indian Institute of Technology	インド
糸崎研究室	Mr. Laurence YOUNG	University college London	イギリス
片山研究室	Dr. Winadda WONGWIRIYAPAN	Institute of Technology Ladkrabang	タイ
葛原研究室（福井大学）	Ms. Szu-Ping TSAI	National Chiao Tung University	台湾
森研究室	Mr. Chen QU	Nankai University	中国
大森研究室	Mr. Sung-hoon KIM	Kyung Hee University	韓国
谷口研究室	Mr. Rutger PRINS	Delft University	オランダ
斗内研究室	Mr. Jingdi ZHANG	Boston University	アメリカ
八木研究室	Mr. Joon Hyuk PARK	Yale University	アメリカ
八木研究室	Mr. Paul ROGISTER	Institute of Neuroinformatics	スイス
八木研究室	Mr. Bumhwi KIM	Kyungpook National University	韓国

Patel Prashantkumar

The topics of research/study at OSAKA University covers, the five latest current research areas in Power Systems & Power Electronics. The first one is, Study of PSCAD/EMTDC Simulation Software, the second one is, Loss Estimation and Stability Analysis of DC Distribution System with Superconducting Cable, this field consist of background, aim, about R&D of Superconducting cable and also about GENESIS plan. The third one is, To Study of DC Micro grid including Configuration and Merits of DC Micro grid, it includes Control Method for DC Micro grid like Common PI control method, Gain Schedule method, Gain Schedule and Fuzzy control method. The fourth one is, Study of Virtual Synchronous Generator Applied in Distributed Generation and the last one is, To Study of HVDC with SMES (Superconducting Magnetic Energy Storage).

Laurence Young

Polycrystalline silicon is the predominant semiconductor used in solar cell production, however the presence of electrically active grain defects and grain boundaries is detrimental to their performance. In the laser SQUID technique, a semiconductor is illuminated with a laser beam creating localized electron-hole pairs, giving rise to photogenerated magnetic fields which can be measured using a HTS SQUID magnetometer. My research at Osaka University will focus on the use of LSQUID microscopy to noninvasively image the magnetic field distribution of solar cells in order to study the properties of grain boundaries in mc-Si.

Winadda Wongwiriyapan

Recently, the usefulness of single-walled carbon nanotubes (SWNTs) as an ultrasensitive sensing material for the detection of gas molecules has been demonstrates.1,2) Regarding to specified molecular recognition, the modulation of the SWNTs using functional nanomaterials is one of the most promising routes.3) Moreover, coating SWNTs with an ultrathin protected layer was purposed to facilitate the improvement of the stability of SWNT sensors.4)
In this research, to achieve the stable and gas-selective SWNT sensors, protective-layer coating of SWNT combined with the consequent decoration with functional nanoparticles will be demonstrated. By taking H2 gas sensing as an example, SWNTs will firstly be coated with SiOx layer by pulsed laser deposition and subsequently decorated with Pd nanoparticles by electron-beam evaporation (Pd-SiOx-SWNTs). The sensing properties to hydrogen (H2) will be investigated. The morphology, internal structure and chemical composition of the Pd-SiOx-SWNTs will be characterized by scanning electron microscopy, high-resolution transmission electron microscopy and X-ray photoelectron spectroscopy, respectively.

Szu-Ping Tsai

In recent years, the increasing demand of the convenience and efficiency of the communication system has driven the development of the wireless communication technology. The 60 GHz range can offer enough bandwidth to transmit data in high speed communication system. Therefore, the 60 GHz wireless communication technology is getting more and more attention due to its high data transmission speed and compact size.
Flip-chip interconnect provides a new packaging approach for 60 GHz RF front end transceiver. In this research, all the 60 GHz GaAs MMICs will be flip-chip bonded onto the Al2O3 substrate. From the demonstration of the single MMIC component, flip-chip interconnect may be used to package the devices (including mixer, LNA, and PA) with little performance decay.

Chen Qu

Nowadays, research about high-power cw or quasi-cw DUV sources operating below 200nm for the high-resolution inspection tools in semiconductor manufacturing industry is quite urgent. MORI laboratory is now developing CLBO crystal to setup a cw 199-nm light source which use sum-frequency mixing (SFM) of the output from a frequency-doubled Argon-ion laser at 244nm and a 1064nm IR laser. The cw deep-UV laser enables the mask inspection system beyond the 45nm technology node. The persistence of crystal is of our concern.
Using crystal CLBO and LBO’ s SHG property, we build a system to converse 1064nm laser to ultraviolet light. Try to find out the optimum temperature for LBO's working and test the relationship of CLBO's conversion efficiency with crystal ‘s working time. Our final purpose is to find the reason for conversion efficiency ‘s descent.

Sung-hoon Kim

Organic thin film transistors (OTFTs) have great potential for flexible devices, radio frequency identification tag, sensors, complimentary circuits(CMOS) and electronic papers. Particularly, solution processes such as ink-jetting, roll-to-roll printing, gravure printing, spin-coating have advantages of low cost, easy process, large area active matrix display. and organic light emitting diodes (OLEDs) is now hot issue for advanced display such as flexible and transparent display.

The organic CMOS circuits is composed with two type of p- and n-type organic transistor that need to patterning of each transistor. However, it is hard to pattern organic semiconducting materials because they are very sensitive and weak to chemical damages.

The organic light emitting ambipolar transistor (OLET) have electrical characteristics both p- and n-type transistor using one organic semiconducting material. Therefore, the ambipolar transistors have advantages of reducing the TFT dimension and it does not need to complicate patterning process for circuit devices. Furthermore, Our ambipolar transistor can emit light during TFT operation that have possibility to apply to display.

Rutger Prins

In collaboration with Prof. Mori an electron transport simulator made by Prof. Kamakura of Taniguchi Lab is adapted for parallel computing so that larger simulations can be studied. Parallel processing is done with GPGPUs using the CUDA architecture. The simulator uses an ensemble Monte Carlo technique coupled with a molecular dynamics method to simulate electron transport in bulk Si and MOSFET inversion layers. The Coulomb interactions among point charges (electrons and negative ions) are directly taken into account in the simulation. The most time consuming part is the calculation of these interactions, because the force on each electron is the summation of the negative forces of all other point charges. This leads to O(N２) computational complexity for N electrons, but when done in parallel should be close to O(N) in running time.

Jingdi Zhang

BiFeO3 is a multiferroic material characterized by a room temperature antiferromagnetic and ferroelectric phase and a 2.6eV bandgap. Terahertz emission from BiFeO3 thin films following excitation above bandgap by UV femtosecond pulses has been observed [1]. The THz emission is related to ultrafast depolarization of the ferroelectric order in the film as observed from the hysteresis of the amplitude of the emitted THz signal as a function of a biasing electric field. Experiments probing the electronic and lattice dynamics with sub-picosecond resolution are an essential step towards identifying the intrinsic mechanism responsible for depolarization and THz emission in BiFeO3. In this study we investigate the carrier dynamics of epitaxial BiFeO3 thin films using degenerate pump-probe spectroscopy at 400 nm with sub-50 fs pulses.

[1] D.S. Rana, et al., Advanced Materials 21, 2881 (2009).

Evan Joon Hyuk Park

My research focuses on developing a miniature microscope to optically measure in vivo neuronal activity with voltage sensitive dyes (VSD) on freely moving animals. At Osaka University, my goal is to test two image sensors that I have designed. I will work with Professor Yagi and Professor Okuno on running in vivo experiments to detect activity in the visual cortex with VSDs and on brain slices using calcium sensitive dyes. I will compare the data from my miniature system (small and mobile) to their current setup (large and fixed). Also, I will test my next-generation chip's performance on the same setup/experiment. I hope to get positive results and am grateful for this collaboration from the professors at Osaka University.

Paul Rogister

The visual cortex is able to perform complex computations that are still very challenging for computer vision systems using conventional cameras.

One reason for these difficulties in emulating cortical visual functions is that, unlike conventional cameras, the biological retina performs complex signal transformations that can support later stages visual processing. The ASPECTUS silicon retina developed by Professor Yagi's laboratory implements the output of retinal ganglion cells, and is able to extract important visual primitives such as edges, orientations and motion directions.

During the GCOE internship, in collaboration with Professor Okuno, we are implementing the extraction of additional fundamental visual features to obtain the global versus local motion and relative velocities estimations. We aim at integrating them in a tracking system able to accommodate the camera’ s movements and learn how to exploit and compute using these visual signal primitives.

Bumhwi Kim

Hi! My name is Bumhwi Kim. I am Ph. D. Candidate student at Kyungpook National University of the South Korea. And I’ m a member of the artificial brain research lab. I am pleased to corporate with Prof. Yagi’ s Lab through the RIP 2010. My research topic is “Implementation of bottom-up saliency map in neuromorphic device” . The goal of my research is reducing the computational cost and processing time by FPGA. Prof. Yagi’ s camera can extract features of physiological process result of retina. And our bottom-up saliency map model mimics brain’ s visual attention process, from retina to LIP area. Using results of Prof. Yagi’ s camera, we can get more biological result. In addition, I will find an application method in the real world problem like surveillance problem using collaboration result. This is the first time to research about neuromorphic device. I’ ll do my best! Thank you about the GCOE office to give me a great chance!

2nd Global COE Student Conference on Innovative Electronic Topics 2010

SCIENT2010 July 28-29

July 28-29, 2010, Icho-kaikan, Suita Campus, Osaka University

Sponsored by the Global COE Program "Center for Electronic Devices Innovation"
Co-sponsored by
Graduate School of Engineering, Osaka University
Graduate School of Engineering Science, Osaka University
Electronic Collaboration Initiative "Leptos"

Osaka University Global Center of Excellence(GCOE), "Center for Electronic Device Innovation" will provide 2day international conference on Innovative Electronic Topics, which will be held on July 28-29,2010 at Icho-kaikan, Suita Campus, Osaka University.

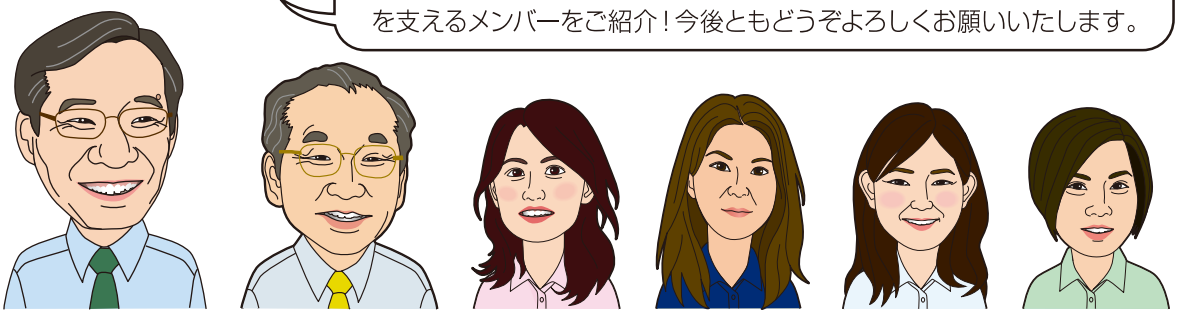
The conference, organized by doctor course students in the Division of Electrical, Electronics and Information Engineering, Graduate School of Engineering, Osaka University, will focus on the research challenges for future electronic devices and provide an opportunity for scientists and engineers working in various fields of electronic devices. This conference also includes presentations of research reports by RIP2010 participants. You are cordially invited to participate in the conference.

Invitation to 2nd Global COE Student Conference on Innovative Electronic Topics was announced at GCOE Summer Research Internship Program kick-off meeting by steering committee menbers.

Contact:scient@gcoe.eei.eng.osaka-u.ac.jp
Details: http://www.eei.eng.osaka-u.ac.jp/gcoe/scient2010/index.html

事務局訪問

グローバルCOEプログラム「次世代電子デバイス教育開発拠点」事務局を支えるメンバーをご紹介！今後ともどうぞよろしくお願いいたします。



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