MAHIDOL UNIVERSITY

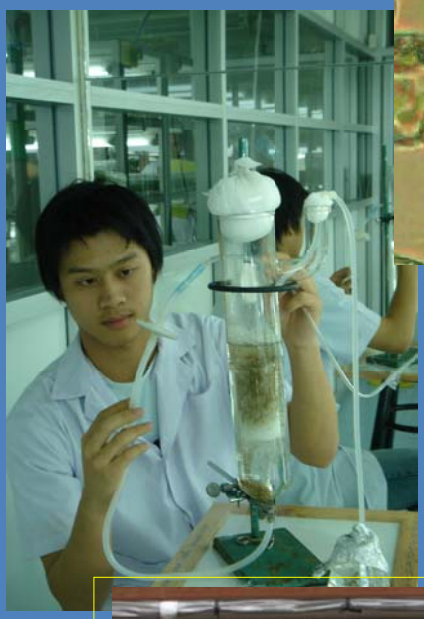
Wisdom of the Land

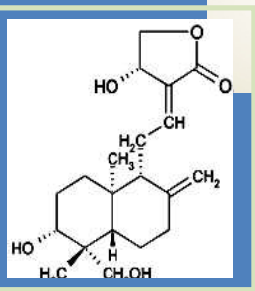
The Overseas Internship Course @ MUSC-2013

The Faculty of Science, Mahidol University

March 18-24th, 2013

Bangkok, Thailand





http://www.sc.mahidol.ac.th

Mahidol University

His Royal Highness Prince Mahidol of Songkla

"Father of Modern Medicine and Public Health of Thailand"

….. The resounding message affirming the dignity and the value of life, so forcefully translated into action by Prince Mahidol, was enunciated in 1948 with the United Nations Universal Declaration of Human Rights. His teaching of the spirit of brotherhood towards all human beings without discrimination of any kind is well-known. Many of his exhortations and pronouncements given to his medical students have been highly respected for their wisdom and their eternal moral values. For instance:

"I don't want you to be only a doctor, but I also want you to be a man" "True success is not in the learning, but in its application to the benefit of mankind."

Mahidol University originates from Thailand's first hospital, Siriraj Hospital, found in 1888. The hospital's medical school is the oldest institution of higher learning in Thailand, granting its first medical degree in 1893. After becoming the University of Medical Sciences in 1942, the University was later renamed with the great honor in 1969 by **H.M. King Bhumibol Adulyadej** after his own father, H.R.H. Prince Mahidol of Songkla. Mahidol University has since developed into one of Thailand's leading universities, internationally renowned for its high caliber of teaching and research.

Philosophy:
"True success is not in the learning, but in its application to the benefit of mankind."

Motto: "Do unto others as you would have others do unto you"

Determination Statement: Wisdom of the Land

Vision: "Mahidol University is determined to be a World Class University"

Mission: "To excel in Health, Sciences, Arts, and Technological Innovation with integrity for the benefit of Thai society and benefit of mankind"

The Overseas Internship Course@ MUSC- 2013

Faculty of Science, Mahidol University
18-24th March 2013

Framework and Reasoning

The greater internationalization of academic institutions and the expansion of regional and global connections and networks has become an important strategy in developing academic institutions across every field of study. Following the global educational trend, including Mahidol University mission to sustain its goal of creating transformative education and actively increasing role in driving relationship and cooperations with our partners, we encourage the exchange of knowledge and offering beneficial courses to the students, both for Thai and Overseas. Refer to its philosophy motto "*True success is not in the learning, but in its application to the benefit of mankind*", and as one of Thailand's leading universities, Mahidol University continues to develop and diversify its high caliber of teaching and research for both Thai and foreign students, especially increase the activities among our partners who involve in collaborative degree programs.

The 2013 Overseas Internship Course is a program organized by the Faculty of Science, Mahidol University (MUSC), to provide the oversea studies in Thailand for foreign students, and further promote scientific communication and better understanding about Thailand from cultures, language, and society through the course, cultural tour and exchanging activities. This program provides most of local expenses (hotel, meals, transportation, and trip) during 8 days of staying in Thailand. The program offer classes and other activities as lecture, seminar, field trip and culture tour. All programs will be conducted in **English**. The scope of the 2013 Overseas Internship Course, this year is mentioned as follows;

1. Lectures in topic of "Science in Sufficient Economy Theory" – Impacts on Agriculture, Food Security and Environment

The modern development has caused changes in all aspects of world society. The positive impacts of the development are economic growth, progress of material and public utilities, modern communication systems, and improvement and expansion of education. However, few of these results have reached rural areas or the underprivileged in the society.

On the other hand, rapid economic growth and the rise of consumerism has led to a state of economic dependence and deterioration of natural resources as well as the dissolution of existing kinship and traditional groups to manage them. The traditional knowledge and wisdom that have been employed to solve problems and accumulated in the past are forgotten and have started to disappear.

Thai Royal Initiative of the 'Philosophy of Sufficiency Economy': Although His Majesty*King BhumibolAdulyadej*of Thailand has been promoting self-reliant or sustainable farming since the 1950s, it is generally accepted that the idea of Sufficiency Economy had been brought up in the 1970s during in His Majesty's speeches.

Sufficiency Economy is a philosophy based on the fundamental principle of Thai culture. It is a method of development based on moderation, prudence, and social immunity, one that uses knowledge and virtue as guidelines in living. Significantly, there must be **intelligence and perseverance** which will lead to real **happiness** in leading one's life. The Philosophy of Sufficiency Economy comprises with three pillars as moderation, reasonableness, and risk Management. Sufficiency Economy does not mean that one must constantly be frugal. A person can indulge himself in luxury once in a while, provided that it is within his capacity to do so. But the majority of the country's population often overspends beyond their means. Sufficiency Economy can lead to the goal of establishing economic stability. Fundamentally, Thailand is an agricultural country; therefore, the country's economy should be keyed towards agro-economy and food stability in order to establish a stable economic system to a certain degree. This is an economic system that can help lessen the risk or economic instability in the long run.Sufficiency Economy can be applied to all levels, branches, and sectors of the economy. It is not necessarily limited to the agricultural or rural sectors, or even the financial, the real estate, and the international trade and investment sectors by using similar principles of emphasizing moderation in performance, reasonableness, and creating immunity for oneself and society. The lectures will provide fundamental of the Sufficiency Economy Philosophy, its impacts on National development and give example of best practice cases focussing on Agriculture, Food Security and Environment.

2. Field trip

The field trip will include the overview of several projects under the Royal initiation and the case study at research stations of the Royal Project outside Bangkok, as well as the Thai historical and culture tour.

3. Student Joint Seminar

The graduate students of MUSC and collaborative institutes in study areas of agricultural science and technology, food science, and environmental science are encouraged to join the course and perform their research presentations in the Joint Seminar "Scientific Impacts on Agriculture, Food Secruity and Sustainable Environment" in order to promote the scientific link and knowledgeable shares among young scholars. The students are requested to present his/her '**Oral presentation**', each with 15 min plus 5 min of Q&A.

Objectives

1. To provide participants the opportunities to exchange knowledge in the related field.
2. To encourage both Thai and overseas students to learn actively by reciprocating knowledge and experiences during the course.
3. To promote the better understanding of Thai cultures, language, and society.
4. To foster relationship between the overseastudents with Thai students, scholars, and further strengthening the integration of academic network, that would be beneficial for the future establishment of academic strategic partner.

Duration of the overseas internship course: March 18-24th, 2013

Expected Results/Outcomes

By attending this program, participants will be able to learn from professional lecturers. Besides, participants will have opportunities to mutually exchange knowledge and opinion with Thai students, including foster the better understanding of Thai cultures, language, and society among the foreign students which will contribute to the future cooperation among participants, both personally and institutionally.

MUSC Coordinators:

1. **Dr. Kanyaratt SUPAIBULWATANA**
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Overall Schedule for the Overseas Internship Course @ MUSC 2013

DATE	TIME	ACTIVITY	NOTE
Monday 18 Mar, 2013	08.30-9.00 h	Registration for Opening Ceremony and Lectures at meeting Room, 1st floor, Stang Mongkolsuk Bld	- Pick up at 8.00 am (hotel → MUSC)
	09.00-9.30 h	Opening Ceremony and Welcome Address of the Special Lectures "Science in Sugfficient Economy Theory" by Dean, MUSC	
	09.30-10.30 h	**"Hornbill Research for Sustainable Forest Ecosystems"** by Emeritus Prof. Pilai Poonswad, Faculty of Science, Mahidol University	- Refreshment Breaks and Lunch are provided at MUSC
	10.30-10.45 h	Refreshment	
	10.45-11.45 h	**"Self Sufficiency Economy: Theory and Practice for Sustainable Development"** by Assist. Prof. Rawin Rawiwong The Chaipattana Foundation	
	12.00-13.00 h	Lunch@ Satang Mongkolsuk Bld.	- Hotel vans pick up at 4.00 pm from MUSC to hotel and MUSC vans are arranged for dinner for inter-participants (pick up at hotel lobby at 6 pm).
	13.00-14.00 h	**"Nanotechnology for Precision Agriculture and Intensive Farming"** by Assist. Prof. Teerakiat Kerdcharoen Faculty of Science, Mahidol University	
	14.00-14.15 h	**"Relevance Approaches for Invasive Pest Control: from Genetics to System Biotechnology for ASEAN"** by Assist. Prof. Sujinda Thanaphum Faculty of Science, Mahidol University	
	14.15-15.15 h	Refreshment	
Tuesday 19 Mar, 2013	08.30-9.30 h	Registration for Student Joint Seminar "Scientific Impacts on Agriculture, Food Security and Sustainable Environment" at meeting Room, 1st floor, Stang Mongkolsuk Bld	- Pick up at 8.00 am (hotel → MUSC)
	09.30-11.30 h	**1st Session**: **Computational and Materials Sciences** (S1-S5) - Refreshment (10.30-10.50 h)	
	11.30-13.00 h	Lunch	
	13.00-15.00 h	**2nd Session: Science & cultures, Biodiversity, Ecology** (S6-S10) - Refreshment (14.20-14.40 h)	- Hotel vans pick up at 4.00 pm from MUSC to hotel
	15.00-16.00 h	Campus Tour	
Wednesday 20 March, 2013	08.30-9.30 h	Registration for Seminar at meeting Room, 1st floor, Stang Mongkolsuk Bld	- Pick up at 8.00 am (hotel → MUSC)
	09.30-11.30 h	**3rd Session: Bioscience, Biochemistry, Biomedical Sciences** (S11-S15) - Refreshment (10.30-10.50 h)	
	11.30-13.00 h	Lunch	- Hotel vans pick up at 4.00 pm from MUSC to hotel
	13.00-15.20 h	**4th Session: Gene and Cell Technology** (S16-S21) - Refreshment (14.20-14.40 h)	

DATE	TIME	ACTIVITY	NOTE
Thursday 21 March, 2013	08.30 h	Arrival at MUSC and go for study trip of the Royal projects at **"Royal Chitralada Palace"** **<u>IMPORTANT NOTE</u> **Suggestion for visitor** - Please ware polite clothes. -T-shirt, sleeveless shirt, short pants, slippers are not allowed. - Wearing pants are not allowed for female, please wear skirt that's long enough to cover the knees. - Total black, including black and white, tone clothes are not allowed. - Please wear polite and comfortable shoes for a long way walk. - Taking photo is allowed, but taking VDO is a taboo. - Umbrella is allowed.	- Pick up at 8.00 am (hotel → MUSC) - MUSC vans are arranged as transportation for visiting
	11.30 h	Depart for MUSC	
	13.00 h	Lunch (is provided at MUSC canteen)	Van pick up back to hotel at 2 pm.
Friday 22 March, 2013	07.30 h	Arrival at MUSC, prepare to go for a field trip at C Bld.	- Pick up at 7.00 am - Please take BF at hotel earlier enough to depart on time at 7.30 am
	08.00 h	Depart for Phetchaburi Province by Bus	- Snack and bottle of water are provided - Lunch are excluded
	11.00 h	Visit **Hua Hin Sam Phan Nam Floating Market**	**** Clothing notes:**
	13.00 h	Visit **Phra Ratchaniwet Mrigadayavan Summer Palace**	- Polite cloth for visiting the Palace
	14.00 h	Visit **The Sirindhorn International Environmental Park** and join CSR activity for **Mangrove planting**	- Comfortable cloth for planting activities - Swimming suit
	17.00 h	Hotel check-in and dinner	- Casual dress
	18.30 h	Cultural activities and games + dinner	
Saturday 23 March, 2013	07.00 h	Breakfast at hotel	- Bus pick up 8.00 am
	09.00 h	Visit **Chang-Hua-Mun Royal Project**	- Dress up causally
	11.00 h	Souvenir shopping	
	12.00 h	Lunch at restaurant	
	13.00 h	Visit **Phra Nakhon Khiri** or **Khao Wang Palace**	
	15.00 h	Departure from Phetchaburi to Bangkok	- Exclude dinner
Sunday 24 March, 2013	10.00 h	Free day to allow you to visit and shopping at Sunday Market ** for person who leaves on 24th night must check-out from hotel before the 12.00 h	- Exclude meals, check out time is before 12.00

Special Lectures

"Science in Sufficient Economy Theory"
Impacts on Agriculture, Food Security and Environment

March 18th, 2013

Meeting Room, 1st floor, Stang Mongkolsuk Bld
Faculty of Science, Mahidol University, Bangkok

The modern development has caused changes in all aspects of world society. The positive impacts of the development are economic growth, progress of material and public utilities, modern communication systems, and improvement and expansion of education. However, rapid economic growth and the rise of consumerism has led to a state of economic dependence and deterioration of natural resources as well as the dissolution of existing kinship and traditional groups to manage them. The traditional knowledge and wisdom that have been employed to solve problems and accumulated in the past are forgotten and have started to disappear. Thai Royal Initiative of the **'Philosophy of Sufficiency Economy', a**lthough **His Majesty King Bhumibol Adulyadej** of Thailand has been promoting self-reliant or sustainable farming since the 1950s, it is generally accepted that the idea of Sufficiency Economy had been brought up in the 1970s during in His Majesty's speeches. Sufficiency Economy is a philosophy based on the fundamental principle of Thai culture and, fundamentally, Thailand is an agricultural country; therefore, the country's economy should be keyed towards agro-economy and food stability in order to establish a stable economic system to a certain degree.

In order to praise **HM King Bhumibol Adulyadej** for his compassion, knowledge, and high reputation, Mahidol University, the Faculty of Science would like to promote the capability of the practical Sufficiency Economy Philosophy in professional level research in science, and provide the special lectures in the view points of the successful scientific researchers that well applied the Sufficiency Economy Philosophy with science, especially in the field of Agriculture for food security and sustainable environment. Beside the appropriate implementation of advanced scientific knowledge and technology to support the Self Sufficiency Economy Theory, its implications to sustainable development of the regions will also be demonstrated. Faculty of Science, Mahidol University is please to invite you to join these special lectures. This program is one of the series activities in The Overseas Internship Course@ MUSC- 2013 organized by Faculty of Science, Mahidol University.

Special Lectures

"Science in Sufficient Economy Theory" Impacts on Agriculture, Food Security and Environment

Meeting Room, 1st floor, Stang Mongkolsuk Bld., Faculty of Science, Mahidol University

In honouring His Majesty the King Bhumibol Adulyadej for his compassion, knowledge, and dedication to helping Thai people, the Faculty of Science, Mahidol University would like to honour HMK's principle of "Self Sufficiency Economy Philosophy" in science by organizing a series of distinguished lectures. The lecturers and topics are as followed;

Schedule: Monday, March 18th, 2013

TIME	ACTIVITY	NOTE
08.30-9.15 h	Registration for Opening Ceremony and Lectures	
09.15-9.30 h	**Opening Ceremony and Welcome Address** By Prof. Skorn Mongkolsuk Dean, Faculty of Science, Mahidol University	
9.30-10.30 h	**"Hornbill Research for Sustainable Forest Ecosystems"** by Emeritus Prof. Pilai Poonswad, Faculty of Science, Mahidol University (Biodata provided at p. 36-42)	
10.45-11.45 h	**"Self Sufficiency Economy: Theory and Practice for Sustainable Development"** by Assist. Prof. Rawin Rawiwong The Chaipattana Foundation (Biodata provided at p. 43-45)	
11.45-13.00 h	Lunch	
13.00-14.00 h	**"Nanotechnology for Precision Agriculture and Intensive Farming"** by Assist. Prof. Teerakiat Kerdcharoen Faculty of Science, Mahidol University (Biodata provided at p. 46-62)	
14.00-15.00 h	**"Relevance Approaches for Invasive Pest Control: from Genetics to System Biotechnology for ASEAN"** by Assist. Prof. Sujinda Thanaphum Faculty of Science, Mahidol University (Biodata provided at p. 63-65)	

*Online Registration URL: www.sc.mahidol.ac.th (No Registration Fee)
**All programs are in English, ***Coffee Breaks are available at 10.30-10.45 am., and 15.00 pm.

Hornbill Research and Sustainability of Forest Ecosystem

Pilai Poonswad

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Abstract

Hornbills are ancient and very large birds of tropical Africa and Asia. Most Asian hornbills inhabit in pristine evergreen forests of various types. They have secretive and intriguing nesting habit by the nesting female seals herself into a cavity of a large tree leaving a small gap for her mate to feed her and later the chick(s). Since she is unable to create her own nest cavity she must rely on a cavity which created by others, including wood decay fungi, woodpeckers. Majority of nest cavities are found in trees of families Dipterocapaceae, Myrtaceae and Datistaceae depending on forest habitat type. Hornbills are omnivorous, but fruits are their main food. Over 100 species of plants are recorded in the diet of hornbills. Interaction between hornbills and food plants is obvious, where unharmed and viable seeds regurgitated along their flyways making them the efficient forest seed dispersal agents and are named 'farmers of the forest'. Due to ongoing forest destruction and hornbill poaching in certain areas hornbill populations have become threatened to extinction. Besides threats caused by human activities hornbills also face unfavorably natural situation within their habitat, that is the shortage of suitable nest cavity, the important limiting factor for breeding.In order to increase and sustain hornbill population and their habitats, research and community based conservation are strongly recommended.

Keywords: Hornbill, forest ecosystem, sustainability, conservation

Self Sufficiency Economy: Theory and Practice for Sustainable Development

Rawin Rawiwong
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Abstract

Sustainable development is simply achieving development while minimizing its impact on resources and environmental quality. In recent years, many countries around the world have considered sustainable development a national agenda and have deployed several policies, strategies, and tools on this issue. In Thailand, "Self Sufficiency Economy (SSE)", initiated by H.M. King Bhumibol Adulyadej, is one of the proven strategies that can enhance the quality of Thai people and pursue sustainable development goal. Its philosophy is based on the fundamental principle of Thai culture and aims to balance between the local way of life and the rapid cultural and economic transitions. SSE can be applied to all levels and sectors of economy, emphasizing Moderation, Reasonableness, and Risk Management at the appropriate level depending on Knowledge and Virtue conditions.

SSE has been applied in Thailand's agricultural sector since the 1970s. After the 1997's economic crisis, SSE many non-agricultural sectors started to learn how to utilize SSE in their business as a tool for creating their immunity. This presentation aims to share the idea of SSE from theory into practice. One Chaipattana's project, The Tea Oil and Other Plant Oil Research Center in Chiang Rai province, is brought up for discussion as an example of applying SSE into operation towards sustainable development.

Nanotechnology for Precision Agriculture and Intensive Farming

Application of Precision Agriculture for Vineyard in Thailand

Teerakiat Kerdcharoen
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Abstract

Thailand is in the New Latitude Wine regions, which are outside the traditional winemaking countries located between the 30th and 50th degrees latitude north and south. Therefore, the impact of environmental conditions of Thailand is different from the traditional winemaking countries. In this research, we investigated various types of sensors and developed software to make a so-called "smart vineyard" system within the framework of precision agriculture (PA). The system features (1) the capability to monitor microclimate condition for selection of proper time of various farming activities, for example, the ability to measure wind speed, relative humidity and temperature to select optimal times for spraying; (2) soil moisture monitoring for proper irrigation management in the vineyard; (3) display image from web camera to monitor the areas of vineyard that winemaker would like to monitor; (4) web-based technology for online vineyard monitoring. This system was successfully tested in a real vineyard at GranMonte vineyard, Nakhon Ratchasima, Thailand. It is hoped that such system will be widely adopted by various types of agriculture, e.g., tea and coffee plantation and fruit orchard.

Keywords: Precision agriculture, smart farm, viticulture, vineyard management

Acknowledgements
Mahidol University and Gran Monte vineyard are acknowledged for supports to this project.

Relevance Approaches for Invasive Pest Control: from Genetics toSystem Biotechnology for ASEAN

SujindaThanaphum

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Abstract

The tephritid fruit flies are both organisms with high level of modality for basic research, and economic pests causing reductions of fruit yields and generating constrains in the international market. Many of these flies are invasive due to their apparent wide host ranges, high fecundity, dispersal tendency, bioclimatic adaptive abilities, and globalization of fruit trade. The genetics research have been initiated and carried out to gain knowledge in the field of molecular olchicine, molecular ecology, chemical ecology, population genetics, cytogenetic, gene linkage mapping, and molecular biology of sex determination pathways from these insects. Subsequently, translational research with system biotechnology approach has been conducted to modernize Integrated Pest Management (IPM) using Sterile Insect Techniques (SIT) for ASEAN. Genetic tools such as genetic sexing strains, sperm-marking technology, and application of microsatellite DNA with mathematical analyses for practicing IPM using SIT were validated in a pilot-scale pest control programme with economic feasibility and sustainability assessment.

Keywords: the oriental fruit fly, genetic sexing strain, microsatellite DNA, Sterile Insect Techniques, *doublesex* genes

Student Joint Seminar

Scientific Impacts on Agriculture, Food Security and Sustainable Environment

19 – 20 March 2012

Organized by Faculty of Science, Mahidol University (MUSC)
Rama VI Rd., Bangkok 10400, the Kingdom of Thailand

Tuesday 19 March 2013 Venue: meeting Room, 1st floor, Satang Mongkolsuk Bld.

	MC – Mr. Phithak Inthima, MUSC
08.30 – 09.30 h	Registration
	Session 1: Computational and Materials Sciences
	Chairperson: Assist. Prof. Dr. Tanakorn Osotchan
09.30 – 09.50 h	**S1** – "Image Analysis on the Surface Color of Fruits During Post-ripening" by Honghua Ma, Niigata University
09.50 – 10.10 h	**S2** – **"**An Electronic Nose for Amine Detection Based on Polymer/SWNT-COOH Nanocomposite" by Panida Lorwongtragool, MUSC
10.10 – 10.30 h	**S3** – "Portable Optical-based Electronic Nose using LEDs Array and Its Applications for Volatile Discrimination" by Treenet Thepudom, MUSC
10.30 – 10.50 h	Refreshment
10.50 – 11.10 h	**S4** – "Application and Study of Poly Para-xylence Chloride Coating for Protection Properties" by Dong Li, Niigata University
11.10 – 11.30 h	**S5** – "CaO-looping process for CO_2 capture" by Caiyun Gao, Niigata University
11.30 – 13.00 h	Lunch (for speakers, chairpersons)
	Session 2: Science & cultures, Biodiversity, Ecology
	Chairperson: Assist. Prof. Dr. Aussanee Pichakum
13.00 – 13.20 h	**S6** – "Unexpected relation of fruit cultivation methods and Japanese Traditional culture" by Kensho Shimizu, Chiba University
13.20 – 13.40 h	**S7** – "Elucidation of various factors affecting the symbiosis between soybean and arbuscular mycorrhizal fungi" by Akiko Nihei, Chiba University
13.40 – 14.00 h	**S8** – "Regeneration and clonal growth of natural Japanese cedar forest after typhoon disturbance in a snowy region of Japan" by Takashi Nagashima, Niigata University
14.00 – 14.20 h	Refreshment
14.20 – 14.40 h	**S9 –** "Effects of patch sixe on species diversity, species composition and trophic types of aquatic insects associated with floating plants in a wetland" by Rungtip Wonglersak, MUSC
14.40 – 15.00 h	**S10** – "Saltwater Wedge Intrusion and Its Control methods in the Estuary of Shinkawa River" by Haisheng Liu, Niigata University

Wednesday 20 March 2013 Venue: meeting Room, 1st floor, Satang Mongkolsuk Bld.

MC – Mr. Phithak Inthima, MUSC

08.30 – 09.30 h	Registration
	Session 3: Bioscience, Biochemistry, Biomedical Sciences
	Chairperson: Dr. Wisuwat Songnuan
09.30 – 09.50 h	**S11** – "Studies on the detection of autophagy in the gastrointestinal tract" by Koya Shinohara, Niigata University
09.50 – 10.10 h	**S12** – "Variation in autophagic control to different genotypic families of *Mycobacterium tuberculosis* in host macrophages" by Fazlul Haque, MUSC
10.10 – 10.30 h	**S13** – "Characterization of Major Allergens from Amaranthus Pollen among Thai Patients" by Umaporn Siriwattanakul, MUSC
10.30 – 10.50 h	Refreshment
10.50 – 11.10 h	**S14** – "Metabolomic Analysis of *Artemisia annua* L. Plant in Responses to Ethephon" by Netiya Karaket, MUSC
11.10 – 11.30 h	**S15** – "Physiological and biochemical responses after molasses application to salt stress exposure of *Eucalyptus camaldulensis* seedling" by Pacawee Daengkaew, MUSC
11.30 – 13.00 h	Lunch (for speakers, chairpersons)
	Session 4: Gene and Cell Technology
	Chairperson: Assist. Prof. Dr. Sasivimon Swangpol
13.00 – 13.20 h	**S16** – "Development and evaluation of the oriental fruit fly, genetic marker strain for the SIT" by Siriwan Isasawin, MUSC
13.20 – 13.40 h	**S17** – "Phylogenetic Study of the Banana Family (Musaceae) in Thailand Based on *trn*L-F Region" by Wandee Inta, MUSC
13.40 – 14.00 h	**S18 –** "Production of Polyploid plants in Kale and Raphanobrassia with olchicines and amyprophosmethyl treatments with the aid ethylene inhibitors" by Hiroyuki Niimi
14.00 – 14.20 h	Refreshment
14.20 – 14.40 h	**S19** – "*Agrobacterium*-mediated transformation of Dendrobium Orchid" by Wasana Phlaetita, Chiba University
14.40 – 15.00 h	**S20** – "Transgenic tomato plants expressing two antifungal protein genes driven by a root specific *AtNRT2.1* promoter confer resistant against root pathogen" by Kynet Kong, Chiba University
15.00– 15.20 h	**S21** – "Identification of alpha-galactosidase gene in normal and curd coconuts (*Cocos nucifera* L.)" By Chanrith Phoeurk, MUSC

S1 – Image Analysis on the Surface Color of Fruits During Post-ripening

Honghua MA[1], Yoshitaka MOTONAGA [2,] and Xin ZHANG[3]
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[3] Graduate School of science and technology, Niigata University, Niigata, Japan
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Abstract

Among the most significant factors in cultivation management and quality control of agricultural products is the evaluation of the color and shape of the product. Color evaluation of fruits, in particular, has been practically used not only as an effective method to determine the quality of fruits but also as an index of grade sorting and in determination of harvesting time. In order to produce high quality products, an intensive quality management during post-ripening processes is also highly considered.

Interestingly, one of the brand local specialties of Niigata Prefecture is the European pear *`Le Lectier`* which has been regarded as a highly valuable fruit due to its appearance, good taste, and its rich fragrance. Because of the increasing interest on the management of the quality of *`Le Lectier`* before shipment, hence in this work, we analyzed the changes in surface color and shape of the fruits of *`Le Lectier`* during post-ripening period by using color image processing. The technique involves the development of fruit color chart for *`Le Lectier`* that illustrates the condition on the fruit surface and the corresponding color patterns ranging from green to yellow. Discussions on the acquisition of the final fruit color chart of *`Le Lectier`* from the comparison between the experimentally derived prototype color charts and reference traditional color charts will be elaborated in the presentation.

Keywords: image analysis; `Le Lectier`; post-ripening management; surface color

Acknowledgements
The authors would like to acknowledge the Ministry of Agriculture, Forestry, and Fisheries of Japan and the Grant for Promotion of Niigata University Research Projects for the financial support.

References

1. B. K. Miller and M. J. Delwiche, "A colour vision system for peach grading," Trans. ASAE, 1989, 32(4), 1484-1490.
2. T. Kameoka, A. Hashimoto, Y. Motonaga, H. Kondo and K. Nakanishi, "Color and Shape Analysis of Agricultural Products," Computational Techniques in Food Engineering, CIMNE, 2002, 196-200.
3. Y. Motonaga, H. Kondou, A. Hashimoto, and T. Kameoka, "Determination of the Standard Shape and Color of Agricultural Products," Proc. QCAV'98, 1998, 29-34.
4. Y. Motonaga and T. Kamata, "Analysis on Color Appearance Space for Fruits during Post-ripening," Proc. Of the AFITA/WCCA2004 Joint Congress on IT in Agriculture, 2004, 880-885.

S2 – An Electronic Nose for Amine Detection Based on Polymer/SWNT-COOH Nanocomposite

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Abstract

An electronic nose (e-nose) system based on polymer/carboxylic-functionalized single-walled carbon nanotubes (SWNT-COOH) was developed for sensing various volatile amines. The SWNT-COOH dispersed in the matrix of different polymers; namely, PVC, cumene-PSMA, PSE and PVP, were deposited on interdigitated gold electrodes to make the gas sensors. The response of these sensors to volatile amines was studied by both static and dynamic flow measurements. It was found that all sensors exhibited behavioral response to volatile amines. Real-world application was demonstrated by applying this e-nose to monitor the odor of sun-dried snakeskin gourami that was pre-processed by salting-preservation. This electronic nose can discriminate sun-dried fish odors with different stored days using a simple pattern recognition based on the principal component analysis (PCA).

Keyword Electronic Nose, Volatile Amine, CNT/Polymer Gas Sensor, Fish Freshness Monitoring

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References

1. A. Pacquit, K. T. Lau, H. McLaughlin, J. Frisby, B. Quilty, D. Diamond. Development of a smart packaging for the monitoring of fish spoilage. Talanta 2006, 69: 515-520.
2. M. O'Connell, G. Valdora, G. Peltzer, R. M. Negri. A practical approach for fish freshness determinations using a portable electronic nose. Sensors and Actuators B 2001, 80: 149-154.
3. N. E. Barbri, E. Llobet, N. E. Bari, X. Correig, B. Bouchikhi. Application of a portable electronic nose system to assess the freshness of Moroccan sardines. Mater. Sci. Eng. C 2008, 28: 666-670.
4. Z. Zhang, J. Tong, D. Chen, Y. Lan. Electronic nose with an air sensor matrix for detecting beef freshness. Journal of Bionics 2008, 5: 67-73.
5. C. D. Natale, G. Olafsdottir, S. Einarsson, E. Martinelli, R. Paolesse, A. D'Amico. Comparison and integration of different electronic noses for freshness evaluation of cod-fish fillets. Sens. Actuators B 2001, 77: 572-578.
6. N. E. Barbria, J. Mirhisse, R. Ionescu, N. E. Bari, X. Correig, B. Bouchikhi, E. Llobet. An electronic nose system based on a micro-machined gas sensor array to assess the freshness of sardines. Sens. Actuators B 2009, 141: 538-543.
7. J. Q. Ni, A. J. Heber, C. A. Diehl, T. T. Lim. Ammonia, hydrogen sulphide and carbon dioxide from pig manure in under-floor deep pits. Journal of Agricultural Engineering Research 2000, 77(1): 53-66.
8. M. L. N. E. Dapkeviciusa, M. J. Robert Nouta, F. M. Romboutsa, J. H. Houben, W. Wymenga. Biogenic amine formation and degradation by potential fish silage starter microorganisms. Int. J. Food Microbiol 2000, 57: 107-114.
9. C. Wongchoosuk, M. Lutz, T. Kerdcharoen. Detection and Classification of Human Body Odor Using an Electronic Nose. Sensors 2009, 9(9): 7234-7249.

S3 – Portable Optical-based Electronic Nose using LEDs Array and Its Applications for Volatile Discrimination

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Abstract

Olfaction is critically important for all mammals including human for survivability. Recently, this natural capability has been mimicked as electronic nose (e-nose), thus widely utilized in many industries including environment monitoring, health care, securities, food quality assessment etc. Although several types of e-nose have been developed and demonstrated for their usefulness and efficiency, the optical-based method can provide some advantages over other counterparts. However, the optical based e-nose has been known for its high cost and large size to be widely realized by most users. In this work, we have developed a low-cost portable optical-based e-nose. The system was designed to have a compact size and simple to use. In this study, we have divided this works into 3 parts; gas sensing fabrication, molecular interactions underlying the sensing mechanism and the e-nose set up. The experimental results have shown that the optical e-nose successfully classifies various types of alcoholic odors, to be applied for health and food areas. Finally, we hope that this affordable instrument will be adopted for many industries in the future.

Keyword portable electronic nose, optical electronic nose, thin film gas sensor, LEDs light source, gas monitoring.

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References

1. Kladsomboon S, M.Lutz, Pongfay T, Kerdcharoen T, "An optical artificial nose system for odor classifications based on LED arrays" Proceeding of the Electrical Engineering/Electronic Computer Telecommunication and Information Technology conference (ECTI2011), pp. 145-148, 2011.
2. Kladsomboon S, M.Lutz, T.Pogfay, Puntheeranurak T, Kerdcharoen T,"Hybrid Optical-electrochemical electronic nose system based on Zn-porphyrin and multi-walled carbon nanotube composite", Journal of Nanoscience and Nanotechnology, vol.12, pp.5240-5244.
3. Thepudom T, Kladsomboon S, Pogfay T, Tuantranont A and Kerdcharoen T, "Portable optical-based electronic nose using dual-sensors array applied for volatile discrimination," Electrical Engineering/Electronic Computer Telecommunication and Information Technology conference (ECTI2012), 2012, pp. 1-4.
4. Thepudom T, Tuantranont A, Kerdcharoen T, "Health-care electronic nose to detect beer odor in breath after drinking," Biomedical Engineering Internatoinal Conference (BMEiCON-2012), pp. 1-4, 2012.
5. Eambaipreuk A, Kladsomboon S, Kerdcharoen T, "Breath monitoring based on the optical electronic nose system," Biomedical Engineering Internatoinal Conference (BMEiCON-2011), pp. 63-66, 2011.
6. Kladsomboon S, Lutz M, Pogfay T, Puntheeranurak T, Kerdcharoen T,"Hybrid Optical-electrochemical electronic nose system based on Zn-porphyrin and multi-walled carbon nanotube composite", Journal of Nanoscience and Nanotechnology, vol.12, pp.5240-5244, 2012.
7. Kladsomboon S, Kerdcharoen T, "A method for the detection of alcohol vapours based on optical sensing of mgnesuim 5,10,15,20-tetraphenyl porphyrin thin film by an optical spectrometer and principal component analysis," Analytica Chimica Acta, vol. 757, pp. 75-82, 201

S4 - Application and Study of Poly Para-xylene Chloride Coating for Protection Properties

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Abstract

The environment is not only closely related to human life, but also impact stability of the various types of products. Under the influence of sunlight and rain, the failure of electronic components, such as the destruction of cultural heritage issues are caused. To develop the technology of the material surface protection is considered to be very important. Poly Para-xylene Chloride (Parylene) film is a kind of electrical insulation and corrosion resistance to a variety of excellent protective polymer materials, and Parylene deposition process is completely environmentally friendly, will not have any negative impact on humans and the environment. In our research, the deposition device was originally made to prepare poly Para-xylene Chloride thin film with better uniformity, integrity and protective performance.

Keyword: environment; Chemistry vapor deposition; PolyPara-xylene Chloride Coating; Protective Performance

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References

1. K. M. Vaeth, R. J. Jackman, A. J. Black. et al. Use of Microcontact Printing for Generating Selectively Grown Films of Poly(p-phenylene vinylene) and Parylenes Prepared by Chemical Vapor Deposition. Langmuir, 2000, 16(22): 8495-8497.
2. K. Smalara, A. Giełdon, M. Bobrowski. et al. Theoretical Study of Polymerization Mechanism of p-Xylylene Based Polymers. J.Phys.Chem.A, 2010, 114(12):4297-4298.
3. N. B. Khiem, K. Matsumoto, I. Shimoyama. Tensile Film Stress of Parylene Deposited on Liquid. Langmuir, 2010, 26(24):18771-18773.
4. J. B. Fortin, T. M. Lu. A Model for the Chemical Vapor Deposition of Poly(para-xylylene) (parylene) Thin Films. Chem.Mater., 2002,14:1945-1947.

S5 - CaO-looping process for CO_2 capture

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Abstract

Nowadays, the global warming is a keen problem discussed in all over the world, thus the reduction of emissions of greenhouse gases from fossil fuel combustion is of great concern. CO_2 emission to the atmosphere from combustors of fossil fuels is one of the reasons of the increased concentrations of greenhouse gases in the atmosphere, so new combustion technologies are needed to solve this problem. In this study, three kinds of coal were burned in an oxygen-enriched atmosphere using a twin-fluidized bed solid circulation system under a condition of Calcium Looping process. This twin-fluidized bed system consisted of a fast bed regenerator (calciner) into which fuel and oxygen-enriched gas were fed and a bubbling bed absorber (carbonator) into which air was fed. Inert quartz sand was employed as the bed material to evaluate the combustion behavior of coal, including char transportation from regenerator to absorber and formation of CO and CO_2 there. The results showed that high volatile coal was reactive and low emissions of CO and CO_2 were observed in absorber, but the emission of NOx from the regenerator was a little higher than those of low volatile coal, also knew that consideration of only the volatile matter is not sufficient for coal selection, choice of bed material and process controlling parameter are also important.

Keyword: Calcium looping, Nitric oxide, Coal combustion, Fluidized bed

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References

8. Shimizu T, Hirama T, Hosoda H, Kitano K, Inagaki M, Tejima K. A twin fluid-bed reactor for removal of CO_2 from combustion processes. Chemical Engineering Research and Design 1999; 77: 62-68.
9. Charitos A, Hawthorne C, Bidwe AR, Korovesis L, Schuster A, Scheffknecht G. Hydrodynamic analysis of a 10kWth Calcium Looping Dual Fluidized Bed for Post-combustion CO_2 capture. Powder technology 2010; 200: 117-27.
10. Hughes RW, Macchi A, Lu DY, Anthony EJ. Changes in Limestone Sorbent Morphology during CaO-$CaCO_3$ Looping at Pilot Scale. Chemical Engineering Technology 2009; 32: 425-34.
11. Salvador C, Lu D, Anthony EJ, Abanades JC. Enhancement of CaO for CO_2 capture in an FBC environment. Chemical Engineering Journal 2003; 96: 187-95.
12. Shimizu T, Takahashi T, Narisawa H, Li LY, Kim HJ. CaO Looping Cycle for CO_2 Separation. Proc. 10th International Conference on Circulating Fluidized Beds and Fluidization Technology - CFB-10 (Ed. by T. Knowlton) 2011; 329-36.
13. Shimizu T., Sazawa y., Adschiri T., Furusawa T. Conversion of char-bound nitrogen to nitric oxide during combustion. Fuel 1992; 71:361-65.

S6 - Unexpected relation of fruit cultivation methods and Japanese traditional culture

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Abstract

The cultivation area of Japanese apple 'fuji' has been extending in China, Korea, USA, and Australia in recent year. However, a lack of winter chilling for breaking bud endodormancy has been occurring in the low-latitude regions. We revealed the unexpected relation of fruit cultivation methods and Japanese traditional culture.

Keywords
Fruit cultivation methods, Japanese traditional culture

S7 - Elucidation of various factors affecting the symbiosis between soybean and arbuscular mycorrhizal fungi

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Abstract

Roots of soybean (or soya bean) establish symbiosis with nodule-inducing rhizobia and AM fungi. AM fungi absorb phosphate ion and some minor elements in soil and supply them for its host plant. At the same time, AM fungi obtain carbon compounds from host plant as an energy source. In this association, AM fungi generally promote the growth of host plant. The research on AM fungi contributes to the sustainability of agricultural production in the world as well as the resolution of environmental problems, such as forest conservation.

(1) Host specificity of AM fungi in the root of soybean

Soybeans were inoculated with four species of AM fungi (Gigaspora rosea, Gigaspora margarita, Glomus etunicatum, and Glomus clarum). The number of AM fungal spore multiplied in potting soil was counted by wet sieving method. A large difference in the spore number multiplied in soil was observed among four AM fungal species. This may be due to the difference in the mycorrhizal formation among four AM fungal species tested.

(2) Influence of phosphate application on the AM fungal colonization rate in the root of soybean

Root samples of soybean colonizing an AM fungus, Gigaspora rosea, were stained with trypan blue in this experiment. The F% (Frequency of mycorrhizal colonization), the M% (Intensity of mycorrhizal colonization), and the A% (Arbuscule abundance) in the roots of soybean were investigated. I found that the F%, M% and A% in the roots of soybean decreased with an increase in the rate of phosphate application.

Keyword: soybean, AM fungi, Host specificity, phosphate application

S8 - Regeneration and clonal growth of natural Japanese cedar forest after typhoon disturbance in a snowy region of Japan

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Abstract

Japanese cedar (*Cryptomeria japonica*) is the coniferous, endemic tree species in Japan. The purpose of this study is to clarify the effects of disturbance on regeneration by seeds and clonal growth of Japanese cedar forest. By comparing two plots (stable and disturbed), the seedlings and clonal growth of Japanese cedar were investigated in a natural forest in a snowy region of Japan. The disturbed plot had been attacked by a large typhoon in 1999 and had the large canopy gap while the stable plot might never been taken any critical disturbance. In the disturbed plot, the number and the length of cedar seedlings are greater than the stable plot, especially on mounds and on fallen trees. It was estimated that fifty-seven trees (/ha) have been fallen in the disturbed plot. Eighty-three percent of fallen trees are alive, and their buds and sprouts have grown as large as other trees. This result shows Japanese cedar reproduces their stems not only by layering but also buds of fallen trees. This study suggests that the large gap formation promotes seedling growth, and that fallen trees may have a strong effect on the regeneration of the forest.

Keywords: Clonal growth, Japanese cedar, Regeneration of natural forest, Typhoon disturbance

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S9 - Effects of patch size on species diversity, species composition and trophic types of aquatic insects associated with floating plants in a wetland

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Abstract

This study was aimed to explore factors influencing community structure by manipulating sizes of habitat patch and monitoring change in community structure through time. Epiphytons (representing by aquatic insects) associated with floating plants (representing by water hyacinth) with different sizes (representing patch sizes increasing from 5%, 10%, 20% up to 80% in each week) were studied in Mahidol University wetlands, Salaya Campus for 9 weeks. Aquatic insects were monitored by examining species or Recognizable Taxonomic Units (RTUs) and abundance. It was found that in natural growth, % cover of floating plants were constant at 5% during the study. The maximum species richness was 16 and 11 in manipulated and natural patches, respectively. Maximum species diversity was found in manipulated patches of 70% cover at 8 weeks from the start time of experiment. Four trophic levels were classified. Invert trophic structures were found in both conditions. Diving beetle and Damselfly nymph were tertiary consumer with highest numbers followed by Water boatman (secondary consumer), Mayfly nymph (primary consumer) and Creeping water bug (quaternary consumer). These results suggest that percent cover of floating plants and time of colonization affect structures of community of aquatic insects in a wetland community in term of number of species, diversity and species that used floating plants as microhabitat. Tertiary consumer may use floating plants as cover to predate other species outside.

Keywords: aquatic insects, floating plants, habitat patches, trophic types, wetland

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References

1 Beattie AJ, Oliver I. A Possible Method for Rapid Assessment of Biodiversity. Conservation Biology 1993; 7: 562-568.
2 Magdi M, Mageed AA, Heikal M. Importance of aquatic macrophyte for invertebrate diversity in large subtropical reservoir. Limnologica 2007; 37: 155-169.
3 Knope ML, Forde SE, Fukami T. Evolutionary History, Immigration History, and the Extent of Diversification in Community Assembly. Frontiers in Microbiology 2012; 2: 1-8.
4 Maurer MA, Brusven MA. Insect abundance and colonization rate in *Fontinalis neo-mexicana* (Bryophyta) in an Idaho Batholith stream, U.S.A. Hydrobiologia 1983; 98: 9-15.
5. Slobodchikoff CN, Parrott JE. Seasonal diversity in aquatic insect communities in an all-year stream system. Hydrobiologia 1977; 52: 143-151.

S10 - Saltwater Wedge Intrusion and Its Control methods in the Estuary of Shinkawa River

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Abstract

The seawater intrusion renders the quality of river water unsuitable for agricultural use. To avoid saltwater mixture to the irrigation water, closing the sluice gate at the Shinkawa river mouth and stopping water intake pump stations have been implemented when the wedge is expected to ascend up to the height of pumps' intake opening. However, operating drainage pumps incurs a cost and stopping pumps causes shortage of irrigation water. This study, therefore, aims at analyzing the characteristics of saltwater wedge, evaluating the influence of saltwater intrusion on irrigation water and finding inexpensive but effective countermeasures to control the saltwater intrusion. The shape and behavior of saltwater wedge in Shinkawa River were visualized through field surveys and numerical calculation under different conditions. Then, the one-dimensional and two-layer unsteady flow model was applied to calculate the depth of density interface in 2011. It can be found that the EC value reaches 1500μS/cm when the vertical distance between the pump opening and halocline zone becomes less than 1.2m, and this situation was estimated to occur in about 23.0% of the total irrigation period. Based on the research above, the in-situ experiment that push-out the saltwater layer outside the river through a submerged orifice was conducted to control the saltwater wedge. As a result of the experiment, the height of the interface between saltwater and freshwater close to intake of pumps fells about 1.5 m within 4 hours. This method can be adopted to limit or prevent the saltwater intrusion in this river.

Keyword: Saltwater Wedge, Eco-sounding Profiling System, Numerical Simulation, Density Interface

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References

1. Frank E. Sargent, Gerhard H. Jirka, M. Experiments on Saline Wedge. Journal of Hydraulic Engineering 1987, 113: 1307-1323.
2. Takao Tokuoka, Ayumi Fukita, Masaaki Tateishi, Kiyokazu Nishimura, Kei Anma, Shigeo Matsuda, Toshiharu Kawasumi and Tatsuo Seki. Saline wedge observation by echo-sounding equipment (SC-3) and towing type water quality monitor (TPM CLOROTEC). LAGUNA 2005, 12: 81-87.
3. Wenping Gong, Jian Shen. The response of salt intrusion to change in river discharge and tidal mixing during the dry season in the Modaomen Estuary, China. Continental Shelf Research 2011, 31: 769-788.
4. Gillibrand, PA and Balls, PW. Modeling salt intrusion and nitrate concentrations in the Ythan estuary. Estuarine, Coastal and Shelf Science 1998, 47: 695-706.

5. Suga Ryozou. Numerical calculation of one-dimensional and two layers unsteady flow. The 24th proceeding of coastal engineering, 1977: 544-548.

S11 - Studies on the Detection of Autophagy in the Gastrointestinal Tract

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Abstract

Autophagy, conserved in all eukaryotes, is a lysosomal bulk degradation process of intracellular components including proteins. It significantly contributes to the turnover and rebuilding of cellular components. Autophagy is induced to supply hosts with energy and amino acids when they are fasted and is known to be regulated by nutrients such as amino acids. Although various organs/tissues are used in studies of autophagy, studies in the gastrointestinal tract are quite limited and the method to assess the autophagy in the small intestine have not established yet. However, some researchers begin to pay attention to the relationship between autophagy and the atrophy of gastrointestinal tract which has become a serious issue recently, because protein metabolism in atrophy of the small intestine of patients is significantly altered by the suppression of protein synthesis and/or the increase of proteolysis. Therefore, we attempted to establish the method to assess autophagy in the small intestine. To investigate the involvement of autophagy in atrophy of the gastrointestinal tract, we employed male Wistar rats fasted for 2 days, a typical condition causing atrophy. The detection of autophagy in the small intestine was undertaken by immunostaining technique, a morphological detection and a western blot, a biochemical detemination. As a result, it was proved that autophagy actively works in the small intestine. Therefore, it is suggested that autophagy is potentially involved in the atrophy of the gastrointestinal tract.

Keywords: Autophagy, Small Intestine, Starvation

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References

1. Drake, K. R., Kang, M., and Kenworthy, A. K. Nucleocytoplasmic Distribution and Dynamics of the Autophagosome Marker EGFP-LC3. *PLoS ONE, 2010:* 5, e9806.
2. Kadowaki, M. and Karim, M. R. Enhancement of autophagy by nutrition. *G. Gerontology, 2007:* 53, 43-44.
3. MacNurlan M. A., Tomkins, M. A., and Garlick, P. J. The effect of starvation on the rate of protein synthesis in rat liver and small intestine. *J. Biochem*, 1979: 178, 373-379.
4. Mizushima, N. Methods for monitoring autophagy. *Int. J. Biochem. Cell Biol*, 2004: 36, 2491-2502.
5. Shibata M., Yoshimura, K., Furuya, N., Koike, M., Ueno, T., Komatsu, M., Arai, H., Tanaka, K., Kominami, E., and Uchiyama, Y. LC3 localizes to not only autophagosomal membranes but also the surface membrane of LDs in hepatic and cardiac tissues under starvation conditions. *Biochem. Biophys. Res. Commun., 2009:* 382,419-423.

S12 - Variation in autophagic control to different genotypic families of *Mycobacterium tuberculosis* in host macrophages

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Abstract

Tuberculosis, caused by *Mycobacterium tuberculosis* (Mtb), is a major global health problem in the world. Mtb infection outcomes are thought to depend upon a complex interplay between host and microbial factors. Epidemiological studies have revealed the differences in virulence among Mtb genotypic families, especially the Beijing family which is reported to be more virulent and associated with poor clinical outcomes and drug resistance when compared to those of the Non-Beijing strains. The Beijing family's hyper-virulence is thought to be resulted from the greater ability to block its phagocytic delivery to lysosome. Recently, autophagy induction has been shown to enhance mycobacteria elimination in host cells by promoting the delivery of *Mycobacterium* laboratory reference strains to lysosome. Autophagy is a biological conserved process by which cytoplasmic contents are engulfed in double membrane vacuole called autophagosome which subsequently fuses with lysosome to digest the sequestered contents. However, the difference in autophagic killing ability of Beijing and Non-Beijing clinical isolates by host macrophages remains undetermined. We hypothesize that the Beijing strains possess greater ability to inhibit host cell autophagy when compared to those of the Non-Beijing clinical isolates. To test this hypothesis we used 10 clinical isolates of both Beijing and Non-Beijing families which include 5 different RFLP groups together with 2 different *pks 15/1* characteristics and a virulent laboratory reference strain (H37Rv). The results showed that upon induction of autophagy, the Beijing isolates can greater resist the autophagic killing of mycobacteria by host cells when compared to those of the Non-Beijing strains such as the Nonthaburi and Single-band isolates. Interestingly, the delivery of all mycobacterial strains to lysosomes is increased as expected upon autophagic induction. To our surprise, the percent colocalization of the Beijing isolates with lysosomes upon autophagic induction appears to be greater increased when compared to those of the Non-Beijing families. These results indicated that even though the Beijing isolates are able to greater inhibit the autophagic killing of Mtb, these strains do so not by inhibiting the delivery of the mycobacteria to lysosomes but through another mechanism.

Keywords: Autophagy, *Mycobacterium tuberculosis*, Beijing family, Non-Beijing family, *pks 15/1*

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S13 - Characterization of Major Allergens from Amaranthus Pollen among Thai Patients

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Abstract

Amaranthus is commonly known as careless weed or Phak khom in Thai. It usually grows in agricultural fields, along road sides and waste areas. Amaranthus pollen allergy has been recognized as a severe problem in several countries, including Thailand. Although there are several Amaranthus species growing abundantly along roadsides in Thailand, no published data about Amaranthus allergy is available. So far, only one allergenic component of Amaranthus pollen has been identified and sequenced from *A. retroflexus*, Ama r 2 but this species cannot be found in Thailand. Therefore, identification of major allergens from Amaranthus pollens species in Thailand is clinically important for allergic disease diagnostics. Samples of Amaranthus inflorescence were collected and identified. There are two species of Amaranthus of which pollen can be collected—*A. hybridus* and *A. spinosus*. The crude extract of pollen from both species was separated by SDS-PAGE. Allergenic proteins were analyzed by immunoblot with serum obtained from thirteen allergic patients. SDS-PAGE analysis revealed that *A. hybridus* and *A. spinosus* pollen proteins comprised of at least twelve discrete protein bands with molecular weight ranging from 10 kD to 80 kD. Even though protein profiles obtained from SDS-PAGE of two Amaranthus species were similar, immunoreactivity was found to be different. The 20 kD, 25 kD and 37 kD bands were major allergens of *A. spinosus.* However, only the 25 kD band was the major allergen of *A. hybridus.*

Keywords: Allergen, Amaranthus, Pollen, SDS-PAGE, Immunoblot

Acknowledgements
The authors would like to thank Institutes of Molecular Biosciences, Mahidol University, Nakhonpathom 73170, Thailand.

References

1. Bunnag C, Kongpatanakul S, Jareoncharsri P, Voraprayoon S, Supatchaipisit P. A Survey of Allergic Diseases in University Students of Bangkok, Thailand. . J Rhinol. 1997 4(2):90-3.
2. Cruz DRDL, Sannchez-Reyes E, Sanchez-Sanchez J. Analysis of Chenopodiaceae-Amaranthaceae airborne pollen in Salamanca, Spain. Turk J Bot. 2012;36:336-43.
3. Franssen AS, Skinner DZ, Al-Khatib K, Horak MJ. Pollen morphological differences in Amaranthus species and interspecific hybrids. Weed Sci. 2001;49:732-7.
4. Tehrani M, Sankian M, Assarehzadegan MA, Falak R, Jabbari F, Varasteh A. Immunochemical characterization of Amaranthus retroflexus pollen extract: extensive cross-reactive allergenic components among the four species of Amaranthaceae/Chenopodiaceae. Iran J Allergy Asthma Immunol. 2010;9(2):87-95.
5. Tehrani M, Sankian M, Assarehzadegan MA, Falak R, Noorbakhsh R, Moghadam M, et al. Identification of a new allergen from *Amaranthus retroflexus* pollen, Ama r 2. Allergol Int. 2011;60(3):309-16.

S14 - Metabolomic Analysis of *Artemisia annua* L. Plant in Responses to Ethephon

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Abstract

Metabolome is the one of major tools for postgenomic analysis besides transcriptome or proteome. With the recent advance technique, mass spectrometry (MS) can apply to identify huge amounts of data set for non-targeted metabolite profiling. The generated data set can give a meaningful interpretation by observed their correlation. In this studied focusing on the effect of ethephon, an ethylene releasing agent on the metabolome of *Artemisia annua* plant. Biochemical responses of different *A. annua* lines to ethephon were observed by gas chromatography-mass spectrometry (GC-MS). The principal component analysis (PCA) of metabolite in each line could distinguish the plant samples into two groups as those that highly respond and slightly respond to ethephon. The variations of metabolic profiles were observed according to different genomic backgrounds of *A. annua* derived from mutant lines. Interestingly, ethephon affect to increase the target compound, artemisinin in most of plant extracts. Since artemisinin is a major useful compound use for antimalarial drug, therefore ethephon can be further applied as elicitor to increase its production.

Keywords: *Artemisia annua*, ethephon, metabolomics, artemisinin, GC-MS

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References

1. Banyai W, Mii M, Supaibulwatana K. Enhancement of artemisinin content and biomass in Artemisia annua by exogenous GA3 treatment. Plant Growth Regul. 2011 2011/01/01;63(1):45-54.
2. Brown GD. The Biosynthesis of Artemisinin (Qinghaosu) and the Phytochemistry of *Artemisia annua* L. (Qinghao). Molecules. 2010;15(11):7603-98.
3. Saeed AI, Bhagabati NK, Braisted JC, Liang W, Sharov V, Howe EA, et al. [9] TM4 microarray software suite. In: Alan K, Brian O, editors. Methods Enzymol: Academic Press; 2006. p. 134-93.

S15 - Physiological and biochemical responses after molasses application to salt stress exposure of *Eucalyptus camaldulensis* seedling

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Abstract

Eucalyptus camaldulensis is one of the important economic trees with high potential species for rehabilitation of forest. Increasing salt tolerance ability of *E. camaldulensis* is necessary for success plantation at salt - affected area. Molasses; a liquid residue by products of sugar industries has been suggested as soil amendments, plant organic fertilizer and increased population number of soil microorganism throughout growing season (Lee, 2010). The investigation was aimed to study the effect of molasses on physiological and biochemical changes of *E. camaldulensis* seedlings under salt stress condition. Sixty day - old seedlings with 5 pairs leaves were transferred to a culture bottle containing 50 ml half - strength Murashige and Skoog (1962) medium and 30 g L^{-1} vermiculite supplemented with molasses solution (5, 10 or 20 ml L^{-1}) then exposed to 0 and 300 mM NaCl for 7 days. The results showed that net photosynthetic rate, photosynthetic efficiency and relative water content in leaf significantly increased after exposing to 5, 10 and 20 ml L^{-1} molasses however the electrolyte leakage and proline content significantly decreased. It was proposed that molasses might act as an exogenous substance to enhance the resistance under salt stress condition of *Eucalyptus camaldulensis* seedlings.

Key words: *Eucalyptus camaldulensis*, molasses, salt stress, physiological response, biochemical response

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References

1. Cha – um, S. and Kirdmanee, C. 2008. Assessment of salt tolerance in *Eucalyptus*, rain tree and Thai neem under laboratory and the field condition. Pak. J. Bot. 40: 2041 – 2051.
2. Cha – um, S. and Kirdmanee, C. 2010. Effect of inland salt-affected soil on physiological and growth characters of Eucalypt tree (*Eucalyptus camaldulensis* Dehnh.). J. Food Agric. 22 (6): 466 - 474.
3. Lee, J. 2010. Effect of application methods of organic fertilizer on growth, soil chemical properties and microbial densities in organic bulb onion production. Scientia Horticulturae 124: 299 – 305.

S16 – Development and Evaluation of the Oriental Fruit Fly, Genetic Marker Strain for SIT

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Abstract

The oriental fruit fly, *Bactroceradorsalis* (Hendel), is a destructive agricultural pest worldwide, causing a loss of quality and quantity of economic crop yields. In pest control, sterile insect technique (SIT) involves field release of large numbers of mass-reared and sterile insects, resulting in successful suppression or eradication of a fruit fly population through infertile matings. Assessment of SIT efficiency requires an accurate identifiable maker for released flies in monitoring, leading to the development and evaluation of a genetic marker strain of this fly. Marker strain development was carried out by characterization of eleven microsatellite DNA markers. Moreover, a test examined the mating effectiveness of the sterile mass-reared strain by egg hatchability. Fruit flies were released into the field cages that simulated different fruit fly control scenarios. The newly developed markers were used to evaluate the maintenance of genetic equilibrium of the strain under mass-rearing conditions. The newly characterized Y-linked microsatellite markers were also used for strain identification to discriminate released sterile males from wild males in order to reduce cost and misidentification in the field monitoring of SIT. Field cage tests suggested that sterile mass-reared males were as competitive as wild males in mating with wild females. Finally, this marker strain can be massively produced, released, and successfully suppress the target wild population in open field testing, and can provided a lower fruit infestation rate. Therefore, the novel microsatellite marker strain will help to increase efficiency and safety of SIT against oriental fruit flies.

Keywords: *Bactroceradorsalis*, marker strain, SIT, field cage test

S17 - Phylogenetic Study of the Banana Family (Musaceae) in Thailand Based on *trn*L-F Region

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Abstract

The banana family or Musaceae, an economically important tropical crop plants, distribute in tropical region of Asia, Africa, and Australia This family comprises of three genera, *Musa* (around 65 species), *Ensete* (8-9 species) and the monotypic genus *Musella*. Phylogenetic study of the banana eases correct and accurate classification of the banana. Moreover, new genetic resources are useful in banana breeding program. In this study, phylogenetic analyses of 30 banana accessions, including 13 species and 4 subspecies in Thailand were analysed along with sequences of 13 banana species from GenBank database based on *trn*L-F sequences on chloroplast genome. *Ravenala madagascariensis* F.J. Gmel. and *Phenakospermum guyannense* (Rich.) Endl. ex Miq. was used as an outgroup. Phylogenetic tree was constructed using Maximum parsimony method and Neighbor-joining method. The analyses showed that the Musaceae is monophyletic and do not support classification of the sections. *Callimusa* species formed a clade with *Australimusa* species, meanwhile, *Musella*, *Ensete*, *Musa ingens* and *Musa* sp. formed a clade with *Rhodochlamys* species. The phylogenetic position of the monospecific *Musella* genus as sister to the clade of *Ensete* suggested that *Musella* is closely related to the *Ensete* species more than to the *Musa* species. However, molecular alone cannot provided reasonable clearly and should be comparison with other characters, such as morphology and anatomy. Next study, we investigate on floral morphology and anatomy to combine with molecular phylogenetic study.

Keyword DNA sequence; molecular phylogeny; Musaceae; *trn*L-F; diversity

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References

1. Kress, WJ., Wurdack, KJ., Zimmer, EA., Weigt, LA. and Janzen, DH. Use of DNA barcodes to identify flowering plants. Proceedings of the National Academy of Sciences of the United States of America. 2005; 102: 8369-8374.
2. Liu, A.-Z., Kress, WJ. and Li, D-Z. Phylogenetic analyses of the banana family (Musaceae) based on nuclear ribosomal (ITS) and chloroplast (*trn*L-F) evidence. Taxon 2010; 59 (1): 20-29.
3. Swangpol S., Volkaert H., Sotto RC., Seelanan T. Utility of selected noncoding chloroplast DNA sequences for lineage assessment of *Musa* interspecific hybrids. Journal of Biochemistry and Molecular Biology. 2007; 40: 577- 587.
4. Taberlet, P., Gielly, L., Pautou, G. and Bouvet, J. Universal primers for amplification of three non-coding regions of chloroplast DNA. Plant Molecular Biology. 1991; 17: 1105–1109.

S18 - Production of Polyploid plants in Kale and Raphanobrassia with colchicine and amyprophosmethyl treatments with the aid of ethylene inhibitors

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Abstract

Brassicaceae plants are known to contain glucosinolates as antioxidants. Recently, we found that some Raphanobrassica plants produced by the cross between radish (*Raphanus sativus*) and Kale (*Brassica oleracea*) showed higher glucosinate contents than both parents. For further breeding of these hybrids, it is necessary to restore the fertility by producing amphidiploid of the hybrids by chromosome doubling. In this study, therefore, we tried to induce chromosome doubling of radish, kale and Raphanobrassica by imbibing the seeds with a solution of colchicine or Tokunol-M (60% amiprophosmethyl) for 24 h, follow by in vitro culture on1/2 MS medium. In radish and kale, 15 mg/l Tokunol-M induced high polyploidization rate. Chromosome-doubled seedlings could be easily detected by the inhibited growth 7 days after sowing and those having less than 0.1 g fresh weight were all tetraploid, indicating that tetraploid plants can be selected easily one week after initiation of chromosome doubling treatment. In our previous study, we obtained hexaploid and octaploid. All 3 kinds of polyploidy Raphanobrassica (4, 6 and 8X) shoed chlorosis of leaves after transfer onto fresh 1/2 MS medium. Addition of 4 mg//l silver nitrate, an ethylene inhibitor, to the medium resulted in decreased number of the chlorotic leaves. AVG (aminoethoxyvinyglycine), another ethylene inhibitor was also effective to prevent chlorosis at 0.2 mg/l in all the 3 kinds of polyploids. By applying these ethylene inhibitors to medium, polyploidization rate was also increased.

Keywords: Chromosome doubling, Antimiotic agents, Ethylene inhibitor

S19 - *Agrobacterium*-mediated transformation of Dendrobium Orchid

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Abstract

Dendrobium orchid is one of the most important ornamental plants as potted plant and cut flower with a variety of color except for blue. In this study, *Agrobacterium*-mediated genetic transformation was carried out by co-cultivating PLBs with *Agrobacterium tumefaciens* strain EHA101 carrying pIG121Hm, which harbored β-glucuronidase (*GUS*) gene as a reported gene and hygromycin phosphotransferase II (*hptII*) gene as selectable gene used for clarifying optimum conditions and 3 kinds of 3 vectors containing flavonoid-3',5'-hydroxylase (F3'5'H) gene, used for producing blue flower color. After selection of the infected PLBs on ND medium containing 1% maltose, 20 mg/l hygromycin and 20 mg/l meropenem for 4 months, regenerated plantlets were obtained from secondary PLBs produced from survived PLBs. The highest efficiencies of PLBs with hygromycin resistance were 15% in the former and 5.9-7.1% in the latter vectors, respectively, when they were inoculated with 10 times diluted Agrobacterium solution (OD600=0.1) for 30 minutes with shaking culture (80 rpm). Transformation of the hygromycin resistant plantlets was confirmed by GUS histochemical assay and PCR analysis.

Keywords: genetic transformation, *Agrobacterium*- mediated, Dendrobium

S20 - Transgenic tomato plants expressing two antifungal protein genes driven by a root specific *AtNRT2.1* promoter confer resistant against root pathogen

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Abstract

Fusarium wilt is an economically important disease of tomato, caused by the soil-born fungus *Fusarium oxysporum f. sp. lycopersici*. We previously reported that wasabi defensin (*WD*) gene (0.5 kb) and synthetic chitinase (*NIC*) gene (1.2kb) were used to confer resistant against soil-borne diseases. In this study, these two antifungal genes were linked to a root-specific promoter (1.1 kb) of *AtNRT2.1* (nitrate transporter 2.1) gene derived from *A. thaliana* then transform into tomato to enhance resistant against *F. oxysporum.* Generated tomato was confirmed by southern hybridization and western blot analysis. The result indicated stable integrations of the transgene into tomato genome with different locations and the protein were accumulated only in root. Disease resistant bioassay against *F. oxysporum* was conducted, all transgenic plants showed increased levels of resistant compared to control. Antifungal activity of protein extract from root or leaf tissue was assayed as CFU (colony forming unit). The CFU values of the control plants did not have significant differences between roots and leaf extracts, however, their values of root extracts in transgenic plants expressing *AtNRT2.1:WD2* and *AtNRT2.1:NIC7* (3.83 and 4.33 CFU respectively) were much lower than those of control (18.25CFU). These results suggest that promoter of *AtNRT2.1* gene successfully trigger the two antifungal genes to be expressed in root and conferred increased level of resistant against root pathogen *F. oxysporum.* On the view of food security, root specific expression of the transgenes is desirable due to T-DNA does not express in the fruit of edible part of tomato.

Key words: *Fusarium oxysporum*, root-specific promoter, Nitrate transpoter 2.1

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References:

1. Maria-Jesfis Cornejo, Diane Luth, Kathleen M. Blankenship, Olin D. Anderson and Ann E. Blechl Activity of a maize ubiquitin promoter in transgenic rice. *PlantMolecularBiology*23: 567-581, 1993
2. Wanggen Zhang, David McElroy, and Ray W U, Analysis of Rice *Actl* 5' Region Activity in Transgenic Rice Plants. The Plant Cell, Vol. 3, 1155-1165, November 1991
3. Wenbin Li, Ye Wang, Mamoru Okamoto, Nigel M. Crawford, M. Yaeesh Siddiqi, and Anthony D.M. Glass Dissection of the *AtNRT2.1:AtNRT2.2* Inducible High-Affinity Nitrate Transporter Gene Cluster1.Plant Physiology, January 2007, Vol. 143
4. Raham Sher Khan, Masahiro Nishihara, Saburo Yamamura, Ikuo Nakamura, Masahiro Mii1Transgenic potatoes expressing wasabi defensin peptide confers partial resistance to gray mold (Botrytis cinerea). *Plant Biotechnology* 23, 179–183 (2006).
5. V. O. Ntui, P. Azadi, G. Thirukkumaran, R. S. Khan, D. P. Chin, I. Nakamura and M. Mii Increased resistance to fusarium wilt in transgenic tobacco lines co-expressing chitinase and wasabi defensin genes. Plant Pathology (2011) 60, 221–231.

S21 - Identification of alpha-galactosidase gene in normal and curd coconuts (*Cocos nucifera* L.)

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Abstract

Curd coconut is a mutation of coconut endosperm which its solid endosperm becomes soft, its liquid endosperm remains as jelly, and sometimes filling the entire nut cavity. Curd coconut was found to be single gene homozygous recessive [1-3], and have the accumulation of galactomannan which is caused by the deficiency of a galactomannan degrading enzymes [4]. This coconut is also deficient of alpha-D-galatosidase enzyme activity [5]. In fact, this gene has not been identified yet in coconut. Therefore, this study was aimed to identify the responsible gene (alpha-galactosidase) in both normal and curd coconuts, and the types of mutation which cause the curd coconut phenotype. In our results, two isoforms of alpha-galactosidase gene (Gal I and Gal II) have been found in the endosperm of normal mature coconut. Gal II was predominately expressed while Gal I was expressed in vegetative parts but very low in mature endosperm. The coding cDNA of coconut Gal II contained 1152 bp (383 amino acids), and belonged to GH31 superfamily. The deduced amino acid sequences of coconut Gal II and α-galactosidase from tobacco, grape, rice, maize and Arabidopsis showed over 78%, 76%, 73%, 63% and 70% homology respectively. The size of Gal II gene on genomic DNA was about 7.5kb, and it showed some point mutations in the intron regions of curd coconuts while the coding cDNA contained point mutation of one amino acid. Moreover, the α-galactosidase activity in solid endosperm of normal coconut increased during the development stage of endosperm whereas in the curd coconut could not be detected. The tissue enzyme activity staining also showed the accumulation of the enzyme started from the inner layer of solid endosperm of 8 months age then evenly distributed to the whole layer of mature endosperm when the embryo started to germinate in normal coconut but absent in curd coconut.

Keywords: Curd coconut, galactomannan, α-galactosidase, gene mutation

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References

1. Zuniga, L. C. The probable inheritance of the Makapuno character of the coconut. Philippine Agriculturist 1953, 36: 402-413.
2. Charanasri, U. Large scale gardening of Maphrao Kathi (Makapuno). Proc. Agric. Conf., 1983, 31: 25-31.
3. Watthanayothin, S. Study on hybrids of Maphrao Kathi in Thailand. TNCEL J.l. 2005, 3: 6-7 (in Thai)
4. Balasubramaniam, K. Polysaccharides of the kernel of maturing and mature coconuts. *Journal of Food Sci.*, 1976, 41: 1370-1373.
5. Mujer, C. V., Tamirez, D. A. and Mendoza, E. M. T. L-D-galactosidase deficiency in coconut endosperm: Its possible pleiotropic effects in Makapuno. Phytochemistry, 1984, 23: 893-89.

Appendix

Biodata of the Invited Speakers

"Science in Sufficient Economy Theory"
Impacts on Agriculture, Food Security and Environment

Biodata

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D. Sc. (Biology: Avian Ecology), Osaka City University, Osaka, Japan

FIELD OF EXPERTISE: Avian Biology and Ecology

Parasitology (Avian Diseases)

CURRENT PROJECTS: Project Leader

1. Biology and Ecology of Hornbills of Thailand
2. Hornbill Conservation villages at Budo Mountain Project
3. Design and Installation of Artificial Nests for Hornbills in Budo-Sungi Padi National Park, Thailand (*Collaborative project with Silpakorn University*)

ACTIVITIES:

1984 - Present	Member of IUCN/Birdlife International Hornbill Specialist Group
1985 - Present	Representative of Thailand in the International Ornithological Union
1994- August 2007	A founder and Secretary - General, Hornbill ResearchFoundation
August 2007- Present	Committee, Hornbill Research Foundation
1996 - Present	Honorary Advisor of The Bird Conservation Society of Thailand
1998 - 2006	Executive Committee of the International Ornithological Committee

2000 - 2004	Elected as a "Corresponding Fellow" of the "American Ornithologists' Union (AOU)"
2001 - 2003	Executive Committee of National Wildlife reservation and Protection
2002 - Present	Committee of the Foundation for Khao Yai National Park Protection
2002 - Present	Advisory Board of Ornithological Science, Journal of Ornithological Society of Japan
2003- Present	Member of the "Thai Academy of Science and Technology Foundation"
2004- Present	Elected as "Honorary Fellow" of American Ornithologists' Union (AOU)"
2005	Advisor of Singapore Hornbill Project, Palau Ubin, Singapore (*Collaborative with National Parks Boards, Parks Management Department, Singapore*)
2006	Subcommittee of Hornbill and Lesser Adjutant Conservation with sustainable ecotourism Project, Senate of Thai Parliament.
2009	Steering committee of DIVERSITAS in Western Pacific and Asia (DIWPA)

HONORS:

International awards:

2006	The first Thai Laureate of "*The 2006 Rolex Awards for Enterprise*" from Rolex SA, Switzerland.
2006	The first Thai recipient of "*The 52nd Annual Chevron Conservation Awards*" from Chevron Corporation, USA.

National awards:

2010	Recipient of "*2010 Alumni Honor Award"* from Faculty of Education, Chulalongkorn University.
2009	Recipient of "*2008 Faculty of Graduate Studies Outstanding Alumni Award (Innovation)*" from Faculty of Graduate Studies, Mahidol University
2008	Recipient of "2007 The Dushi Mala Medal for Great Eminence in science, awarded by His Majesty King Bhumibhol (King Rama IX)
2007	Recipient of "*2007 National Outstanding Person Award (Natural Resources and environment)"*from Prime Minister Office, Royal Thai Government

2007	Recipient of "*BCST-Swarovski Award 2007 (Outstanding Bird Conservationist)"*from Bird Conservation Society of Thailand & Swarovski Optik, Austria
2007	Recipient of "*2006 Outstanding Lecturer Award(Science & Technology)"* from the Council of the University Faculty Senates of Thailand
2006	Recipient of "*2006 Faculty of Science Outstanding Lecturer Award (Professor level)*" from Faculty Senate of Faculty of Science, Mahidol University, Bangkok, Thailand.
2006	Recipient of "*2005 Mahidol University Prize for Excellence in Research*" from Mahidol University, Bangkok, Thailand
2003	Recipient of*"Professional Research Group Award"* from the National Center for Genetic Engineering and Biotechnology (BIOTEC), Ministry of Science and Technology, Thailand.
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2002	Recipient of*"Conservation & Environmental Grants"* in "Hornbill Conservation Villages at Budo Mountain Project" from Ford Operations (Thailand) Company Limited.
2001	Recipient of*"Conservation & Environmental Grants"* in "Hornbill Conservation Villages at Budo Mountain Project" from Ford Operations (Thailand) Company Limited.
1996	Recipient of*"Distinguished Conservationist Award" in "Wildlife Research"*from the Faculty of Forestry, Kasetsart University and the Royal Forest Department, Thailand.
1994	Recipient of*"Distinguished Environmental Concern Award"* from the Siam Environmental Club, Thailand.

LIST OF PUBLICATIONS

2012

Poonswad P, Thiensongrusamee P, Mudsri S. 2012. Basic conservation approaches and the fate of hornbills in Thailand: a prototype for future bird-people relationships. Journal of Ornithology. doi 10.1007/s10336-012-0868-5.

2011

Chantarat S, Barrett C, Janvilisri T, Mudsri S, Niratisayakul C, Poonswad P. 2011. Index insurance for pro-poor conservation of hornbills in Thailand. Proceedings of the National Academy of Sciences of the United of America 108: 13951-13956.

Viseshakul N, Charoennitikul W, Kitamura S, Kemp A, Thong-Aree S, Surapunpitak Y, Poonswad P, Ponglikitmongkol M. 2011. A Phylogeny of frugivorous hornbills linked to the evolution of Indian plants within Asian rainforests. Journal of Evolutionary Biology 24: 1533-1545.

Pasuwan C, Pattanakiat S, Navanugraha C, Chimchome V, Madsri S, Rattanarungsikul P, Thiensongrusamee P, Boonsriroj T, Poonswad P. 2011. As assessment on artificial nest construction for hornbills in Budo-Sungai Padi National Park, Thailand. The Raffles Bulletin of Zoology S24: 85-93.

Supa-Amornkul S, Wiyakrutta S, Poonswad P. 2011. Wood decay fungi in hornbill nest cavity in Khao Yai National Park, Thailand. The Raffled Bulletin of Zoology S24: 95-11.

Chaisuriyanun S, Gale G, Madsri S, Poonswad P. 2011. Food consumed by Great Hornbill and Rhinoceros Hornbill in tropical rainforest, Budo Sugai Padi National Park, Thailand. The Raffles Bulletin of Zoology S24: 123-135.

Kitamura S, Thong-Aree S, Sittichai M, Poonswad P. 2011. Characteristics of hornbill-dispersed fruits in lowland dipterocarp forests of Southern Thailand. The Raffles Bulletin of Zoology S24: 137-147.

2010

Kitamura S, Thong-Aree S, Madsri S, Poonswad P. 2010. Mammal diversity and conservation in a small isolated forest of Southern Thailad. The Raffles Bulletin of Zoology 58: 145-156.

2009

Kitamura S, Suzuki S, Yumoto T, Wohandee P, Poonswad P. 2009. Evidence of the consumption of fallen figs by Oriental Pied Hornbill *Anthracoceros albirostris* on the ground in Khao Yai National Park, Thailand. Ornithological Science 8: 75-79.

Chamutpong S, Saito S. Saichi, Viseshakul N, Nishiumi Isao, Poonswad P, Ponglikitmongkol M. 2009. Isolation and characterization of microsatellite markers from the great hornbill, *Buceros bicornis.* Mocecular Ecology Resources9:591-593.

Kanwatanakid-Savini C, Poonswad P, Savini T. 2009. An assessment of food overlap between gibbons and hornbills.The Raffles Bulletin of Zoology 57:189-198.

2008

Kitamura S, Yumoto T, Poonswad P, Suzuki S, Wohandee P. 2008. Rare seed-predating mammals determine seed fate of *Canarium euphyllum*, a large-seeded tree species in a moist evergreen forest in Thailand. Ecological Research 23:169-177.

2007

Kitamura S, Yumoto T, Poonswad P, Wohandee P. 2007. Frugivory and seed dispersal by Asian elephants, *Elephas maximus*, in a moist evergreen forest of Khao Yai National Park, Thailand. Journal of Tropical Ecology23:373-376.

Suzuki S, Kitamura S, Kon M, Poonswad P, Chuailua P, Plongmai K, Yumoto T, Noma N, Maruhashi T,Wohandee P. 2007. Fruit visitation patterns of small mammals on the forest floor in a tropical seasonal forest of Thailand. Tropics16:17-29.

2006

Kitamura S, Suzuki S, Yumoto T, Poonswad P, Chuailua P, Plongmai K, Maruhashi T, Noma N, Suckasam C. 2006. Dispersal of *Canarium euphyllum* (Burseraceae), a large-seeded tree species, in a moist evergreen forest in Thailand. Journal of Tropical Ecology 22: 137-146.

2005

Poonswad P, Sukkasem C, Phataramata S, Hayeemuida S, Plongmai K, Chuailua P, Thiensongrusame P, Jirawatkavi N. 2005. Comparison of cavity modification and community involvement as strategies for hornbill conservation in Thailand. Biological Conservation 122: 385-393.

Kitamura S, Suzuki S, Yumoto T, Chuailua P, Plongmai K, Poonswad P, Noma N, Maruhashi T, Suckasam C. 2005. A botanical inventory of a tropical seasonal forest in Khao Yai National Park, Thailand: implications for fruit-frugivore interactions. Biodiversity Conservation 14: 1241-1262.

Ouithavon K, Poonswad P, Bhumbhakpan N, Laohajinda V. A comparative study of the feeding ecology of two sympatric hornbill species (Aves: Bucerotidae)during their breeding season in Huai Kha Khaeng Wildlife Sanctuary 2005. *In:* Lum S, Poonswad P (eds). The ecology of hornbills: reproduction and populations. Bangkok: Pimdee Karnpim Co. Ltd. p 59-74.

Thiensongrusamee P, Poonswad P, Hayeemuida S. 2005. Characteristics of Helmeted Hornbill nests in Thailand.*In:* Lum S, Poonswad P (eds). The ecology of hornbills: reproduction and populations. Bangkok: Pimdee Karnpim Co. Ltd. p 51-54.

Ouithavon K, Poonswad P, Bhumbhakpan N, Laohajinda V. 2005. Some characteristics of food of two sympatric hornbill species (Aves: Bucerotidae) and fruit availability during their breeding season in Huai Kha Khaeng Wildlife Sanctuary, Thailand. *In:* Lum S, Poonswad P (eds). The ecology of hornbills: reproduction and populations. Bangkok: Pimdee Karnpim Co. Ltd. p 75-86.

Plongmai K, Poonswad P, Sukkasem C, Chuailua P. 2005. The availability of ripe fruits in the annual hornbill life cycle. *In:* Lum S, Poonswad P (eds). The ecology of hornbills: reproduction and populations. Bangkok: Pimdee Karnpim Co. Ltd. p 131-140.

Kitamura S, Yumoto T, Poonswad P, Chuailua P, Plongmai K, Maruhashi T, Noma N, Wohandee P. 2005. Fruit-frugivore interactions in a moist evergreen forest of Khao Yai National Park in Thailand. Tropics 14:345-335.

Shawn, L. and Poonswad, P.(eds.) 2005. The ecology of hornbills: reproduction and populations.Pimdeekarnpim, Bangkok. 248 pp.

2004

Kitamura S, Yumoto T, Poonswad P, Chuailua P, Plongmai K. 2004. Characteristics of hornbill-dispersedfruits in a tropical seasonal forest in Thailand. Bird Conservation International 14: S80-S88.

Poonswad P, Tsuji A, Jirawatkavi N. 2004. Estimation of nutrients delivered to nest inmates by four sympatric species of hornbills in Khao Yai National Park, Thailand. Ornithological Science 43: 99-112.

Kitamura S, Yumoto T, Poonswad P, Noma N, Chuailua P, Plongmai K, Maruhashi T, Suckasam C. 2004. Pattern and impact of hornbill seed dispersal at nest trees in a moist evergreen forest in Thailand. Journal of Tropical Ecology 20: 545-553.

Kitamura S, Suzuki S, Yumoto T, Poonswad P, Chuailua P, Plongmai K, Noma N, Maruhashi T, Suckasam C. 2004. Dispersal of *Aglaia spectabilis*, a large-seeded tree species in a moist evergreen forest in Thailand. Journal of Tropical Ecology 20: 421-427.

2002

Kitamura S, Yumoto T, Poonswad P, Chuailua P, Plongmai K, Maruhashi T, Noma N. 2002. Interactions between fleshy fruits and frugivores in a tropical seasonal forest in Thailand. Oecologia 133: 559-572.

Poonswad P. Jailbirds. BBC Wildlife 2002. April 2002; 62-67.

2000

Round P, Poonswad P. 2000. An Overview of Ornithological Studies in Thailand. Review of Biodiversity Research in Thailand 172-202.

Poonswad, P. 2000. Hornbills: Masters of Tropical Forest. Sarakadee. Bangkok. 108pp. *(In Thai)*

1999

Poonswad P. 1999. The Birds of the Thai-Malay Peninsula: Volume 1: Nonpasserines. Well DR. London: Academic Press. 648 pp. *In:* Conservation Biology 14(2): 588-589.

Liewviriyakit R, Poonswad P, Kutintara U. Nests and environment. 1999. In: Poonswad P, editor. Manual for Training in Asian Hornbill Research. Bangkok: Hornbill Research Foundation. p 9-37.

Poonswad P, Phatarametra S, Chimchome V, Thiensongrusame P. Breeding cycle of some hornbill species in Thailand.1999. *In:* Poonswad P, editor. Manual for Training in Asian Hornbill Research. Bangkok: Hornbill Research Foundation. p 41-53.

Poonswad P, Chimchome V, Plongmai K, Chuilua P. 1999. Factors influencing the reproduction of Asain hornbills. In: Adams N, Slotow R, editors. Ornithological Congress. Durban: University of Natal.

Poonswad, P. (ed) 1999. Manual for Training in Asian Hornbill Research: Breeding Biology and Field Techniques. Hornbill Research Foundation, Bangkok. 146pp.

1998

Chuailua P, Plongmai K, Poonswad P. 1998. Status of nest cavities of hornbills in Khao Yai National Park, Thailand. In: Poonswad., P (ed.), The Asian Hornbills: ecology and conservation. Bangkok: Thai Studies in Biodiversity No. 2. p 219-226.

Chimchome V, Vidhidharm A, Simchareon S, Bumrungsri S, Poonswad P. 1998. Comparative study of the breeding biology and ecology of two endangered hornbill species in Huai Kha Khaeng Wildlife Sanctuary, Thailand. 111-336 pp. *In:* Poonswad, P. (ed). The Asian Hornbillls: Ecology and Conservation; Bangkok. Thai Studies in Biodiversity No. 2: 1-336 pp.

Poonswad P, Chuailua P, Plongmai K, Nakkuntod S. 1998. Phenology of some *Ficus* species and utilization of Ficus sources in Khao Yai National Park, Thailand. p 227-244.*In* Poonswad, P. (ed).

The Asian Hornbillls: Ecology and Conservation; Bangkok. Thai Studies in Biodiversity No. 2: 1-336 pp.

Poonswad P, Tsuji A, Jirawatkavi N, Chimchome V. 1998. Some aspects of food and feeding ecology of sympatric hornbill species in Khao Yai National Park, Thailand. P 137-158. *In*Poonswad P. (ed). The Asian Hornbillls: Ecology and Conservation; Bangkok. Thai Studies in Biodiversity No. 2: p 1-336.

Poonswad P. (ed) 1998. The Proceedings of the 2nd International Asian Hornbill Workshop 10-18 April 1996, Thailand. Natural History Bulletin Siam Society 46(1): 3-62.

Poonswad, P. (ed.) 1998. The Asian Hornbills: Ecology and Conservation; Bangkok. Thai Studies in Biodiversity No. 2: 1-336 pp.

PROCEEDINGS

1. Shawn L. and Poonswad P. 2005. The ecology of hornbills: reproduction and populations.Pimdeekarnpim, Bangkok. 248 pp.

2. Poonswad P. 2000. Hornbills: Masters of TropicalForest. Sarakadee. Bangkok. 108pp. *(In Thai)*

3. Poonswad P. (ed) 1999. Manual for Training in Asian Hornbill Research: Breeding Biology and Field Techniques. Hornbill Research Foundation, Bangkok. 146pp.

4. Poonswad P. (ed) 1998. The Asian Hornbillls: Ecology and Conservation; Bangkok. Thai Studies in Biodiversity No. 2: 1-336 pp.

5. Poonswad P. (ed) 1996. Hornbills: Masters of Tropical Forests. By AtsuoTsuji. Sarakadee Bangkok. 93pp.

6. Poonswad P. and Kemp A.C. (eds) 1993. Manual to the Conservation of Asian Hornbills. Sirivatana Interprint, Bangkok. 560pp.

Biodata

NAME Rawin Raviwongse, Ph.D.

Current Positions

Engineering Consultant, Chaipattana Foundation

Senior Engineering Consultant, Chulabhorn Research Institute

Advisory Board, Suvarnabhumi Institute of Technology

Fellow Industrial Engineer, Council of Engineer, Thailand

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Education Background

1989 B.Eng. (Industrial Engineering), Chulalongkorn University, Thailand

1998 Ph.D., M.S. (Engineering Management), University of Missouri-Rolla, USA (now Missouri University of Science and Technology)

2009 Advanced Management Program, Mahidol University, Thailand

Administrative Experiences

2007-2011	Dean, Faculty of Engineering, Mahidol University
2006-2007	Associate Dean, Finance and Procurement, Faculty of Graduate Studies, Mahidol University
2005 – 2006	Associate Dean, Student Affairs, Faculty of Graduate Studies, Mahidol University
1999 – 2003	Department Chairman, Department of Industrial Engineering, Faculty of Engineering, Mahidol University

Professional Experiences

2010- 2012	Project Director, Development of National LCI/LCA for 6 Industrial Sectors, Ministry of Industry
2010 – 2012	Director, Human Resource Development for Network Administration "UNINET", Ministry of Education
2004 – 2006	Project Director, Cleaner Technology Program for Canned Pineapple Industry, Ministry of Industry
1989 - 1991	Project Engineer, TPI Polene Public Company, Saraburi, Thailand

Academic Experiences

1998-2011 Full time Faculty Member, Department of Industrial Engineering, Faculty of Engineering, Mahidol University, Thailand

2000 - Appointed as an Assistant Professor in Industrial Engineering

Courses Assigned :

- Industrial Management (undergraduate)
- Integrated Product/Process Development (undergraduate)
- Industrial Plant Design (undergraduate)
- Packaging Management (undergraduate)
- Product Design and Development (graduate)
- Research Methodology (graduate)

2010-2011 Program Director, Master of Science in Technology of Information System Management, Mahidol University

1998 - Guest Lecturer

- University of the Thai Chamber of Commerce (Decision Support System/ Manufacturing Information System)
- Ramkhamhaeng University (Product Design and Development)
- Kasembundit University (Seminar and Project)
- Rajamangala Institute of Technology Lanna Tak (Cleaner Technology)
- Ministry of Public Health (Clean Technology in Hospital Management)
- Mahanakorn University of Technology (Industrial Management)

1998 - Thesis Advisor

- Mahidol University (Master / Ph.D.)
- Kasetsart University (Ph.D)
- Rajamangala Institute of Technology Tanyaburi (Master)
- King Mongut's University of Technology (Master)
- Thai-Nichi Institute of Technology (Master)

Research Activity

Registered 2 Product Design Patents and 2 Petty Patents

Selected Publications (English)

1. Plastic Manufacturing Process Selection Methodology Using Self Organizing Map (SOM)/Fuzzy Analysis, Journal of Advanced Manufacturing Technology, 1999.
2. A Fuzzy-logic Approach for Manufacturability Evaluation of Injection Molded Parts, with V. Allada, Journal of Engineering Evaluation and Cost Analysis, Vol. 2, 1999, pp. 81-92.
3. A Hybrid SOM/Fuzzy-based Approach for DFM Analysis, International Journal of Computers and Industrial Engineering., 2001
4. An Intelligent Fuzzy-Based System for Paroxysmal Atrial Tachycardia Identification, Proceedings of the 2001 ANNIE Conference, St.Louis, Missouri, USA, pp. 295-300.

5. A Kiosk-Based Multimedia Courseware on Statistical Process Control for Supervisor in Electronic Manufacturing Company, Proceedings of the 2001 IE Network Conference, Ubon Rachatani, Thailand.
6. Designing a Water Recycling System in Rice Flour Production Process, Proceedings of the 20th Conference of ASEAN Federation of Engineering Organisation, September, 2002, Panom-Penh, Cambodia, Volume 1, pp.227 – 232.
7. An Algorithm for Fractal Image Compression Using Fuzzy Logic, Proceedings of the 2003 ANNIE Conference, St.Louis, Missouri, USA, pp. 485-490.
8. A Prototype of Retail Internet Banking for Thai Customers, Proceedings of the 2003 International Conference on Electronic Business, Singapore.
9. Current Status and Trend of Eco-Design Implementation in Thailand, Symposium of Eco-Design 2003, Taipei, Taiwan.
10. Waste Reduction in Textile Spinning Process : A Cleaner Technology Approach, to be published in the 22nd Conference of ASEAN Federation of Engineering Organisation Proceeding, December, 2004, Rangoon, Mynmar.
11. Development of a Vertical Coconut Extracting Prototype : Proceeding of the 2nd ICFET Conference, January 2005, Pathum Thani, Thailand.
12. Packaging Improvement for Community Products: A Case Study of Lemon Grass Tea in Thailand, Proceeding of the IAPRI Annual Packaging Conference, October 2006, Tokyo, Japan

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Surname: KERDCHAROEN (เกิดเจริญ)

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http://nano-in-thailand.blogspot.com/

EDUCATION

University or equivalent	Years attended		Degrees
Chulalongkorn University, THAILAND	1986	1989	B.Sc. (Chemistry)
Chulalongkorn University, THAILAND	1990	1991	M.Sc. (Physical Chemistry)
University of Innsbruck, AUSTRIA	1992	1995	Dr.rer.nat (Physical Chemistry)
Technical University of Munich, GERMANY	1999	2000	Postdoc (Materials Design)

Educational Scholarships:

Name	Year
Development and Promotion of Science and Technology Talent Program	1986-1988
Austrian On-Place Scholarship for Graduate Research	1990-1992
Austrian Government Scholarship for Doctoral Study	1993-1995

RESEARCH & CAREER PATH

Employments:

Place	Period of duty		Academic responsibilities
	From	to	
Mahidol University	1996	1999	Lecturer
Mahidol University	2000	present	Assistant Professor

Awards:

Name	Year
DFG Postdoctoral Fellow, Technical University of Munich	1999-2000
Cherry L. Emerson Fellow, Emory University, USA	2001
Thailand Young Scientist Award	2001
Thailand Toray Science & Technology Aids	2005
Thailand Research Fund's Outstanding Research Prize	2008

Research Experiences (in Thai)

- จมูกอิเล็กทรอนิกส์ร่วมกับห้องปฏิบัติการวิจัยเครื่องกลจุลภาคแห่ง NECTEC "1 ใน 10 ผลงานเด่นของเนคเทค ประจำปี 2551"
- จมูกอิเล็กทรอนิกส์เพื่อการเกษตรและอาหาร "ผลงานเด่น สกว. ปี 2551"
- รางวัลผลงานวิจัยที่ได้รับตี พิมพ์ในวารสารวิชาการระดับนานา ชาติของ มหาวิทยาลัยมหิดล ประจำปี 2552

Research Project (Principal or co-investigator)	**Year**
• Hybridized Chemical Gas Sensor (Thailand Research Fund)	2008-2011
• Real-Time Ambient Sensing Technology for Precision Farming (Thai Government)	2007-2009
• Nanoscale Device and Engineering (National Nanotechnology Center)	2006-2011
• Research and Development on Flexible Electronic Devices including Organic Light Emitting Display and Their Materials (Japan Society for the Promotion of Science and National Research Council of Thailand)	2006-2008
• Design and Development of Software for Odor Recognition (NECTEC)	2006-2007
• Aroma Molecular Sensing Device for Food and Healthcare Applications (Thai Government)	2005-2007
• Aroma Molecular Sensing Device (Thailand Toray Science Foundation)	2004-2005

- Biomimetic Nanoarchitectonics of Molecular Devices (Thailand Research Fund) 2006-2008
- Characterization of Metallo-Phthalocyanine Thin Film Surface by Photoemission and Electronic Structure Calculations (National Synchrotron Research Center) 2005-2006
- Capability Building for Development of Nano-products (Commission on Higher Education) 2003-2004
- Organic Light Emitting Devices (MTEC) 2002-2005
- Development of Nanoscale Theory, Modeling and Simulation for Soft-Condensed Matters and Application to Protein Modeling (Thailand Research Fund) 2004-2006
- A Study of Structure and Dynamics of the Infinitely Diluted Solutions of Alkali and Alkaline-earth Metal Ions in Ammonia by Means of Molecular Modeling and Simulations 2001-2003
- Development of Quantum Mechanics and Molecular Mechanics for Nanoclusters (German Research Council) 1999-2000
- Computer Modeling and Simulation of Metal Ions in Liquid Ammonia Including Many-Body Interactions (Faculty of Science, Mahidol University) 1998-1999

Research Interests:

Hardware and software development of electronic nose

Organic semiconductor

Nanoarchitectonics and Biomimetic Architecture

Patent:

1. สิรพัฒน์ ประโทนเทพ, รุ่งโรจน์ เมาลานนท์, ธีรเกียรติ์ เกิดเจริญ, ไพศาล ดวงจักร ณ อยุธยา, คำขอจดสิทธิบัตร เลขที่ 0801004238 เรื่อง "วิธีการตรวจจับกลิ่นและเครื่องตรวจวัดกลิ่นที่ใช้วิธีดังกล่าว"
2. ชัชวาล วงศ์ชูสุข, Mario Lutz, อดิสร เตือนตรานนท์, ธีรเกียรติ์ เกิดเจริญ, คำขอสิทธิบัตรเลขที่ 0901001349 เรื่อง "เครื่องตรวจวัดกลิ่นตัวของมนุษย์เพื่อการระบุบุคคล"
3. สิรพัฒน์ ประโทนเทพ, สุรีย์พร ดวงจักร ณ อยุธยา, สุมนา กลัดสมบูรณ์, ธีรเกียรติ์ เกิดเจริญ, รุ่งโรจน์ เมาลานนท์, รัชฎา บุญเต็ม, วรวรรณ พันธุมนาวิน, คำขอสิทธิบัตรเลขที่ 0901002613 เรื่อง "กระบวนการเตรียมฟิล์มบางสารอินทรีย์ด้วยการอบไอระเหยเคมีเพื่อเพิ่มประสิทธิภาพในการใช้สำหรับเป็นก๊าซเซ็นเซอร์เชิงแสง"
4. ธีรเกียรติ์ เกิดเจริญ, ชัชวาล วงศ์ชูสุข, คำขอสิทธิบัตร 1001001840 เรื่อง "เครื่องจมูกอิเล็กทรอนิกส์แบบกระเป๋าหิ้ว"
5. ธีรเกียรติ์ เกิดเจริญ, พนิดา หล่อวงศ์ตระกูล, คำขอสิทธิบัตร 1101002202 เรื่อง "ชุดหัววัดไอระเหยสารประกอบแอมโมเนียและเอมีน ประเภทวัสดุผสมนาโน และอุปกรณ์ตรวจวัด ไอระเหยแบบมือถือ (Ammonia and Amine Sensor Array Based on Nanocomposite Materials and Hand-Held Device)"
6. ธีรเกียรติ์ เกิดเจริญ, สุมนา กลัดสมบูรณ์, คำขอสิทธิบัตร 1201002073 เรื่อง "เครื่องจมูกอิเล็กทรอนิกส์ ที่ใช้การตรวจจับเชิงแสง และเชิงไฟฟ้าเคมี แบบพกพา โดยอาศัยไดโอดเปล่งแสง"

7. นัษฐพงษ์ ทองรอด, ณัฐพล วัฒนวิสุทธิ์, อดิสร เตือนตรานนท์, ธีรเกียรติ์ เกิดเจริญ, คำขอสิทธิบัตรเรื่อง "ถุงมือรับส่งข้อมูล โดยใช้เซ็นเซอร์กระดาษ และเครือข่ายไร้สายซิกบี" (กำลังยื่นจด)

International Publications: (ISI, SCOPUS, IEEE Database):

1. S. Hannongbua, T. Kerdcharoen and B. M. Rode, "Zinc(II) in Liquid Ammonia: Intermolecular Potential Including Three-Body Terms and Monte Carlo Simulation", *Journal of Chemical Physics* 96 (1992) 6945-6949.
2. T. Kerdcharoen, K. R. Liedl and B. M. Rode, "Bidirectional Molecular Dynamics: Interpretation in Terms of a Modern Formulation of Classical Mechanics", *Journal of Computational Chemistry* 17 (1996) 1564.
3. T. Kerdcharoen, K. R. Liedl and B. M. Rode, "A QM/MM Simulation Method Applied to the Solution of Li^+ in Liquid Ammonia", *Chemical Physics* 211 (1996) 313.
4. T. Aree, T. Kerdcharoen and S. Hannongbua, "Charge Transfer, Polarizability and Stability of Li-C_{60} complexes", *Chemical Physics Letters,* 285 (1998) 221.
5. T. Kerdcharoen and S. Hannongbua, "*Ab Initio* Study of Ion-Ammonia Complexes: Geometry and Many-Body Interactions", *Chemical Physics Letters*, 310 (1999) 333.
6. T. Kerdcharoen and B. M. Rode, "What is the Solvation Number of Na^+ in Ammonia ? An *Ab Initio* QM/MM Molecular Dynamics Study", *J. Phys. Chem. A* 104 (2000) 7073.
7. M. Kiselev, T. Kerdcharoen, S. Hannongbua and K. Heinzinger, "Structural Properties of Sub- and Supercritical Ammonia as Studied by Molecular Dynamics Simulations*", Chemical Physics Letters* 327 (2000) 425.
8. M. Kiselev, S. Noskov, Y. Puhovski, T. Kerdcharoen and S. Hannongbua, "The Study of Hydrophobic Hydration in Supercritical Water-Ammonia Mixture", *Journal of Molecular Graphics and Modeling* 19 (2001) 412.
9. S. Krishtal, M. Kiselev, Y.Puhovski, T. Kerdcharoen, S.Hannongbua and K.Heinzinger, "The Study of Hydrogen Bonds Network in Sub- and Supercritical Water by Molecular Dynamics Simulation", *Zeitschrift fuer Naturforschung* 56a (2001) 579.
10. T. Belling, T. Grauschopf, S. Krüger, F. Nörtemann, M. Staufer, M. Mayer, V. A. Nasluzov, U. Birkenheuer, A. Hu, A. V. Matveev, A. M. Shor, M. S. K. Fuchs-Rohr, K. M. Neyman, D. I. Ganyushin, T. Kerdcharoen, A. Woiterski, and N. Rösch, ParaGauss 2.2 Density Functional Software and User's Manual, Technische Universität München (2001).
11. T. Kerdcharoen and K. Morokuma, "ONIOM-XS: An Extension of ONIOM Method for Molecular Simulation in Condensed Phase", *Chemical Physics Letters* 355 (2002) 257.
12. T. Kerdcharoen, U. Birkenheuer, S. Krueger, A. Woitersky and N. Roesch, "Implementation of a QM/MM Approach in the Parallel Density Functional Program ParaGauss and Applications to Copper Thiolate Clusters", *Theoretical Chemistry Accounts* 109 (2003) 285.
13. S. Krongsuk, T. Kerdcharoen and S. Hannongbua, " How Many Water Molecules in the Hydration Shell of 18-crown-6? Monte Carlo Simulations Based on Ab Initio Derived Potential Energy Surface", *Journal of Physical Chemistry B* 107 (2003) 4175.
14. T. Kerdcharoen and K. Morokuma, "Combined QM/MM Simulation of Ca2+/Ammonia Solution based on ONIOM-XS Method: Octahedral Coordination and Implication to Biology", *Journal of Chemical Physics* 118 (2003) 8856.
15. M. Kiselev, D. Ivlev, Y. Puhovski and T. Kerdcharoen, "Preferential Solvation and Elasticity of the Hydrogen Bonds Network in Tertiary Butyl Alcohol-Water Mixture", *Chemical Physics Letters* 379 (2003) 581.
16. A. Udomvech, T. Kerdcharoen, V. Parasuk, Y. Tantirungrotechai and T. Osotchan, "Electronic Structure of the Finite-Sized Single Walled Carbon Nanotube", *International Journal of Nanoscience* 2 (2003) 141.

17. C. Angsuthanasombat, P. Uawithya, S. Leetachewa, W. Pornwiroon, P. Ounjai, T. Kerdcharoen, G. Katzenmeier and S. Panyim, "Bacillus thuringiensis Cry4A and Cry4B Mosquito-Larvicidal Proteins: Homology-Based 3D Model and Implications for Toxin Activity", *Journal of Biochemistry and Molecular Biology* 37 (2004) 304.
18. A. Udomvech, T. Osotchan and T. Kerdcharoen, "A DFT Study of Li/Li+ Adsorbed on Carbon Nanotube: Variation of Tubule Diameter and Length", *Chemical Physics Letters* 406 (2005) 161.
19. P. Wutticharoenmongkol, P. Supaphol, T. Srikhirin, T. Kerdcharoen and T. Osotchan, "Electrospinning of Polystyrene/Poly(2-Methoxy-5-(2'-Ethylhexyloxy)-1,4-Phenylene Vinylene) Blends", *Journal of Polymer Science* B 43 (2005) 1881.
20. Y. Kanintronkul, T. Srikhirin, C. Angsuthanasombat and T. Kerdcharoen, "Insertion behavior of the Bacillus thuringiensis Cry4Ba insecticidal protein into lipid monolayers", *Archive of Biochemistry and Biophysics* 442 (2005) 180.
21. S. Suramitr, T. Kerdcharoen, T. Srikhirin and S. Hannongbua, "Electronic Properties of Alkoxy Derivatives of Poly(para-phenylenevinylene), Investigated by Time Dependent Density Functional Theory Calculations", *Synthetic Metals* 155 (2005) 27.
22. Y. Kanintronkul, T. Srikhirin, C. Angsuthanasombat and T. Kerdcharoen, "Adsorption of the Bacillus thuringiensis Cry4Ba toxin at lipid membrane-water interface: model studies towards nanodevice implications", *FEBS Journal* 272 (2005) 377.
23. S. Krongsuk, T. Kerdcharoen, M. Kiselev and S. Hannongbua, "Solvation Structures of the 18-Crown-6 in Carbon Tetrachloride as Studied by Monte Carlo Simulation Based on Ab Initio Potential Models", *Chemical Physics* 324 (2006) 447.
24. S. Krongsuk, T. Kerdcharoen and S. Hannongbua*, " The Hydration Structure of 18-crown-6/K+ Complex as Studied by Monte Carlo Simulation Using Ab Initio Potential", *Journal of Molecular Graphics and Modeling* 25 (2006) 55-60.
25. R. Traiphol*, P. Sanguansat, T. Srikhirin, T. Kerdcharoen, T. Osotchan, "Spectroscopic Study of Solvent-induced Photophysical Change in Collapsed Coils of Isolated Chains of Conjugated Polymers: Effects of Solvent and Temperature", *Macromolecules* 39 (2006) 1165.
26. A. Tongraar*, T. Kerdcharoen and S. Hannongbua, "Simulations of liquid ammonia based on combined quantum mechanical/molecular mechanical (QM/MM) approach", *Journal of Physical Chemistry A* 110 (2006) 4924.
27. P. Aramwit, T. Kerdcharoen and H. Qi, "In Vitro Plasma Compatibility Study of a Nano Suspension Formulation", *PDA Journal of Pharmaceutical Science and Technology* 60 (2006) 211.
28. R. Traiphol, T. Srikhirin, T. Kerdcharoen, T. Osotchan and T. Maturos, "Influences of Local Polymer-Solvent pi-pi Interaction on Dynamics of Phenyl Ring Rotation and Its Role on Photophysics of Conjugated Polymer", *European Polymer Journal* 43 (2007) 478.
29. R. Traiphol, T. Srikirin, T. Kerdcharoen, T. Osotchan, N. Scharnagl, R. Willumeit, "Chain Organization and Photophysics of Conjugated Polymer in Poor Solvents: Aggregates, Agglomerates and Collapsed Coils Polymer ", *Polymers* 48 (2007) 813.
30. C. Wongchoosuk, S. Krongsuk and T. Kerdcharoen, "Theoretical Investigations on the Tip-Functionalized Carbon Nanotubes Interacting with Water", *International Journal of Nanoparticles* 1 (2008) 136.
31. S. Uttiya , T. Kerdcharoen, S. Vatanayon and S. Pratontep, "EFFECT OF STRUCTURAL TRANSFORMATION TO THE GAS SENSING PROPERTIES OF PHTHALOCYANINE THIN FILMS", *Journal of the Korean Physical Society* 52 (2008) 1575.
32. A. Udomvech, T. Osotchan and T. Kerdcharoen, "Theoretical Investigation of Lithium Atoms Insertion into the Ultra-Small Diameter Carbon Nanotubes", *Journal of the Korean Physical Society* 52 (2008) 1350.
33. S. Krongsuk, T. Kerdcharoen, A. Borodin and M. Kiselev, "Computer Simulation Study of Porphyrazine Monolayer at the Water-Gas Interface: Structure and Molecular Orientation", *Journal of the Korean Physical Society* 52 (2008) 1657.

34. A. Udomvech, J. Sonpong, O. Waipan and T. Kerdcharoen, "Electronic Structure of Straight and T-Shape Singled-Wall Carbon Nanotube Junctions: A Molecular Quantum Mechanics Study", *Advanced Materials Research* 55-57 (2008) 565.
35. O. Chamlek, S. Pratontep, T. Kerdcharoen and T. Osotchan, "Spectroscopy Studies of Iron Phthalocyanine Thin Films", *Advanced Materials Research* 55-57 (2008) 301.
36. Niwat Srisawasdi, Teerakiat Kerdcharoen and Jerry Suits, "Turning Scientific Laboratory Research into Innovative Instructional Material for Science Education: Case Studies from Practical Experience", International Journal of Learning 15 (2008) 201.
37. C. Wongchoosuk, A. Udomvech and T. Kerdcharoen, "The geometrical and electronic structures of open-end fully functionalized single-walled carbon nanotubes", *Current Applied Physics* 9 (2009) 352.
38. Rakchart Traiphol, Nipaphat Charoenthai, Parinda Manorat, Thanutpon Pattanatornchai, Toemsak Srikhirin, Teerakiat Kerdcharoen, Tanakorn Osotchanb, "Photophysical change of poly(9,9-di(2-ethylhexyl)fluorene) and its copolymer with anthracene in solvent–non-solvent: Roles of interchain interactions on the formation of non-emissive and emissive aggregates", *Synthetic Metals* 12 (2009) 1224.
39. Chatchawal Wongchoosuk, Supab Choopun, Adisorn Tuantranont, Teerakiat Kerdcharoen, "Au-doped Zinc Oxide Nanostructure Sensors for Detection and Discrimination of Volatile Organic Compounds", *Materials Research Innovation* 13 (2009) 185.
40. Chatchawal Wongchoosuk, Mario Lutz and Teerakiat Kerdcharoen, "Detection and Classification of Human Body Odor Using an Electronic Nose", *Sensors* 9 (2009) 7234.
41. Niyom Hongsith, Ekasiddh Wongrat, Teerakiat Kerdcharoen, Supab Choopun, "Sensor response formula for sensor based on ZnO nanostructures", *Sensors and Actuators* B 144 (2010) 67-72.
42. Aurapan Sansukcharearnpona, Supason Wanichwecharungruang, Natchanun Leepipatpaiboonb, Teerakiat Kerdcharoen, Sunatda Arayachukeat, "High loading fragrance encapsulation based on a polymer-blend: Preparation and release behavior", *International Journal of Pharmaceutics* 391 (2010) 267-273.
43. Chatchawal Wongchoosuk, Anurat Wisitsoraat, Adisorn Tuantranont, Teerakiat Kerdcharoen, "Portable Electronic Nose Based on Carbon Nanotube-SnO2 Gas Sensors and Its Application for Detection of Methanol Contamination in Whiskeys", *Sensors and Actuators B* 147 (2010) 392.
44. Rakchart Traiphol, Ruttayapon Potai, Nipaphat Charoenthai, Toemsak Srikhirin, Teerakiat Kerdcharoen, Tanakorn Osotchan, "E ffects of chain conformation and chain length on degree of aggregation in assembled particles of conjugated polymer in solvents-nonsolvent: A spectroscopic study", *J ournal of Polymer Science Part B: Polymer Physics* 48 (2010) 894-904.
45. S. Tuntikulwattana, A. Mitrevej, T. Kerdcharoen, D. B. Williams and N. Sinchaipanid, "Development and Optimization of Micro/Nanoporous Osmotic Pump Tablets, *AAPS Pharmaceutical Science and Technology* 11 (2010) 924-935.
46. Chatchawal Wongchoosuk, Anurat Wisitsoraat, Ditsayut Phokharatkul, Adisorn Tuantranont and Teerakiat Kerdcharoen, "Multi-walled Carbon Nanotubes Doped Tungsten Oxide Thin Film for Hydrogen Gas Sensing", *Sensors* 10 (2010) 7705 .
47. Chakkrapan Nerungsi, Piangkhwan Wanitchang, Somboon Sahasithiwat, Karoon Sadorn, Teerakiat Kerdcharoen and Tienthong Thongpanchang, "Organic electroluminescence devices based on anthracene sulfide derivatives", *Tetrahedron Letters* 51 (2010) 6392.
48. R. Traiphol, T. Pattanatornchai, T. Srikhirin, T. Kerdcharoen and T. Osotchan, "Effects of steric anthracene moieties and keto defects on photophysics and color stability of poly(9,9-di(2-ethylhexyl)fluorene-stat-anthracene) in different local environments", *Macromolecular Research* 18 (2010) 1182.
49. C. Vergnat, S. Uttiya, S. Pratontep, T. Kerdcharoen, J.-F. Legrand and M. Brinkman, "Oriented growth of zinc(II) phthalocyanines on polycarbonate alignment substrates: Effect of substrate temperature on in-plane orientation", *Synthetic Metals* 161 (2011) 251.

50. P. Intharathep, T. Rungrotmongkol, P. Decha, N. Nunthaboot, N. Kaiyawet, T. Kerdcharoen, P. Sompornpisut and S. Hannongbua, "Evaluating how rimantadines control the proton gating of the Influenza A M2-proton port via allosteric binding outside of the M2-channel: MD simulations", *Journal of Enzyme Inhibitor and Medicinal Chemistry* 26 (2011) 162.
51. S. Krongsuk and T. Kerdcharoen, "Effects of Surface Concentration on the Porphine Monolayers: Molecular Simulations at the Nanoscale Water-Gas Interface", *Applied Surface Science* 257 (2011) 6270.
52. Panida Lorwongtragool, Anurat Wisitsoraat and Teerakiat Kerdcharoen, "An Electronic Nose for Amine Detection Based on Polymer/SWNT-COOH Nanocomposite", *Journal of Nanoscience and Nanotechnology* 11 (2011) 10454-10459.
53. Sumana Kladsomboon, Sirapat Pratontep, Theeraporn Puntheeranurak, Teerakiat Kerdcharoen. "An Artificial Nose Based on M-Porphyrin (M = Mg, Zn) Thin Film and Optical Spectroscopy", *Journal of Nanoscience and Nanotechnology* 11 (2011) 10589-10594.
54. S. Wanprakhon, A. Tongraar, T. Kerdcharoen, "Hydration structure and dynamics of K + and Ca 2+ in aqueous solution: Comparison of conventional QM/MM and ONIOM-XS MD simulations", *Chemical Physics Letters* 517 (2011) 171.
55. T. Piromjitpong, P. Lorwongtragool, P. Piromjitpong, T. Kerdcharoen, "The Development in an Effective of Ammonia-Odor Sensor Based on PSE-Polymer/SWNT Nanocomposite", *Advanced Materials Research* 506 (2012) 579-582.
56. C. Wongchoosuk, P. Jangtawee, S. Lokavee, S. Udomrat, P. Sudkeaw and T. Kerdcharoen, "Novel Flexible NH3 Gas Sensor Prepared By Ink-Jet Printing Technique", *Advanced Materials Research* 506 (2012) 39-42.
57. Sumana Kladsomboon, Mario Lutz, Tawee Pogfay, Theeraporn Puntheeranurak, Teerakiat Kerdcharoen, "Hybrid Optical-Electrochemical Electronic Nose System based on Zn-porphyrin and Multi-walled Carbon Nanotube Composite", *Journal of Nanoscience and Nanotechnology* 12 (2012) 5240-5244.
58. Johannes Ph. Mensing, Teerakiat Kerdcharoen, Adisorn Tuantranont, Chakrit Sriprachuabwong, Anurat Wisitsorrat, Ditsayut Phokharatkul and Tanom Lomas, "Facile Preparation of Graphene/Metal Phthalocyanine Hybrid Material by Electrolytic Exfoliation", *Journal of Materials Chemistry* 22 (2012) 17094-17099.
59. Sukhontip Thaomola, Anan Tongraar and Teerakiat Kerdcharoen, "Structure and dynamics of hydrogen bonds in liquid water: A comparative study of conventional QM/MM and ONIOM-XS MD simulations", *Journal of Molecular Liquids* 174 (2012) 26-33.
60. Sumana Kladsomboon and Teerakiat Kerdcharoen, "A Method for Detection of Alcohol Vapors Based on Optical Sensing of MgTPP Thin Film by Optical Spectrometer and Principal Component Analysis", *Analytica Chimica Acta* 757 (2012) 75-82.
61. Johannes Ph. Mensing, Anurat Wisitsoraat, Adisorn Tuantranont, Teerakiat Kerdcharoen, "Inkjet-printed sol-gel films containing metal phthalocyanines/porphyrins for opto-electronic nose applications", *Sensors and Actuators* B 176 (2013) 428-436.
62. Nattapong Tongrod, Shongpun Lokavee, Natthapol Watthanawisuth, Adisorn Tuantranont, Teerakiat Kerdcharoen, "Design and Development of Data Glove Based on Printed Polymeric Sensors and Zigbee Networks for Human Computer Interface", *Disability and Rehabilitation: Assistive Technology*, (2013) in press.
63. Chatchawal Wongchoosuk, Anurat Wisitsoraat, Ditsayut Phokharatkul, Mati Horprathum, Adisorn Tuantranont and Teerakiat Kerdcharoen, " Carbon Doped Tungsten Oxide Nanorods NO2 Sensor Prepared by Glancing Angle RF Sputtering", *Sensors and Actuators B* (2013) accepted.
64. Pattrawan Sripa, Anan Tongraar and Teerakiat Kerdcharoen, "Structure-making" ability of Na+ in dilute aqueous solution: An ONIOM-XS MD simulation study", Journal of Physical Chemistry, accepted.

65. Thara Seesaard, Panida Lorwongtragool, Teerakiat Kerdcharoen, "Development of Fabric-Based Chemical Gas Sensors toward the Use as Wearable Electronic Nose", *Sensors*, submitted.
66. Sumana Kladsomboon, Sirapat Pratontep, Teerakiat Kerdcharoen, "The Mixed Layer of Metallo-porphyrin and Metallo-phthalocyanine Thin Films as Optically-active Sensing Materials for an Electronic Nose", *Molecules*, submitted.
67. Anurak Udomvech, Md. Shafiquzzaman, Teerakiat Kerdcharoen, "In Search of Molecular Scale Diodes: Theoretical Study of Linearly Fused Straight Single-Walled Carbon Nanotube Junctions Based on the Pentagon/Heptagon Pair Defects", *Journal of Nanomaterials*, submitted.

International Proceeding Papers/Abstracts:

1. S. Lokavee, T. Puntheeranurak, T. Kerdcharoen, N. Watthanwisuth, A. Tuantranont, "Sensor pillow and bed sheet system: Unconstrained monitoring of respiration rate and posture movements during sleep", Conference Proceedings - IEEE International Conference on Systems, Man and Cybernetics , 2012, art. no. 6377959 , pp. 1564-1568. (Indexed in SCOPUS, IEEE Explore Database)
2. T. Seesaard, C. Khunarak, T. Kerdcharoen, and T. Kitiyakara, " Development of an electronic nose for detection and discrimination of exhaled breath of hepatocellular carcinoma patients", Conference Proceedings - IEEE International Conference on Systems, Man and Cybernetics , 2012, art. no. 6377969 , pp. 1622-1626. (Indexed in SCOPUS, IEEE Explore Database)
3. Thara Seesaard, Panida Lorwongtragool, Teerakiat Kerdcharoen, "Wearable Electronic Nose Based on Embroidered Amine Sensors on the Fabric Substrates", ECTI-CON2012 - 9th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 16-18 May 2012, Hua Hin, Thailand. (Indexed in SCOPUS, IEEE Explore Database)
4. Treenet Thepudom, Sumana Kladsomboon, Tawee Pogfay, Adisorn Tuantranont, Teerakiat Kerdcharoen, "Portable Optical-Based Electronic Nose Using Dual-Sensors Array Applied for Volatile Discrimination", ECTI-CON2012 - 9th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 16-18 May 2012, Hua Hin, Thailand. (Indexed in SCOPUS, IEEE Explore Database)
5. Chatchawal Wongchoosuk, Chayanin Khunarak, Mario Lutz, Teerakiat Kerdcharoen, "WiFi Electronic Nose for Indoor Air Monitoring", ECTI-CON2012 - 9th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 16-18 May 2012, Hua Hin, Thailand. (Indexed in SCOPUS, IEEE Explore Database)
6. Panida Lorwongtragool, Enrico Sowade, Teerakiat Kerdcharoen, Reinhard R. Baumann, "All Inkjet-Printed Chemical Gas Sensors Based on CNT/Polymer Nanocomposites: Comparison between Double Printed Layers and Blended Single Layer", ECTI-CON2012 - 9th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 16-18 May 2012, Hua Hin, Thailand. (Indexed in SCOPUS, IEEE Explore Database)
7. P. Lorwongtragool, T. Seesaard, C. Tongta, T. Kerdcharoen, "Portable e-nose based on polymer/CNT sensor array for protein-based detection", IEEE-NEMS 2012 - 7th IEEE International Conference on Nano/Micro Engineered and Molecular Systems, 5-8 March 2012, Kyoto, Japan. (Indexed in SCOPUS, IEEE Explore Database)
8. P. Lorwongtragool, E. Sowade, T. N. Dinh, O. Kanoun, T. Kerdcharoen, R. R. Baumann, "Inkjet printing of chemiresistive sensors based on polymer and carbon nanotube networks", IEEE-SSD 2012 - International Multi-Conference on Systems, Signals and Devices, 20-23 March 2012, Chemnitz, Germany. (Indexed in SCOPUS, IEEE Explore Database)
9. A. Eambaipreuk, S. Kladsomboon, T. Kerdcharoen, "Breath monitoring based on the optical electronic nose system", BMEiCON 2011 - The 4th Biomedical Engineering International Conference, 29-31 January 2012, Chiang Mai, Thailand. (Indexed in SCOPUS, IEEE Explore Database)

10. W. Donkrajang, N. Watthanawisuth, J. P. Mensing and T. Kerdcharoen, "A Wireless Networked Smart-Shoe System for Monitoring Human Locomotion", BMEiCON 2011 - The 4th Biomedical Engineering International Conference, 29-31 January 2012, Chiang Mai, Thailand. (Indexed in SCOPUS, IEEE Explore Database)
11. Johannes Ph. Mensing, Anurat Wisitsoraat, Teerakiat Kerdcharoen, Adisorn Tuantranont, "Phthalocyanine/graphene hybrid-materials for gas sensing in bio-medical applications", BMEiCON 2011 - The 4th Biomedical Engineering International Conference, 29-31 January 2012, Chiang Mai, Thailand. (Indexed in SCOPUS, IEEE Explore Database)
12. S. Lokavee, N. Watthanawisuth, J. P. Mensing, A. Tuantranont and T. Kerdcharoen, "Sensor Pillow System: Monitoring Cardio-Respiratory and Posture Movements During Sleep", BMEiCON 2011 - The 4th Biomedical Engineering International Conference, 29-31 January 2012, Chiang Mai, Thailand. (Indexed in SCOPUS, IEEE Explore Database)
13. Thara Seesaard, Teerakiat Kerdcharoen, "DESIGN AND FABRICATION OF WEARABLE AMINE SENSORS EMBROIDERED INTO THE FABRIC SUBSTRATES BASED ON PSE POLYMER/SWNT-COOH NANOCOMPOSITE", PACCON2012 – Pure and Applied Chemistry International Conference, 11-13 January 2012, Chiang Mai, Thailand.
14. Wathang Donkrajang, Shongpun Lokavee, Nattapong Tongrod, Teerakiat Kerdcharoen, "THE DEVELOPMENT OF LOW-COST PRESSURE SENSOR BASED ON INK JET PRINTING OF CONDUCTIVE POLYMER ON FLEXIBLE SUBSTRATES", PACCON2012 – Pure and Applied Chemistry International Conference, 11-13 January 2012, Chiang Mai, Thailand.
15. S. Lokavee, Natthapol Watthanawisuth, J. P. Mensing, Teerakiat Kerdcharoen, "PRINTED POLYMER SENSORS AND APPLICATIONS IN HEALTHCARE MONITORING", PACCON2012 – Pure and Applied Chemistry International Conference, 11-13 January 2012, Chiang Mai, Thailand.
16. Teerakiat Kerdcharoen, "ELECTRONIC NOSE AND APPLICATIONS IN BIO-BASED SENSING", PACCON2012 – Pure and Applied Chemistry International Conference, 11-13 January 2012, Chiang Mai, Thailand.
17. C. Wongchoosuk, P. Jangtawee, S. Lokavee, S. Kladsomboon, S. Udomrat, P. Sudkeaw, T. Kerdcharoen, "NOVEL FLEXIBLE NH3 GAS SENSOR PREPARED BY INK-JET PRINTING TECHNIQUE", CMICBA 2011 – Chiang Mai International Conference on Biomaterials and Applications, 9-10 August 2011, Chiang Mai, Thailand.
18. T. Piromjitpong, P. Lorwongtragool, P. Piromjitpong, T. Kerdcharoen, "DEVELOPMENT OF AMMONIA-ODOR SENSOR BASED ON PSE-POLYMER/SWNT NANOCOMPOSITE", CMICBA 2011 – Chiang Mai International Conference on Biomaterials and Applications, 9-10 August 2011, Chiang Mai, Thailand.
19. C. Khunarak, M. Lutz, P. Lorwongtragool, C. Wongchoosuk, S. Kladsomboon, T. Seesaard, T. Kerdcharoen, "INDOOR AIR QUALITY MONITORING USING NETWORKED ELECTRONIC-NOSE FOR BETTER QUALITY OF LIFE", CMICBA 2011 – Chiang Mai International Conference on Biomaterials and Applications, 9-10 August 2011, Chiang Mai, Thailand.
20. Johannes Ph. Mensing, Teerakiat Kerdcharoen, Adisorn Tuantranont, "PHTHALOCYANINE/GRAPHENE HYBRID NANO-MATERIALS FOR GAS SENSING APPLICATIONS", CMICBA 2011 – Chiang Mai International Conference on Biomaterials and Applications, 9-10 August 2011, Chiang Mai, Thailand.
21. Weerayut Srichaisiriwech, Anurat Wisitsoraat, Ditsayut Phokharatkul, Adisorn Tuantranont and Teerakiat Kerdcharoen, "Electrochemical Detection of Ethanol from NiFe Alloyed Thin Film Electrode Prepared by Co-sputtering", CMICBA 2011 – Chiang Mai International Conference on Biomaterials and Applications, 9-10 August 2011, Chiang Mai, Thailand.
22. Chatchawal Wongchoosuk, Taweesak Youngrod, Hirihattaya Phetmung, Mario Lutz, Theeraporn Puntheeranurak, Teerakiat Kerdcharoen, "Identification of People from Armpit Odor Region using Networked Electronic Nose", IEEE DSR2011 – Defense Science and Research Conference, 3-5 August 2011, Suntec Convention & Exhibition Center, Singapore. (Indexed in SCOPUS, IEEE Explore Database)

23. Nattapong Tongrod, Shongpun Lokavee, Teerakiat Kerdcharoen, Natthapol Watthanawisuth, Adisorn Tuantranont, "Gestural System Based on Multi-functional Sensors and ZigBee Networks for Squad Communication", IEEE DSR2011 – Defense Science and Research Conference, 3-5 August 2011, Suntec Convention & Exhibition Center, Singapore. (Indexed in SCOPUS, IEEE Explore Database)
24. Natthapol Watthanawisuth, Adisorn Tuantranont, Teerakiat Kerdcharoen, "Design for the Next Generation of Wireless Sensor Networks in Battlefield Based on ZigBee", IEEE DSR2011 – Defense Science and Research Conference, 3-5 August 2011, Suntec Convention & Exhibition Center, Singapore. (Indexed in SCOPUS, IEEE Explore Database)
25. Sumana Kladsomboon, Mario Lutz, Tawee Pongfay, Teerakiat Kerdcharoen, "An Optical Artificial Nose System for Odor Classifications Based on LED Arrays", ECTI-CON2011 - 8th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 17-19 May 2011, Khon Kaen, THAILAND. (Indexed in SCOPUS and IEEE Explore Database)
26. Chatchawal Wongchoosuk, Anurat Wisitsoraat, Adisorn Tuantranont, Teerakiat Kerdcharoen, "Nanostructured Gas Sensors by Electron Beam Evaporation", ECTI-CON2011 - 8th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 17-19 May 2011, Khon Kaen, THAILAND. (Indexed in SCOPUS and IEEE Explore Database)
27. Panida Lorwongtragool, Chatchawal Wongchoosuk, Teerakiat Kerdcharoen, "Portable Electronic Nose for Beverage Quality Assessment", ECTI-CON2011 - 8th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 17-19 May 2011, Khon Kaen, THAILAND. (Indexed in SCOPUS and IEEE Explore Database)
28. Nattapong Tongrod, Teerakiat Kerdcharoen, Natthapol Watthanawisuth and Adisorn Tuantranont, "A Low-Cost Data-Glove for Human Computer Interaction Based on Ink-Jet Printed Sensors and ZigBee Networks", ISWC 2010 - International Symposium on Wearable Computers, 10-13 October 2010, Seoul, KOREA. (Indexed in SCOPUS, IEEE Explore Database)
29. T. Kerdcharoen, C. Wongchoosuk, "DEVELOPMENT OF PORTABLE ELECTRONIC NOSE AND APPLICATIONS FOR MONITORING ARMPIT ODOR", BMEiCON 2010 - The 3rd Biomedical Engineering International Conference, 27-28 August 2010, Kyoto, JAPAN.
30. Wathang Donkrajang, Sriprajak Krongsuk and Teerakiat Kerdcharoen, "A study of porphine and metal-porphine at the gas/water interface based on molecular dynamics simulations", 1st International Conference on Computation for Science andTechnology, 4-6 August 2010, Chiang Mai, THAILAND.
31. Shongpun Lokaveea, Anurak Udomvech and Teerakiat Kerdcharoen, "The Geometry and Electronic Structures of Sidewall Functionalized Carbon Nanotubes: A Theoretical Study on the Effects of Carboxylic Groups", 1st International Conference on Computation for Science andTechnology, 4-6 August 2010, Chiang Mai, THAILAND.
32. Nattapong Tongrod, Adisorn Tuantranont and Teerakiat Kerdcharoen, "Design and Development of Data-Glove Based on Printed Polymeric Sensors and Zigbee Networks for Human Computer Interface", 4th International Convention for Rehabilitation Engineering & Assistive Technology, 21-23 July 2010, Shanghai, CHINA
33. P. Lorwongtragool, C. Wongchoosuk, T. Kerdcharoen, "Portable artificial nose system for assessing air quality in swine buildings", ECTI-CON2010 - 7th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 19-21 May 2010, Chiang Mai, THAILAND. (Indexed in IEEE Explore Database)
34. Johannes Ph. Mensing, Tanom Lomas, Teerakiat Kerdcharoen, Adisorn Tuantranont, "Inkjet-printed Optical Gas Sensor based on Metallo-phthalocyanine Layers", ECTI-CON2010 - 7th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications

and Information Technology Association, 19-21 May 2010, Chiang Mai, THAILAND. (Indexed in IEEE Explore Database)

35. Sumana Kladsomboon, Sirapat Pratontep, Teerakiat Kerdcharoen, "Optical Electronic Nose Based on Porphyrin and Phthalocyanine thin films", ECTI-CON2010 - 7th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 19-21 May 2010, Chiang Mai, THAILAND. (Indexed in IEEE Explore Database)
36. N. Watthanawisuth, N. Tongrod, T. Kerdcharoen, A.Tuantranont, "Real-time monitoring of GPS-tracking tractor based on ZigBee multi-hop mesh network", ECTI-CON2010 - 7th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 19-21 May 2010, Chiang Mai, THAILAND. (Indexed in IEEE Explore Database)
37. Weerayut Srichaisiriwech, Anurat Wisitsoaat, Ditsayut Phokharatkul, Chanpen Karuwan, Adisorn Tuantranont and Teerakiat Kerdcharoen, "Electronic Tongue Based on Modified Carbon Nanotube Electrochemical Sensor Array", ECTI-CON2010 - 7th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 19-21 May 2010, Chiang Mai, THAILAND. (Indexed in IEEE Explore Database)
38. Shongpun Lokavee, Anurak Udomvech, and Teerakiat Kerdcharoen, "The Geometry and Electronic Structures of Functionalized Single-Walled Carbon Nanotubes by Carboxyl Groups on Perfects and Defect Tubes", 14th International Annual Symposium on Computational Science and Engineering (ANSCSE2010), 23-26 March 2010, Mae Fah Luang University, THAILAND.
39. Teerakiat Kerdcharoen, "Electronic Nose for Agriculture", Invited Speaker, Pure and Applied Chemistry International Conference (PACCON2010), 21-23 January 2010, Sunee Grand Hotel and Convention Center, Ubon Ratchathani, THAILAND.
40. Patcharin Promsuk, Sirapat Pratontep, Teerakiat Kerdcharoen, "Development of Zinc tetra-tert-butyl-phthalocyanine (ZnTTBPc) blend in Natural Rubber as UV sensor", Pure and Applied Chemistry International Conference (PACCON2010), 21-23 January 2010, Sunee Grand Hotel and Convention Center, Ubon Ratchathani, THAILAND.
41. Weerayut Srichaisiriwech, Teerakiat Kerdcharoen, Anurat Wisitsoaat, Ditsayut Phokharatkul, Chanpen Karuwan and Adisorn Tuantranont, "Pure and Applied Chemistry International Conference (PACCON2010), 21-23 January 2010, Sunee Grand Hotel and Convention Center, Ubon Ratchathani, THAILAND.
42. Panida Lorwongtragool, Anurat Wisitsoraat and Teerakiat Kerdcharoen, "An Electronic Nose for Amine Detection Based on Polymer/SWNT-COOH Nanocomposites", IEEE International Nanoelectronics Conference (IEEE-INEC 2010), 4-7 January 2010, City University of Hong Kong, Hong Kong, CHINA. (Indexed in IEEE Explore Database)
43. Sumana Kladsomboon, Theeraporn Puntheeranurak, Sirapat Pratontep and Teerakiat Kerdcharoen, "An Artificial Nose Based on M-Porphyrin (M = Mg, Zn) Thin Film and Optical Spectroscopy", IEEE International Nanoelectronics Conference (IEEE-INEC 2010), 4-7 January 2010, City University of Hong Kong, Hong Kong, CHINA. (Indexed in IEEE Explore Database).
44. Chavis Srichan, Thitirat Saikrajang, Thitiporn Suwanpreecha, Pornpimol Sritongkham, Teerakiat Kerdcharoen, Adisorn Tuantranont, "Low Cost Disposable Inkjet-Printed Saliva Glucose Sensor with Micromolar sensitivity based on PEDOT/PSS chemoresistance", ICFPE2009- International Conference on Flexible and Printed Electronics, 11-13 November 2009, KAL Hotel, Jeju Island, KOREA.
45. Nattapong Tongrod, Thitirat Saikrajang, Natthapol Watthanawisuth, Adisorn Tuantranont, and Teerakiat Kerdcharoen, "A Data-Glove Based on Printed Polymeric Sensor and ZigBee Networks for Real Time Hand Tracking", ICFPE2009- International Conference on Flexible and Printed Electronics, 11-13 November 2009, KAL Hotel, Jeju Island, KOREA.
46. Thitirat Saikrajang, Nattapong Tongrod, Chavis Srichan, Adisorn Tuantranont and Teerakiat Kerdcharoen, "A Study of Plastic, Paper and Textile Substrates for Ink-Jet Based Printed

Electronics", ICFPE2009- International Conference on Flexible and Printed Electronics, 11-13 November 2009, KAL Hotel, Jeju Island, KOREA.

47. Nattapong Tongrod, Adisorn Tuantranont, Teerakiat Kerdcharoen, "Adoption of Precision Agriculture in Vineyard", ECTI-CON2009 - 6th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 6-9 May 2009, Pattaya, THAILAND. (Indexed in IEEE Explore Database)
48. Piangkhwan Wanitchang, Somboon Sahasithiwat, Chakkrapan Nerungsi, Tienthong Thongpanchang and Teerakiat Kerdcharoen, "Organic light emitting devices using 9,10-bis (dodecylthio)anthracene as a new emitting material", ECTI-CON2009 - 6th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 6-9 May 2009, Pattaya, THAILAND. (Indexed in IEEE Explore Database).
49. Chavis Srichan, Thitirat Saikrajang, Tanom Lomas, Apichai Jomphoak, Thitima Maturos, Disayut Phokaratkul, Teerakiat Kerdcharoen, and Adisorn Tuantranont, "Inkjet Printing PEDOT:PSS using Desktop Inkjet Printer", ECTI-CON2009 - 6th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 6-9 May 2009, Pattaya, THAILAND. (Indexed in IEEE Explore Database).
50. Chatchawal Wongchoosuk, Anurat Wisitsoraat, Adisorn Tuantranont, and Teerakiat Kerdcharoen, "Mobile Electronic Nose Based on Carbon Nanotube-SnO2 Gas Sensors: Feature Extraction Techniques and Its Application", ECTI-CON2009 - 6th International Conference of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association, 6-9 May 2009, Pattaya, THAILAND. (Indexed in IEEE Explore Database).
51. Panida Lorwongtragool, Chatchawal Wongchoosuk, Anurak Udomvech, Teerakiat Kerdcharoen, "Computational studies on the dynamics and trajectories of Li+ intercalated into single-walled carbon nanotube", 13th International Annual National Symposium on Computational Science and Engineering (ANSCSE2009), 25-27 March 2009, Kasetsart University, THAILAND.
52. Wathang Donkrajang, Sumana kladsomboon, Chatchawal Wongchoosuk and Teerakiat Kerdcharoen, "Study of Interactions between Metalloporphyrins with Various Volatile Substances Using Computational Quantum Mechanics and Molecular Dynamics simulations", 13th International Annual National Symposium on Computational Science and Engineering (ANSCSE2009), 25-27 March 2009, Kasetsart University, THAILAND.
53. Shongpun Lokavee, Chatchawal Wongchoosuk and Teerakiat Kerdcharoen, "Sidewall Functionalized Carbon Nanotubes: A Theoretical Study on the Effects of Carboxylic Group", PACCON2009 - Pure and Applied Chemistry International Conference, 14-16 January 2009, Naresuan University, Pitsanuloke, THAILAND.
54. Wathang Donkrajang, Sumana Kladsomboon and Teerakiat Kerdcharoen, "Molecular Modeling of the Interactions between Metalloporphyrins as Optical Sensing Materials with Volatile Organic Molecules", PACCON2009 - Pure and Applied Chemistry International Conference, 14-16 January 2009, Naresuan University, Pitsanuloke, THAILAND.
55. Thanyaphat Techalertmanee, Chaiyuth Sae-Kung, Chanchana Thanachayanont, Porponth Sichanugrist, Teerakiat Kerdcharoen, "FABRICATION AND APPLICATIONOF DYE SENSITIZED SOLAR CELLS IN VINEYARD", PACCON2009 - Pure and Applied Chemistry International Conference, 14-16 January 2009, Naresuan University, Pitsanuloke, THAILAND.
56. Sumana Kladsomboon, Sirapat Pratontep, Theeraporn Puntheeranurak and Teerakiat Kerdcharoen, "Investigation of Thermal and Methanol-Vapor Treatments for MgTPP as an Optical Gas Sensor", The 4th Annual IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE-NEMS2009), 5-8 January 2009, Sheraton Dameisha Resort, Shenzhen, CHINA. (Indexed in IEEE Explore Database)
57. Nattapong Tongrod, Adisorn Tuantranont and Teerakiat Kerdcharoen, "Smart Farm Technology and Opportunities for Tea Plantation", International Conference on Tea Production and Tea Products 2008, 26-28 November 2008, Mae Fah Luang University, Chiang Rai, THAILAND.

58. Chatchawal Wongchoosuk, Mario Lutz and Teerakiat Kerdcharoen, "James Bond Electronic Nose for Estimation of Thai Tea Aroma", International Conference on Tea Production and Tea Products 2008, 26-28 November 2008, Mae Fah Luang University, Chiang Rai, THAILAND.
59. Teerakiat Kerdcharoen, "A Review of Agricultural Sensors and Opportunities for Tea Orchard", International Conference on Tea Production and Tea Products 2008, 26-28 November 2008, Mae Fah Luang University, Chiang Rai, THAILAND.
60. Piyorot Khongchuay, Sukanya Phongsuphap and Teerakiat Kerdcharoen, "The prediction of crop yield based on machine vision: a case study in vineyard and opportunities for tea orchard", International Conference on Tea Production and Tea Products 2008, 26-28 November 2008, Mae Fah Luang University, Chiang Rai, THAILAND.
61. Mario Lutz, Adisorn Tuantranont and Teerakiat Kerdcharoen, "Soil moisture measurement system, integrated into a ZigBee environmental monitoring system", International Conference on Tea Production and Tea Products 2008, 26-28 November 2008, Mae Fah Luang University, Chiang Rai, THAILAND.
62. Natthapol Watthanawisuth, Teerakiat Kerdcharoen and Adisorn Tuantranont, "Microclimate monitoring in vineyard based on ZigBee sensor networks", International Conference on Tea Production and Tea Products 2008, 26-28 November 2008, Mae Fah Luang University, Chiang Rai, THAILAND.
63. Sureeporn Uttiya, Sirapat Pratontep, Worawan Bhanthumnavin, Radchada Buntem, Teerakiat Kerdcharoen, "Volatile Organic Compound Sensor Arrays Based on Zinc Phthalocyanine and Zinc Porphyrin Thin Films", Proceeding of IEEE International Nanoelectronics Conference (IEEE-INEC2008), 24-27 March 2008, Shanghai, CHINA. (Indexed in IEEE Explore Database)
64. Sumana Kladsomboon, Sirapat Pratontep, Sureeporn Uttiya, Teerakiat Kerdcharoen, "Alcohol gas sensors based on magnesium tetraphenyl porphyrins", Proceeding of IEEE International Nanoelectronics Conference (IEEE-INEC2008), 24-27 March 2008, Shanghai, CHINA. (Indexed in IEEE Explore Database)
65. Nattapong Tongrod, Krisanadej Jaroensutasinee, Adisorn Tuantranont and Teerakiat Kerdcharoen, "Information Technology for Smart Vineyard", The 6th World Congress on Computers in Agriculture, 24-27 August 2008, Tokyo, JAPAN.
66. Sureeporn Uttiya, Sumana Kladsomboon, Onanong Chamlek, Wiriya Suwannet , Tanakorn Osotchan, Teerakiat Kerdcharoen, Martin Brinkmann, Sirapat Pratontep, "Molecular interactions between alcohols and metal phthalocyanine thin films for optical gas sensor applications", The 2008 European Materials Research Society Spring Meeting, 26-30 May 2008, Strasbourg, FRANCE.
67. Chatchawal Wongchoosuk, Thanyarat Techalertmanee, Somboon Sahasithiwat, Adisorn Tuantranont, Teerakiat Kerdcharoen, "DISCRIMINATION OF THAI ALCOHOLIC BEVERAGES USING CARBON BLACK-POLYMER COMPOSITE SENSOR ARRAY", The 4th International Conference on Technological Advances of Thin Films & Surface Coatings (Thin Films 2008), 13-16 July 2008, SINGAPORE.
68. Chatchawal Wongchoosuk, Supab Choopun, Adisorn Tuantranont, Teerakiat Kerdcharoen, "AU-DOPED ZINC OXIDE NANOSTRUCTURE SENSORS FOR DETECTION AND DISCRIMINATION OF VOLATILE ORGANIC COMPOUNDS", 2ND INTERNATIONAL CONFERENCE ON FUNCTIONAL MATERIALS AND DEVICES 2008 (ICFMD2008), 16-19 June 2008, Kuala Lumpur, MALAYSIA.
69. Johannes Mensing, Sumana Kladsomboon, Teerakiat Kerdcharoen, "Optical Gas Sensor Based on MgTPP Thin Film for the Detection of Alcohol Vapors", The 5th International Conference in Electrical Engineering / Electronics, Computer, Telecommunications, and Information Technology, 14-17 May 2008, Krabi, THAILAND. (Indexed in IEEE Explore Database)
70. Chatchawal Wongchoosuk, Mario Lutz and Teerakiat Kerdcharoen, "Correction of Humidity Effect for Detection of Human Body Odor", The 5th International Conference in Electrical Engineering / Electronics, Computer, Telecommunications, and Information Technology, 14-17 May 2008, Krabi, THAILAND. (Indexed in IEEE Explore Database)

71. Sumana Kladsomboon, Sirapat Pratontep, Sureeporn Uttiya, Teerakiat Kerdcharoen, "Preparation of Magnesium Tetraphenyl Porphyrins Spin Coated Thin Film for the Alcohol Gas Sensor", 2nd International Workshop on Functional Materials and Nanomaterials, 22-25 April 2008, Chiang Mai, THAILAND.
72. Chatchawal Wongchoosuk, Mario Lutz, Adisorn Tuantranont, Teerakiat Kerdcharoen, "Development of the Hardware and Software for Human Body Odor Discrimination", The 5th International Joint Conference on Computer Science and Software Engineering (JCSSE2008), 7-9 May 2008, Felix River Kwai Resort, Kanchanaburi, THAILAND.
73. Nattapong Tongrod, Krisanadej Jaroensutasinee, Adisorn Tuantranont, Teerakiat Kerdcharoen, "Information Technology for Smart Farming", 5th International Joint Conference on Computer Science and Software Engineering (JCSSE2008), 7-9 May 2008, Felix River Kwai Resort, Kanchanaburi, THAILAND.
74. A. Udomvech, J. Sonpong, O. Waipan and T. Kerdcharoen, "Electronic Structure of Straight and T-Shape Singled-Wall Carbon nanotube Junctions: A Molecular Quantum Mechanics Study", 2nd International Workshop on Functional Materials and Nanomaterials, 22-25 April 2008, Chiang Mai, THAILAND.
75. Chatchawal Wongchoosuk, Supab Choopun, Adisorn Tuantranont, Teerakiat Kerdcharoen, "PORTABLE ELECTRONIC NOSE BASED ON AU-DOPED ZNO NANOSTRUCTURE SENSORS FOR CLASSIFICATION OF THAI ALCOHOLS", The 1st International Workshop on Nanotechnology and Applications - IWNA2007, 15-17 November 2007, Vung Tau City, Vietnam.
76. Mario Lutz, Niwat Srisawasdi, Rapeephan Ngernlhor, Teerakiat Kerdcharoen, "NOSE SIMULATOR: AN APPLICATION OF THE NANOSCIENCE OF SMELL FOR RAPID FLAVOR CLASSIFICATION", The 1st International Workshop on Nanotechnology and Applications - IWNA2007, 15-17 November 2007, Vung Tau City, Vietnam.
77. Teerakiat Kerdcharoen, Thitima Maturos, Toemsak Srikhirin, Rakchart Traiphol and Tanakorn Osotchan, "GREEN-COLOR ORGANIC LIGHT EMITTING DEVICE BASED ON POLYFLUORENE-ANTHRACENE CO-POLYMER", The 1st International Workshop on Nanotechnology and Applications - IWNA2007, 15-17 November 2007, Vung Tau City, Vietnam.
78. C. Wongchoosuk, S. Krongsuk and T. Kerdcharoen, "First Principles and MD Simulation Study of the Interaction of Functionalized Carbon Nanotubes with Water Molecules", Proceeding of the 7th IEEE International Conference on Nanotechnology (IEEE-NANO 2007), 2-5 August 2007, Hong Kong Convention & Exhibition Centre, Hong Kong, China. (Indexed in IEEE Explore Database)
79. Md. Shafiqzzaman, A. Udomvech and T. Kerdcharoen, "Theoretical Studies of Pentagon-Heptagon Pair Defects in Carbon Nanotube Junctions", Proceeding of the 7th IEEE International Conference on Nanotechnology (IEEE-NANO 2007), 2-5 August 2007, Hong Kong Convention & Exhibition Centre, Hong Kong, China. (Indexed in IEEE Explore Database)
80. Anurak Udomvech, Teerakiat Kerdcharoen, "Adsorption of Li2 on 4 Å Single Walled Nanotubes as Studied by Density Functional Theory", Proceeding of the International Conference on Nanoscience and Nanotechnology (ChinaNANO 2007), 4-6 June 2007, Beijing, China.
81. Yodsoi Kanintronkul, Chonticha Suwattanasophon, Issara Sramala, Chanan Angsuthanasombat, Toemsak Srikhirin, Teerakiat Kerdcharoen, "The Toxicity of Wild-type and Mutants (N166D and N166I) of Bacillus thuringiensis Cry4Ba Pore-forming Protein as Explained by Molecular Dynamics Simulation at the Protein-Membrane-Water Nanoscale Interface", Proceeding of the International Conference on Nanoscience and Nanotechnology (ChinaNANO 2007), 4-6 June 2007, Beijing, China.
82. Sriprajak Krongsuk, Teerakiat Kerdcharoen, Supot Hannongbua, "Concentration Effects on the Structure and Dynamic of the Uncomplex 18-Crown-6 at the Water-CCl4 Interface: A Molecular Dynamics Simulation Study", Proceeding of the International Conference on Nanoscience and Nanotechnology (ChinaNANO 2007), 4-6 June 2007, Beijing, China.
83. Wattanasit Pimpao, Assawaphong Sappat, Teerakiat Kerdcharoen, Manas Sangworasil, Anurat wisitsoraat, Adisorn Tuantranont, "Odor Recognition System Using MEMS Based Gas Sensor

Array and Principal Component Analysis", Proceeding of the International Conference on Nanoscience and Nanotechnology (ChinaNANO 2007), 4-6 June 2007, Beijing, China.

84. R. Maolanon, J. Wongsala, S. Uttiya, T. Kerdcharoen and S. Pratontep, "AFM study of thermally induced structural transformation of zinc phthalocyanine thin films", Proceeding of the International Scanning Probe Microscopy Conference (JEJU 2007 ISPM), 10-14 June, Jeju, Korea.
85. T. Maturos, T. Srikhirin, T. Osotchan, R. Traiphol and T. Kerdcharoen, "MOLECULAR ENGINEERING OF POLYFLUORENE-ANTHRACENE CONDUCTIVE POLYMER: SYNTHESIS, SPECTROSCOPY, DEVICE FABRICATION AND QUANTUM MOLECULAR MODELING", Proceeding of The 1st International Workshop on Functional Materials and The 3rd International Workshop on Nanophysics and Nanotechnology 2006, 6-9 December 2006, Saigon-Halong Hotel, Halong City, Vietnam.
86. Anurak Udomvech, Tanakorn Osotchan, Teerakiat Kerdcharoen, "THEORETICAL INVESTIGATION OF LITHIUM ATOMS INSERTION INTO THE ULTRA-SMALL DIAMETER CARBON NANOTUBES", Proceeding of The 1st International Workshop on Functional Materials and The 3rd International Workshop on Nanophysics and Nanotechnology 2006, 6-9 December 2006, Saigon-Halong Hotel, Halong City, Vietnam.
87. Sriprajak Krongsuk, Teerakiat Kerdcharoen, Alexander Borodin and Michael Kiselev, "Computer Simulation Study of Porphyrazine Monolayer at the Water-Gas Interface: Structure and Molecular Orientation", Proceeding of The 1st International Workshop on Functional Materials and The 3rd International Workshop on Nanophysics and Nanotechnology 2006, 6-9 December 2006, Saigon-Halong Hotel, Halong City, Vietnam.
88. Sureeporn Uttiya, Teerakiat Kerdcharoen, Santi Vatanayon, Sirapat Pratontep, "EFFECT OF STRUCTURAL TRANSFORMATION TO THE GAS SENSING PROPERTIES OF PHTHALOCYANINE THIN FILM", Proceeding of The 1st International Workshop on Functional Materials and The 3rd International Workshop on Nanophysics and Nanotechnology 2006, 6-9 December 2006, Saigon-Halong Hotel, Halong City, Vietnam.
89. W. Pimpao, T. Kerdcharoen, M. Sangworasil, A. Jomphoak, A. Tuantranont, "Design and Development of Gas Sensor Array System for Portable Electronic Nose", Proceeding of the 1st International Conference on Applied Science, 5-7 November 2006, Vientiane, Laos, *Laos Journal on Applied Science* 1 (2006) 515.
90. N. Chabasri, T. Srikhirin, S. Leetacheewa, C. Angsuthanasombat, T. Kerdcharoen, "Penetration of Insecticidal Toxin Cry4Ba into Lipid Layer: Temperature Effect Study", Proceeding of the 1st International Conference on Applied Science, 5-7 November 2006, Vientiane, Laos, *Laos Journal on Applied Science* 1 (2006) 27.
91. C. Wongchoosuk, A. Udomvech, T. Kerdcharoen, "Open-ended Functionalized Single-Walled Carbon Nanotubes: a Quantum Mechanics Study of the Effects of Tubule Length and Functional Groups", 1st International Conference on Applied Science, 5-7 November 2006, Vientiane, Laos, *Laos Journal on Applied Science* 1 (2006) 75.
92. O. Chamlek, S. Pratontep, T. Kerdcharoen, T. Osotchan, "Studies of Metal Atom in Phthalocyanine Thin Film", Proceeding of the 1st International Conference on Applied Science, 5-7 November 2006, Vientiane, Laos, *Laos Journal on Applied Science* 1 (2006) 158.
93. U. Phuapaiboon, B. Panijpan, T. Kerdcharoen, S. Pratontep, T. Osotchan, "Studies of Appropriate Scientific Contents in Nanotechnology for High School Teacher", Proceeding of the 1st International Conference on Applied Science, 5-7 November 2006, Vientiane, Laos, *Laos Journal on Applied Science* 1 (2006) 201.
94. P. Duangjak na ayudhaya, K. Jaroensutasinee, S. Pratontep, C. Pornpanomchai and T. Kerdcharoen, "Principle Component Analysis of Instant Coffee with Static Electronic Nose System", Proceeding of the 1st International Conference on Applied Science, 5-7 November 2006, Vientiane, Laos, *Laos Journal on Applied Science* 1 (2006) 438.
95. S. Uttiya, T. Kerdcharoen, P. Daungjak Na Ayutthaya, W. Bhanthumnavin, R. Buntem and S. Pratontep, "Optical Gas Sensor Array Based on Metallo-Phthalocyanines and Metallo-

Porphyrins", Proceedings of the 2007 Electrical Engineering/Electronics, Computer, Telecommunications, and Information Technology International Conference, 9-12 May 2007, Mae Fah Luang University, Chiang Rai, Thailand.

96. C. Wongchoosuk, S. Krongsuk and T. Kerdcharoen, "Computational Molecular Modeling and Simulation of Functionalized Carbon Nanotubes", Proceedings of the 2007 Electrical Engineering/Electronics, Computer, Telecommunications, and Information Technology International Conference, 9-12 May 2007, Mae Fah Luang University, Chiang Rai, Thailand.
97. Md. Shafiqzzaman, A. Udomvech and T. Kerdcharoen, "The Electronic and Energetic Properties of Linearly Fused Single-walled Carbon Nanotubes by Pentagon-Heptagon Pair Defects", Proceedings of the 2007 Electrical Engineering/Electronics, Computer, Telecommunications, and Information Technology International Conference, 9-12 May 2007, Mae Fah Luang University, Chiang Rai, Thailand.
98. K. Kasemsuwan, C. Thanachayanont, R. Traiphol and T. Kerdcharoen, "Influences of Fabrication Process on Aggregation of Conjugated Polymer in Thin Films and its Roles on the Performance of Plastic Solar Cells", Proceedings of the 2007 Electrical Engineering/Electronics, Computer, Telecommunications, and Information Technology International Conference, 9-12 May 2007, Mae Fah Luang University, Chiang Rai, Thailand.
99. S. Harnsoongnoen, M. Lutz, N. Waranuch, A. Tuantranont and T. Kerdcharoen, "Application of an Electronic Nose for Body Odor Recognition: Opportunity and Problem", Proceedings of the 2007 Electrical Engineering/Electronics, Computer, Telecommunications, and Information Technology International Conference, 9-12 May 2007, Mae Fah Luang University, Chiang Rai, Thailand.
100. W. Pimpao, A. Sappat, T. Kerdcharoen, M. Sangworasil, A. Tuantranont, "Electronic Nose System for Orange Juice Freshness Quality Control", Proceedings of the 2007 Electrical Engineering/Electronics, Computer, Telecommunications, and Information Technology International Conference, 9-12 May 2007, Mae Fah Luang University, Chiang Rai, Thailand.
101. A. Rassamesard, T. Srikhirin, T. Kerdcharoen, T. Osotchan, "Molecular Electronic Device from Monolayer Films", Proceedings of the 2005 Electrical Engineering/Electronics, Computer, Telecommunications, and Information Technology International Conference, 12-13 May 2005, Asia Pattaya Beach Hotel, Pattaya, Thailand.
102. R. Jaroen, S. Rutanaphan, T. Osotchan, S. Pratontep, T. Srikhirin, T. Kerdcharoen, "Metalloporphyrins as Organic Sensors", Proceedings of the 2005 Electrical Engineering/Electronics, Computer, Telecommunications, and Information Technology International Conference, 12-13 May 2005, Asia Pattaya Beach Hotel, Pattaya, Thailand.
103. T. Taveecharoenkool, M. Kiselev, T. Kerdcharoen, C. Angsuthanasombat, "Molecular Dynamics Simulations of *Bacillus thuringiensis* Cry4Aa Mosquito-Larvicidal Protein in Explicit water", Proceeding of the 2nd Asian Pacific Conference on Theoretical and Computational Chemistry, 2-6 May 2005, Chulalongkorn University, Bangkok, Thailand.
104. A. Udomvech, T. Osotchan, T. Kerdcharoen, "First Principles Study of Li/Li+ and Li Clusters Doped Single-Walled Carbon Nanotubes", Proceeding of the 2nd Asian Pacific Conference on Theoretical and Computational Chemistry, 2-6 May 2005, Chulalongkorn University, Bangkok, Thailand.
105. P. Wutticharoenmongkol, P. Supaphol, T. Srikhirin, T. Osotchan, T. Kerdcharoen, "Effects of Polymer Concentration and Salt Addition on Electrospun PS/MEH-PPV Nanofibers", Proceeding of the International Conference on Smart Materials, 1-3 December 2004, Imperial Mae Ping, Chiang Mai, Thailand.
106. A. Udomvech, T. Osotchan, U. Robkob, V. Parasuk, T. Kerdcharoen, "Computational Modeling of Finite-Sized Pure and Alkali-Metal Intercalated Carbon Nanotubes", Proceeding of the International Conference on Smart Materials, 1-3 December 2004, Imperial Mae Ping, Chiang Mai, Thailand.

107. T. Maturos, T. Srikhirin, T. Kerdcharoen, T. Osotchan, "Fabrication and Luminescent Characterization for Copolymer of Polyfluorene and Anthracene Light Emitting Devices", Proceeding of the International Conference on Smart Materials, 1-3 December 2004, Imperial Mae Ping, Chiang Mai, Thailand.
108. Y. Kanintronkul, T. Srikhirin, C. Angsuthanasombat, T. Kerdcharoen, "Adsorption of the Bacillus thuringiensis Cry4Ba Toxin at Lipid Membrane-Water Interface: Model Studies towards Nanodevice Implications", Proceeding of the International Conference on Smart Materials, 1-3 December 2004, Imperial Mae Ping, Chiang Mai, Thailand.
109. R. Jaroen, K. Kasemsuwan, C. Thanachayanont, T. Srikhirin, T. Osotchan, T. Kerdcharoen, "MEH-PPV and Metalloporphyrins as Organic Sensors", Proceeding of the International Conference on Smart Materials, 1-3 December 2004, Imperial Mae Ping, Chiang Mai, Thailand.
110. A. Rassamesard, T. Srikhirin, T. Kerdcharoen, T. Osotchan, "Scanning Probe Microscope Investigation of Electrical Characteristics and Surface Morphology of Side Chain Liquid Crystalline Copolymers", Proceeding of the International Conference on Smart Materials, 1-3 December 2004, Imperial Mae Ping, Chiang Mai, Thailand.
111. T. Kerdcharoen, T. Srikhirin, T. Osotchan, "Design and Fabrication of Organic Device for Lighting Applications", Proceeding of the International Symposium on Nanotechnology in Environmental Protection and Pollution 2005, Miracle Grand Convention Hotel, Bangkok, Thailand.
112. R. Jaisutti, S. Maneetool, T. Kerdcharoen, S. Pratontep and T. Osotchan, "Feature extraction of metal oxide gas sensors using compressed coefficients of discrete wavelet transform", Proceeding of the International Conference on Engineering, Applied Sciences, and Technology (ICEAST2007), 21-23 November 2007, The Swissotel Le Concorde, Bangkok, Thailand

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EDUCATION AND DEGREES

Ph.D. in Biomedical Sciences (Genetics), 1995; University of Hawaii, USA

M.Sc. in Biomedical Sciences (Genetics) 1990; University of Hawaii USA

B.Sc. Biology 1985; Mahidol University, Bangkok, THAILAND

POSITIONS HELD
Chief Scientific Officer for Research Contracts from the IAEA-UN

Head of Fruit Fly Molecular Genetic Laboratory

Member of National Executive Committee of the Fruit Fly Control Area under the Ministry of Agriculture

Member of the International Subcommittee for the Frutt Fly Control Area under the Ministry of Agriculture

Member of Excecutive Committee of the Graduate Programs in Biotechnology, Mahidol University

INTERNATIONAL FELLOWSHIPS AND RESEARCH GRANTS (Recently)

Three Research Contracts from the International Atomic Energy Agency (IAEA-UN)

1. "*Molecular Technology for the Effectiveness of the SIT*" (year 2003 to 2008)
2. "*Development and Evaluation of Improved Strains of Insect Pests for SIT* (2009 to 2014)
3. "*Resolution of Cryptic Species Complexes of Tephritid Pests to Overcome Constrains to SIT Application and International Trade*" (2010 to 2015)
4. Visiting Scholar Grant to Univesity of Pavia, Pavia, Italy (2004)
5. Scientific Visit Grant from the IAEA-UN under topic "*Insect Trans-genesis*" (2005)

PROFESSIONAL ACTIVITIES

Local organizer for the third Research Coordination Meeting for the CRP "Molecular Technology for the Effectiveness of SIT" Bangkok, THAILAND during November 6th-10th , 2006. Support by the IAEA/FAO Joint Division.

Organiser of the First ASEAN Fruit Fly: Research and Bionomics meeting. Bangkok Thailand March 9, 2012.

INTERNATIONAL SCIENTIFIC SERVICE

A member of the Expert Drafting Group to draft the diagnostic protocol of *Bactrocera dorsalis* complex for the International Plant Protection Convention (IPPC), FAO, UN

An expert listed in the field environmental risk assessment criteria for genetically modified arthropods by the European Food Safety Authority

An expert listed in the field of the fruit fly and plant phytosanitation by the National Bureau of Agricultural Commodity and Food Standards (ACFS)

Reviewer for Scientific Journals such as *Genetica*, *Insect Molecular Biology, PlosOne, African Biotechnology*

PUBLICATIONS (Recently; * corresponding authors)

Isasawin S, N. Aketarawong, S. Thanaphum*. 2012. Characterization, evaluation, and utilization of microsatellite markers from a genetic sexing strain of the oriental fruit fly, *Bactrocera dorsalis* (Diptera: Tephritidae), for sterile insect technique. *Eur. J. Entomol.* In press.

Aketarawong N, S. Chinvinijkul, W. Orankanok, C.R. Guglielmino, G. Franz, A.R. Malacrida and S. Thanaphum*. 2011. The utility of microsatellite DNA markers for the evaluation of area-wide integrated pest management using SIT for the fruit fly, *Bactrocera dorsalis* (Hendel), control programs in Thailand. *Genetica.* 139(1):129-140.

Permpoon R, N. Aketarawong, S. Thanaphum*. 2011. Isolation and characterization of *Doublesex* homologues in the *Bactrocera* species: *B. dorsalis* (Hendel) and *B. correcta* (Bezzi) and their putative promoter regulatory regions. *Genetica*. 139(1):113-127.

Permpoon R. and S. Thanaphum*. 2010. "Isolation and characterization of oligomerization domain I and II coding regions of *doublesex* genes in agricultural fruit flies (Diptera: Tephritidae)" *Eur. J. Entomol.* 107:121-126.

Aketarawong N., M. Bonizzoi, S. Thanaphum, L.M. Gomulski, G. Gasperi, A.R. Malacrida*, and C.R. Gugliemino. 2007. Inference on the population structure and Colonization process of the invasive oriental fruit fly, *Bactrocera dorsalis* (Hendel) *Mol. Ecol.* 16:3522-32.

Orankanok W., S, Chinvijijkul, P. Sittilob, S. Thanaphum, and W.R. Enkerlin*. 2007. Integrating the Sterile Insect Technique (SIT) of Fruit Fly Control in Thailand. In Vreysen MJB, Hendrichs J, Robinson AS (eds.) Area-wide Control of Insect Pest: From Research to Field Implementation. Springer, Dordrecht, theNetherlands.

Aketarawong N., M. Bonizzoni, A.R. Malacrida, G. Gasperi, and S. Thanaphum*. 2006. Seventeen novel microsatellite markers from an enriched library of the pest species *Bactrocera dorsalis* sensu stricto. *Mol. Ecol. Notes.* 6:1138-40.

Thanaphum*, S. and U. Thaenkham 2003. Relationships and forms within the *Bactrocera tau* (Walker) (Diptera: Tephritidae) taxon based on *Heat Shock Protein* Cognate Sequences. *Ann. Entomol. Soc. Am.* 96(1): 44-53.