ATPER สมาคมนักวิชาชีพไทยในยุโรป
Association of Thai Professionals in Europe

สำนักยุทธศาสตร์อุดมศึกษาต่างประเทศ

สำนักงานคณะกรรมการการอุดมศึกษา

328 ถนนศรีอยุธยา

กรุงเทพฯ 10400

8 มิถุนายน 2552

รายงานย่อ การจัดประชุมประจำปี ATPER2009 ณ กรุงปารีส ประเทศฝรั่งเศส ของสมาคมนักวิชาชีพไทยในยุโรป ประจำปีงบประมาณ 2552 และขอพิจารณาความร่วมมือในปีงบประมาณ 2553

      สมาคมนักวิชาชีพไทยในยุโรป (ATPER) ได้รับงบประมาณสนับสนุนประจำปีจาก สกอ. โดยส่วนหนึ่งจะใช้ในการจัดประชุมทางวิชาการ ซึ่งในปี 2552 นี้ ATPER2009ได้จัดขึ้น ณ กรุงปารีส ประเทศฝรั่งเศส เมื่อวันที่ 22–23 พฤษภาคม ศกนี้

      ในการจัดประชุม ATPER2009 ทางคณะกรรมการบริหารสมาคมฯ ได้เชิญผู้แทนจากประเทศไทยเข้าร่วมประชุม เพื่อเป็นเกียรติต่อสมาคมฯ โดยการบรรยาย 20 นาที และ ร่วมให้ข้อคิดเห็นและสรุปการสัมมนาของแต่ละวัน โดยผู้แทนจากประเทศไทยที่เข้าร่วมประชุมได้แก่

คุณ ชาญชัย จรัญวัฒนากิจ อัครราชทูตที่ปรึกษา สถานเอกอัครราชทูตไทย ณ กรุงปารีส

ดร. จันทร์เพ็ญ เมฆาอภิรักษ์ อัครราชทูตที่ปรึกษา ด้านวิทยาศาสตร์และเทคโนโลยี ประจำกรุงบรัสเซลส์

ดร. นพวรรณ ตันติพิพัฒน์ ผู้ช่วยผู้อำนวยการ สวทช.

ซึ่งการจัดประชุมครั้งนี้ ประสบความสำเร็จเป็นอย่างยิ่ง การบรรยายจัดแบ่งออกเป็นหลายสาขา ซึ่งมีความต่อเนื่อง และผู้บรรยายสามารถให้ความรู้ ความเข้าใจ ต่อผู้เข้าร่วมประชุมในสาขาอื่น ทำให้ผู้เข้าร่วมประชุมทุกท่าน เกิดความสนใจที่จะร่วมกันประสานงาน เพื่อให้เกิดประโยชน์ต่อประเทศชาติ และเนื่องจากปีนี้เป็นปีแรกที่ไม่มีผู้แทนจาก สกอ. เข้าร่วมประชุม ทำให้ขาดข้อมูลสำคัญ รวมทั้งขาดข้อคิดเห็นจาก สกอ. ซึ่งจะเป็นประโยชน์ต่อสมาชิกของสมาคมฯ

ทั้งนี้คณะกรรมการบริหารสมาคมฯ มีความหวังเป็นอย่างยิ่งว่า สมาคมฯ จะยังคงได้รับงบประมาณสนับสนุนประจำปีจาก สกอ. พร้อมทั้ง ผู้แทนจาก สกอ. ให้เกียรติเข้าร่วมประชุมทางวิชาการประจำปี เพื่อให้คำแนะนำ และ เสนอข้อคิดเห็นต่อสมาคมฯ ในครั้งต่อไป

เนื่องจากคณะกรรมการบริหารสมาคมฯ มีความตั้งใจที่จะเสนอขอความร่วมมือจากทั้ง สกอ. และ สวทช. ในการวางแผนจัดประชุม ATPER2010 ในประเทศไทยในปี 2553 โดยเชิญผู้บรรยายชุดเดิมจาก ATPER2009 แต่อาจจะเปลี่ยนการบรรยายเป็นแบบโครงการร่วม เพื่อให้เกิดการประสานงานระหว่างนักวิชาชีพไทยในยุโรป และ อาจเป็นตัวอย่างสำหรับนักวิชาชีพในประเทศไทย รวมทั้งอาจก่อให้เกิดการประสานงานระหว่างนักวิชาชีพไทยในยุโรปและนักวิชาชีพในประเทศไทย และเนื่องจาก สกอ. ไม่ได้มีผู้แทนเข้าร่วมประชุม ATPER2009 ครั้งนี้ ทางคณะกรรมการบริหารสมาคมฯจึงได้แนบเอกสารเกี่ยวกับ กำหนดและหัวข้อการประชุม ATPER2009 มาพร้อมกับจดหมายฉบับนี้ เพื่อเป็นข้อมูลในการพิจารณาของ สกอ.

สำหรับรายละเอียดการใช้งบประมาณจาก สกอ. ประจำปี 2552 จะรายงานรวมเมื่อทางสมาคมฯ เสร็จสิ้นโครงการบริหารสมาคมฯ ประจำปี

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

ดร. กฤษณา รุ่งเรืองศักดิ์ ทอร์ริสสัน
นายกสมาคมนักวิชาชีพไทยในยุโรป

เอกสารแนบ

กำหนดและหัวข้อการประชุม ATPER2009 รวมทั้งสถานที่จัดประชุม ณ กรุงปารีส ประเทศฝรั่งเศส และ บดคัดย่อของการบรรยาย จำนวนทั้งสิ้น 24 หน้า

Association of Thai Professionals in Europe (ATPER)

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Handled by:

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ATPER สมาคมนักวิชาชีพไทยในยุโรป
Association of Thai Professionals in Europe

Provisional ATPER2009 Meeting Agenda

22–23 May 2009, Paris, France

Date and time	Topic	Presenter/Leader
วันศุกร์ที่ 22 พฤษภาคม 2552		
0830 – 0900 น	**ลงทะเบียน**	
0900 – 0920 น	กล่าวต้อนรับและเปิดการประชุม	คุณ ชาญชัย จรัญวัฒนากิจ อัคราชทูตที่ปรึกษา สถานเอกอัคราชทูตไทย ณ กรุงปารีส
0920 – 0940 น	การบรรยายพิเศษ เรื่อง _____ (รอยืนยัน)	ดร. นพวรรณ ตันติพิพัฒน์ ผู้ช่วยผู้อำนวยการ สวทช.
0940 – 1000 น	Positional analysis and overview of countries for potential collaboration – Where is Thailand? (Example from International Science Strategy of Department of Fisheries and Oceans Canada (DFO)	ดร. กฤษณา รุ่งเรืองศักดิ์ ทอร์ริสสัน (นายกสมาคมฯ)
1000 – 1020 น	Reverse Brain Drain Projects 2008: "The report of the seminar on walking machine technology and follow-up projects"	Dr. Poramate Manoonpong (Germany)
1020 – 1040 น	**พักดื่มชา – กาแฟ สำหรับผู้เข้าร่วมประชุมทุกท่าน**	
1040 – 1100 น	Reverse Brain Drain Project: "Medical Research Education in Toxicology"	Dr. Nongnit Laytragoon-Lewin (Sweden)
1100 – 1120 น	Project: "Spatial and temporal data analysis "	Dr. Boonchai Stensholt (Norway)

Date and time	Topic	Presenter/Leader
Life Science		
1120 – 1140 น	Pharmaceutical and Agricultural Potential of Genetically Engineered Plants	Dr. Supaart Sirikantaramas (Denmark)
1140 – 1200 น	Stem Cell Research for Pharmaceutical Development	Mr. Weerapong Prasongchean (UK)
1200 – 1220 น	Click Chemistry to Synthesize PNA HyBeacon Probes	Dr. Nittaya Gale (UK)
1220 – 1300 น	Synthesis of Alanyl-Peptide Nucleic Acid Oligomers with Respect to a β-Sheet Conformational Switch	Mr. Panupun Limpachayaporn (Germany)
1300 – 1400 น	**อาหารกลางวัน สำหรับผู้เข้าร่วมประชุมทุกท่าน**	
1400 – 1420 น	Development of sensitive and validate analytical methods for *Furasium* toxins by LC-MS/MS and molecular diagnostic by PCR in agriculture products	Ms. Sasithorn Limsuwan (Germany)
1420 – 1440 น	Mechanism of p38 MAPK activation during myocardial ischaemia	Mr. Sarawut Kumphune (UK)
Science – Engineering		
1440 – 1500 น	Electroceramics Green Energy Harvesting in Industrial Estates and Agriculture in Thailand	Dr. Kesorn Pechrach (UK)
1500 – 1520 น	Survivable Wireless Sensor Network Solutions for Agricultural Monitoring in Harsh Conditions	Mr. Krisakorn Rerkrai (Germany)
1520 – 1540 น	Measurement of droplets in sprays: on the development of Rainbow refractomer	Dr. Sawitree Saengkaew (France)
Economics		
1540 – 1600 น	Impact Assessment of Farmer Field School Project on Rice Production in Thailand: Long-term Analysis	Ms. Piyatat Pananurak (Germany)
1600 – 1620 น	Why Do Shareholders Value Marriage?	Dr. Pramuan Bunkanwanicha (France)
1620 – 1640 น	**พักดื่มชา – กาแฟ สำหรับผู้เข้าร่วมประชุมทุกท่าน**	
1640 – 1745 น	Discussion and Conclusion about today presentations. How these works can be useful for CHE and NSTDA?	ดร. กฤษณา รุ่งเรืองศักดิ์ ทอร์ริสสัน (นายก สมาคมฯ) ดร. นพวรรณ ตันติพิพัฒน์ (สวทช.) ดร. จันทร์เพ็ญ เมฆาอภิรักษ์ (อัครราชทูตที่ปรึกษา ด้านวิทยาศาสตร์และเทคโนโลยี ประจำกรุงบรัสเซลส์)
1900 น	**อาหารค่ำ สำหรับผู้เข้าร่วมประชุมทุกท่าน**	

Date and time	Topic	Presenter/Leader
วันเสาร์ที่ 23 พฤษภาคม 2552		
Engineering		
0930 – 0950 น	The use of fly ash to stabilize low levels of mercury in the environment	Ms. Waraporn Kitchainukul (UK)
0950 – 1010 น	Alternative Cement / Challenge for sustainable construction industry	Ms. Fongjan Jirasit (Germany)
1010 – 1030 น	Development of Sustainable Design Strategy for Buildings in Thailand	Mr. Theerasak Kaewkhluab (UK)
1030 – 1050 น	**พักดื่มชา – กาแฟ สำหรับผู้เข้าร่วมประชุมทุกท่าน**	
Computational Science		
1050 – 1110 น	Flow Control by Means of Direct and Large Eddy simulation	Mr. Arpiruk Hokpanna (Germany)
1110 – 1130 น	Extending Wireless Sensor Networks to Support Safety-Critical Applications	Ms. Petcharat Suriyachai (UK)
1130 – 1220 น	Discussion and Conclusion about today presentations. How these works can be useful for CHE and NSTDA?	นาย วรรณวิทย์ อาขุบุตร (รองนายกสมาคมฯ) ดร. นพวรรณ ตันติพิพัฒน์ (สวทช.) ดร. จันทร์เพ็ญ เมฆาอภิรักษ์ (อัครราชทูตที่ปรึกษาฯ ประจำกรุงบรัสเซลส์)
1220 – 1230 น	ปิดการประชุม ATPER2009 Meeting	ดร. นพวรรณ ตันติพิพัฒน์ (สวทช.)
1230 น	**อาหารกลางวัน สำหรับผู้เข้าร่วมประชุมทุกท่าน ก่อนเดินทางกลับ**	

Venue details

Hotel Ibis Paris Alésia Montparnasse 14ème

49, rue des Plantes - 75014 - PARIS - FRANCE

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Details of Location

From the ring road: Porte d'Orléans exit, then head toward Denfert-Rochereau (straight on). At Place Victor Basch, turn left into Rue d'Alésia, then turn left at the lights into Rue des Plantes. 330 yards from Alésia metro station (line 4) or tram line T3 (Jean Moulin stop). Close to the Porte de Versailles exhibition center, and Gare Montparnasse train station. Direct access to the center of Paris on metro line 4.

More information:

http://www.accorhotels.com/gb/hotel-0959-ibis-paris-alesia-montparnasse-14eme/location.shtml

The report of the seminar on walking machine technology and follow-up projects

Poramate Manoonpong

Bernstein Center for Computational Neuroscience, University of Göttingen, Göttingen, Germany

According to Reverse Brain Drain projects of National Science and Technology Development Agency (NSTDA), I, on behalf of ATPER members, had the opportunity to return to Thailand to

1) setup a seminar sponsored by the Commission on Higher Education,
2) visit two universities organized by the Commission on Higher Education, and
3) give a talk at NSTDA including developing two project proposals.

On September 29, 2008, I gave the seminar on "Walking Machine Technology" to other Thai students and researchers. The seminar was held at Radisson Hotel. During the seminar, I gave a talk, demonstrated a 6-legged walking machine, and finally asked participants to discuss a given case study and to present their brainstorm. About 150 lecturers, researchers and universities' students took part in the seminar, which was completed with active and informative interaction as well as friendly atmosphere.

On September 31 and October 1, 2008, I was scheduled to visit Chulalongkorn University and King Mongkut's University of Technology North Bangkok (KMUTNB) respectively to seek possibility for academic cooperation with the two institutions. As a consequence, the cooperation will be formed by supporting Thai students and researchers in doing short time researches at Bernstein Center for Computational Neuroscience (BCCN) in Germany. Such an activity will lead to the knowledge transfer and enable them to experience different working atmospheres. Furthermore, after discussion with Associate Prof. Dr. Sathaporn Laksanacharoen of KMUTNB, due to our common interest we have established the project entitled "The Development of a Mobile Robot using Neural Network Control" where the project has been accepted and supported by the Commission on Higher Education.

On October 3, 2008, I was invited to give a talk entitled "Walking Machine Technology: Towards Versatile, Adaptive, Autonomous Systems" at NSTDA. There were approximately 50 participants including students, lectures and researchers. After the talk, we discussed about our future cooperation. As a result, we have made two project proposals: 1) EMG-Based Variable-Damper Knee Prosthesis and 2) Science Center for Robotics Education.

Medical Research Education in Toxicology

Nongnit Laytragoon-Lewin

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Purpose: We focus our project on educating the Master degree and PhD degree students in why/what can be done and how to present their research work. This project is the collaboration between Department of Oncology, Uppsala University Hospital, SWEDEN and Department of Toxicology, Chiengmai University, THAILAND. The toxic effects from the medical treatments and individual habits will be used as the model.

Introduction: The research in Thailand is on process of developing. Thai students have skill but lack of motivation and support for doing or presenting their research work.

Material and method: Most of toxicology was studied in relation to certain substance. The human habit or treatment induce toxicity is very interesting since it involves way of life. The can or cannot have ability to avoid man-made toxicity effects is still an open question.

Individual habit as well as medical treatment could cause serious toxic effects. General habit such as alcohol, smoking and sunbathing will be selected as the model for habit related toxicology. Radiation and chemotherapy will be used as the model for medical treatment related toxicology.

The project will be divided into:

A) How to detect the toxicology effects at molecular level, cellular level and individual life quality.

B) The students will present their work for the feedback and suggestion.

C) The information concerning the process for national or international presentation.

Significance: The project will give an idea and update knowledge in medical research. The student will also have the possibility to get information how to prepare for travelling, presenting or discussing their research work at national and international meeting.

Pharmaceutical and Agricultural Potential of Genetically Engineered Plants

Supaart Sirikantaramas

Plant Biochemistry Laboratory, Department of Plant Biology and Biotechnology, Faculty of Life Sciences, University of Copenhagen
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Plants, as sessile organisms, have evolved complex mechanisms for protection themselves against natural enemies including insects and pathogens, and for adaptation to ever-changing environmental conditions. In order to survive in these conditions, they produces an extensive number of organic compounds. Many of these compounds, known as secondary metabolites, are not directly involved in the normal growth and development but involved in increasing their fitnesses in growing areas. Humans have also been recieving the benefit from these metabolites as medicines, flavors, and other specialized compounds. Genetically engineered plants have been constructed to manipulate biosynthetic pathways leading to interesting compounds. Several projects that I have been involved will be provided as the potential of genetically engineered plants in pharmaceutical and agricultural fields.

Pharmaceutical related projects

1. *Cannabis sativa*, also known as marijuana, is the only plant that can produce the compounds called cannabinoids. These compounds contain the activity for the treatment of cancer pain relief and multiple sclerosis.

2. *Camptotheca acuminata*, *Nothapodytes foetida*, and several *Ophiorrhiza* plants produce the compound named camptothecin which has been using as an anticancer drug.

At present, both cannabinoids and camptothecin supplied for pharmaceutical uses are extracted from plants. With expected great demand, several efforts including biosynthetic enzyme cloning, in vitro cultures, and construction of genetically engineered plants, are now in progress in order to make a sustainable production of the compounds.

Agricultural related project

One of the major problems that significantly impact the agricultural productivity is the environmental stresses including high temperature and drought. Using the model plant, *Arabidopsis thaliana*, the regulations of gene expression and metabolite under a stress condition have been investigated. Construction of stress-tolerant transgenic plants is one of the goal in this area.

Since Thailand is an agricultural country and is rich in plant diversity, particularly the presence of a large number of medicinal plants. Thailand offers many opportunities for plant biotechnology research. Many exciting researches are remained to be investigated.

Stem Cell Research for Pharmaceutical Development

Stem cells are defined by their ability to self-renew and differentiate into specialized cell types. Attempts have been made to explore sources of stem cells in different stages of organisms in order to understand functions of these cells during embryonic development, physiological roles in adults and tissue repair throughout life, and to investigate emerging applications including stem cell-based therapy, drug discovery and toxicology. I have been investigating biology of stem cells, its applications in new drug screening and stem cell transplantation in experimental models of diseases of central nervous system both in vitro and in vivo. For instance, neural and therapeutic potential of amniotic fluid-derived stem cells (AFSCs) were investigated during my first year PhD study. I found that undifferentiated AFSCs were actively proliferating and showed expression of several markers associated with multipotent neural cells. When treated with small molecules such as dbcAMP and IBMX, some AFSC rapidly displayed a neuronal-like morphology and became positive for a marker of neuronal cells, Tuj1, suggesting that under appropriate conditions they could differentiate along the neuronal lineage. When transplanted either in the developing chick embryos in ovo or in postnatal rat brain slices in vitro, AFSCs proliferated, migrated and underwent morphological changes. To study whether AFSC differentiation potential could be stimulated following neural injury and whether they may contribute to neural repair, embryonic day 2.5 chick embryos were injured and AFSCs immediately grafted at the injury site. Subsequently, I found that AFSCs increased survival of injured chick embryos. In addition, the AFSC-grafted chick embryos displayed much reduced vascular damage than non-grafted operated embryos. Studies to further characterize AFSCs and investigate the mechanisms underlying their beneficial effect on survival in injured embryos are in progress. This work, therefore, can be viewed as 1). a simple model for in vitro screening of compounds modulating stem cell function, 2). a versatile model for in vitro neural transplantation and 3). an accessible in vivo model to characterize stem cell integration and differentiation, and to assess effects of grafted cells in the injury model. Ultimately, at research centre for drug innovation and health products, Faculty of Pharmaceutical Sciences, Chulalongkorn University, I will be exploring strategies to modulate stem cell functions by food supplements, Thai medicinal plants and medicines. Furthermore, the search for natural biomaterials used as stem cell scaffolding and pharmaceutical stem cell bioprocessing will be also carried out.

Click Chemistry to Synthesize PNA HyBeacon Probes

Gale N.[1], Kocalka P.[1], Brown D.J.S.[1] and Brown T.[2*]
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Click chemistry using the copper-catalyzed azide-alkyne cycloaddition (CuAAC reaction) has been used for the synthesis of cyclic oligonucleotides, oligonucleotide catenanes[1], very stable cyclic mini-duplexes[2] and duplexes that are crosslinked across the major groove through uracil bases[3]. Due to its simple requirements i.e., ambient temperature, tolerance of other functional groups, and compatibility with a wide variety of solvents including water, it has been widely exploited by synthetic and biological chemists[4]. HyBeacons are fluorogenic oligonucleotide probes that are used to detect the Single nucleotide polymorphisms (SNPs) and point mutations by melting temperature analysis (Tm differences). We have developed peptide nucleic acids (PNA) versions of HyBeacons using alkyne-labelled PNA coupled to fluorescein azide by click chemistry. These probes can be used to analyze SNP's, giving a higher Tm than conventional DNA HyBeacons and much greater ΔTm between wild type and mutant. Two cystic fibrosis targets were used to evaluate the PNA HyBeacons. Probe 1 was used to detect a T to C mutation and gave different in Tm between wild type and the mutation of 17 ˚C (55.5 and 38.5˚C) and probe 2 was used to detect a deletion of single adenine base, giving Tms of 54.5˚C for wild type and 41.9 ˚C for the deletion.

Cystic fibrosis is an inherited chronic disease that affects the lungs and digestive system by producing an unusual thick, sticky mucus that can obstruct the lungs, pancreas and other organs. This mucus secretion can cause death or life threatening. Early detection can increase life expectancy. Each year around 1,000 new cases are diagnosed and there are about 70,000 cases worldwide.

This assay could be used for other genetic or genetic related diseases such as breast cancer and to detect mutated genes that induces drug tolerance or increase the side effects of drugs such as myopathy from using statins.

1. R. Kumar, A. El-Sagheer, J. Tumpane, P. Lincoln, L. M. Wilhelmsson, T. Brown, *J. Am. Chem. Soc.* **2007**, *129*, 6859.
2. A. H. El-Sagheer, R. Kumar, S. Findlow, J. M. Werner, A. N. Lane, T. Brown, *Chembiochem* **2008**, *9*, 50.
3. P. Kocalka, A. H. El-Sagheer, T. Brown, *Chembiochem* **2008**, *9*, 1280
4. V. D. Bock, H. Hiemstra, J. H. van Maarseveen, *Eur. J. Org. Chem.* **2005**, 51-68.

Synthesis of Alanyl-Peptide Nucleic Acid Oligomers with Respect to a β-Sheet Conformational Switch

Panupun Limpachayaporn, Ruzica Ranevski and Ulf Diederichsen

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Alanyl-peptide nucleic acid oligomer (Alanyl-PNA), synthetic analogue of nucleic acids which has a peptide backbone with D,L-alternating configuration based on alanyl amino acid with nucleotide bases as recognition unit connected at the β-position of side chain, was first invented by Diederichsen.[1] It has been synthesized and developed to function as a small molecular tool so-called "conformational switch", with which the secondary structure and conformation of the protein ligated by the molecule could be under control by switching between a random coil state and β-sheet structure with respect to a pairing and depairing mechanism.

Controlling the three-dimensional arrangement of secondary structure elements of proteins can provide understanding of influence of their conformation on their express functions and properties as well as the possible medicinal treatment of the serious diseases in a broad variety of mammals such as the bovine spongiform encephalopathy (BSE) and Creutzfeldt-Jakob disease (CJD) which are based on protein misfolding caused by proteinaceous infectious particles (prions).[2]

Like synthesis of general peptides, construction of various alanyl-PNAs was performed using manual solid phase peptide synthesis (SPPS) with Boc strategy on Merrifield resin for peptide acids and MBHA resin for peptide amides and standard coupling reagents. However, couplings of each building block of alanyl-PNAs are much more difficult and take much longer time than those of peptides because of bulk and steric hindrance of nucleotide bases of the side chain. To enhance the efficiency of couplings and accelerate the rate of reaction, optimization is required and was carried out by using several procedures as well as a number of superior coupling reagents and high temperature (Microwave-Assisted Synthesis). The synthesis of non-*N*-methylated alanyl-PNAs was accomplished using TBTU/HOBt/DIPEA, HBTU/HOBt/DIPEA and HATU/HOAt/DIPEA, whereas *N*-methylated alanyl-PNAs were synthesized successfully using HATU/HOAt/DIPEA, PyCloP/DIPEA and PyAOP/DIPEA. In the preliminary investigation, the coupling efficiency of both non- and *N*-methylated monomeric units was enhanced significantly and the reaction rate was 25-30 times faster, when the reactions were performed using HATU/HOAt/DIPEA at 120°C heated by microwave.[3],[4]

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Development of sensitive and validate analytical methods for *Fusarium* toxins by LC-MS/MS and molecular diagnostic by PCR in agriculture products.

Fasariums species are considered to be the agriculture field fungi, since they are primarily plant pathogens before crop harvesting. In addition to induced disease that leads to reduced yield and quality of grain, the majority of *Fasarium* spp. is ale to produce mycotoxins. These toxins are harmful to human and animal consumers. EU legislation limits for *Fusarium* toxins in food and animal feed have been established and a guidance document was prepared to protect the consumer. Over recent years, these regulations have an impact not only on the EU itself, but on their trading partners as well. Therefore, mycotoxins monitoring of food and feed in Thailand should be considered.

Because of low level of legislation limits, identification and quantitative assessment of mycotoxins require sophisticated sampling, sample preparation and detection method. Recently, LC-MS/MS has been increasingly applied to mycotoxins analysis because of high selection and sensitivity. In Thailand, we use LC-MS/MS for drug residue analysis, not for mycotoxins analysis. One objective of this project is to develop method and monitoring mycotoxins in food and feed by LC-MS/MS.

PCR is sensitive, specific, fast and highthrouhput method to detect, identify and quantify *Fusarium* species, another objective is to develop a competitive PCR assay to identify and quantify *Fusarium* species in food and feed.

Sasithorn Limsuwan

Mechanism of p38 MAPK activation during myocardial ischaemia

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In prior studies the host laboratory has shown that activation of p38-MAPK by dual phosphorylation during myocardial ischaemia aggravates lethal injury. However, under other circumstances activation of this kinase can protect the heart. Recent evidence suggests that the mechanism of p38-MAPK activation may differ by circumstance. Determining the precise mechanism is of considerable importance since it may allow prevention of the detrimental, but not the beneficial, activation of p38-MAPK and lead to the identification of the relevant downstream signals.

One of the key reproducible observations indicating an altered mechanism of p38-MAPK activation during myocardial ischaemia is the prevention of p38-MAPK dual phosphorylation by its pharmacological catalytic site inhibitor SB203580. One possibility underlying this observation is that SB203580, an ATP-mimetic, inhibits other kinase(s) involved in the transphosphorylation of p38-MAPK during ischaemia. A second possibility is that p38-MAPK can autophosphorylate and that this process is prevented when SB203580 or similar inhibitors occupy the ATP-binding site. Most investigators agree that a scaffold protein known as TAB1 is involved in the activation of p38-MAPK, however the detail remains controversial.

The purpose of this study is to examine the mechanisms of p38 MAPK activation during myocardial ischaemia by ectopic expression of p38 MAPK, in wild type and mutants forms, together with TAB1 in a non-cardiac cell line and in adult cardiomyocytes. This information will be supplemented with an examination of putative upstream kinases using adenoviral transfection and null mouse lines. Finally, we will use mice expressing an SB203580 insensitive form of p38α.

Electroceramics Green Energy Harvesting in Industrial Estates and Agriculture in Thailand

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Energy harvesting transform natural energy sources into usable electrical energy, for example, solar energy, thermal energy, wind and vibration energy, etc. This technology is very attractive for low power electronic devices which include medical devices, smart implants, camera imaging inside the human body and hearing aid devices.

One of the most interesting sources for energy harvesting is environmental vibrations. The devices that have been used are piezoelectric, electromagnetic, electrostatic, pyroelectric, photovoltaic and thermoelectric. The conversion of harvesting energy is very good in scalability, capability, high energy density and compatible with standard electronic technology.

In this paper the green energy harvesting will emphasise use of piezoelectric devices in industrial estates and agriculture in Thailand. The selected models and solutions will be introduced. In addition, the basic problems from using this method for energy harvesting will be discussed. A general comparison of the energy using in the existing waste water treatment plants in industrial estates and fish farming will be presented.

In conclusion the development of the electroceramics green energy harvesting devices requires specific design to suit the particular application for each area. This would provide challenging for material sciences and manufacturers around the world.

Survivable Wireless Sensor Network Solutions for Agricultural Monitoring in Harsh Conditions

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Abstract— **Designing scalable and self-organizing sensor networks is vital for enabling the real-world deployment of large-scale applications. In this work we show a fully functional, but scaled-down system that was developed for agricultural WSNs. The full-scale system with 64 sensor nodes was deployed with a backend server to a medium-sized vineyard. The protocols used ensure reliable local data storage, robust communication and energy-efficient data gathering. The backend server provides a user-friendly interface offering two main functionalities: logging communication messages of the employed protocols and providing end-user support.**

I. INTRODUCTION

The use of networked sensors in agriculture is becoming more feasible and important. Environmental sensors such as temperature, light and soil moisture can be employed across agricultural fields to provide real-time data to farmers. Environmental data need to be constantly and automatically monitored. Such systems are generally developed to support precision agriculture in plant care. In particular, our system helps farmers to control irrigation, and to adjust fertilizer and pesticide deployments more precisely for individual parts of the vineyard.

In this work, we present an autonomous monitoring system for vineyards that is capable of collecting and storing data as well as providing measured data upon request with reliable routing and transport protocols. The system provides centralized and distributed data storage. Data from the network are regularly backed up at a backend server. The graphical user interface allows end-users to retrieve the measured data upon request or to send notification emails or SMSes to registered users. The protocols used in this demonstration have been developed in the the European UbiSec&Sens project. The system has been successfully deployed at a commercial vineyard with 64 sensor nodes at the city of Neustadt, Germany, during vine growing season until harvest time in 2008.

II. SYSTEM OVERVIEW

The architecture of the vineyard monitoring system is shown in Figure 1. The system is composed of two main parts: a collection of wireless sensor nodes and a backend server. The general idea is to collect the environmental data either locally from the network if a user is in the vineyard or remotely through the backend server through Internet.
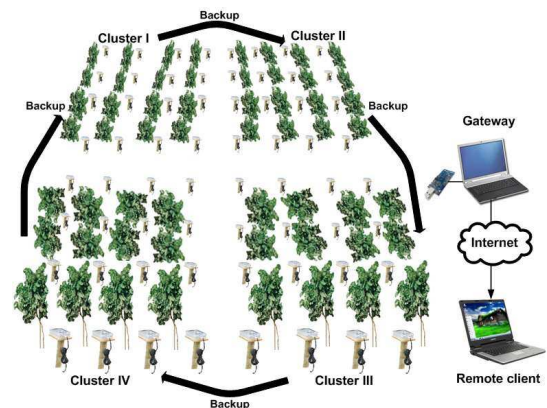
Fig. 1. System architecture.

We have chosen the Telos sensor platform. Built in temperature and light sensors are employed. We also use an additional ECHO EC5 soil moisture sensor depicted in Figure II to measure soil moisture values in the ground. Each node is housed in a waterproof box with a transparent lid which allows the embedded light sensors on the Telos motes to measure the light intensity.
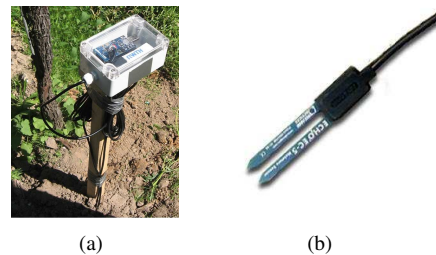

(a)   (b)

Fig. 2. Sensor node in a weather-proof box and soil moisture sensor.

The sensor nodes are distributed in a loose grid topology. A group of sensor nodes are geographically clustered and the data from the nodes are aggregated at each cluster head. The aggregated data are transmitted to a gateway node over the multihop network constructed from different clusters. The developed protocols make the entire system persistent, reliable and self-organizing. The system also has a self-healing mechanism to recover system functions in the case of failures.

Measurement of droplets in sprays :
On the development of Rainbow refractomer.

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Combustion of liquid involves the atomization of the liquid fuel as a spray of tiny droplets which evaporate. The design of a stable spray combustor is conditioned to the knowledge of the fundamental phenomena acting on the droplets that influence the combustion process. In this regard, optical techniques are needed to measure accurately the droplet characteristics as: droplet size distribution, droplet velocity, droplet concentration, droplet temperature, etc. During the last decades, a large effort has been devoted to develop powerful optical techniques (as LDV, PDA, PIV, etc.,) which essentially give a geometrical description of the spray: the size distribution, the velocity field and the correlation size/velocity. However, the characterization of the thermo-chemical properties of droplets has not received much attention from the investigators, even though these properties are significant in the control of the combustion efficiency. Among other techniques, Global Rainbow Technique (GRT) is a promising technique using to measure droplet temperature with a few degree of accuracy. This robust and non intrusive technique can be applied in a large domain of temperature. Moreover, there is no need to add any dye in the liquid. The technique is based on the dependence of the absolute angular rainbow location with the refractive index therefore the temperature. By analyzing the global rainbow signal, the droplet size and refractive index, therefore the temperature, can be simultaneously extracted.

The objective of this work is to demonstrated the potential of GRT to extract information on droplet temperature and size distribution in real combustion chamber. These information are necessary to validate the numerical simulation leading to an optimization and improvement of combustion chamber, especially for bio-combustive.

Abstract

Impact Assessment of Farmer Field School Project on Rice Production in Thailand:

Long-term Analysis[1]

Ms.Piyatat Pananurak[2]

Department of Agricultural Extension (DOAE) has launched the Farmer Field School (FFS) project on integrated pest management (IPM) to train farmers for rice production throughout the cropping season 1999/2000. The purpose of the project has primarily aimed to decrease chemical pesticide use in order to reduce human health hazard and environmental impacts and helping farmers make right decisions. Five provinces, Angthong, Chainat, Kampaengpetch, Udon Thani, and Kalasin provinces, were selected as the study area. The respondents were classified into 3 groups: the first group was the farmer participated in FFS, the second group was non-participated FFS and located in the same village as the FFS group, and the third group was non-participated FFS and located in different village from the FFS group. The farmers were interviewed at three different time periods: before the training had started in 2000, after the training one year in 2001, and two years after the second survey in 2003. The total number of farmers interviewed before and the first after training is 241 farmers. For the third survey, the sample size had to be reduced to 122 because of heavy flooding.

The impact assessments of FFS project for short and medium term analyses had done by many studies (Kuwattanasiri 2001; Pananurak 2001; Praneetvatakul, Waibel et al. 2007). In other studies on the impact assessment of FFS project of many countries, the major applied either time series or cross section data (Van den Berg 2004). However, the long-term impact that used the same respondents for panel data estimation has not done before.

Therefore, for the sake of future extension and planning of the project, economic benefits analysis of the project in long-term period is useful.

Keywords: Impact assessment, Integrated Pest Management, Farmer Field School, Rice production

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[1] This abstract submits to the meeting of ATPER 2009

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Title: Why Do Shareholders Value Marriage?

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Abstract

This paper shows that family firms use marriage as a mechanism to establish long-term networks. Out of 200 marriages of the offspring of big business owners in Thailand during 1991-2006, more than two-thirds help connect the group to business or political networks. Network marriages are associated with an increase in stock prices, which indicates that such marriages are valuable to the firms. A business family has strong economic incentives to engage in a network marriage when its business depends on state concessions, operates in the property and construction industry, is diversified, and relies heavily on debt. Overall, the results suggest that network marriages may be a business strategy employed by family firms in emerging economies to overcome the drawbacks of weak legal and market institutions.

UNIVERSITY OF SOUTHAMPTON

<u>**ABSTRACT**</u>

FACULTY OF ENGINEERING, SCIENCE & MATHEMATICS

SCHOOL OF CIVIL ENGINEERING AND THE ENVIRONMENT

<u>**Doctor of Philosophy**</u>

THE USE OF FLY ASH TO STABILISE LOW LEVELS OF MERCURY IN THE ENVIRONMENT

By Waraporn Kitchainukul

The work demonstrates that mercury bound to fly ash from the coal fired 24,000 Mwatt Ekibatuz power plant in Kazakhstan is fairly stable at pH levels that are found in most natural water bodies. The adsorption behavior followed the Freundlich adsorption model. The adsorption capacity of the fly ash for Hg (II) was found to be 3.5 mg g^{-1} of dry ash. The adsorption equilibrium was reached after 72 hours. The absorption isotherms with pH from 7.0 to 8.0 and initial Hg concentration at 40 mg l^{-1} were the optimize condition. The study showed that between the pH range of 6.0 and 8.0 bound mercury on wet and air dried ash was fairly resistance to leaching with the maximum leaching being 12 and 6 % for the wet and air dried fly ash respectively with a leachate at pH 7.0.

Lab studies of the stability of the absorbed mercury on fly ash when mixed with organic rich sediments in an anaerobic environment showed that despite ideal conditions for methylation to take place after 8 weeks the concentration in solution was less than 2 μg l^{-1}. The results indicated that fly ash from the 24,000 Mwatt Ekibatuz power plant in Kazakhstan fired with high ash medium volatile coal can be used to stabilise low concentration of mercury in the natural environment.

Alternative Cement
Challenge for sustainable construction industry

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Abstract

Construction industry is a factor which has a significant weight in influencing world economic growth. In construction industry, *Concrete* is the fundamental material for infrastructural facilities, social amenities, and buildings. Typical constituents of concrete are cement, aggregate and water (sometimes with additives). A major constituent, *Portland cement*, is an effective cementitious material with excellent physical and engineering properties. It is used as a binder in other building material manufacture such as bricks, tiles, pipes, and various extruded products. Therefore, Portland cement has been a marked increase in a global market demand to 3.6 billion metric tons in 2012[1]. With the growing demand and subsequent growth in production, questions arise on the ecological impact of cement production. The cement manufacturing industry is a significant source of hazardous air pollutants, mainly in the form of CO_2 emissions. Cement plants account approximately 5% of global anthropogenic carbon emission, the main cause of global warming. CO_2 emissions in cement manufacturing come directly from chemical reaction of clinker process, *Limestone Calcination*, and combustion of fossil fuels. Cement production generates an average world carbon emission of 0.73 to 0.99 kg of CO_2 per kg cement produced. Furthermore, cement industry is one of the most energy- and natural resources-intensive consumption and hazardous waste disposal, i.e., *Cement Kiln Dust* (CKD). The combination of all these factors during cement production plays an important role concerning environmental degradation and regarding health and safety regulations. Consequently, cement industry and its stakeholders are then motivated to improve the sustainability of cement production. There are numerous opportunities for cement industry to approach towards sustainable production, i.e., using alternative fuels, enhancing the efficiency of cement plants, and developing innovative cement and concrete products. A partial replacement of *Ordinary Portland Cement* (OPC) with *Supplementary Cementitious Materials* (SCMs), so-called Blended Cement, significantly reduces CO_2 emissions from the production of clinker and also turns industrial wastes into resources. However, reliance on limestone-based cement manufacturing causes a weakness in sustainable development initiative. Therefore, an alternative binder substituted for traditional cement is a favourable requirement for sustainable future.

Nowadays, innovative technology provides an alternative binder that is potential substituted for limestone-based clinker with an aluminosilicate-based binder. *Alkali-Activated Cements*, so-called *Geopolymer*, are a widely discussed binder that has received considerable attention over the past decade. This binder does not generate CO_2 as an inherent part of the process chemistry. Additionally, it is an excellent waste-based cement which utilises industrial wastes and by-products as feedstock. As most waste materials contain large amounts of silica and alumina that can be used as reagents for in situ geopolymerisation reactions. Preliminary studies have shown that the strength and durability characteristics of alkali-activated cement are satisfactory (see Fig. 1). In a global perspective to reduce greenhouse gas emissions, introduction of alkali-activation technology for making alternative cement would reduce emissions caused by the clinker manufacturing approximately 80–90%[2].

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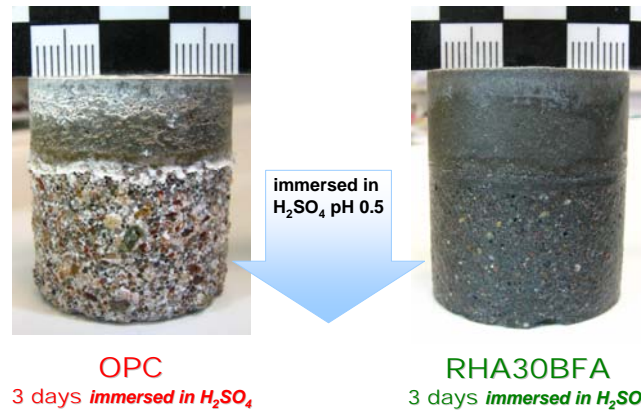
Fig. 1: The comparison between Ordinary Portland Cement mortars (OPC) and alkali-activated mortars (RHA30BFA[3]) immersed in sulphuric acid solution with pH of 0.5 at 3 days.

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[3] **RHA30BFA:** an alkali-activated mortar of 70% Rice Husk Ash (**RHA:** *Roi-ed Green Power plant, Thailand*) with 30% weight replacement by Brown Coal Fly Ash (**BFA:** *Mae-Moh Power plant, Thailand*) incorporating with potassium silicate activator.

Development of Sustainable Design Strategy for Buildings in Thailand
By Theerasak Kaewkhluab, United Kingdom

Building construction and operation have an enormous direct and indirect impact on the environment. Buildings not only consume resources such as energy and raw materials, they also generate waste and potentially harmful atmospheric emissions. These are believed to contribute to climate change which is being experienced across the globe.

There is a noticeable shift in awareness of climate change issues and the need for building projects that both embrace climate change scenarios as well as adopt resource efficient approaches to design and construction. This requires a different approach to design and new ways of looking at the appropriateness of what is being built.

Sustainable building design is a design philosophy that seeks to reduce negative impacts on the environment through building planning, design and management, choice of building materials and building operations to tackle climate change. The basic objectives of sustainable design are to reduce consumption of non-renewable resources, minimise waste and create healthy productive environments throughout the life cycle of buildings.

In recent years, there has already been a move towards sustainable construction and building design in developed countries. However, in developing countries like Thailand, this has not yet been addressed as a critical issue and there is a recognised need to reduce the impact of climate change and deliver appropriate buildings through new system thinking within the design and construction process, rather than conventional design approaches using existing methods of analysis and design tools.

This research is aimed at developing a sustainable design strategy for buildings in Thailand, which has a hot and humid climate. The design strategy will provide a consistent approach to sustainable construction at every stage: including planning, design, construction and operation. In addition to conventional design approaches, this can be achieved through the following considerations:

- sustainable site development
- designing to reduce whole life cycle environmental impact using renewable energy, for example, wind turbines, solar panels, geothermal energy and other technologies to generate electricity which would otherwise be produced by burning coal, oil or natural gas.
- designing for appropriate durability with low maintenance requirements
- designing to reduce waste during construction and operation
- designing for future reuse
- using less material
- using local materials to minimise carbon emission from transportation
- using recycled or reclaimed materials
- using materials which minimise pollution, for example, fly ash (a by-product from coal burning power plants) as cement replacing material to reduce carbon emission from cement production
- making the buildings sustainable in operation

Furthermore, the available methods and tools for evaluating sustainable characteristics of building projects currently used in the developed world, for example, the LEED Green Building Rating System, which was first launched in 1998, will be studied. The study will look at the suitability and appropriateness of the available sustainable scoring or rating systems to be adapted for building projects in Thailand, as the rating system used needs to be flexible enough to suit the particular context and climate condition in Thailand. The rating system will help promote improvement of building occupant well-being, environmental performance and economic return of buildings in Thailand. It is hoped this will be a tool for market transformation towards sustainability in the building industry in Thailand; similar to the huge success of label recognition of the energy efficiency rating system for household electrical appliances, which was first introduced in 1994 and quickly has become exemplary.

Finally, this sustainable building design strategy should help designers and stakeholders in Thailand to understand and address building design, construction and operation in a way that aligns environmental responsibility with business success.

Flow Control by Means of Direct and Large eddy simulations

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Turbulent flows are a major challenge in the area of fluids mechanics. Numerical simulations of turbulent flows have matured considerably in the past two decades. We are now able to predicts a statistically steady state of turbulent flows in with a satisfactory accuracy. Most of the numerical simulations used in the industrial flows is performed by the Reynolds-averaged Navier-Stokes equations (RANS). RANS predicts the time-averaged solutions of fluid flows by modeling the behavior of the turbulence interactions. Numerical simulations using RANS rely extensively on the accuracy of the turbulence modeling. Sometimes the user needs to adjust certain parameters in the model in order to achieve a good prediction. RANS is thus an appropriate tool to make a rough predictions of the flows those are already known. On the other hand, RANS can fail completely when applied to a flow that is relatively unknown. Therefore when it is applied to a complex situations such as separations an reattachment flows or a flow with control mechanism, grossly wrong predictions can be expected.

The best approach for inquiring flow physics by means of numerical simulation is to use direct numerical simulations (DNS). This approach solve the Navier-Stokes equations directly without any turbulence modeling. DNS can be very accurate but extremely expensive therefore many researchers turn to another approach called "large eddy simulations" (LES) in which the large scale of the flows are solved directly but the small scale is modeled. Accurate large eddy simulations are usually cheaper than the DNS counterpart by at least a factor of hundred. Despite such remarkable improvement, LES is still expensive. It is not so uncommon to use two hundred processors for a single run over a period of a month. Large scale simulations can easily occupy a thousand processors for half a year. This resources requirement is far beyond current capability of supercomputers in Thailand.

In order to be a pioneer and successful in this field. Thai researchers need cutting-edge numerical codes solving this problem and powerful supercomputers to steer the codes. The first may take a decade to develop and the latter requires several thousand million bahts to buy. In this financial crisis, it is unlikely to see such investment from our government in several years to come. A better approach is to cooperate with a developed country that already had strong supercomputers and established researchers who are willing to share the code.

I would like to propose a collaboration project entitled *Flow control by means of direct and large eddy simulation*. In this project the MGLET code of my previous supervisor will be used. This code is highly efficient and can be run on thousands processors with almost ideal scalability. Regarding the computational resources, it is possible to write application to several supercomputing center in Germany such as Jülich supercomputing center, high performance computing center Stuttgart and the Leibniz supercomputing center. They are currently listed as 11th, 44th and 84th fastest supercomputer in the world, respectively. The research direction can be set off in two directions, theoretical and application oriented. The control theory for turbulent flows is still an open field. A lot of new approach can be proposed and existing theory are opened for an investigation. For the applications, a drag reduction of container trucks and optimal propeller for fishery boats and electric fans can be very valuable for Thailand's economics.

During the meeting, I will present the application of the code applied to investigate the flow physics and control of flow separation past thick airfoil by trapped vortex cell technology. This research is a part of the project called *Fundamentals of actively controlled flows with trapped vortices* funded by European Commission within the FP6 program.

Extending Wireless Sensor Networks To Support Safety-Critical Applications

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Abstract—Many existing network components in Wireless Sensor Networks (WSNs) aim to be energy efficient, but little attention has been devoted to deterministic performance regarding both data transfer delay and reliability. Therefore, WSNs cannot deliver safety-critical applications that demand guaranteed performance of data delivery. This paper outlines a Medium Access Control (MAC) protocol that can ensure the worst-case guarantees of both data transfer delay and reliability. Given such deterministic performance, this network component could consequently help propel the use of WSNs into a new frontier of a safety-critical application domain.

I. INTRODUCTION

Wireless Sensor Networks (WSNs) comprise small autonomous devices called *nodes* that harvest information such as temperature and pressure from their physical environment, and report the sensed information to a control station. WSNs offer the promise of wide-scale environmental or system monitoring with minimal infrastructure costs and low energy consumption. However, their use is severely limited by their lack of deterministic behavior. This lack of predictable behavior restricts current WSNs to only a few application domains. Moreover, it excludes WSNs from potential applications that are safety-critical, such as industrial process automation or patient monitoring in hospitals.

In order to support the aforementioned safety-critical scenarios, performance assurances in message transfer delay and reliability must be provided. For instance, in an industrial process automation domain, a factory could deploy a wireless sensor network to monitor pressure in pipes. Upon detection of an over threshold pressure value, a sensor node must forward this value to the control station timely and reliably. This deterministic data delivery behavior allows the control station to take a proper action to avoid a disastrous accent.

One common approach that can influence data delivery performance in WSNs is through the design of a Medium Access Control (MAC) protocol, as the protocol arbitrates when and how nodes access a shared wireless communication channel. The majority of existing MAC protocol focus on an energy-efficiency objective, while a few studies have addressed delay and reliability objectives. In addition, these protocols' delivery performance cannot always be guaranteed, and consequently they are inadequate to serve safety-critical applications. Such shortcoming necessitates the development of a deterministic MAC protocol that assures performance in both delay and reliability domains.

II. DETERMINISTIC MAC PROTOCOL

Assumptions: Sensor data readings are forwarded hop-by-hop toward a control station within a tree topology consisting of n nodes and having the maximum hop distance H between any node in the network and the control station. Furthermore, the worst-case bit error rate B encountered in the deployment area can be determined. An application is assumed to require the minimum end-to-end reliability R. The protocol exploits these assumptions to perform a worst-case model analysis that can determine the performance bounds in delay and reliability.

Delay Assurance: In this protocol, the time axis is divided into fixed-length base units or epochs. Each epoch is subdivided into $m = k \cdot n$ time slots. The value k is the maximum number of transmissions necessary on a link between any two neighboring nodes. Each node exclusively owns k time slots within the epoch to transmit a message. Each message transmission is immediately acknowledged within the time slot. A node has to be active within slots assigned to its child nodes and its parent node to ensure network connectivity. Parent and child nodes are defined statically prior to network deployment. The protocol is collision free, and thus a worst-case bound for data transfer delay between two neighboring nodes can be determined based on the epoch size.

Reliability Assurance: Each node must transmit a message within its first time slot in the epoch; if no data is available, a control message is sent for the purpose of link quality monitoring. If this transmission is not acknowledged, the node will retransmit within the next slot of the k transmission slots. If the parent node does not receive a message from a child node, it will start listening on the next transmission slot assigned to this node. Thus, a node has k chances to successfully transmit a message and delivers the required minimum end-to-end reliability R.

Evaluation: The protocol is implemented on TinyOS 2.0.2 for the TelosB platform. Moreover, a preliminary test was completed using a tree topology of size $n = 15$ nodes and a setting of an industrial process automation scenario.

III. CONCLUSION

This paper offers an overview of a deterministic MAC protocol that can assure timely and reliable data delivery in WSNs. The development of such protocol represents a novel research approach and could enable the adoption of WSN technology for safety-critical applications where this has been difficult or impossible.