

PROCEEDINGS

DTAS-2018

**International Symposium on Development
of new Technologies in Engineering &
Applied Science Research**

**Venue: Hotel Mystays Ochanomizu Conference
Center, Tokyo, Japan**

Date: June 23-24, 2018



CONFERENCE BOOK OF ABSTRACT PROCEEDINGS

Consortium-ET

Consortium of Engineering & Technology



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Book of Abstracts Proceedings

International Symposium on Development of new Technologies in Engineering & Applied Science Research (DTAS)

Tokyo, Japan
June 23-24, 2018
ISBN: 9754-602-6587-04-1

Email: info@consortium-et.com

URL: www.consortium-et.com

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Proceedings of the International Symposium on Development of new Technologies in Engineering & Applied Science Research (DTAS)

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***International Symposium on Development of new
Technologies in Engineering & Applied Science Research
(DTAS)***

Venue: Hotel Mystays Ochanomizu Conference Center Tokyo, Japan

Conference Theme: An effective platform to meet other renowned
experts in the field of engineering and technology

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CONFERENCE TRACKS

- Computer and Software Engineering
- Mechanical & Metallurgical Engineering
- Electrical & Electronics Engineering
- Civil Engineering
- Bio-Technology & Food Technology
- Chemistry & Chemical Engineering
- Physical, Applied and Life Sciences
- Interdisciplinary

CONFERENCE CHAIR MESSAGE

Michael Sasaoka

“International Conference of Consortium of Engineering & Technology” is a platform that thrives to support the worldwide scholarly community to analyze the role played by the multidisciplinary innovations for the betterment of human societies. It also encourages academicians, practitioners, scientists, and scholars from various disciplines to come together and share their ideas about how they can make all the disciplines interact in an innovative way and to sort out the way to minimize the effect of challenges faced by the society. All the research work presented in this conference is truly exceptional, promising, and effective. These researches are designed to target the challenges that are faced by various sub-domains of the social sciences and applied sciences.

I would like to thank our honorable scientific and review committee for giving their precious time to the review process covering the papers presented in this conference. I am also highly obliged to the participants for being a part of our efforts to promote knowledge sharing and learning. We as scholars make an integral part of the leading educated class of the society that is responsible for benefitting the society with their knowledge. Let’s get over all sorts of discrimination and take a look at the wider picture. Let’s work together for the welfare of humanity for making the world a harmonious place to live and making it flourish in every aspect. Stay blessed.

Thank you.

Michael Sasaoka

Conference Chair

Email: contact@consortium-et.com

CONFERENCE SECHDULE

Consortium-et-2018

Venue: Hotel Mystays Ochanomizu Conference Center Tokyo, Japan

Time: Registration & Kit Distribution (09:00 am - 09:10 am)

Day: Saturday

Date: June 23, 2018

Venue: Room 1

| | |
|---------------------|----------------------------------|
| 09:10 am - 09:20 am | Introduction of Participants |
| 09:20 am - 09:30 am | Inauguration and Opening address |
| 09:30 am - 09:40 am | Grand Networking Session |

Tea/Coffee Break (09:40 am - 10:00 am)

DAY 01 (June 23, 2018)

First Presentation Session (10:00 am - 12:30 am)

Venue: Room 1

Track A: Business, Economics, Social Sciences & Humanities

| Presenter Name | Manuscript Title | Paper ID |
|----------------------------|---|-----------------|
| YConnie K. W. Liu | The Role of Information Technology and Firm Motivation in Green Supply Chain Management and its Performance | BSHDS-JUNE-101 |
| Yu Shan Chang | The Impact of Management and Auditor Gender on Earnings Management: Evidence from China | BSHDS-JUNE-110 |
| Hao-En Sheng | The Impact of Taiwan-Japan Open Sky Policy on Efficiency of Traditional Airlines and Low-Cost Carriers | BSHDS-JUNE-111 |
| Pei-Hsuan Tsai | Trust, Guanxi and Cooperation in Buyer-Supplier Relationships | BSHDS-JUNE-112 |
| Fang-Min Fu | Outpatient Patient Satisfaction Scale Construction for Taiwan Hospitals | BSHDS-JUNE-115 |
| Annie J. Daniel | Exploring the Whether Adolescents Perception of Deviance or Non-Deviance When Using the Internet Increases or Decreases Deviant Behavior While Using the Internet | BSHDS-JUNE-117 |
| Olamide Oluwaseyi Oguntoye | Small Enterprises and Environmental Sustainability: A Review of Recent Developments | BSHDS-JUNE-119 |
| Pao-Hui Lin | Food safety and vulnerability perceptions of consumers in Taiwan | BSHDS-JUNE-123 |
| Lee Kyunghwa | Analysis of Differences in Core Competencies among Major, Grade and Gender of Korean University Students | BSHDS-JUNE-124 |
| Juei-Chi Chang | B Corporations in Taiwan | BSHDS-JUNE-125 |

Lunch Break:(12:30 - 01:30 pm)

DAY 01 (June 21, 2018)

Second Presentation Session (01:30 pm - 03:30 pm)

Venue: Room 1

Track B: Engineering, Technology & Applied Sciences

| Presenter Name | Manuscript Title | Paper ID |
|------------------------------|--|-----------------|
| Kochakorn Saeach | Electrical Properties and Electromechanical Responses of Pullulan Hydrogels for Soft Actuator Application | DTAS-JUNE18-101 |
| Kittipon Sangsuriy-onk | Electrically Controlled Drug Release from Carboxymethyl Cellulose Hydrogel | DTAS-JUNE18-102 |
| Nuttawadee Sittisan-guanphan | Fabrication of Graphene Oxide/Hyaluronic Acid Composite Hydrogels for Electrically Controlled Transdermal Drug Delivery System | DTAS-JUNE18-103 |
| Jirawat Thanokiang | Electrically Controlled Release of Diclofenac Sodium Salt from Dextran Hydrogel | DTAS-JUNE18-105 |
| Ayoub BOUTEMEDJET | Improved Adaptive Non-Uniformity Correction in Infrared Focal Plane Arrays | DTAS-JUNE18-109 |
| Kyung Hyun Choi | Fabrication of 3D Printed Smart Key with Embedded Sensor and Electronics Using a Multi-Material Smart 3D Printer | DTAS-JUNE18-110 |
| Jinho Ahn | Self-Stabilizing Distributed Algorithm for Enabling Completely Local Recovery | DTAS-JUNE18-114 |
| Kamonpan Ruang-mak | Deproteinized Natural Rubber Latex (DPNR) Foam for Controlled Drug Release | DTAS-JUNE18-104 |

Closing Ceremony

Participants Registered as Listener/Observer

The following Scholars/ practitioners who don't have any paper presentation, however they will attending the conference as delegates & observers.

Official ID: TKS-368-102A

GDawn Bonsor

Alumni of Concordia University in Montreal, Quebec, Canada

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Randall Dagenais

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Official ID: TKM-368-102A

Dr Anas Nseir

University of Montreal

Conference Day 02 (June 24, 2018)

Second day of conference will be specified for touristy. Relevant expenses are borne by Individual him/herself.



*International Symposium on Development of new Technologies
in Engineering & Applied Science Research (DTAS)*

Tokyo, Japan

ISBN: 9754-602-6587-04-1

TRACK A

BUSINESS, ECONOMICS, SOCIAL SCIENCES & HUMANITIES



The Role of Information Technology and Firm Motivation in Green Supply Chain Management and its Performance

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Keywords: Information, Global, Destruction

The recent deterioration of the environment is undeniable and is an on-going, leading issue in the global society. Business organizations are, unfortunately, the main contributors of this destruction. In particular, the manufacturing industry and its accompanying supply chain are the major polluters emitting CO₂ and other greenhouse gases, intoxicating the earth. Thus, there is an increasing pressure for governments all over the world to legislate the industry. Feeling the pressure, enterprises are motivated to undergo green transformation causing a change in the basis of competition. One of the enabler and key resource of green transformation is the advancement of information systems (IS) and technologies (IT) because information systems facilitate affordable organization change. The systems also allow the monitoring and measuring of change and organization performance and most modern organizations are depending on it regardless of their green initiatives because it is a great contributor to productivity improvement as well. However, literature studying both GSCM and GISIT is not common. In SCM literature, there are relatively few papers which examine IT as an enabler of GSCM. On the other hand, most GISIT literature focuses on specific type of systems and their related issues but rarely do they establish the impact of GITIS on the performance of the adopting organizations. Therefore, this study has a significant contribution in bridging the important gap of GSCM, GISIT and their impact on different aspects of organization motivation and performance in the context of product design, which is where sustainability starts to be implemented in the entire supply chain. We look at the intersection of these important parts of modern commercial world, in particular the moderating effect of Green ISIT, These results have important managerial implications: that companies are indeed under pressures to implement sustainability in their organization through GSCM, and at the same time it could help them increase different aspects of their performance. Governments and practitioners should encourage the implementation of GSCM in order to protect the environment and help organizations to improve their performance as well.

The Impact of Management and Auditor Gender on Earnings Management: Evidence from China

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Keywords: Earnings Management, Real Activities Manipulation; Accrual-Based Management; Gender; Industry-Expert Auditor, Auditors Industry Specialty

We examine the joint impact of top management gender and auditor gender on earnings management practices, including both accrual-based management (ABM) and real activities manipulation (RAM). Employing a Chinese setting characterized by a male-dominant culture and emerging economy, we find that firms led by female-dominant management have higher discretionary accruals but conduct less RAM when the firms are audited by male auditors, compared to firms led by male-dominant management. The differences in ABM and RAM practices disappear when the firms are audited by female auditors no matter whether the firms are led by female-dominant or male-dominant management. Our results indicate that firms may have different preference of earnings management methods, depending on the female representation in top management. But the difference is constrained by female auditors. We further find that the association is primarily observed in firms audited by non-industry-expert auditors. The gender impact disappears if firm hire industry-expert auditors. These findings have implications for academics, practitioners, analysts, and regulators.

The Impact of Taiwan-Japan Open Sky Policy on Efficiency of Traditional Airlines and Low-Cost Carriers

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Keywords: Open Sky Policy; Efficiency, Data Envelopment Analysis; National Airlines, Low-Cost Carriers

With the development of Taiwan's economy, traveling abroad is one of the choices for Taiwanese people to relax for leisure, and business travelers are also moving in major cities in Asia, so the aviation industry has rapidly expanded its territory. The reciprocity of the open-sky policy has made the bridge between countries even closer, and passengers can more easily reach to the destination where they want to go. Therefore, it is an important issue to explore that open sky policy affects efficiency of the aviation industry. This study uses data envelopment analysis to analyze the impact of Taiwan's implementation of the Open Skies Policy with Japan on the performance of traditional aviation and low-cost aviation. After the Taiwan-Japan Open Skies Policy Agreement is signed, the performance of each company will grow significantly, among which, the traditional aviation Performance is better than low-cost carriers after opening sky in Taiwan and Japan. However, as low-cost airlines operate in the market, they were initially inefficient, but the passenger boarding rates and efficiency values increased with year-on-year growth, exceeding the efficiency value of traditional aviation, is just around the corner.

Trust, Guanxi and Cooperation in Buyer-Supplier Relationships

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Keywords: Good will Trust, Competence Trust, Cooperation, Guanxi, Relationship Quality

Most of manufacturing companies are small and medium enterprises. Compared to companies in Western countries, Asian companies need to cooperation with their suppliers to improve operational performance and efficiency and reduces costs. This study aims to investigate relationships among buyers trust on supplier, buyer-supplier mutual cooperative behaviors and relationship quality. Also, in Chinese culture context, Guanxi plays an important role in interaction between a buyer and its suppliers. Therefore, Guanxi is considered as the moderator. Questionnaires were distributed to samples in hand tool industry in Taichung Taiwan. This study employ partial least square method (PLS) to verify the relationships among variables in conceptual model. This study found that the more the buyers trust on its supplier, the more cooperative behaviors between the buyer and its supplier. Guanxi enhances the positive relationship between buyers trust on its supplier and their cooperative behaviors. The more cooperative behaviors between a buyer and its supplier, the higher intention for the buyer to continue relationship with its supplier. Also, the more cooperative behaviors lead to lower relational risk on buyer-supplier relationship.

Outpatient Patient Satisfaction Scale Construction for Taiwan Hospitals

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Keywords: Patient satisfaction, Outpatient department, Satisfaction Scale

With statistics from the Ministry of Health and Welfare in Taiwan, Taiwan hospitals has gradually decreased by 10.4% from 2006 to 2016. With the development of healthcare science and improvement of living standard and education, people are asking for higher living quality and more demand in the country. After the implementation of the National Health Insurance System in Taiwan, more and more people are focus on the healthcare quality. In the previous studies, patient satisfaction has been developing as a main factor to measure service quality, and outpatient department medical service is the window between hospitals and patients. Satisfaction surveys represent not only a hospital's satisfaction for the patient service and medical technology but an index for patients to determine whether they will go back to the same hospitals for outpatient medical service or go back for other services, such as physical examination and surgery service. It is critical for hospitals to develop a scale to measure outpatient satisfaction; however, there are few studies to measure the overall satisfaction. This study aims to develop an outpatient patient satisfaction scale for hospitals. In this study, outpatient patient satisfaction scale was developed based on structure, process, and outcome parts. There are a several factors included in the proposed questionnaire and they are medical environment facility (structure), the service attitude, administrative efficiency, relationship between doctors and patients (process), professional factors and healthcare results (outcome). After constructing the outpatient patient satisfaction scale, questionnaires will be distributed to Taiwan hospitals to verify the factors and items used to measure satisfaction.

Exploring the Whether Adolescents Perception of Deviance or Non-Deviance When Using the Internet Increases or Decreases Deviant Behavior While Using the Internet

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Keywords: Adolescents, Perception, Decreases

If the current trend continues, the use of computer technologies and the Internet will increase for teaching and education. It is urgent that researchers study computer and Internet deviance. Any new technology tends to create a new human environment, Marshall McLuhan declared this quote over forty years ago. Indeed, today's technology has created many new human environments and behaviors. Deviant behaviors on the computer and the Internet are rising as technology use increases (Hollinger, 1996b; Power, 2000; Vatis, 2000). This is evident in the enormous number of computer viruses, hacking; data pirating that have recently caused businesses, educational institutions and personal computer users to become skeptical about performing familiar daily tasks (e.g., opening email messages). For the purpose of this study, deviant behavior for technology will include these activities: using computers and the Internet for illegal activities that violate local, state, and/or federal laws, inappropriate use; such as, a violation of the intended use of the Internet or computer, and/or its intended purpose and goal, obscene activities; defined as entering a pornography website or selling pornography goods on the Internet; using the Internet or computer to violate copyrights laws or other contracts such as institutional or third party copyright, license agreements and other contracts, intentionally disrupting the Internet traffic by spreading a computer virus, spreading rumors about another person on the Internet, intimidating, bullying and frightening another person on the Internet. The goal of this study was to explore middle and high school students' perceptions of deviant behavior when using computers and the Internet. The target population for this study was middle and high school students. The accessible population included all students who attended a middle or high school in the East Baton Rouge Parish School, which has computers that are capable of accessing the Internet (1,150 students 575 middle school students and 575 high school students). Professor San-Yi Li of Taiwan designed the instrument used in this study. The instrument contained 66 questions and a scantron was used to record participants' responses.

Small Enterprises and Environmental Sustainability: A Review of Recent Developments

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Keywords: SME, Capacity Development, SDG, Environmental Management

Aim is to examine recent developments in the study of SMEs and environmental sustainability with a view to understanding emerging trends and new research directions. Using a deductive thematic analysis of relevant literature, the paper examines publications from the last decade and compares themes with earlier sets of literature in this field. Three key trends are observed a changing conceptual view of SMEs, the growing embodiment of theories from adjacent disciplines, and the growing analytical segmentation of SMEs. Based on these findings, potential areas for future research on SMEs and the environment are discussed.

Food Safety and Vulnerability Perceptions of Consumers in Taiwan

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Keywords: Food Safety, Food Safety Vulnerability, Importance-Performance Analysis

The ceaseless food scandals that happened in recent years have increased the consumers risk perceptions of foods and destroyed their trust to food providers. Consumers perception of food safety is much less satisfaction than expected, consumers are exposed to food safety vulnerability, finally there will be consumer protest, consumer web connection, and consumer boycott behavior. Vulnerability is a broad concept with wide-ranging applicability; however, the issue of food safe vulnerability has not yet been addressed. The study was to identify the attributes of critical food safety vulnerability in Taiwan. A total number of 160 valid survey samples was analyzed by using the analytical methods of Importance-Performance Analysis. It looks at two dimensions of consumers response to food safety, moreover examines both how well a factor contributes to a given goal as well as how important that factor is to the consumers. By understanding both the importance and performance of a given factor, the managers can discover where they are succeeding and where they need to improve in food safety.

Analysis of Differences in Core Competencies among Major, Grade and Gender of Korean University Students

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Keywords: Core Competency, Creative Competence, Convergence Competency, Community Competence, Communication Competency, Leadership Competence, Global Competence

In order to achieve global competitiveness, university students should have core competency as creative convergent talent that can actively respond to changes, recreate culture with new ideas, and play a leadership role in a constantly diversifying society. Therefore, it is very important to analyze the core competencies of university students according to their major, grade, and gender, and to develop differentiated and systematic curriculum based on this. In this study, a core competency test (by S University, 2016) was conducted on 5770 students in years 1 to 4 at S University in Seoul. We analyzed the core competencies of students (creative competence, convergence competence, community competence, communication competence, leadership competence, and global competence) according to their major, grade, and gender. The results showed that there were differences in the 6 core competencies among college students according to their majors($p < .05$): creativity and convergence competence were the highest in Art and the lowest in Law and Sports; communication and leadership competence were the highest in the convergence specialized free majors, and the lowest in Art; the highest communication competence was found in the humanities, and the lowest in convergence specialized free majors; global competence was the highest in the humanities, and lowest in the sports majors; Overall the six core competencies of Soongsil are the highest among those students in the convergence specialization. In addition, there were differences in core competencies among Korean university students according to the year of study students were($p < .05$) in all 6 core competencies ($p < .05$), with the students in the 4th year being the highest in all 6 core competencies including the core competency total. The core competence of students was found to be higher in males than females in all areas of creativity, convergence, global competence and core competence, except communication. Based on these results, universities should develop appropriate curriculum considering majors, grade, and gender in order to effectively cultivate core competencies of students.

B Corporations in Taiwan

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Keywords: B Corporations, B Lab

The B Corporations has been regarded as a popular type of company in recent years. This organizational form is considered to better than government because of it is more efficient. Also, it is considered to better than a traditional company because it is more ethical (Rae 2012). So far, there are 21 B corporations in Taiwan. The first one is certified in 2014, most of them are certified in 2016. These corporations win more score from community sector than other sector, which means they have great contribution in their communities. However, most of them gain few points from customer sector which may have further impact on companys revenue. Thought B corporations in Taiwan are expanding their impact in this country, they must have more clear mission and management mechanism to prove the accountability of the benefit system.

TRACK B

***ENGINEERING & TECHNOLOGY, COMPUTER, BASIC &
APPLIED SCIENCES***

Electrical Properties and Electromechanical Responses of Pullulan Hydrogels for Soft Actuator Application

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Keywords: Pullulan Hydrogels, Electromechanical Response, Actuator

Pullulan is one of non-ionic polysaccharides obtained from the fermentation medium of black yeast. Due to its non-toxic, non-mutagenic, non-immunogenic, non-carcinogenic, tasteless, edible, and odorless characteristics, they have been explored for biomedical applications including tissue engineering, targeted drug/gene delivery, and wound healing. In addition, Pullulan is an interesting material to develop a novel polymeric actuator with improved existing actuation performances. In this work, the pullulan was prepared by using sodium trimetaphosphate (STMP) as the crosslinking agent to form hydrogel. The effects of the amounts of crosslinking agent and electric field strengths on the electromechanical properties were investigated. The storage modulus (G') increased with increasing crosslinking agent amount. For the electric field strength effect, the storage modulus decreased at low electric field strength, and it increased at high electric field strength. The storage modulus and loss moduli were transformed to the creep compliance through the relaxation spectrum and retardation spectrum, respectively. The creep compliance of pullulan hydrogel decreased with increasing crosslinking agent amount. In the case of electric field strength, the creep compliance initially increased at low electric field strength and decreased at high electric field strength, suggesting two competing mechanisms were involved.

Electrically Controlled Drug Release from Carboxymethyl Cellulose Hydrogel

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Keywords: Carboxymethyl cellulose, Controlled Drug Release, Electrically Stimuli Compensation

Transdermal drug delivery is a technique to introduce a drug into body through skin and into blood system with high efficiency, especially in avoiding the first pass effect. Carboxymethyl cellulose is one of water-soluble cellulose derivatives, produced from renewable sources; it is non-toxic, low cost, and pH dependent. Hydrogels based on carboxymethyl cellulose (CMC) were prepared by solution casting method by using citric acid as the crosslinking agent. The carboxymethyl cellulose hydrogel were prepared under various molar ratios of CMC and citric acid namely 0.2, 0.3, 0.4, 0.5, and 0.6. 5-fluorouracil, a non-ionic cancer drug, was released from the hydrogel under electrical potentials. The diffusion coefficients and the release mechanisms of the model drugs on the CMC hydrogels were investigated by using a modified Franz-Diffusion cell with the PBS buffer solution of the pH value of 7.4 at temperature of 37 C for the duration of 24 h. In this work, the effects of mesh size, electric field strength, and electrode polarity were systematically studied. The swelling test illustrated an increase of the mesh size with decreasing crosslinking agent. In addition, the drug diffusion coefficient decreased with increasing crosslinking ratios Moreover, the diffusion coefficient a clearly depended on the applied electric strength and the electrode polarity.

Fabrication of Graphene Oxide/Hyaluronic Acid Composite Hydrogels for Electrically Controlled Transdermal Drug Delivery System

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Keywords: Transdermal Drug Delivery, Hyaluronic Acid Hydrogels, Graphene Oxide

Transdermal drug delivery system (TDDS) is a medicated adhesive patch placed on the skin to deliver drug molecules through the skin and into blood circulation. In this work, the tamoxifen citrate loaded graphene oxide/hyaluronic acid (TMX-loaded GO/HA) composite hydrogels were fabricated by the solution casting method using citric acid as the chemical crosslinking agent at various HA and citric acid mole ratios of 1: 1, 1: 2, and 1: 3. The functional groups, morphology, swelling behaviors, mesh size, and released behaviors of the hydrogels were investigated. The degree of swelling (%), weight loss (%), and mesh size of the HA hydrogels decreased with increasing HA and citric acid mole ratio. In the vitro drug release experiments, the amounts of TMX release from the composite hydrogels relative to the pristine HA hydrogel under the effect of electric potential were investigated using the modified Franz-diffusion cells with the ethanol/phosphate buffered saline solution (pH 7.4) at 37 C for the duration of 24 h. The amounts of TMX released from HA hydrogels increased with time and then reached the constant values. With decreasing HA and citric acid mole ratio, the amounts of TMX released increased. Under an applied electric potential, the higher amounts of TMX released were observed when compared to that without an electric potential. In order to increase the amounts of TMX released under applied electric potential, the GO was used. It was found that GO affected the release behavior of TMX-loaded GO/HA composite hydrogels under applied electric potential.

Deproteinized Natural Rubber Latex (DPNR) Foam for Controlled Drug Release

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Keywords: Natural Rubber Latex, Porous Structure, Transdermal Patch, Drug Delivery System

Deproteinized natural rubber latex (DPNR) was obtained from natural rubber latex (NRL) in which some proteins that cause the skin allergy were eliminated. It possessed many good properties to be used as the transdermal patch namely biocompatibility, high mechanical resistance, ease of manipulation, and low cost. In this work, the DPNR foams were prepared by the UV irradiation and the surfactant micelle formation to produce various porous structures. Sodium dodecyl sulfate (SDS) was used as the surfactant at various DPNR: SDS volume ratios (1:0.3 to 1:0.5). The fabricated foams were characterized for the surface morphology and pore size. The DPNR foams were prepared with various DPNR: SDS volume ratios, and various pore sizes were obtained. The pore size of DPNR foams increased with increasing DPNR: SDS volume ratio. However, the porosity was not obtained in the dense DPNR film, in which no SDS was added. After that, the modified Franz diffusion cells were used to study the drug releases during a period of 24 hours using the phosphate buffer solution at the pH of 7.4 and at the temperature of 37 ± 0.5 °C. The model drug solution, indomethacin in ethanol, was allowed to be absorbed into the transdermal patch before the release experiment. The drug release experiment field revealed that the model drug was hardly released from the dense DPNR film (5.7 %), whereas, it was released much easier from the DPNR foams (80.8 to 94.5 %) and attained the steady state amounts within the short periods of 3-5 hours

Electrically Controlled Release of Diclofenac Sodium Salt from Dextran Hydrogel

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Keywords: Dextran Hydrogel, Diclofenac Sodium Salt, Electrically Controlled Release

Transdermal drug delivery systems (TDDS) are used as an alternative route to deliver drugs into the blood system for therapy. The materials that have been widely used in TDDS are hydrogels. However, the hydrogel in TDDS has a limitation namely the low amount of drug released. This limitation can be improved by applying external stimulus such as electric field. The dextran hydrogels were prepared by the solution casting using trisodium trimetaphosphate (STMP) as the crosslinking agent, and diclofenac sodium salt as the anionic model drug. The in-vitro release of diclofenac sodium salt from the dextran hydrogels was studied using a modified Franz-Diffusion cell in a phosphate-buffered saline (PBS) solution at the pH of 7.4 and at 37 C for a period of 24 h, in order to investigate the effects of the dextran molecular weights, crosslinking mole ratios, and electrical potentials. The drug-loaded dextran hydrogels were obtained from various dextran molecular weights (40000 and 500000 g/mol) with the dextran: STMP mole ratios from 1:0.2 to 1:1. The swelling and mesh size decreased with increasing crosslinking mole ratio. For the release behavior of diclofenac sodium salt loaded in the dextran hydrogel, the amounts and release rates decrease with increasing dextran: STMP mole ratios, but were greater under applied electrical potentials relative to without electrical potential. Thus, the applied electrical potential was shown to enhance the amounts and release rates of diclofenac sodium salt from the dextran hydrogel.

Improved Adaptive Non-Uniformity Correction In Infrared Focal Plane Arrays

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Keywords: Non-uniformity Correction, Adaptive Correction, Ghosting Artifacts.

This paper presents an improved version of a classic scene-based non-uniformity correction approach for infrared focal plane arrays. The adaptive approach is known as a simple and fast process that can work on each frame in a real-time fashion without the need of information on the previous one. However, as a side effect of its design, this technique faces a major drawback in the image quality called ghosting artifacts. Sources of this problem were thoroughly studied in this work and following on that, a new adaptive method was proposed that can retain the simplicity of the correction process in the original method while dealing with the ghosting challenge. The main contributions of this proposed method can be summed as follow: - Consideration of edge information using an edge-aware weighting that can accurately extract image structure and incorporate it into the algorithm learning rate, - Insurance of faster correction by the use of variable learning rate adapted to the level of residual noise in the image, - Prevention from over-correction by setting a gating measure that halts correction when no considerable change has been noticed in the scene. These claims were demonstrated through different experimental settings and the improvement in the proposed method was established using a comparison study with state-of-the-art methods

Fabrication of 3D Printed Smart Key with Embedded Sensor and Electronics Using a Multi-Material Smart 3D Printer

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Keywords: 3D Printing, Single-Build, Electrohydrodynamics

An advanced 3D printing system and process have been developed for multi-material printing of smart materials and structures in a single-build. The system has four nozzles mounted on a precise rotating print head that are capable of printing complex patterns and structures, and depositing thin films using a variety of materials. For this device, two FDM based heads with ABS (plastic body) and GNR-PLA (conductive structures) materials, one EHD (Electrohydrodynamics) printing head for silver based conductive patterns on the surface, and one precise dispensing head for flexible poly-urethane based structures have been employed. A multi-material based 3D CAD model was developed including all the details of the 2D patterns and 3D structures. The plastic body was first printed using ABS with embedded conductive patterns based on GNR-PLA conductive filament for the battery compartment, IR transmitter, and the touch sensor. The head then automatically shifts to EHD printing nozzle for the fabrication of silver based conductive patterns serving as interconnects for embedded electronics. The microchip was then placed on the printed silver pads and was heated using a blower for reflow without removing the device from the printer bed. This allows to continue further printing steps without any re-alignment and error risk. After installment of IC, a polyurethane based thin layer was printed on to the touch sensor cavity in the plastic structure with embedded conductive patterns. The top body and plastic cover of the device was then printed using ABS and the final device was removed from the system. The device has specifically designed built-in connectors and cabins for the IR LED and the battery. Once these components are manually inserted, the device is ready to be tested. When the flexible PU membrane of the printed touch sensor is pressed, the IC sends a coded signal to the IR transmitter that is detected by the receiver on the other end. If the received code matches the database, the receiver unlocks the target. This state-of-the-art system can be used to print complex 3D printed structures and devices using smart and multiple materials with embedded electronics and sensors. It can be a future of integration of printed electronics and 3D printing with industry.

Self-Stabilizing Distributed Algorithm for Enabling Completely Local Recovery

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Keywords: Distributed Systems, Self-Stabilizing, Reliability, Stable Storage.

The problem of finding a minimum dominating set in a graph is arguably one of the most important combinatorial problems on graphs, having, together with its variants, numerous applications and offering various lines of research. Fault-tolerance has become a desirable property, especially for dominating sets. The failure of a single node should not be able to destroy the domination property and a fault-tolerant dominating set should be as small as possible. Combining fault-tolerance and extended range gives the possibility of computing a good solution for the specifications of a real-world network. This paper presents a simple and efficient self-stabilizing distributed algorithm with the following desirable features. As the first one, the algorithm may achieve self-stabilizing recovery functionality without any help from other nodes in geographically distributed areas despite node or process failures. In addition, in this algorithm, the recipient of each inter-area message finishes its message logging task in completely independent manners. In order to satisfy these desirable requirements, the algorithm has every inter-area message transmitted to a node or process locally recorded on the area-wide stable storage. The proposed algorithm may greatly enhance degree of self-stabilization and speed up its recovery process.

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