



**EURASIA RESEARCH LIVE**  
**ONLINE CONFERENCE**  
**PROCEEDINGS**

**ICSTR – International Conference on Science &  
Technology Research, 2020**

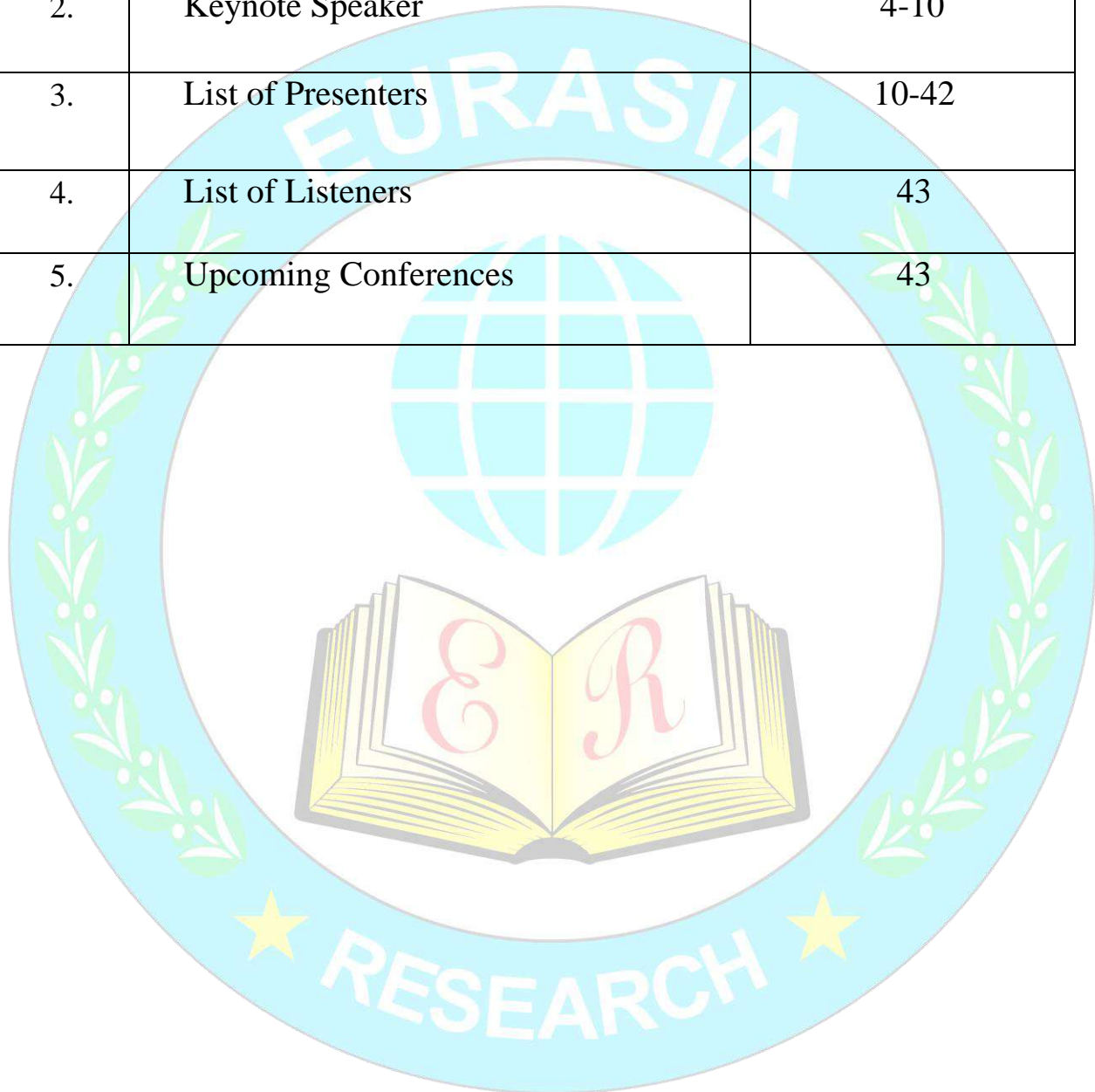
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## **LIST OF KEYNOTE SPEAKERS**



**Dr. Saadia Khouyibaba**  
**Senior Instructor of Mathematics, American University of Sharjah, U.A.E.**  
**Topic: The role of History of Mathematics in Teaching Math**



**Dr. Peiman Kianmehr**  
**Associate Professor of Civil Engineering, American University, Dubai**  
**Dubai 2001**



**Dr. Holger Nord**  
**Area Manager, Victorian School of Languages, Australia**  
**Melbourne 2002**



**Dr. Liudmyla Gryzun**  
**PhD & Second Doctoral Degree in Pedagogical Science,**  
**Full Professor of Computer Science Department, National Pedagogical University, Kharkiv, Ukraine**  
**Topic: Computer Modeling as an Instrument for Realization of Holistic Educational Approach**



**Saralah Devi Mariamdaran Chethiyar**  
**School of Applied Psychology, Social Work and Policy,**  
**University Utara Malaysia (UUM), Sintok, Kedah,**  
**Malaysia**  
**Topic: Igniting Responsive Citizens To Conquer Corona**  
**Virus (COVID 19 @ C'19 In Malaysia)**



**Bogusława Gosiewska**  
**English Language and Literature at Opole University**  
**Topic: Foreign Language Teaching Method Relevant for**  
**Dyslexic Students-a Mixed Study**



**Dr. (Mrs.) W.G. Samanthi Konarasinghe**  
**Statistical Consultant and Senior Lecturer of Institute of**  
**Mathematics and Management, Sri Lanka**  
**Topic: The Role of Mathematics in the Overall**  
**Curriculum**



**Engr. Marizen B. Contreras**  
**Registered Professional Industrial Engineer, Mechanical**  
**Engineering Department, College of Engineering,**  
**University of Batangas, Philippines**  
**Topic: Lean Six Sigma as a Process Improvement Tool**  
**for Academic Institutions**



**Ana Sofia Saldanha**  
**Translator (English and Spanish into Portuguese),**  
**Lecturer, Mentor (Member of the EMCC and Associate**  
**Board Member IMA), Lisbon, Portugal**  
**Topic: Mentoring: The (Possible) Future of Higher**  
**Education**



**Dr. Shahryar Sorooshian**  
**Department of business administration, University of Gothenburg, Sweden**  
**Preparation of Organizations for the Current Industrial Environment**



**Dr. Liudmyla Gryzun**  
**PhD & Second Doctoral Degree in Pedagogical Science, Full Professor of Computer Science Department, National Pedagogical University, Kharkiv, Ukraine**  
**Topic: Computer Modelling in Per-service Teachers' Training in Terms of Holistic Education**



**Dr. Manoj Sahni**  
**Associate Professor, Department of Mathematics, School of Technology, Pandit Deendayal Petroleum University, Gujarat, India**  
**Topic: Functionally Graded Materials and its Applications**



**Dr Agnieszka Ilendo-Milewska**  
**Director of the Faculty of Psychology, Private University in Bialystok, Poland**  
**Topic: Neuroscientific evidence regarding self-regulation and its failures**



**Dr. János Kollár**  
**Associate professor of Institute of Behavioral Sciences,**  
**Semmelweis University, Budapest, Hungary**  
**Topic: Gamification in Education**



**Henjie Carmelotes**  
**Project-Based Learning Coordinator, Head of the**  
**Department at Beaconhouse Yamsaard School, Thailand**  
**Topic: Technology and Education**



**Prof. Cecília R.C. Calado**  
**High Institute of Engineering of Lisbon (ISEL- Instituto**  
**Superior de Engenharia de Lisboa Rua Conselheiro**  
**Emídio Navarro, Lisboa, Portugal**  
**Topic: From Biomarker Discovery towards Precision**  
**Medicine**



**Elza M.M Fonseca**  
**Professor at the Dep. of Mechanical Eng. of the**  
**Polytechnic Institute of Porto, Portugal**  
**Topic: Solution Methods for Temperature Evolution on**  
**Steel Members Submitted to Fire**



**Prof. Paulo Alexandre Gonçalves Piloto**  
**Department of Applied Mechanics, Polytechnic Institute of Bragança, Bragança, Portugal**  
**Topic: Experimental Investigation on Non-Load Bearing Asymmetric Stud Double Wall**



**Yiannis Koumpouros**  
**Asso. Professor, Department of Informatics and Computer Engineering, University of West Attica, Greece**  
**Topic: Shaping the future of healthcare through the exploitation of Information and Communication Technologies**



**Dr. Arzu Baloglu**  
**IT Senior Consultant, Mentor and Author, Dept. of Industrial and Computer Engineering, Engineering Faculty, University of Istanbul, Istanbul, Turkey**  
**Topic: Smart City Istanbul against Pandemic**



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**PhD & Second Doctoral Degree in Pedagogical Science, Full Professor of Computer Science Department, National Pedagogical University, Kharkiv, Ukraine**  
**Topic: Exploring the Properties of Polygonal Numbers and their Educational Applications for Computer Modelling**





**Vladimir Uskov**  
**Professor, Computer Science and Information Systems,**  
**and Director, the Interlabs Research Institute, Bradley**  
**University, USA**  
**Topic: Smart University: Concepts, Research, Systems,**  
**and Technology**



**Gregorio S. Ochavillo, Ph.D.**  
**College of Maritime Education, Palompon Institute of**  
**Technology (PIT) Palompon, Leyte, Philippines**



**Ing. Ts. Dr Mohd Faisal Hushim**  
**Automotive Lecturer, Automotive & Combustion**  
**Synergies Group (ACSG), Faculty of Engineering**  
**Technology, Universiti Tun Hussein Onn, Malaysia**  
**Managing Director, FZM TEKNO PLT, Malaysia**  
**Topic: Retrofit Fuel Injection System for Small Gasoline**  
**Engine**



**Dr. Manoj Sahni**  
**Associate Professor, Department of Mathematics, School**  
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**Topic: Fuzzy Logic and Its Applications in Artificial**  
**Intelligence**



**Dr Liudmyla Gryzun**  
**PhD & Second Doctoral Degree in Pedagogical Science**  
**Full Professor, Information Systems Department, Simon**  
**Kuznets Kharkiv National University of Economics,**  
**Kharkiv, Ukraine**  
**Topic: Mobile Technology for Petri Nets Mastering**

## PRESENTERS

**Certain Freshwater-Derived Fungi Under Different Ph Conditions**



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**ERCICSTR2001060**

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### **Abstract**

The aim of this work was to evaluate metallothionein(MT) as a bioindicator of heavy metal pollution in certain freshwater-derived fungi under different pH conditions. During the last decades, environment in general and water in particular have been strongly exposed to the effect of different harmful pollutants, especially heavy metals which have become one of the most serious environmental problems. Any modification of environmental parameters leading to a response by organisms may be considered as a stress. There are several biomarkers to measure the stress response. Stress proteins as a part of cellular defense response, are strong candidates as biomarkers of environmental pollution. Fungi are capable of removing metals either by biosorption or bioaccumulation in the cytoplasm, binding them by stress proteins, e.g., by cysteine-rich peptides such as Metallothioneins (MTs). In potato broth medium adjusted to neutral, alkaline and acidic pH conditions, two concentrations were prepared from the four tested heavy metals; Cd, Cu, Fe and Zn, then discs of *Aspergillus oryzae* and *A. clavatus* growth were added, and all the treatments were incubated for 10 days. The mycelial mats were separated, homogenized and centrifuged to determine total proteins concentrations using spectrophotometer. Sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE) was used to separate proteins according to their molecular weights. The results showed that in *A. oryzae*, the (MTs) bands clearly appeared at low molecular weight only in neutral medium containing Cu concentrations, and total proteins concentrations were high in case of all metals at all pH conditions. While, in *A. clavatus*, no bands appeared at all in the tested metals at all pH conditions, and total proteins showed low concentrations. In conclusion, MTs is a good bioindicator of heavy metal pollution in freshwater-derived fungi.

**Keywords: Biomarkers; Metallothioneins; Freshwater Fungi; Heavy Metals**



Esam Alawadhi  
ERCICSTR2001068

### Feasibility Study of Wind Energy in Kuwait: Onshore and Offshore

Esam Alawadhi

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#### Abstract

In this paper, the wind energy generated by four wind farms is statically predicated and assessed. The average speed from four weather stations in Kuwait from 2009 to 2017 is adopted in the investigation. Three of these stations are onshore and one offshore. The value of the dimensionless Weibull shape and scale parameters are determined. The maximum annual value for Weibull shape parameter is 4.76, and the maximum annual value for scale parameter is 8.35 m/s. The highest recorded monthly wind power density is 257.36 W/m<sup>2</sup>. According to NREL classification, one site is categorized as good/excellent, while other sites are marginal. The analyses indicated that the maximum yearly output energy of 11.71 GW-h can be produced by a wind turbine with a rated power of 3.0 MW.

Keywords: Wind Energy, Turbines, Wind Farms



Ralph E. Hammann  
ERCICSTR2001070

### Cladding Fires in High-Rise Buildings

Ralph E. Hammann

Thomas D. Hubbard Professor in Architecture, The University of Illinois at Urbana-Champaign, Illinois, USA

#### Abstract

This conference presentation to the 6th ICSTR Dubai – International Conference on Science & Technology Research, 19-20 February 2020 presents new findings of my research in regards to safety issue in regards to building energy performance retrofits. So-called “cladding fires” in high-rise buildings are one of the most dangerous types of catastrophic events endangering the lives of many. Yet they are relatively little known to the public which is typically more familiar with the outbreak of fires as a result of ignition of combustible material at the interior of buildings. Cladding fires, meaning the fire of the exterior sheathing of a building, spread extremely rapidly, and vertically, capable of covering large expanses of a building’s façade with a ‘curtain’ of high-temperature gases and liquid combustibles. The taller the building the most rapidly the fire is capable to spread, due to a combination of stack effect and temperature differences. This phenomenon is particular of concern in buildings which underwent the common present-day energy performance retrofits, meaning which were outfitted with an exterior layer of insulation material of various kinds. Several fire catastrophes in the recent past have costs, unnecessarily, hundreds of lives. This paper presented at the Dubai conference in February 2020 will focus on a compilation of retrofit insulation strategies, material recommendations and design for the prevention of such events.



Dr. Boma Geoffrey  
Toby  
ERCICSTR2001079

### A Review of the Insurance Laws and Practices in the United States of America and South Africa: Lessons for Nigeria

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#### Abstract

The United States of America is one of the largest financial markets, and houses the most mature and viable insurance sector in the world, with a huge population and well developed technologically advanced insurance sector. Insurance contributes close to 40% of the GDP of the financial

institutions in the USA. Similarly, in the Republic of South Africa, though smaller in population to the United States and Nigeria, SA enjoys a robust insurance sector with the latest insurance Act 2018 to help the sector and the economy. Nigeria, on the other hand is much larger in terms of size and population to SA, being over 200million in population, but with a weak insurance sector and little legislation sustaining insurance practice. The insurance Act 2004 is the primary legal regime. This paper examines the prospects, challenges and pitfalls of these experienced sectors, with a view to gaining useful insights into their insurance law, practices and for useful insights that can benefit the Nigerian insurance industry. This paper made recommendations that attention must be given to our laws, by way of a review and an amendment to grow the industry in Nigeria, digital and technological infrastructure, though presently at its nascent stages, must be fully explored. While attention must be given to the cost and over-dependence on digital and tech innovations to avoid their pitfalls.

**Keywords:** Insurance, United States of America, South Africa, Nigeria, Lessons

Mostafa H. Sharqawy  
ERCICSTR2001081

**Refrigeration and Defrost Energy Consumption in Commercial and Walk-In Freezers**

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**Abstract**

The energy consumption of commercial and walk-in freezers has been experimentally investigated in this project. Three different sizes of walk-in freezers were tested to observe the difference of the energy consumption among them. The freezers tested are of 5.98 kW, 1.49 kW & 0.57 kW cooling capacity and 37.84 m<sup>3</sup>, 3.67 m<sup>3</sup> & 0.49 m<sup>3</sup> in storage volume respectively. In addition, the temperature distribution inside the freezers cabinet were measured to investigate the temperature variation at different places inside the cold spaces. We conducted the tests varying the defrost timer and observed the performance of those freezers. While we ran the tests, we determined the defrost to refrigeration energy consumption ratio and the percentage increased in the temperature from the storage set-point. This ratio represents the amount of energy consumed during the defrost process and the energy required to cool the freezer to the set-point after the defrost process ended. In 8 hours timer, it was found that the average defrost to refrigeration ratio was 37.4% in freezer A and 13.9 % in freezer B. In freezer C, the defrost to refrigeration ratio was 18.2% in 7 hours timer.

Jing-Yun Chen  
ERCICSTR2004057

**ADAM17 ISA Critical Factor of Airway Fibrosis in Mice and Humans**

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**Abstract**

Subjects with chronic obstructive asthma (COA) develop progressive persistent pulmonary function impairment and irreversible airflow obstruction that is caused by subepithelial fibrosis. A Disintegrin and A Metalloproteinase 17 (ADAM17), the most studied members of ADAM family, has been implicated in lung inflammation and tissue fibrosis; however, the role of ADAM17 in airway fibrosis of COA have not been explored. Here, we found marked overexpression of ADAM17, ADAM17-phosphorylation, and CTGF in human lung fibroblasts from COA patients compared with normal subjects. Similarly, the levels of ADAM17, CTGF,  $\alpha$ -SMA, and collagen are increased in endobronchial biopsies from COA but not in controls. Employing an ovalbumin (OVA)-induced chronic asthma model, we showed that ADAM17 conditional knockout (CKO) mice subjected with OVA display diminished airway wall thickness and lung fibrosis relative to controls as assessed by

	<p>immunohistochemistry, real-time quantitative PCR, and Western blot analysis. Additionally, TGF-<math>\beta</math>-induced <math>\alpha</math>-SMA and collagen I expression were reduced by ADAM17 small interfering (si)RNA in normal human lung fibroblasts (NHLFs). Thus, these findings indicated a pivotal role of ADAM17 in airway fibrosis and a potential therapeutic target for patients with COA. Keywords: Chronic Obstructive Asthma, Airway Fibrosis, ADAM17, TGF-<math>\beta</math> Human Lung Fibroblasts</p>
<p>Tzu-Chun Kan ERCICSTR2004061</p>	<p><b>Preclinical Assessment of Anti-Nicotinic Acetylcholine Receptor <math>\alpha 9</math> Antibodies on treatment of Triple-Negative Breast Cancers</b></p> <p>Tzu-Chun Kan Graduate Institute of Medical Sciences, College of Medicine, Taipei Medical University, Taipei, Taiwan</p> <p>Sonjid Ochirbat International Master/Ph.D. Program in Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan</p> <p>Jungshan Chang Graduate Institute of Medical Sciences, College of Medicine, Taipei Medical University, Taipei, Taiwan International Master/Ph.D. Program in Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan</p> <p><b>Abstract</b></p> <p>Breast cancer is the second cause of deaths in women and triple-negative breast cancers(TNBCs) display higher recurrence and more aggressive stage. Currently, there is no effective targeted therapy TNBC patients due to lack of specific therapeutic markers on tumors. Recently, it has been documented that higher expressions of Anti-Nicotinic Acetylcholine Receptor <math>\alpha 9</math> (<math>\alpha 9</math>-nAChRs)either on patient-derived biopsytumors or cell lines such as MDA-MB-231 are observed, and the levels of <math>\alpha 9</math>-nAChRs are strongly associated with metastasis and drug resistance. It indicated that <math>\alpha 9</math>-nAChRscan be a therapeutic candidate for targeted therapy of TNBCs. In this study, we evaluated the therapeutic effects of anti <math>\alpha 9</math>-nAChR antibodies (<math>\alpha</math>-<math>\alpha 9</math>-<math>\alpha</math>PEG) and its derivative anti-<math>\alpha 9</math>-nAChRs/anti-mPEG bispecific antibodies (represented as <math>\alpha</math>-<math>\alpha 9</math>-<math>\alpha</math>PEG) non-covalent linked liposomal doxorubicin (Lipo-Dox) on TNBC. The therapeutic assessments were characterized on two animal models including microtube array membrane (MTAM) and xenograft. It is allowed us to rapidly screen out the candidates in the MTAM and confirm their therapeutic efficacy in animals. The results demonstrated that <math>\alpha</math>-<math>\alpha 9</math>-<math>\alpha</math>PEG/Lipo-Dox (<math>\alpha</math>-<math>\alpha 9</math> derive from chicken) and mCLP S1 (derived from murine) significantly reduced the numbers of TNBCs (MDA-MB-231)in the lumen rooms and <math>\alpha</math>-<math>\alpha 9</math>-<math>\alpha</math>PEG, <math>\alpha</math>-<math>\alpha 9</math>-<math>\alpha</math>PEG/Lipo-Dox, mCLP S1 and mCLP2S9 (derived from murine) lowered the vessel density on/around MTAM membranes. Furthermore, <math>\alpha</math>-<math>\alpha 9</math>-<math>\alpha</math>PEG alone or <math>\alpha</math>-<math>\alpha 9</math>-<math>\alpha</math>PEG/Lipo-Dox reduced tumor volume in animals, suggesting <math>\alpha 9</math>-nAChRs antibodies is a potent therapeutic candidate or a value targeted molecule on TNBC survival and angiogenesis. To unbraid the mechanism of <math>\alpha 9</math>-nAChRson TNBCs, we first determine if <math>\alpha 9</math>-nAChR-mediated cell migrations and invasion using wound healing and trans-well assay. The preliminary results demonstrated that MDA-MB-231 cells exposure to <math>\alpha 9</math>-nAChRs antibodies displayed concentration-dependent reduction in migration. We also found the several factors including EPAS1, HIF-1a and TGB1may correlate to <math>\alpha 9</math>-nAChRs-mediated angiogenesis. Taking together, it suggests the <math>\alpha 9</math>-nAChRs is a superb molecule for TNBC targeted therapy. Keywords: Triple-Negative Breast Cancer, Anti-Nicotinic Acetylcholine Receptor A9, Microtube Array Membrane, Angiogenesis</p>
<p>Ivana Mitrović ERCICSTR2006060</p>	<p><b>Production of Bioagent for Sustainable Control of Apple Fusarium Rot in Storage by Streptomyces Hygroscopicus</b></p> <p>Ivana Mitrović Faculty of Technology, University of Novi Sad, Bulevar Cara Lazara 1, Novi Sad 21000, Serbia</p> <p>Jovana Grahovac Faculty of Technology, University of Novi Sad, Bulevar Cara Lazara 1, Novi Sad 21000, Serbia</p>

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#### Abstract

Intensive use of synthetic pesticides in modern agriculture, including those used to control phytopathogenic fungi, has led to several problems related to environmental pollution and the emergence of resistant strains. In the last few years in focus is the search for alternative methods that can reduce the use of toxic agrochemicals and one alternative way is use of beneficial microorganisms. This investigation studied the potential of *Streptomyces hygroscopicus* as a biocontrol agent against two isolates of *Fusariumavenaceum*obtained from apple fruit samples expressing rot symptoms.Production of biocontrol agent by *S. hygroscopicus* was carried out in 3 L stirred tank bioreactor (BiostatAplus, Sartorius AG, Germany) at aeration rate of 1.5vvm and agitation speed of 150 rpm in medium containing glycerol as carbon source. Bioprocess was carried out at  $26 \pm 1^\circ\text{C}$  during 7 days. Activity of bioagent production was tested every 12 h of cultivation using in vitro well diffusion method. Also, residual glycerol, residual nitrogen content and cell biomass were determined in order to analyze bioprocess parameters. The results showed that the highest production of antagonist agents was achieved in 96 h of cultivation, forming the inhibition zone diameters of *F. avenaceum*KA12 and KA13 mycelia growth of 43.33 and 40.67 mm, respectively. Activity was also confirmed in planta, where it was found that necrosis diameters which were measured on treated and artificially inoculated apple fruits, compared to necrosis diameter measured on untreated, control fruits, were 2.80 (for KA12) and 2.17 (for KA13) times smaller.

**Keywords:** Biocontrol; *Streptomyces hygroscopicus*; *Fusarium* apple rot;Bioprocess.



Mohd Sazali bin Jirin  
ERCICSTR2006087

#### Supplementing Metal Cutting Process with a Specifically Designed Tool

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#### Abstract

The goal of this project was to examine the plausibility of a supplementary tool known as Stand for Grinder Cutting that could possibly aid the process of metal cutting in producing metal plates that were cut properly according to required measurements. There were 30 students from a welding technology programme of a local vocational institution who tested this tool and were required to express their ratings on its function and features by completing questionnaires. The findings revealed that the students found this tool efficient, safe, useful and easy to use. This suggested that this tool could be potentially replicated and promoted across vocational institutions and factories in order to provide welders an improved experience in cutting metal plates and other types of materials of a better quality.

**Keywords:** Grinder, Metal Cutting Process, Metal Plates, Welding.



Sanyogita Shahi  
ERCICSTR2006095

**“Trichoderma” The Fungal Activity of Gaddi Sheep’s Milk Oligosaccharides**

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**Abstract**

Carbohydrate is a natural constituent of all living beings like: bacteria, fungi, plants and placental mammals’ milk, in which oligosaccharide are the main constituents. The milk is a rich source of oligosaccharides with different novel oligosaccharides depending on the nature of the origin of mammals the milk belongs. One of the most important roles for milk is to support the immune system of a newborn, and provide bioactive molecules that allow the gastrointestinal tract of the new born to mature, this maturation play important role in development of a healthy balance of microflora. Goat milk oligosaccharides have anti-inflammatory effects. It is valuable for intestinal protection and fix after the harm brought about by DSS (Dextran sodium sulphate)-induced colitis and their implication in human intestinal inflammation. Bison milk oligosaccharides have resistivity against parasitic diseases. Donkey milk oligosaccharides stimulate non-specific and specific immunological resistance. The cows’ milk oligosaccharides decrease the addition of enterotoxigenic Escherichia coli strains of the calf. Keeping all biological activity of different milk in mind, Gaddi sheep's milk was collected and processed by Modified method of Kobata and Ginsburg and afterward purified by Sephadex G-25 Gel column. The homogeneity was affirmed by reverse phase high performance chromatography. The acetylation of oligosaccharides mixture followed by the silica gel chromatography led to isolation of novel oligosaccharides. The contagious action of Gaddi sheep's milk oligosaccharides was explored against three types of Trichoderma, to be specific T. polysporum, T. flavofuscum and T. longibrachiatum, based on their importance as human pathogens. All samples of milk oligosaccharide exhibited fungal activity against these fungal species.

**Keyword: Oligosaccharide, Trichoderma, Bioactivity, HPLC**

Harvey Andrew G. Lim  
YRSICSTR2006051

**Portable Arduino-Based Integrated Water Quality Analyzer With Real-Time Data Transmitter**

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**Abstract**

In our society, there’s an accelerated rate of morbidity and mortality worldwide stemming from various water-related diseases. Thus, safety is the most critical factor in the decision making for safe-

drinking water. Moreover, prompt acquisition of information regarding water quality is still a challenge due to the unavailability of portable devices that can give vital information, which hinders the resolution of water-related problems. Another posing challenge is the transport time of data from one location to another especially from distant or isolated places, and the limitation of the locals to interpret the information. In this study, the problems are solved by the development of a portable Arduino-based integrated water quality analyzer, which measures the temperature, pH, turbidity and the total dissolved solid (TDS) of the water, which are the core parameters of water (Environmental Protection Agency, 2014), to determine the water quality in just one setting. The device will automatically analyze the information and instantly give the conclusion if the water is safe to drink or not. Furthermore, the device has a Global System for Mobile Communication (GSM) module which sends real-time data to identified professionals and institutions for them to decide and take appropriate and immediate actions. To ensure the accuracy of the device, the sensors were subjected to various tests, verifications, and comparisons with standard laboratory equipment. The results show that both the device and the lab equipment had no significant differences, with the data values acquired from the device all falling within  $\pm 5\%$ , which guarantees the accuracy of the device. The device has the potential in helping people ranging from the locals up to the professionals and the institutions by reducing the time of data transport and simplifying the analysis regarding water quality, which is crucial in the decision making and the action-taking process of water treatment.

**Keywords:** Water Quality, Potability, Safety, Information, Arduino, Sensors

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ERCICSTR2006099(  
A)**

**Niger Delta Region's Resources: Amnesty, Laws Any Synergy For Sustainable Development?**

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**Abstract**

The Niger Delta Region is the greatest wetland and one of the greatest resource regions in Africa. The region is rich both in natural and human resources, renewable and non-renewable. It is located within the Gulf of Guinea and close to the Atlantic Ocean. The location of the Delta makes it rich in both terrestrial and aquatic lives. The environment and ecology support major economic activities and the region accounts for over 60% of the oil production in Nigeria and dates back to 1958, with the first commercial export made to Europe. Unfortunately, the blessings which the oil exploration brought to Nigeria through export revenue and foreign exchange has not translated equitably to the development of the region. This ugly scenario has engendered the feeling of anger, distrust between the region and the various tiers of government; particularly against the federal government of Nigeria, culminating in the struggle, destruction, economic strangulation and degradation that play out in the region. It is to douse the ensuing tensions and brewing crises from the region that the federal government granted amnesty to repentant indigenes of the region, hitherto not witnessed in Nigeria. In addition, some laws have been made to address the plight and underdevelopment of the region. This paper seeks to evaluate the Niger delta region; their resources, amnesty and the legal regime that aim to set the region on the path of economic recovery and sustainable development. The objective is to find a relationship between the existing resources and the sustainable development of the region to see how the extant laws have promoted poverty alleviation and sustainable empowerment in the region. This paper finds serious disconnect between the people, their resources and sustainable development, leading to the conclusion that the existing legal framework have not yielded the much required impact in this regard. The paper recommends some dynamic and aggressive laws that will promote sustainable development and biodiversity protection within the region.

**Keywords:** Niger Delta Region, Resources, Amnesty, Law and Sustainable Development.





Dr. Boma Geoffrey  
ERCICSTR2008069

**Nigerian Insurance Sector and Digital Imperative 2020 and Beyond in the Face of Covid-19  
Pandemic Outbreak: Legal Concerns**

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**Abstract**

The Nigerian Insurance industry has come face to face with the need for a fully digitized sector. This is seen in the recent lockdown across the world and the social distancing policy allowing for closure of business places and shops and the quarantining of people at home following the sudden outbreak of the Covid-19 pandemic. This is and will change the way businesses, institutions and especially Nigerian insurers will continue to do business; in addition to the way individuals will live their lives post covid-19. It is becoming a turning point for the insurers to demonstrate their higher purpose and value to society and to reminisce at its effort at digitalizing the insurance sector since its inception in the 1950s. Sadly, the law does not provide for digital marketing and the sector has continued to operate physically with customers; neglecting the need to fully develop its digital economy meet with global insurance marketing practice. The Covid-19 has demonstrated the higher need for digital technology to connect insurers and the insured; prospects and the entire populace as it is practiced in the global market. The need for a comprehensive and fully automated digital insurance sector has never been more desired than now and cannot be over-emphasized. This paper finds a serious disconnect between the current insurance legislation and the realities necessitated by the coronavirus emergency leading to the conclusion that the laws are obsolete and digitalization of the insurance sector a priority for visibility, accessibility and meaningful contribution to Nigeria's GDP. This paper recommends for full digitalization of the insurance industry and the review of the current law to allow for full digital insurance marketing, sales and services. Additionally, the expansion of the scope of insurance marketing mechanisms using online services and the provision of sudden interruption insurance policies to cater for covid-19 risks and order remote unforeseen risk events is recommended.



Al Razi Sena  
YRSICRLSH2007051

**The Implementation of Acute Appendicitis Clinical Pathway toward Average Length of Stay**

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**Abstract**

**Background:** Acute appendicitis is a gastrointestinal disease that the number of them increases in several countries every year. The incidence of acute appendicitis in Indonesia, was increased with 566132 people in 2009 to 621435 in 2010. Cases of acute appendicitis are continued to increase every year in Condong Catur Hospital. Appropriate clinical guidance is needed in the provision of medical services, to treat every acute appendicitis patient. Implementation of the clinical pathway as a clinical guide needed to be measured, if the health care facilities want to know the impact on the outcome of the patient. This study aim to see there is a significant impact of the acute appendicitis clinical pathway toward the average length of stay (AvLOS).

**Methods:** The type of this research is quantitative research with cross-sectional design. The population in this research were all medical records of patients at Condong Catur Hospital, obtained 102 samples (discharge summary and clinical pathway sheets). Data analysis was performed by Chi-Square test.

**Results:** This study noted the majority of sufferers of Acute Appendicitis, suffered by the age of 15-24 years with male sex. Majority of the patient medical record is without clinical pathway. Implementation of clinical pathway reduce mean the length of stay from 3.52 days become 2.36 days Data analysis used Chi-Square, showed the significant relationship between the implementation of clinical pathway appendicitis acute toward AvLOS with p-value = 0.000

**Conclusion:** There is a significant relationship between the implementation of clinical pathway appendicitis acute toward reduced of AvLOS. Suggestions that can be given are evaluating compliance of filling the clinical pathways, and increasing the socialization of documentation using clinical pathways to health workers.

**Keywords:** Clinical Pathway, Acute Appendicitis, Average Length Of Stay



Fady M. A Hassouna  
ERCICSTR2009061

**Performance Analysis of Modern Roundabouts as An Alternative to Conventional Signalized Intersections: A Comprehensive Review**

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**Abstract**

The intersection is one of the most important elements of roadway network; it is considered as a point of weakness in any roadway network, because it has a higher probability of accident occurrences and a lower capacity than other elements of roadway network.

During the last three decades, the roundabout began to be highlighted as a solution to problems of conventional signalized intersections. Since then, numerous studies have been conducted to determine and quantify the performance and benefits of converting the conventional signalized intersection to a modern round about.

Most of these studies have focused on certain aspects of the performance of roundabouts, while neglecting the others. In addition, most of these studies did not determine the extent of conflicts among the different factors that affect the performance of the roundabout. This necessitated the need for a comprehensive study that addresses all aspects of roundabout performance and analyzes the interference among the different factors that affect roundabout performance.

In this study, the literature concerning all aspects of roundabout performance (safety of drivers, pedestrians, cyclists, as well as capacity, delay, toxic emissions, fuel consumption, cost) were analyzed. In addition, the degree of interference among all factors that affect the performance of a roundabout was determined in order to clarify the overall picture of roundabout performance and finally to present the overall findings of the study.

**Keywords:** Modern Roundabout, Safety of Roundabout, Circular Intersection, Roundabout Performance, Benefits of Roundabout, Impacts of Roundabout, Unsignalized Intersection



Desmond Doulatram  
ERCICSTR2009066

**Report from a former a Nuclear Testing in the Asia Pacific: A Case Study on the Marshall Islands**

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**Abstract**

The emerging and expanding fields of environmental law and international law provide greater transparency in revealing human right concerns in the Asia-Pacific region. This paper explores these human right concerns of the affected populations in the Marshall Islands which functioned as a nuclear testing ground between 1946 to 1958 when it served as a strategic Trust Territory administered by the United States. In 2014, the Marshall Islands sued the United States and the Asian nations of India, Pakistan, and North Korea for violating the 1968 nuclear non-proliferation treaty (NPT). The aggressive diplomatic pressure imposed by the Marshall Islands to major nuclear powers is not without reason. This paper provides and explores an underutilized historical perspective explaining the legal and humanitarian consequences of the nuclear testing period in the Marshall Islands and their limited adaptive capacity in addressing humanitarian obligations to its citizens despite not creating the situation. It explains the reasoning behind the aggressive political nature in Marshallese politics stemming from unhealed wounds that eventually led to Marshallese climate change ambassador Tony deBrum's (February 26, 1945 – August 22, 2017) sole decision to sue the United States and the Asian nations of India, Pakistan, and North Korea.



Agung Adi Firdaus  
ERCICSTR2009067

**Trends in the Use of Technology in Support Physical Distancing During the Pandemic Period**

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**Abstract**

The coronavirus pandemic which is also known as COVID-19 was declared as an emergency public health by the WHO were more than four million people have been affected by the disease with more than 278,000 deaths until May 11, 2020. Transmission and spread of infectious diseases can be prevented by public health initiatives such as physical distancing, self-isolation, and lockdown. In carrying out these efforts, technology has a very important role. During the COVID-19 pandemic, technology plays an important role in keeping our community functioning at both locked and

quarantined. The purpose of this research is to describe trends in the use of technology to support physical distancing during the pandemic period. The method used in this research is a descriptive research method with the analysis of qualitative and quantitative data. Data collection techniques using literature studies with data sources in the form of books, scientific journals, reports, and official institutional websites. The results and discussion show that technology is becoming a trend and increasing its use during the pandemic including online shopping and digital payments, remote work, e-learning, telehealth, digital platforms entertainment, supply chain 4.0, robotics, and drones and information and communications technology (ICT). The existence of such technologies can help to reduce coronavirus spread while assisting activities in various areas of life such as business, education, health, economics can still run. Technology can help make the community more resilient in the face of a pandemic period.

**Keywords:** Trends, Technology, Physical Distancing, Pandemic

Irakli Chitaia  
ERCICSTR2009069

**Relations between c-reducibility and other Reducibilities**

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**Abstract**

One of the most important types of strong reducibilities is the conjunctive (c) reducibility, which was defined by Jockusch [3] in the following way: say that a set  $A$  is  $c$ -reducible to a set  $B$ , if there is a computable function  $f$  such that  $x \in A$  where and  $y \in B$  is the finite set with canonical index  $e$ . The interest in studying the algebraic structures of conjunctive degrees has been arisen from the works of Dobritsa [2] and Belegradek [1] about the algebraically closed groups. It is worth mentioning that the key thing which makes the conjunctive reducibility more interesting is its two diverse natures, it is stronger version of both  $c$ -reducibility and  $c$ -reducibility. During the research on conjunctive reducibility, some interesting and important results have been obtained by different authors, but many issues are still unexplained and undetermined. In this talk we will present some recently obtained results about  $c$ -reducibility and its connections with other reducibilities.

**Keywords:** Conjunctive Reducibility, C-Degrees, Hypersimple Set.



Prof. Gh. Saleh  
ERCICSTR2010065

**Structure of the Photon**

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The ancients believed that the world is made up of four elements: fire, air, water and earth. Over time, with the progress of science, scientists discovered that every material is composed of tiny particles called molecules which, themselves, are constituted of atoms. Similarly, atoms have a nucleus and electrons.

Attention has raised in the last 20 years in the scientific areas of attosecond science and strong field laser-matter interactions. In the last years a new activity addressing the linking of quantum optics with attosecond science has been successfully initiated. One of the points that can help to understand the related phenomenon in this area, knowing the structure of Photon.

This paper presents a distinct picture of structure of the photon, to give a basic concept of the geometry and the behavior of photon. We define that, like the atom, the photon also has a central part around which the rotating particles move in an irregular manner and, indeed, the photon is a small atom with a similar constitution.

**Keywords:** Photon Structure, Wave Particle Duality, Photon Motion, Cidtone



Erma Suryani  
ERCICSTR2011056

**Scenario Model to Reduce Traffic Congestion using Intelligent Transportation Systems**

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**Abstract**

This study aims to develop scenario model to reduce traffic congestion using intelligent transportation systems (ITS). ITS is an application of advanced technology in the fields of electronics, computers and telecommunications to make transportation infrastructure and facilities more informative, smooth, safe and comfortable. It encompasses the latest wireless, electronic, simulation, and automatic technology. As a method to develop the scenario model, system dynamics (SD) is utilized considering that it can accommodate a system with complex non-linearity, faster and easier sensitivity analyses through the tests on the structure of the models. SD has been used at the macroscopic and microscopic levels of the traffic flow to explore the interaction of transportation and urban planning as well as to evaluate the effect of different transport policies. ITS can reduce traffic congestion through the placement of several surveillance cameras in some corners of the city and is equipped with sensors to detect the number of vehicles. This detection results can be used as an input in setting the time for traffic signal control to reduce the volume of vehicles by prioritizing solid lines to get the green light, so that the flow of heavy traffic can run first. With this scenario, traffic congestion is projected to decrease to be in the range 0.71 – 0.79 (below the maximum saturation level of 0.85) due to the decrease in vehicle volume as the impact of the implementation of ITS.

**Keywords:** Model, Simulation, Intelligent Transportation Systems, System Dynamics, Traffic Congestion



Erma Suryani  
ERCICSTR2011056

**System Dynamics Model to Decrease Congestion Cost Using Transit-Oriented Development**

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**Abstract**

This research aims to develop system dynamics simulation model and scenario to decrease congestion cost using transit-oriented development (TOD). TOD is the integration of land use and transit to create a community that can walk within walking distance of a transit stop or station. It integrates people, jobs and services to create efficient, safe and comfortable services for traveling on foot or by bicycle, transit, or car. As a method to develop the scenario model, system dynamics (SD) is utilized based on consideration that SD can accommodate the dynamics complexity of several variables influencing the cost of traffic congestion. SD provides a framework to develop a causal loop diagram which allows SD as a tool to test the impact of various strategies and policies that affect the cost of traffic congestion. TOD can reduce the congestion cost by encouraging housing locations near transit facilities, incorporating retail into regional development to attract customers from both TOD and main roads, as well as improving compatibility and connectivity of transportation systems.

Simulation results of the scenario model after implementing the TOD show that the congestion cost per hour per capita is projected to decrease by an average difference of 53%. Congestion costs after applying TOD are projected to be around IDR 2025 per hour per capita in 2021 and IDR 451,800 per hour per capita in 2045.

**Keywords:** Model, System Dynamics, Congestion Cost, Transit Oriented Development, Simulation

Ana R. Cardoso  
ERCICSTR2011071

**Laser-Induced Graphene-Based Platforms for Dual Biorecognition of Molecules**

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**Abstract**

Expanding the use of 3-electrode systems by laser-scribed technology for portable and on-site analyte detection, a dual molecule detection 2-working electrode system consisting of laser-induced graphene (LIG) was developed, for ascorbic acid (AA) and amoxicillin (AMOX) detection, which are currently used in aquaculture and persist as water contaminants. The biorecognition element of each target compound was a suitable molecularly-imprinted polymer (MIP). The AMOX MIP was a new material, developed herein for the first time, and assembled by electropolymerizing eriochrome black T (EBT). It showed a wide linear response from 100 nM to 50  $\mu$ M, with a sensitivity of -13.32  $\mu$ A/decade. Calibration curves revealed good squared correlation coefficients ( $R^2 > 0.99$ ) with a limit of detection (LOD) of 11.98 nM. AA MIP was assembled according to previous work reported in the literature, displaying a linear response from 1.5 mM to 4 mM and a sensitivity of 1.356  $\mu$ A/decade. The developed dual-LIG device was further tested in real samples and successfully applied to the analysis of binary mixtures prepared in environmental water samples from a well. Overall, the proposed device allows in-situ analysis of two different molecules, holds an exceptionally low-cost design when compared to competing architectures in the literature, and, the fabrication method here employed offers the possibility of easily adjusting the desired architecture on demand.

**Keywords:** Dual Detection; Laser-Induced Graphene; Molecularly-Imprinted Polymer Technology; Ascorbic Acid; Amoxicillin.

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<p>Soni Asmaul Fuadi ERCICSTR2011071 + Ario Dwi Prabowo ERCICSTR2011071</p>	<p>through the PhD Grant, SFRH/BD/115173/2016, SFRH/BD/130107/2017 respectively.</p> <p><b>Real-Time Measurement of Solar Cell's Current and Voltage to Predict Battery Capacity using IoT Technology with ESP 32 Microcontroller</b></p> <p><b>Soni Asmaul Fuadi</b> PT PLN (Persero) Pusat Pendidikan dan Pelatihan, UPDL Banjarbaru, Banjarbaru, Indonesia</p> <p><b>Ario Dwi Prabowo</b> PT PLN (Persero) Pusat Pendidikan dan Pelatihan, UPDL Banjarbaru, Banjarbaru, Indonesia</p> <p><b>Abstract</b> Many solar cells have been installed in the households as one of the supporters of electrical reliability. Meanwhile most of the solar cell installation is not equipped with voltage and current monitoring device that can be monitored realtime so that the user does not know how much the capacity of the battery that stores energy from the solar cell. This condition can damage the battery and also the reliability of solar panels. The use of current and voltage measurement devices in real time using IoT technology with ESP 32 microcontrollers can predict the storage capacity of the battery continuously over time. <b>Keywords : Solar Cell, Transducer; Iot 4.0 ESP 32 ; Realtime Monitoring</b></p>
<p>Ana P. M. Tavares ERCICSTR2011072</p>	<p><b>Molecularly-Imprinted Materials on Cork to Remove Antibiotics from Aquatic Environments</b></p> <p><b>Ana P. M. Tavares</b> BioMark/ISEP, School of Engineering of the Polytechnic School of Porto, Porto, Portugal BioMark/UC, Department of Chemical Engineering, Faculty of Sciences and Technology of the University of Coimbra, Coimbra, Portugal</p> <p><b>M. Goreti F. Sales</b> BioMark/ISEP, School of Engineering of the Polytechnic School of Porto, Porto, Portugal BioMark/UC, Department of Chemical Engineering, Faculty of Sciences and Technology of the University of Coimbra, Coimbra, Portugal</p> <p><b>Abstract</b> Antibiotics are found today in wastewaters and in environmental, surface, ground, drinking and seawater waters, arriving from several sources. Production/manufacturing processes in pharmaceutical industries introduce antibiotics in the environment through the effluents/influents of sewage treatment plants. Another source is its use. Most antibiotics used for preventing/treating infections in humans/animals and for promoting faster growth of livestock are only partially metabolized and are then discharged along the excreta, either to wastewater treatment plants (WTP) or straightforward in waters or soils. Only antibiotics reaching a wastewater course will follow some kind of treatment in WTPs, which is however highly ineffective. The main risks deriving from the presence of antibiotics in the waters include direct organic damage to water; impact on the biotic environment; and also the indirect effects on health via resistant microorganisms. The increasing emergence of antibiotic resistance in human pathogens is today a great concern to public health. Diminishing the environmental impact of antibiotics is thus an emerging and concerning issue, for which removing the existing drugs is an immediate and critical response. Herein, a molecularly-imprinted polymer (MIP) material was tailored on cork, taking the advantage of having cork as a natural adsorbing material and modifying its ability to absorb a given target antibiotic. This is the first time a MIP is tailored on cork. This was done by surface imprinting with methacrylic acid (MAA) and ethylene glycol meta acrylate (EGMA) and having as target norfloxacin (NOR). The binding ability to NOR was monitored by HPLC/DAD, using a C18-reversed phase column and a mobile phase of 20 mM of KH<sub>2</sub>PO<sub>4</sub> with 0.5% triethylamine and acetonitrile (85:15 v/v), adjusted pH to 3.5 with phosphoric acid, flowing at 0.8 mL/min. Detection was set to 278 nm. Overall, the cork/MIP material presented a good ability to remove NOR from simulated samples, followed-up in HPLC from 20 μM to 120 μM. The results indicated good adsorption performance, up to 27.5% removal, having standard solutions with no absorption material as control. This material is particularly suitable for NOR removal in aquaculture facilities, and it is being further optimized. <b>Keywords: Norfloxacin, Molecularly-Imprinted Polymer, Cork, HPLC</b></p>

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M. Goreti F. Sales  
ERCICSTR2011073

**A Cellulose-Based Colour Test-Strip for Equipment-Free Drug Detection On-Site: Application to Sulfadiazine in Aquatic Environment**

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**Abstract**

This work develops a simple and innovative test-strip to monitor antibiotics in aquaculture facilities by an equipment-free approach. It consists of a low-cost disposable cellulose paper that was chemically modified to produce a colour change when in contact with a given antibiotic. In brief, the cellulose substrate was subject to oxidation with periodate, followed by amination with chitosan binding and modification with Cu(II). The test strip was then dipped in the target solution and the intensity of the colour generated therein revealed the concentration of antibiotic present for concentrations higher than 0.5 mM. The higher the concentration in sulfadiazine (SDZ), the more intense the pink colour formed in the final solution, which was also turbid due to the insolubility of the formed product. This colour intensity also varied linearly with the logarithm of the SDZ concentration (from 0.5 mM to 5 mM), when plotted against the sum of the RGB coordinates extracted from digital pictures. The linear equation of this response was represented by  $(R+G+B) = -256.1 \log(\text{SDZ, mol/L}) - 362.0$ , with an R-squared of 0.9913. The test-strip was stable for at least 15 days and was selective in the presence of tetracycline and difloxacin, while the response to other members of the sulfadiazine family requires prior evaluation.

Overall, the test-strips developed herein are inexpensive and provide valuable (semi-) quantitative data for monitoring SDZ in waters, a most valuable approach to control and reduce the level of antibiotics in fish tanks, which in turn may reduce the costs of fish production and the environmental concerns linked to this practice. Moreover, the test strip uses a cellulose substrate that has little environmental impact upon discard.

**Keywords:** Test-strip; Sulfadiazine; Cellulose, Colour.

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Mariana C.C.G. Carneiro  
ERCICSTR2011090

**Paper-based colorimetric immunoassay for myoglobin detection using gold nanoparticle enhancement**

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#### Abstract

Fast response, low-cost, low consumption of samples and reagents and possibility of portability makes paper-analytical devices (PADs) an interesting option for protein detection, in alternative to conventional methodologies<sup>1</sup>. Colorimetric transduction is a suitable methodology for PADs, enabling fast and naked-eye results, easily interpreted without the need of trained technicians or sophisticated instruments<sup>2</sup>. Gold nanoparticles (AuNPs) have been widely used as colorimetric probes in these assays, due to their excellent optical properties, including high extinction coefficients<sup>3</sup>.

Thus, this work describes a new colorimetric immunosensor for Myoglobin (Myo) detection, developed in a cellulose substrate. In current work, suitable chemical changes were performed on cellulose substrates to provide the ability to react with the target protein. AuNPs were synthesized by citrate reduction and conjugated with Myo monoclonal antibodies. This complex further recognized Myo, previously immobilized on a cellulose paper disk modified with antibodies. An enhancement solution was employed, comprising chloroauric acid and hydroxylamine to increase the size of the AuNPs, thus providing a colour change that enabled a semi-quantitative result. Pictures of the results were captured by a smartphone camera and RGB (red, green, blue) values were analysed by ImageJ software, allowing a quantitative response. The Green coordinate increased proportionally to Myo concentration, from 0.7 to 700 ng/mL, following the equation  $\text{Green} = -0.0353 \times \log(\text{Myo concentration, ng/mL}) + 0.9974$  (R-squared 0.998). This sensor has the potential to be extended for other target molecules.

**Keywords:** Colorimetric Immunosensor; Myoglobin; Cellulose; Gold Nanoparticles; Naked-Eye Detection

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ERCICSTR2011091

Fluorescent Cellulose Membranes for Direct Myoglobin Detection based on Molecularly Imprinted Polymers

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**Abstract**

A fluorescent cellulose membrane was developed as a rapid test for myoglobin detection in synthetic human serum. The concept is based on molecularly imprinted polymers (MIPs) as recognition elements, previously prepared at the surface of semi-conductor mercaptopropionic cadmium telluride quantum dots CdTeMPA-QDs, as fluorophores. The fluorescent membrane was developed for the specific recognition of the cardiac biomarker myoglobin, without any time-consuming pre-treatments. Furthermore, the membrane was applied to quantify myoglobin in a 1000-fold diluted synthetic human serum. Experimental results showed that the fluorescent membranes showed a linear detection for myoglobin in the interval  $[(7.93 \times 10^{-3} - 2.91 \times 10^{-1}) \text{ ng/ml}]$ , below the cut-off for myocardial infarction  $[(9.52 - 4.71 \times 10^1) \text{ ng/ml}]$ , with a limit of detection of  $7.39 \times 10^{-3} \text{ ng/ml}$  and an imprinting factor  $IF = 1.65$ .

Overall, MIP-QDs display good stability and selectivity towards Myo when compared with the non-imprinted controls, NIP-QDs. The imprinted membranes served as simple and sensitive fluorescent sensors for myoglobin in complex biological samples.

**Keywords:** Myoglobin; Cardiac Biomarker; Quantum Dots; Molecularly Imprinted Polymer; Fluorescent Sensor; Imprinted Cellulose Membrane

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ERCICSTR2011092

TEMPO-Oxidated Microcrystalline Cellulose for Colorimetric Biosensing applications

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**Abstract**

Cellulose is the most abundant biomass material in nature. In this work, microcellulose samples were converted into their oxidized state with different pre-treatments, using catalytic amounts of 2,2,6,6-tetramethylpiperidine-1-oxyl radical (TEMPO), sodium hypochlorite, and potassium bromide in buffer. An increase in the quality of carboxylated crystalline nanocellulose (CNC) samples was observed. For the characterization, we used several methods: TEM, FTIR and conductometric titration.

The oxidized nanocellulose (NC) was layered onto the cellulose test-strips for glucose detection. In detail, glucose oxidase (GOx) was immobilized onto the NC/paper substrate to form a multilayer-modified test-strip. Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) produced by the GOx reacts with the glucose and with the chromogenic reagent [2,2'-Azino-bis(3-ethylbenzothiazoline-6-sulfonic acid)diammonium salt] in order to form a coloured products with (horseradish peroxidase) HRP as catalyst. GOx catalyses the oxidation of glucose to produce H<sub>2</sub>O<sub>2</sub>, then, peroxidase catalyses the oxidation of substrate by H<sub>2</sub>O<sub>2</sub> to produce a blue colour reaction. As a result, NC improved the colour uniformity and intensity of colorimetric biosensing system.

Overall, this sensing system showed gradient colour changes against glucose concentration. The digital images collected by a smartphone were also analysed using Image J. In this, a linear relationship was observed between colour change and glucose concentration, from 0.01 to 10 mM. This simple cellulose-based sensing system may be employed for quick screening of glucose concentration.

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	<p>POCTEP/INTERREG is also acknowledged through the project 2QBioneuro, Impulso de una red de I+i en química biológica para diagnóstico y tratamiento de enfermedades neurológicas.</p>
 <p><b>Eri Kondo</b> ERCICSTR2012058</p>	<p><b>Learning and Memory to Encode, Storage, and Retrieve Information</b></p> <p><b>Eri Kondo</b> English, The Local Government, Nagoya, Japan</p> <p><b>Abstract</b></p> <p>This research is focused on the relation between learning and memory. In general, learning has been investigated in the field of psychology. The aspect of memory has been also examined in the function and role to encode, storage, and retrieve information. It is apparent that there has been questions why information is encoded and retrieved correctly and how information is in storage. It should be noted that behaviorism is dominant to practices of learning on education and that structuralism is prevailing on language acquisitions. However, this presentation has a research hypothesis that learning has a feature to advance the self-awareness of learners. It is the knowledge and information in storage. It surely refers to a distinction with pedagogical issues. The investigation of this study is based on activities and tasks in reading, listening, speaking, and writing. It reveals that language learning might be developed in the awareness. It suggests that instructions and tests in learning should be shifted toward the focus on learner-centeredness.</p>
<p><b>Mohd Akmal Hadi Bin Haidon</b> ERCICSTR2012060</p>	<p><b>Redesigning Trolley Jack to be More Efficient, Convenient and Safe</b></p> <p><b>Mohd Akmal Hadi Bin Haidon</b> Automotive Technology, Keningau Vocational College, Malaysia</p> <p><b>Donny Guntabid</b> Automotive Technology, Keningau Vocational College, Malaysia</p> <p><b>Lasius Gemuru</b> Automotive Technology, Keningau Vocational College, Malaysia</p> <p><b>Niel Solimin</b> Automotive Technology, Keningau Vocational College, Malaysia</p> <p><b>TS. Amirullah Abdul Karim</b> Automotive Technology, Keningau Vocational College, Malaysia</p> <p><b>Dr. Sirhajwan Idek</b> Automotive Technology, Keningau Vocational College, Malaysia</p> <p><b>Abstract</b></p> <p>This research examined the efficiency of a specifically modified trolley jack in extracting car components particularly gearbox and transferring these components to a specific workspace. This project was built to minimize physical workload, reduce time taken to perform this task and mitigate health and safety risks. There were 20 respondents involved in this study and they were required to test the project before completing observation checklists and questionnaires. The findings revealed that the students had strong approval on each function and feature of the project. There were few recommendations on how the project could be improved to be safer and more efficient.</p> <p><b>Keywords:</b> Trolley Jack, Gearbox, Hydraulic Jack, Plate Surface</p>
<p><b>Harish Annangi</b> ERCICSTR2012063</p>	<p><b>Cloud Computing</b></p> <p><b>Harish Annangi</b> Computer Science Engineering, NBKR Institute of Science and Technology, Nellore, India</p> <p><b>Abstract</b></p> <p>Cloud computing has come of age since Amazon's rollout of the first of its kind of cloud services in 2006. It is particularly relevant to Hong Kong because of the tremendous amounts of data that are being processed here daily in various sectors, and there are signs that subscription to cloud services by the local companies will soon be on a skyrocket course, despite a slow start in previous years. As a research theme, cloud computing now easily tops any list of topics in computer science because of its</p>

far reaching implications in many areas in computing, especially big data which without cloud computing is at best a concept. Alibaba's jump in 2014 FQ on the bandwagon (www.aliyun.com), as well as the recent establishment of one of its data centers in Hong Kong, signified the beginning of a new era in cloud computing where not just the scale, but also every other single aspect in a cloud service will meet with much elevated complexities. Hong Kong is poised to play a role in the advancement of cloud computing technologies because of its track record in networking, and recently cloud, research. The recent establishment of a major cloud R&D center in Hong Kong by Lenovo (January 2015) attests to this fact. Researchers in various local institutions already have an active agenda of important and significant problems for which they would like to seek the best and optimized solutions. We believe solving these problems will create a spot for Hong Kong in the world map of cloud computing research. The results will also benefit Hong Kong as the reliance on cloud computing services is rapidly increasing. This brief talk will outline some of the concerns pertaining to the further development.



Yekambaram  
Rentamallu  
ERCICSTR2012064

#### IoT for Smart Learning/Education

Yekambaram Rentamallu

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#### Abstract

When IoT is implementing in the learning sector, the main reason is the IoT enhances the learning itself and gives advance values to the environment and design. An IoT platform is a framework of end-to-end software. It is the glue, and it helps to move together information from devices, networks, sensors, and software that work together to actionable data and unlock valuable data. It provides a service to manage and collect data for defining the business rules to enable visualization and analytics. In recent days, a child also using a computer as part of her education because education defines a process of knowledge gaining. So, that IoT devices using everywhere in recent days. IoT in education will lead to citizens, and then it leads to smart environments or cities. The IoT will change the education meaning, and then the data won't be limited because the multiple learning data occurs in any place at any time by the experts is available. In recent IoT is using many industries such as teaching, travel, finance or telecommunications, and so on. In the IoT education sector, the technology of IoT is used as a smart classroom. The technology of IoT provides security systems and lockdown protocols and wireless door locks. The smart classroom has a student ID cards, interactive whiteboards, environment sensors, temperature, and automatic attendance tracking system. The IoT has so many issues during it connects on the internet. Network security and privacy is the major drawback of IoT devices. IoT using an education application from everywhere and anywhere. So, we recommend protecting the device securely. The education elements have to make the environment as intelligent by analyzing smart technologies. The enhancement of the IoT education different frameworks must be proposes. Smart education emphasizes a belief system for giving a better education via digital media. The people are talking about the digital environment, and to improve smart cities, introducing IoT in education is one way. IoT in education is key for the advantage of students and also for creating the globe developed in both rural areas and urban areas.

Keywords - Networks, Sensors, Software, Student ID cards, Automatic Attendance Tracking system, Interactive Whiteboards, Environment Sensors, Temperature.

Sasikanth Reddy  
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ERCICSTR2012066

#### Exploring the Cyber- Attacks to Blockchain and Edge Systems with Possible Solutions. A Systematic Overview

Sasikanth Reddy Mandati

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#### Abstract

Blockchain is the latest technology to manage digital transaction efficiently. It becomes like immutable ledger in providing the transaction in a decentralized manner. These promptly evolving technologies improve the digital transaction in new way in many sectors like supply chain, internet of things, health care, manufacturing and cyber security. Blockchain enabled technology has the issues like scalability, security, privacy, compliance and governance related issues. They lack a powerful security of blockchain system. In this paper we explore the systematic survey of security attacks on blockchain and edge system. There are various kinds of attacks possible including domain name system attack (DNS), denial of service attack and privacy attacks. Edge computing can offer real-time data computation without latency. It enables faster processing, faster responsiveness and

	<p>smaller network traffic. These security threats can pose a significant challenges in the functionality of the blockchain as well as edge computing. At the end we outline the issues with possible solution to address the issues described in the following section (Nidhee Rathod, 2018).</p>
<p>Mustafa Shuaieb Sabri ERCICSTR2012068</p>	<p style="text-align: center;"><b>Bitcoin and Blockchain in Information Technology</b></p> <p style="text-align: center;">Mustafa Shuaieb Sabri Information Assurance, Java Developer, Wilmington University, Virginia, USA</p> <p style="text-align: center;"><b>Abstract</b></p> <p>In recent days, the technologies referred to as Blockchain and Bitcoin have gained much interest from society. These activities are increasing relevancy in the era of digitization and which forms a digital economy in the United States and all over the world. Currently, the automation of IT has deployed the use of technology atomization process through robotics hence machine production, the development of the framework of artificial intelligence, the Blockchain, and Bitcoin referred to as the open systems, the concepts of big data, algorithms of software, and the neural networks. In the implementation of enterprise, it is not easy to access the possibilities of assessing adequately and the consequences, which includes the opportunities of a qualitative change. In the last century, the invention of the essential ingredients that are key in the cryptography and its use in the hash functions have been underway and have also included the sensitivities that will enable Blockchain and Bitcoin to be successful. In recent years, technology has become available for the systems of payment, and other applications that revolve around bold issues, and the contracts are smart. The essay will discuss the automation trends and consequences of Blockchain and Bitcoin in the various sectors of the economy, including the industries. The paper will also comment on the analogies associated with the payments that may lead to a deeper understanding of the properties of Blockchain and Bitcoin.</p>
<p>Ibrahim Ali Mohammed ERCICSTR2012069</p>	<p style="text-align: center;"><b>Risk Management</b></p> <p style="text-align: center;">Ibrahim Ali Mohammed Information Technology, NewYork University, Ontario, Canada</p> <p style="text-align: center;"><b>Abstract</b></p> <p>Risk management in information technology is the research problem in my essay. Research has shown that business risks related to information technology risk management can be considered and adopted within an organization or enterprise. The study has been demonstrated that some organizations have a well-laid enterprise risk management set out. In this case, therefore, risk management is seen as part of enterprise risk management. The study will also further expound on the risk management methodology, which constitutes a generic framework. The framework must, therefore, be considered as a risk management exercise. Based on a review of literature, the risk management procedure has taken into account risk assessment that ENISA has over time, reviewed the process to parameterize the entire risk management process. Risk identification states that there can be potential losses when threats, assets vulnerabilities, consequences, and related business processes are not considered. Therefore risk management in information technology must revolve around integrating risk management through the system development life cycle. The process cannot be termed as complete if risk management methods are not considered. In 2006, the threat sketch started a cybersecurity risk assessment that targeted small companies. In this study, the methodology uses real options, to prioritize and forecast a list of fixed high-level threats.</p>



Sena Yaw Atsyo  
YRSICSTR2012051

**A Review of Some Physical and Mechanical Properties of Cassava Related to Harvesting and Processing Machines**

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**Abstract**

For many years now, harvesting of cassava is difficult because there has not been a well-designed machine to harvest, separate and convey the crop in one-time operation. This means that harvesting of the crop is labour intensive and partially mechanized. In all the unit operations in cassava production, several machines and types of equipment have been mechanized successfully. However, cassava harvesting and peeling have remained a serious global challenge to engineers involved in machine design.

In light of this, some pieces of literature on the physical and mechanical properties of cassava were reviewed and the study parameters were highlighted qualitatively. This review also presents the harvesting methods for cassava around the globe, considering its merits and limitations for future development.

We found out that cutting shear stress and force increased with increasing cassava tuber age because of an increase in density and starch content. Additionally, the proportion of peel in cassava roots ranges from 0.106 to 0.215. The frictional properties of cassava are essential in the design and development of machines for post-harvest operations of cassava roots. Furthermore, the angle of repose of unpeeled cassava is required for the design of the hopper and that of the peeled is required for the design of the chute. In terms of capacity, manual, semi-manual and fully mechanised harvesting options require about 22-51 man h/ha, 16-45 man h/ha and 1-4 man h/ha respectively. The fully mechanized method is very efficient, and the field is ploughed alongside harvesting which saves time, fuel and cost of operation.

Even though less research is carried out on cassava harvesting mechanization compared to other crops, the current development is a harvesting machine hitched to a tractor with a conveyor unit powered by the PTO system. The knowledge of this review would be a blueprint for engineers in designing cassava mechanical harvesters.

**Keywords:** Machine design, Mechanical harvester, Literature review, Morphology of cassava, Engineering properties



Aye Min Tun  
ERCICSTR2013056

**Ore Reserve Estimation by Using A Geostatistical Tool at Heinda Mine, Tanintharyi Region, Union of Myanmar**

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**Abstract**

Heinda mine is one of major tin producers in Myanmar. The mine has been operated for over 100 years. The mine falls at Latitude 14° 8' N and Longitude 98° 27' E, approximately about 45 kilometers to the east of Dawei. The ore reserve is the principal factor of mining venture. The aim of this study is to improve the ore reserve estimation using geostatistical method (ordinary kriging). In geostatistical evaluation, it involved variogram analysis, variogram modelling and kriging estimation. The exponential variogram modelling was used to calculate the ordinary kriging estimation. The result of ore reserve estimation by using estimated samples of ordinary kriging indicates about 81,192 tons ((SnO<sub>2</sub>) of mineable reserve at Heinda mine. It has been shown that geostatistical method (ordinary kriging) may improve the accuracy of grade distribution and the ore reserve estimation for the better mining development and future's plans.

**Keywords:** Alluvial tin, Variogram, Ordinary kriging, Ore reserve



Dr. Collins O Chijioke  
ERCICSTR2013066

**A Comparative Evaluation of the Effect of the Outbreak of Covid-19 on Selected Legal Rights in Nigeria**

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**Abstract**

The Worst calamity that has hit the World since the Second World War is the recent outbreak of Corona Virus, otherwise tagged Covid-19; which pandemic catastrophic effects made the World Health Organization to declare it a global emergency. This disastrous infectious respiratory disease broke out in Wuhan, China in December 2019 and has spread across the globe resulting in so many people being infected and so many unprecedented deaths; as it has defied any known clinical vaccine and drugs. The effect of the pandemic is felt on all the spheres of human life ranging from the health sector to migration, food and agriculture, international commerce, environment, education and legal rights of citizens to mention but a few.



Nay Zaw Htay Win  
ERCICSTR2013068

**The Effectiveness of Physical Separation Process for the Alluvial Tin (Heinda) Ore, Myanmar**

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**Abstract**

Mineral beneficiation is a process by which valuable constituents of an ore are concentrated by means of a physical separation process. In the present investigation, tin ore sample were collected from the Heinda tin mine, Thanintharyi region, Myanmar. Heinda mine is tin placer deposits which is located about 50 Km east of Dawei, Tanintharyi, Myanmar. The mine can be reached by road from Poo Nam Ron check point, Kanchanaburi Province, Thailand. In this study, particle size analysis (PSD) was carried out over the range of - 6.7 mm and +0.075 mm in 9 different mesh sizes. The operating variables used to determine the recovery effectiveness of jigging and shaking table include; particle size, stroke, table slope and dilution ratio, then the percent recovery of tin concentrate was evaluated by applying X-ray fluorescence (XRF). The results shown that tin mineral concentrate of jig separator is 70.7% and shaking table is 49.8%. The cassiterite recovery processes was conducted by using the discounted cash flow model (DCF) in order to economic analysis of the project.



Esaduwha Stanley  
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ERCICSTR2016063

### Speed Sensor Study Using A Single Fiber Bragg Grating (FBG)

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#### Abstract

Optical Fiber Sensors (OFS) based on Fiber Bragg Grating (FBG) technology possess several advantages such as sensitivity, reliability, low intrusively, galvanic insulation, as well as the ability to provide quasi-distributed remote measurements. FBGs are extensively employed in optical sensing and can compete favourably with traditional electrical strain gauges. In this research, speed sensor using a single Fiber Bragg Grating has been studied. The study was conducted using an Optical Spectrum Analyzer (OSA) and a 1300nm Super Luminescent Diode (SLD). The experiment resulted in the bending of the FBG. In this experiment, the FBG was located inside a wind tunnel. An increasing bending of the FBG was noticed as the speed and pressure in the tunnel increased from 7.22 to 27.25 m/s and 31.90 to 450.80 Pa respectively. The Bragg wavelength shift also increased with speed and pressure. The measured sensitivities were 0.0058nm/ms<sup>-1</sup> for speed and 0.0463 ms<sup>-1</sup>(-1)/Pa for wind pressure. The sensitivity measurements are very important especially when FBG is to be applied as a sensing system. As such, the FBG in question can be used as a strain sensor, wind pressure sensor and wind speed sensor.

**Keywords:** Fiber Bragg Grating (FBG), speed sensor, wind tunnel, sensitivity

Michael Brazley  
ERCICSTR2015060

### Learning Technology in Urban Planning and Architecture

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#### Abstract

Virtual Reality (VR) is the most current generation of learning technology for most design professions. VR is being used in professional offices and taught in Schools of Architecture, interior design and Fashion Design & Merchandising, now. The research questions being asked are: How can Virtual Reality assist students in learning; is developing VR instruction a good educational experience; and which study prototype do students prefer, a physical or virtual model? This research proves that virtual reality is the technology of choice for current and future generations of learners and researchers.

**Keywords:** Virtual Reality, Architectural Education, Fashion Design & Merchandising (FDM)

Arturas Kaklauskas  
ERCICSTR2015062

### Affect-Based, Multimodal, Video Tutoring System for a Neuromarketing

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#### Abstract

Considerable research has been conducted globally showing how study results are substantially conditional to the interest and productivity of a learner in the studies and the emotions and stress the learner experiences. Scholars emphasize that learning should be pleasing, enticing, and emotionally positive leading to increased effectiveness of the studying. Tests were conducted regarding the effectiveness of the MSc Property management studies process among students. Development of the ARTSY Model involved five iterative phases over the course of the research. ARTSY Model,

	<p>intelligent and physiological technologies that had served as the basis for developing the Affect-based, Multimodal, Video Tutoring System for a Neuromarketing (ARTSY) were applied for this research. ARTSY analyses the interest students have in learning, their productivity, emotions and stress levels. Upon a comparison with the most advanced, existing affective tutoring systems, there are two innovative elements distinguishing ARTSY. First, automatic means develop and select the most effective variants from thousands of textual and video learning material alternatives by considering learner interest, productivity and stress levels. Secondly, exams or tests are unnecessary for assessing student knowledge levels by employing the newly developed Calculating a Student's Self-assessment Grade.</p> <p><b>Keywords:</b> Neuromarketing, Tutoring system, Affect-based, Multimodal</p>
<p>Zongren Zhang ERCICSTR2017057</p>	<p><b>Tunable Broadband All-Dielectric Perfect Absorber Based on Phase Change Material</b></p> <p>Zongren Zhang Mary Institute and Country Day School, High School Student, St. Louis, Missouri</p> <p><b>Abstract</b> This work reported a polarization-independent, all-dielectric perfect absorber based on phase-change material. Broadband (in the wavelength range of 400-1000 nm) absorption of higher than 90% has been realized in our designed absorber. Moreover, absorption bandwidth and absorptivity can be tuned via structural parameters (such as the period, height and radius of nanopillars, the thicknesses of TiO<sub>2</sub> and bottom GeTe films) and phase-change process. The underlying physical mechanism of the absorber is analyzed in detail. The proposed all-dielectric perfect absorber has potential applications in solar energy harvesting.</p> <p><b>Keywords:</b> Perfect absorber, amorphous state, crystalline state, absorption spectra</p>
<p>Thomas Varelas ERCICSTR2018053</p>	<p><b>AR anchor based indoor positioning system</b></p> <p>Thomas Varelas Information Technologies Institute, Centre for Research &amp; Technology Hellas, Thessaloniki, Greece</p> <p><b>Abstract</b> Indoor navigation is a very interesting scientific domain due to its potential use compared with the GPS signals, which are restricted to outdoor environments. This paper describes common used methods of Indoor navigation, positioning and mapping systems using Augmented Reality (AR) techniques. The most notable options are discussed and a new method of positioning is proposed. Concepts like AR Frameworks, anchors and AR reference points are deeply discussed. An anchor, in the context of AR, is a point selected by a user in a 3D environment. Anchors are a crucial feature of AR Frameworks and used to enhance the user experience. An Indoor navigation system, which is based on an AR application, is a pipelined procedure, which is consisted of three modules. Those are the positioning system, the map and the route planning algorithms. In this paper emphasis is placed on the positioning system module and the creation of the map. The proposed method for position tracking does not require any special hardware or component other than a smartphone with a camera. The proposed method for the map creation is an enhanced version of an existing method of the ARKit framework. Finally, the paper reports the results of the proposed methods using different route planning algorithms.</p>
<p>Yulun Wu ERCICSTR2019057</p>	<p><b>Machine Learning Classification of Stars, Galaxies, and Quasars</b></p> <p>Yulun Wu 11th Grade High School, Northfield Mount Hermon School, Irvine, United States</p> <p><b>Abstract</b> The objective of this study is to create a predictive model to classify stars, galaxies, and quasars. A subsequent objective is to compare and construct different classification models and find the superior one. I hypothesize that it is possible to successfully train a machine learning model to classify stars, galaxies, and quasars using astronomical data provided by the Sloan Digital Sky Survey (SDSS). The data used is the data release 14 of SDSS. After variable selection and exploratory data analysis (EDA), the remaining 6 independent feature variables (u, g, r, i, z, and redshift) and 1 dependent class variable are standardized using MinMax scaler and split into 80% training and 20% testing samples. A multinomial logistic regression model is first trained and tested, and the classification report and confusion matrix heatmap of the model is created. Next, a decision</p>



tree model is trained and tested using different samples, and the classification report and confusion of this model are similarly created. The feature variables of u, g, and i appear to have high correlations of 0.96 and above with each other. The dataset and feature variables do not follow normal distributions. There are 4152 stars, 4998 galaxies, and 850 quasars in the dataset. The multinomial logistic regression model has an accuracy of 0.87, weighted average precision, recall, and an f-1 score of 0.87, and a cross-validation accuracy score of 0.8664. During data analysis, a convergence warning of max iterations reaching a limit appears for the logistic regression model. The decision tree model, on the other hand, has an accuracy of 0.99, weighted average precision, recall, and an f-1 score of 0.87, a cross-validation accuracy score of 0.99, and a cross-validation accuracy score of 0.9858. The decision tree model has significantly superior performance compared to the logistic regression model and is an extremely well fit and accurate classifier for stars, galaxies, and quasars. Therefore, my hypothesis of being able to successfully train a machine learning model for the classification of celestial objects using SDSS data is proven to be correct. The decision tree model created in this study can be used as a very competent and reliable classification tool in all astronomical purposes with the need for classifying stars, galaxies, and quasars, potentially being able to allow astronomers to increase the sample sizes of stars, galaxies, and particularly quasars with great speed and accuracy. Some future improvements would be to train and compare more machine learning models and to fix the convergence warning for the logistic regression model.  
Keywords: Multinomial Logistic Regression, Decision Tree, Accuracy, Precision, Recall, F1-Score, Cross-Validation

Thanika Promchai  
ERCICSTR2019058

**Flavonoids and Flavonoid Glycosides from the Leaves of Anomianthus Dulcis**

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**Abstract**

The phytochemical investigation of the methanolic crude extract from the leaves of *Anomianthus dulcis* (Dunal) L. Sinclair (synonym *Uvaria dulcis*) led to the isolation of flavonoid derivatives including (+)-pinocembrin (1), ( $\pm$ )-7-O-methylchamanetin (2), (+)-pinostrobin (3), chrysin (4), kaempferol 3-O-(6''-O- $\alpha$ -rhamnopyranosyl- $\beta$ -galactopyranoside) (5), kaempferol 3-O-rutinoside (6), quercetin 3-O-rutinoside (7) and quercetin 3-O-(6''-O- $\alpha$ -rhamnopyranosyl- $\beta$ -galactopyranoside) (8). The structures of all isolated compounds were elucidated using spectroscopic techniques (1D and 2D NMR). Compounds 5-8 were the first report of the isolation from this plant. All compounds were tested their biological activities against *Plasmodium falciparum* (TM4/8.2 and K1CB1) and epidermoid carcinoma of oral cavity (KB).

**Keywords**

*Anomianthus dulcis* (Dunal) L. Sinclair, Flavonoid, Flavonoid Glycoside, *Plasmodium Falciparum*, Epidermoid Carcinoma of Oral Cavity

Mei-Ling Fang  
ERCICSTR2024052

Study on the separation of phycoerythrin from Pteridophyte by High Performance Liquid Chromatography (HPLC)

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Abstract

In this study, we tried to use HPLC and a liquid separator to separate the crude ethanolic fern extract of Fern algae, and to obtain a high-purity fern phycoerythrin by small batches. Small space and reduced operator workload. In the study, 4.9kg of fern algae were freeze-dried at -30 ° C for 72 hours, and 95% ethanol was used as an extraction solvent. After ultrasonic extraction, filtration, and concentration under reduced pressure, 116 g of total fern algae extracts (extraction Rate is about 0.317%). Finally, the phycoerythrin was separated and purified by a HPLC separator, and the phycoerythrin with a purity of 99% was obtained. In order to further confirm that the purified phycoerythrin molecular structure is consistent with the structure of phycoerythrin standards, analysis was performed by NMR and FT-IR. 1. On NMR analysis, it was confirmed that  $\delta$ 7 to 9 PPM was aromatic. Existence of hydrocarbons and isoaromatic hydrocarbons; 2. It was confirmed by FT-IR analysis that 1600 cm<sup>-1</sup> to 1700 cm<sup>-1</sup> had aromatic systems combined with carbonyl functional groups, and both results were in accordance with the structure of fern phycoerythrin.

**Keywords:** Caulerpa Racemose, Caulerpa Lentillifera, Caulerpin, Marine Drugs

Ko-Yuan Liang  
ERCICSTR2024053

Separation of the caulerpin from Caulerpa racemose by using the simulated moving bed (SMB)

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**Abstract**

Caulerpin are anti-inflammatory, anti-tumor, anti-tuberculosis, and plant growth regulating. There are many methods for purifying Caulerpin, such as batch chromatography or high-speed countercurrent chromatography. However, it is the disadvantage that usually need a large amount of solvent or a toxic organic solvent. Simulated moving bed (SMB) is a continuous chromatography device. It was used in the separation of glucose and fructose in the early days. Until recently, it has been used in medicine and protein purification and separation technology in biotechnology. Because the design of the simulated moving bed is complicated and the operating conditions are not easy to set, a mathematical model is needed for preliminary evaluation. Triangular theory can be used to estimate the volumetric flow rate of each zone and switching time of the SMB. Therefore, the porosity ( $\epsilon$ ) and the Henry constants ( $K_A$  and  $K_B$ ) of a single column of SMB must be surveyed before separation Caulerpin from the extract of Caulerpa racemose that is Ultrasonic extraction by ethanol. It is the purity of the extracting Caulerpin can reach 96% with the column of SMB is packing with Welch Ultimate AQ-C18 and size is ID10 mm x 250 mm. The best Operating conditions is Desorbent 7.5 mL / min; Feed 0.3 mL / min; Extract 4.4 mL / min; Raffinate 3.4 mL / min and a switching time 4.25 minutes. Caulerpin was purified in simulated moving bed by 96% in this study. In addition to estimating the operating conditions of the SMB, the triangle theory can also obtain operating parameters and large-scale equipment conditions.

**Keywords:** Caulerpa Racemose, Caulerpa Lentillifera, Caulerpin, Marine Drugs, Simulated Moving Bed

**Kholil Kholil**  
ERCICSTR2024061

**Trigona Honey Business Model for the Economic Recovery of the Community Post Earthquake in the Time of Covid 19 Pandemic (A Case Study in North Lombok West Nusa Tenggara, Indonesia)**

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**Abstract**

Since the devastating July 2018 earthquake, most of the people of North Lombok have experienced economic pressure due to damaged economic facilities and infrastructure. Economic pressure is getting heavier in the era of the Covid 19 pandemic which has been 8 months. In order to economic recovery of the people, local natural resources based home industry development has been proven to be able to mobilize the community economy massively. Before the earthquake, the trigona honey home industry had developed widely in the North Lombok region and became the main productive activity for most people to support their economic family, but most of their activities stopped or did not develop due to earthquake. In terms of health, trigona honey has many benefits to increase human immunity especially in dealing with Covid 19. So the demand for trigona honey in this pandemic season continues to increase. This research aims to analyze the trigona honey business model, to make the local government easier for intervening the policies to increase business scale and community income, using the SAST (Strategic Assumption Surfacing and Testing) method. The results showed that the availability of superior trigone bee seeds and cultivation techniques were the most important and strategic factors in the development of trigone honey business. Trigona honey business actors sell their product through collectors in their village then collectors sell to companies, and the collectors' profits are much higher than business owners. Therefore, it is necessary to develop a business model that provides fair benefits for business actors.

**Keyword :** Trigona Honey, Home Industry, Collector, Sustainable

Mohamed Nakd  
ERCICSTR2025053

**A Comparison between the Spatial Considerations of Technologies in Standard and Hybrid Operating Rooms**

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**Abstract**

The spatial considerations of operating rooms (ORs) are evolving frequently to keep pace with the scientific development of surgical procedures. The study utilizes a comparative approach to specify the differences between the dimensional and spatial considerations of equipping standard ORs that introduced significant technological improvements and hybrid ORs that integrate developed imaging equipment within the surgical environment. For example, operating tables offer a wide range of tilting angles and a radiolucent surface to pass-through x-rays in the hybrid OR, while the articulating arms of ceiling-mounted booms need enough space to move freely within the OR and suitable load capacity to hold various medical utilities. On the other hand, devices such as anesthesia and heart-lung machines are placed near the patient to provide the required medical support, while imaging equipment in hybrid ORs such as the C-arm require specific spatial considerations for ergonomic workflows. Ultimately, spatial considerations of hybrid ORs are similar to standard ORs with unique intraoperative imaging technologies.

**Keywords:** Operating Rooms, Hybrid Operating Rooms, Surgical Equipment, Spatial Requirements

Serap Zel  
ERCICSTR2020065

**Success Factors in Design and Implementation of Virtual Reality Technology**

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**Abstract**

Virtual reality (VR) is a computer-generated environment that creates a simulated experience for users. VR technology is used as an effective training tool, especially for teaching potentially dangerous and/or difficult-to-create scenarios in real-life. Despite the vast literature that shows the positive impact of VR training on the learners' performance and experience, studies that investigate the criteria for the selection of appropriate VR technology are quite limited. This paper proposes key decision criteria in selecting and investing in the right VR technology to create the best possible learning outcome. Ease of installation and user experience are identified as the most influential factors affecting the successful implementation of VR technology.

**Keywords :** Technology Selection, User Training, Virtual Reality

Shweta Pandey  
ERCICSTR2020069

**A Secure And Managed Cloud Storage System Using Encryption With Machine Learning Approach**

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**Abstract**

**Background:** Cloud storage platform is a promising architecture provided by the Cloud Service providers to their users to keep and access data or resources on-demand basis through the internet. The large stored database required better management compared to locally stored data. Migration or duplication of memory has been used by the cloud storage providers to save bandwidth and for large data storage. However, the use of these services raises many doubts and concerns about the security, confidentiality, reliability and integrity of users' data and information. Therefore, the security of stored data becomes a great challenge.

**Objective:** To overcome security problem, a secure cloud storage model is proposed using encryption in combination with a machine learning approach. This research aims to improve the efficiency of search process for the stored text documents in the cloud by using machine learning techniques. Because the cloud is based on a per-user payment model, it will take longer to retrieve the required document, which will be the financial burden for the cloud users, and hence affects the satisfaction level of cloud user. This is the major point, where presented research comes to play.

**Methodology:** The proposed work is takes advantage of multi layered neural network architecture for secure cloud storage system along with the involvement of encryption and similarity approaches. Here, similarity check is performed with Cosine Similarity algorithm while encryption check engrosses AES and DSA approaches. Simulation analysis to offer secure cloud platform are performed using cloudsim simulator.

**Research Outcomes:** Experimentation was performed against 700 text documents to evaluate the proposed work to offer secure cloud storage. The performance is evaluated in terms of precision, recall, f-measure and accuracy with an average accuracy of 93%.

**Conclusion and future scope:** Simulation results had demonstrated that the designed algorithm proved to offer data storage in cloud computing environment with high end security. In future, authors aims to involve some deep learning approaches to improve the text mining capabilities using cloud storage without challenging data security.

**Keywords:** Cloud Computing, Cloud Storage, Security, Encryption, Similarity measure, Classification

Reema Jain  
ERCICSTR2020071

**Review of EMG Signal Classification Approaches based on Various Feature Domains**

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**Abstract**

**Background:** Electromyography (EMG) is a widely used analytical practice that relays the health-status of the muscles or the nerve cells by monitoring their electrical impulses. However, it inherits poor signal-to-noise ratio in addition to occasional signal distortions that significantly challenges the efficacy of this technique. Therefore, since the advent of this technology, numerous researchers have dedicated their study to improve the signal quality by reducing inherent noise in addition to offering its automated classification.

**Objective:** In the present work, authors have presented an overview of various existing researches in the field of electro-myographic signals classification involving various state-of-art techniques.

**Methodology:** A comprehensive survey has been provided while discussing the EMG signal analytic techniques involving different domains along with their performance. In the process, research not published before 2010 in various authenticated sources, such as Elsevier, PubMed, Springer, IEEE

and other articles and reports that are under coverage of Web of Science and Google Scholar were analyses.  
**Outcomes:** The review examined the suitability of various existing techniques to empower healthcare sector based on interpretation of EMG signal. Detailed comparison of nature inspired approaches for segmentation is also involved while comparing their demonstrated accuracies. Further, time domain is also found to be more preferred as compared to frequency domain for signal evaluation.  
**Conclusion:** Authors tried to provide an excellent understanding and evolution of the existing EMG signal classification techniques to guide for more influential, efficient and flexible applications in the future.  
**Keywords:** Electromyography (EMG), Myopathy, Muscular diseases, Feature Domains, Signal Classification.



Michael Brazley  
ERCICSTR2026054

**On-Line Technology Educating Architectural Students**

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**Abstract**

What is the next generation of learning technology, the cellphone, your watch, or your glasses? This research seeks to explore ways people learn with on-line technology. The research question being asked is: How can on-line technology properly assist students in learning? This study will investigate using on-line technology for the teaching/learning process, as well as assessment. The methodologies used in this research includes both quantitative and qualitative: literature review, case studies, interviews and surveying students. It is understood that environment and culture contributes to the development of cognition. Critical pedagogical and constructivist theories ground this research with the view ‘that one learns from their experiences with their environment’. What is the learning environment of today’s students – technology! Colleges are experiencing declining enrollment. The majority of Universities state that on-line education is a significant element of their long-term plans. Most students have no choice but to take online courses. Online classes are here for good and will continue to increase in volume. It is known that every profession (and everyone) has their own learning style(s). On-line learning for architectural students includes visual and real world contexts, followed by verbal information for best results. Interaction between teacher and student, real world problems, and making their own decisions about learning, gives students the most satisfaction with on-line learning. With the presents of Desire2Learn (D2L), Zoom, new apps and software tools, on-line learning has become a major force in today’s educational systems, both high school and college. The outcome of this research is a better understanding of how students learn best, with the use of on-line technology.

Haifeng Ding  
ERCICSTR2027057

**Theoretical prediction of various collision results between primordial black holes and the Earth**

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**Abstract**

Contemporarily, convincing evidence is lacking for the existence of microscopic black holes due to their small masses. A specific situation is discussed that a microscopic black hole , with a mass of up to 10<sup>12</sup> kg in particular, flies towards the Earth. Two conditions are analyzed, one in which the black hole is scattered off by the Earth and the other in which the impact parameter is small enough for it to smash onto the surface of the Earth. The classical impact parameter of black holes is defined as the perpendicular distance between the path of the black hole and the earth in the Earth's rest frame. According to the theoretical analysis, the Earth's surface will be tidally disrupted if black hole’s closest approach to the Earth is smaller than certain threshold, which is very close to the Earth radius, or initial velocity of black holes (in Earth’s rest frame) is lower than critical velocity (as a function of given impact parameter). Therefore, even if it flies near the Earth, it is difficult to find their existence unless it smashes onto the Earth.

**Keywords:** Mini Black-Holes; Primordial Black Holes; Earth Encounter.

Yujin Choi  
ERCICSTR2027062

**A study on interaction latency in AR-based collaborative system**

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**Abstract**

Recently, the use of remote collaborative systems is increased due to the worldwide pandemic of COVID-19. Video conferencing solutions, which have been used as remote collaboration systems, have limitations in immersion and work efficiency. To overcome it, research to apply virtual reality (VR) or augmented reality (AR) to remote collaborative systems has been recently conducted. In those system, the following latencies may occur: rendering latency, measurement latency, network latency or etc. These latencies can impair both user's interaction satisfaction and work efficiency. Therefore, in this paper, we analyze the effect of latency on interaction for an AR- based collaborative system. Experiments with respect to various latencies are conducted and quantitative factors (such as completion time and distance to target) are measured. In experiment 1, latency effect of 0ms to 200ms (with 50ms increased) was examined. As a result, no significant latency effect was found under the latency condition of experiment 1. In experiment 2, latency effect of 0ms to 800ms (with 200ms increased) was examined. As a result, significant difference was found in the completion time(800ms) and distance to target(600ms, 800ms) under the latency condition of experiment 2. From the results, it was confirmed that latency in AR-based collaborative system should be lower than 600ms. This paper has a meaningful significance that it provided a guide about latency to researchers and developers of AR-based collaborative system.

**Keywords: Augmented Reality, Collaborative System, Latency, Interaction**

Sarah Levrey  
ERCICSTR2029056

**Exergetic Optimisation of a Hydrogen Chain Operated in Cogeneration – Application for the MYRTE Platform**

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**Abstract**

Located in Ajaccio, the MYRTE platform generates power from solar energy. Part of generated power by photovoltaic panels is fed into the national grid while the surplus is stored in the form of hydrogen. Due to the diversity of energy produced (power, heat, hydrogen) several operating scenarios can be considered such as the cogeneration or trigeneration. In order to better assess these possibilities, the thesis aims to develop an exergetic approach for comparing and optimizing the use of these different energy forms.

The first objective is to consolidate existing static and dynamic characterization of each platform subsystem. The aim is to model exergy destruction and losses of each unitary operation in order to minimize them. The first and second laws of the thermodynamics must be taken into accounts. The higher heating value of hydrogen usually used, will be replaced by the exergetic value.

The second axis aims to improve the strategic algorithms of operational management on the basis of

the reliable knowledge of the subsystem behavior. An Energy Management System (EMS) will be developed to allow an analysis of thermal potential and the electrical constraints of the platform. This EMS will also optimize the State of Charge (SoC) of hydrogen over several days. Thirdly, various operating scenarios will be studied in order to find the best case for which the value addition of such a system (photovoltaic-hydrogen chain) is highest from a technical and economic point of view (multi-criteria optimization). After reviewed the literature on possible stationary application and existing exergetic analysis methods, the first step is to model the heat recovery subsystem in different operating modes. This will allow to determine the required modifications to the system. Secondly, the exergetic approach will be carried out for each unitary operation in order to develop the EMS. Finally, the technical-economic balance will be draw up as well as the multi-purposes optimization. Finally, the ultimate objective is to demonstrate the technical and economic viability of a hybrid renewable energy- hydrogen chain system that can be used for multiples purposes in order to promote the use of renewable energy and achieve the goals of the energy transition.

**Keywords:** Energy, Hydrogen, Supply Chain, optimization



**Bassant Abdelrahman**  
ERCICSTR2030053

**Public Acceptance of Grey Water Reuse: A Case Study & Analysis in the UAE**

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**Abstract**

Fresh water is considered a limited resource in the United Arab Emirates (UAE), with full reliance on ground water and desalinated saline water. Grey water reuse has been investigated as a solution to reduce the demand for potable water and to provide an alternative water resource. However, public perceptions and acceptance of treated wastewater is a significant factor for adopting grey water reuse on a wide domestic scale. This study aims to investigate the factors influencing public acceptance of grey water reuse. A stated preference survey is designed and distributed in the different Emirates of the UAE. The results of the study suggest that there is still lack of awareness in the perception of fresh water availability among residents in the UAE. Moreover, 70 % of the surveyed sample agreed to use treated grey water in applications not involving direct contact. Factors influencing public acceptance were found to be health risks concerns, lack of confidence in the water quality, lack in scientific knowledge about the treatment process and the potential uses of treated grey water. The results of this study demonstrate potential for the public acceptance of grey water reuse, thus, its implementation in the UAE.

**Keywords:** Grey Water, Reuse, Sustainability, Social Perception

**Alaa Kamel**  
ERCICSTR2030056

**Effectiveness of Reject Brine in Removal of Phosphorus from Wastewater**

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**Abstract**

The constant increase in the world's population and water demand accompanied by the drastic decrease in clean water resources have made it necessary to finding alternative water sources. While desalination of sea and underground brackish waters is an effective process to fulfill the increasingly growing gap between supply and demand of potable water, the production of concentrated reject brine as a by-product of the desalination process is of environmental concern. Although the reject is considered harmful to the environment, it contains some useful minerals like magnesium. Similarly, wastewater (particularly centrate) contains valuable nutrients, such as phosphorus, that can potentially be recovered. Phosphorus is a vital nutrient utilized in multiple industries; however, its natural resources are diminishing extensively and therefore finding new sources is significant. While the recovery of phosphorus from centrate as struvite (magnesium ammonium phosphate) is well established, high operational cost due to the need for an external magnesium source is a deterrent. Consequently, a cheaper source of magnesium is needed to drive the recovery of phosphorus. This



research aims to study the sustainability of recovering phosphorus as struvite from wastewater using reject brine, as a source of magnesium. The efficiency of the proposed process is measured by the percentage of phosphorus removed and characteristics of the struvite formed. The effect of pH and magnesium to phosphorus molar ratios on struvite precipitation is investigated. Experiments performed showed that up to 90% of phosphorus can be removed when running the experiments at a Mg:P molar ratio of 3:1 and a pH level of 9. Also, SEM-EDX analysis confirmed struvite precipitation with Mg:P molar ratio close to the theoretical ratio of 1:1.

**Keywords:** Struvite, Desalination. Reject brine, Phosphorus, Magnesium, Centrate, Nutrients



**Mohammad Idris  
Rasuli**  
ERCICSTR2030055

**Fundamental Investigation of Recycled Concrete using Paper Sludge Ash and Silica fume**

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**Faculty of Civil and Environmental Engineering, Kumamoto University, Kumamoto, Japan**

**Abstract**

Waste management and recycling of wastages play important role for having a sustainable city or echo-city. Rapid increasing population in some cities of the world and other developing countries cause different kind of pollution such as air, water, noise, visual and etc. Wastages are directly associated with city contamination. Useful policies for recycling waste can reduce the pollution and boost economy of a country. This study investigates influence of recycled concrete aggregate (RCA), Silica fume(SF), and paper sludge ash (PSA) on workability, strength and elastic modulus of concrete. 5 and 10% of cement was replaced by PSA and silica fume and 10 and 20% of coarse aggregate was replaced by the recycled aggregate. PSA and SF improved the Strength, Young's modulus and acoustic emission behaviors of concrete, moreover, the recycled aggregate also improved the properties of concrete.

**Keywords:** Paper Sludge Ash, Silica Fume, Recycled Aggregate, Workability, Strength, Acoustic Emission Behavior



**Tawika Suwanphitak**  
ERCICSTR2028057

**Potential Assessment of Greenhouse Gas Reduction from Efficient Energy Use in Pattaya Hotels, Thailand**

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**Abstract**

This paper reports the study results of the greenhouse gas (GHG) emissions and their reduction potential in 4- and 5-star hotels in Pattaya, Thailand. In the study, seven 4- and 5-star hotels participated in surveys to assess their GHG emissions from activities including electricity use, stationary combustion, mobile combustion, refrigerant leak, wastewater, solid waste, and outsourced laundry. The data used in this study were based on 2018 statistics. The average emission by the surveyed hotels was at 4,466.99 tCO<sub>2</sub>e/year, equivalent to 107.88 kgCO<sub>2</sub>e/m<sup>2</sup>-year, and 45.42 kgCO<sub>2</sub>e/room-night. The electricity use was the major activity accounting for 77% of the total emissions. Hence, the GHG reduction plan was put forth to the energy efficiency improvement of energy-intensive machines. The findings from surveyed hotels were used as the basis to estimate the GHG emissions and potential reduction for 4- and 5-star hotels in the whole Pattaya. By the proposed improvement scheme, the potential to reduce the GHG emission was 13,794.93 tCO<sub>2</sub>e, for an equivalent reduction of 7.79% of the total GHG emissions.

**Keywords:** Greenhouse Gas Emissions, Greenhouse Gas Reduction, Hotel Energy Saving



Aliashim Albani  
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### Ocean Current Energy Potential for Malaysia

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#### Abstract

This paper aims to present the ocean current power density data at six selected sites in Malaysia seawater. The sites are three-point in the Southeast part of Sabah, and three-point in the Southeast part of Peninsula Malaysia seawater. The data were obtained from the Copernicus Marine Environment Monitoring Service (CMEMS) center's numerical model product. The obtained variables were Northward and Eastward components, whereas the ocean current speed, direction, and power density were generated using the specific equation directly. The ocean current power density data are essential and can be reused in the ocean energy study, particularly for a preliminary feasibility study.

Keywords: Current speed, Power density, Ocean Energy, Renewable Energy, Malaysia

Alexis Chung  
ERCICSTR2028062

### Effects of Torque on a Spinning Coin on a Horizontal Surface

Alexis Chung

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#### Abstract

This paper was designed to analyze the rotational motion of a spinning coin on a horizontal surface, primarily testing the relationship between the inclination angle  $\theta$  of the coin and its precession frequency  $\Omega$ . We recorded the motions of three spinning coins on a wooden table using a high-speed camera operating at a rate of 240 frames/s and constructed graphs of  $\theta$  vs. time and  $\Omega$  vs. time according to experimental data collected through Physics Tracker. The graph of  $\Omega^2$  vs.  $\sin \theta$  was compared to the expected precession frequency, thereby verifying our theoretical approaches and formulas, which we had derived based on Euler's angular momentum equation, in terms of actual measurements acquired from the coins. In future experiments, we hope to explore the impact of distinct surface types and of friction on the rotational motion of the coin and to discuss the pattern of motion that the center of mass of the coin follows during precession.

Keywords: Euler's disk, Precession, Rotational Motion, Torque

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