CONFERENCE PROCEEDINGS

ICSTR Mauritius – International Conference on Science & Technology Research, 17-18 December, 2018

17-18 December, 2018
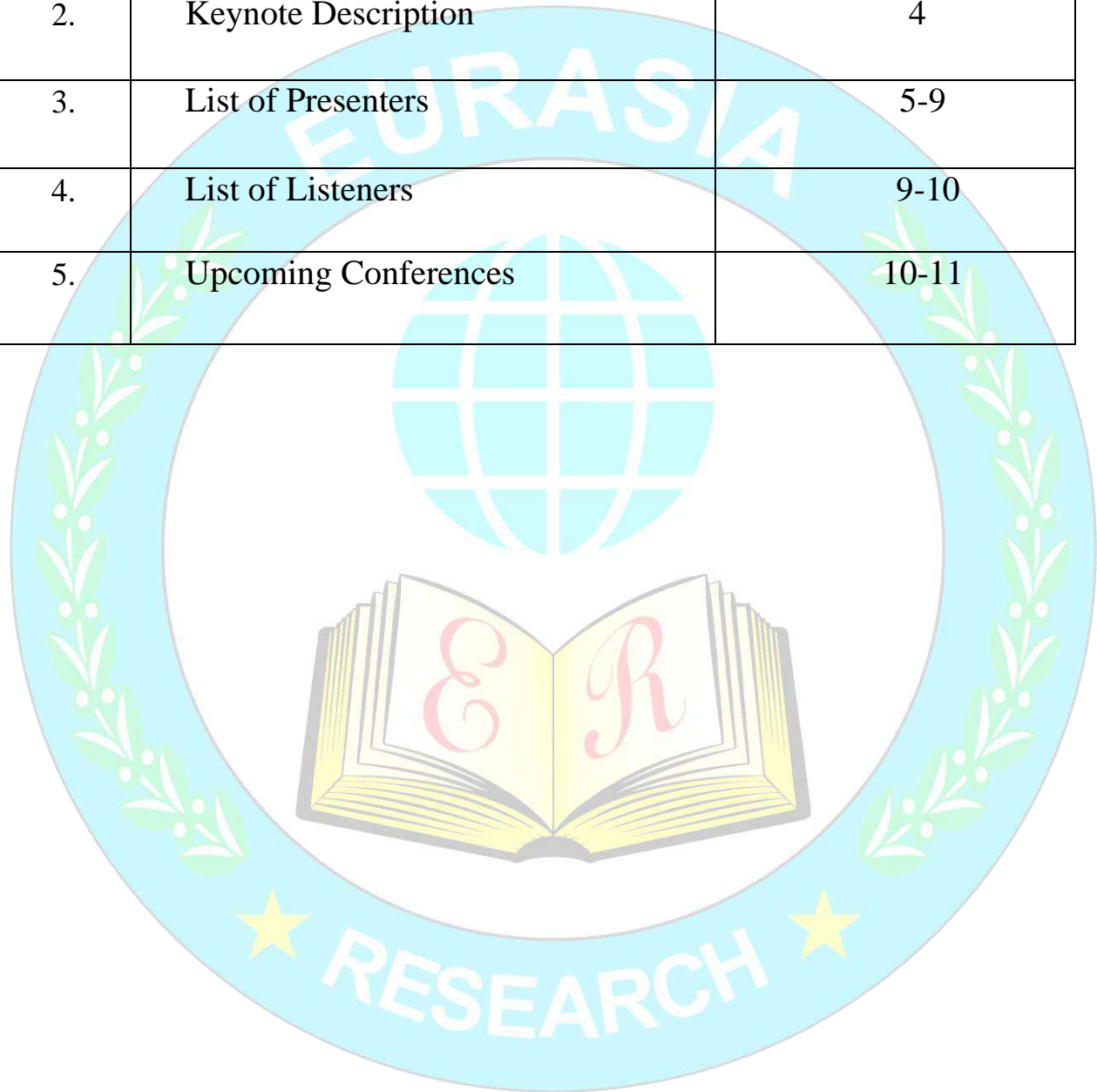
CONFERENCE VENUE

Voilà Bagatelle Hotel, Mauritius

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Table of Content:

Preface:

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Our mission is to make continuous efforts in transforming the lives of people around the world through education, application of research & innovative ideas.

KEYNOTE SPEAKER

Dr. Fawzi Mahomoodally

Associate Professor and Former head of Department at the Faculty of Science

University of Mauritius, Mauritius

Dr. Fawzi Mahomoodally is an associate professor and former head of department at the faculty of science, University of Mauritius. Fawzi is an alumnus of the Harvard University, USA, and recipient of several awards. He has authored 214 scientific publications (133 full scientific papers in ISSN/impact factor journals, edited 4 academic books, 36 book chapters, and 41 abstracts in international/national conferences). He is the recipient of >40 fellowships/travel grants. In 2011, he was invited as a key speaker at the 14th Asian Chemical Congress (Thailand); ASM-GM (Boston, USA), the ICAAC meeting in Colorado, USA and 6 strategic meetings in Washington DC, USA. In 2018, he was an invited speaker for at the ISE 2018, Dhaka and plenary speaker for Creative Educational Society's College of Pharmacy, India. He was invited to the Commonwealth conference (Bangalore) by the Royal Society, UK, the Young leader session with Nobel Laureates at the STS forum, Japan and Fellow of African Science Leadership Programme, South Africa. He is presently the PI/co-PI of 6 research grants/consortium (total of 13 million MUR). He has organized/instructed >15 international/national workshops/training courses. Fawzi works in the field of health sciences, with a deep-rooted interest towards documenting/validating the use of complementary/alternative medicine and indigenous/traditional knowledge pertaining to the use of natural products (medicinal herbs/spices/food plants/animal products/practices). He endeavors to develop therapeutic bio-products from medicinal herbs/food plants to address global health, wellness, and food security issues. He is presently collaborating with private companies to translate his research into commercial therapeutic bio-products.

Applying machine learning techniques to classify birds based on their chirping pattern

Supriya Supriya
Department of Computer science and Engg,Srinivas school of engineering affiliated to Visvesvaraya TechnologicalUniversity, Belagavi,Mangalore, India

Abstract
This paper classifies the birds automatically considering their chirping patterns. Speech processing and Machine learning techniques are carried out to categorize the various bird species. An attempt has been made to include the bird's that are local to South Canara region of India in order to understand the ecological interdependence. The birds here are being classified into respective classes by employing the machine learning techniques like Gaussian Mixture model (GMM) and Support Vector Machine (SVM). An overall efficiency of 95% and 82.5% is gained using 50 recordings of 4 bird classes using GMM and SVM respectively. The paper also highlights the variation of the frequency spectrum of the birds in open and dense vegetation. This project is helpful for Ornithologists to identify the birds on hearing their chirps.
Keywords
Speech processing, Machine learning, South Canara region, Gaussian Mixture model, Support Vector Machine.

Supriya Supriya
ERCICSTR1807054

Green Synthesis of Zinc Oxide Nanoparticles from Plant Extracts

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Department of Physics & Electronics, Faculty of Science & Technology, National University of Lesotho, Roma, Maseru, Lesotho

Abstract
A number of methods have been employed to synthesize zinc oxide (ZnO) nanoparticles (NPs) with improved properties. Biological methods for NPs synthesis using microorganisms, enzymes, and plants or plant extracts have been suggested as possible green and eco-friendly alternatives. We report the synthesis of ZnO NPs through bio-reduction of zinc nitrate in neem (Azadirachta indica) plant extract. Samples were characterized by X-ray Diffraction (XRD) analysis, FT-IR spectroscopy. UV-Vis absorption, Scanning Electron Microscopy (SEM) and Atomic Force Microscopy (AFM). XRD analysis confirmed the hexagonal wurtzite phase of ZnO with unit-cell parameters: $a = b = 3.249$ Å, $c = 5.206$ Å. Debye-Scherrer crystallite size was estimated to be around 16 nm. FT-IR spectra absorption peak at 418 cm-1 was attributed to the characteristic absorption of ZnO. UV-Vis absorption wavelength at 372 nm also showed a typical spectrum for ZnO. The SEM image showed spherical ZnO NPs smooth surface morphology and size ranging between 16 to 36 nm, which was confirmed through AFM pictures also.
Keywords: ZnO nanoparticles, Bio-reduction, Structural analysis

Himanshu Narayan
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Progression of Flow Parameters in the Core of Miniature Neutron Source Reactor (MNSR)

Mohammed Salihu
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Abstract
Specifications of Ghana Research Reactor 1 (GHARR-1) was taken as the model MNSR for the present work. The reactor utilizes 90% enriched U-

Mohammed Salihu **ERCICSTR1807057**	235 to produce neutron flux of up to 1x1012 cm-2s-1 at a corresponding thermal power output of 31 kW. The numerical values of flow parameters as contained in GHARR-1 Safety Analysis Report (SAR) were used to condition the code initially and also to validate the convergence. The SAR only defined flow parameters in pairs which are based on the instrumentations at the inlet and outlet of the reactor core hence does not account for the progression of the flow parameters as the coolant transit from inlet to outlet of the reactor core. In the present work, GHARR-1 reactor core coolant was modelled and simulated using Simulation of Turbulent flow in Arbitrary Regions Computational Continuum Mechanics C++ based (STAR CCM+) Computational Fluid Dynamics (CFD) code and used to analyze the progression of flow parameters from the inlet to the outlet of the reactor core. Thermal hydraulic studies of the reactor core coolant is necessary for safety of evaluation. Ghana Research Reactor-1 (GHARR-1) was used to experimentally generate data on the inlet and outlet temperatures at varying coolant flow rates for the purpose the simulation and modelling. Keywords: STAR-CCM+, CFD, GHARR-1, core coolant, flow rates, thermal flux, thermal power, MNSR
Umesh Ramnarain **ERCICSTR1807058**	**The use of Physics Education Technology (PhET) computer simulations** **Umesh Ramnarain** **Science and Technology Education, University of Johannesburg, South Africa** **Abstract** **Researchers have called for an extensive examination of the use of technology learning resources such as simulations in particular learning contexts in order to understand the widespread use of its integration in learning (Cheng & Tsai, 2013; Ramnarain & Moosa, 2018; Song, 2014). A computer simulation is a computer program that attempts to simulate a model of a particular system. Users can manipulate the model to view how it would behave under various conditions, and the outcome of these changes are made visible or reported as a measurement by the program itself (Khan, 2010). Computer simulation environments allow learners to observe and investigate models of abstract and complex concepts, and to modify existing scientifically incorrect conceptions (Chang, Chen, Lin, & Sung, 2008; Chen, Pan, Sung, & Chang, 2013; de Jong & Van Joolingen, 1998). This study investigated the pedagogy of a physical sciences teacher in teaching topics with Physics Education Technology (PhET) computer simulations. PhET computer simulations are developed by the University of Colorado and are available for free downloading. These simulations enable students to make connections between real-life phenomena and the underlying science, deepening their understanding and appreciation of the physical world. In order to further encourage quantitative exploration, the simulations also offer measurement instruments including rulers, stop-watches, voltmeters and thermometers. As the user manipulates these interactive tools, responses are immediately animated thus effectively illustrating cause-and-effect relationships as well as multiple linked representations (motion of the objects, graphs, number readouts, etc.) (PhET, 2013). This study used design-based research methodology because it focuses on understanding how, when, and why educational innovations work in practice. This methodology is directed at the study of learning in context through the systemic design of and study of instructional strategies and tools (Brown, 1992). The research followed four phases of design-based research as suggested by Reeves, Herrington and Oliver (2005): (i) Analysis of practical problem by researchers and practitioners, (ii) Development of solutions informed by existing design

	principles and technological innovations, (iii) Interactive cycles of testing and refinement of solutions in practice and (iv) Reflection to produce "design principles" and enhance solution implementation. Key design principles were explicated in the use of simulations. **Keywords** Simulations; pHET; science; teaching
Olushola Samuel Fadairo **ERCICSTR1807059**	**Livelihoods and Socio-Economic Impacts of Climate Variability and Change among Vegetable Farmers in Selected Sites from Ghana, Uganda and Nigeria** **Olushola Samuel Fadairo** **Agricultural Extension and Rural Development, University of Ibadan, Ibadan, Oyo State, Nigeria** **Abstract** **A clear understanding of the socioeconomic impact of climate variability and change on livelihoods of vegetables farmers in Western and Eastern Africa, which is not readily available, is critical for sustainable vegetable production in Africa. Multi-stage sampling procedure was used to sample193 vegetable farmers in selected sites from Uganda, Ghana and Nigeria. Data were collected on local awareness and perception of climate variability and trends related to climate change; the impacts of climate related changes and adaptation measures employed by local farmers. Data were analysed using descriptive statistics, ANOVA and linear regression at $\alpha0.05$. Mean age and experience of vegetable farming were 47.9 ± 11.9 and 21.2 ± 9.7 years, respectively. Pepper (78.2%), tomato (71.5%), eggplant (59.6%) and okra (54.4%) were mostly cultivated vegetables. Most (68.9%) have heard but only know little about climate change. Awareness of climate variability and change was high among most respondents from the three countries, but highest among respondents from Uganda (78.3%). Awareness was highest for long dry spell ($\bar{x}=1.90$) and drought ($\bar{x}=1.81$) and lowest for harmful gas emissions ($\bar{x}=0.76$). Changes in climate variability and trends was perceived to be highest in terms of flood volume/damage caused by flood to farmlands in Nigeria ($\bar{x}=3.85$) and Uganda ($\bar{x}=5.0$), but in terms of increased temperature for Ghana ($\bar{x}=4.93$). Impact of climate related changes on vegetable farming was low in Nigeria (53.4%) and Uganda (95.0%), but high in Ghana (98.3%). Most utilised adaptation strategies include water conservation practices in Nigeria ($\bar{x}=2.93$), use of fertilizer in Ghana ($\bar{x}=3.97$) and adjustment of planting calendar in Uganda ($\bar{x}=3.78$). Awareness ($\beta=0.14$), perception ($\beta=0.15$) and use of adaptation strategies ($\beta=0.10$) predicted change on impact of climate variability and change among vegetable farmers. Vegetable farmers in Nigeria, Ghana and Uganda are affected differently by climate variability. Farmers in these countries also have different priority for adaptation strategies.** **Keywords: Climate variability, vegetable farming, adaptation, socio-economic impacts.**
Samuel Akinsola **ERCICSTR1807064**	**Utilization of E-collaboration for Effective Decision Making: A developing country public sector perspective** **Samuel Akinsola** **Informatics, Namibia University of Science and Technology, Windhoek, Namibia** **Abstract** **As technology is being aligned and integrating more into business**

processes, there is a need for organizations to be revolutionized including the public organizations. The use of e-collaboration tools has become an important part of effective decision-making in organizations. Many organizations have embraced the benefits they bring to organization effectiveness. However, as most organizations and public organizations in particular are been financially strained due to reduced budget allocation and increase demand for public services, exploiting other expenditure and cost reduction measures alternatives is a necessity. The public sector organizations explicitly in Namibia are faced with financial crisis which has led the Government to minimize the allocation of funds. This paper explored how to utilise the e-collaboration tools to facilitate decision-making. The results indicated that managers had some collaboration tools in place however these tools are not being used to facilitate managers' official decision-making process. The utilization of e-collaboration tools such as Skype for Business, Email, and GoToMeeting makes it possible for employees that are dispersed to share information and ideas while saving on costs on travels where physical presences may be avoided.

Keywords: E-Collaboration tools, Public Sector, Decision-making

Phytoremediation for copper contaminated agriculture soil: A review

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Samuel Apori Obeng
ERCICSTR1807070

Abstract

Copper is a trace element occurring naturally in all environmental media, including soil, sediment air and water. It is an essential micronutrient responsible for cell function, playing a vital role in processes. Copper causes soil and water contamination mainly through agriculture activities such as application of copper-based fungicides and pesticides application. The continuous use of the copper-base fungicides on crop results in the fungicides residues accumulation in the soil leading to contamination. Most of the conventional remedial technologies use for remediation of copper contaminated soil are expensive and inhibit the soil fertility; this causes negative impacts on the ecosystem. The use of Phytoremediation for remediation of copper contaminated soil is a cost effective, environmentally friendly, aesthetically pleasing approach most suitable for developing countries. A minireview was carried out using peer-reviewed articles published from 2000 to 2018. The AGORA and Google Scholar databases were used to conduct the search for articles using the terms copper and phytoremediation. Following these searches, 10 journal articles out of a total of 125 articles satisfied criteria for inclusion and were used in the final systematic review. The study showed that plants use for phtoremediation of copper was able to reduce the mobility and bioavaliability of copper in the soil.

Keywords: Phytoremediation, copper, phytoextraction, hyperaccumulator, indicator, excluder species

Takaaki Wajima
ERCICSTR1807052

Simple desalination process for making agricultural cultivation solution from seawater using natural zeolite and activated alumina

Takaaki Wajima
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Abstract

We attempted to make agricultural cultivation solution from seawater with a two-step process using natural zeolite and activated alumina. Natural zeolite used in this study is Japanese mordenite-type zeolite with

high content of Ca2+ as exchangeable cation. Activated alumina can remove anions, SO42- and Cl-, and divalent cations, Mg2+ and Ca2+, better than monovalent cations, Na+ and K+, from seawater. By treating seawater with natural zeolite, the obtained solution contains higher divalent cations and lower monovalent cations than seawater, due to the ion exchange of natural zeolite, and removal of cations from the obtained solution is higher than that from seawater, while removal of anions is almost same. Radish sprouts can be grown in the solution after two-step treatment of natural zeolite and activated alumina, while they cannot be grown in seawater and the solutions after one-step treatment of natural zeolite and activated alumina.

Keywords: Agricultural cultivation solution, Seawater, Natural zeolite, Activated alumina, Radish sprouts

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Upcoming Conferences

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- ➢ ICSTR Bangkok – International Conference on Science & Technology Research, 21-22 December, 2018

- ➢ 2nd ICSTR Dubai – International Conference on Science & Technology Research, 26-27 December 2018

- ➢ ICSTR Bali – International Conference on Science & Technology Research, 29-30 December 2018

- 2nd ICSTR Bangkok – International Conference on Science & Technology Research, 07-08 February 2019

- 3rd ICSTR Dubai – International Conference on Science & Technology Research, 26-27 February 2019

- 2nd ICSTR Singapore – International Conference on Science & Technology Research, 15-16 March 2019

- ICSTR London – International Conference on Science & Technology Research, 11-12 April 2019

- ICSTR Rome – International Conference on Science & Technology Research, 03-04 May 2019

- ICSTR Prague – International Conference on Science & Technology Research, 06-07 June 2019

- 2nd ICSTR Malaysia – International Conference on Science & Technology Research, 28-29 June 2019

- ICSTR Lisbon – International Conference on Science & Technology Research, 27-28 June 2019

- 3rd ICSTR Singapore – International Conference on Science & Technology Research, 28-29 June 2019

- 2nd ICSTR Bali – International Conference on Science & Technology Research, 11-12 July 2019

- 2nd ICSTR Budapest – International Conference on Science & Technology Research, 11-12 July 2019