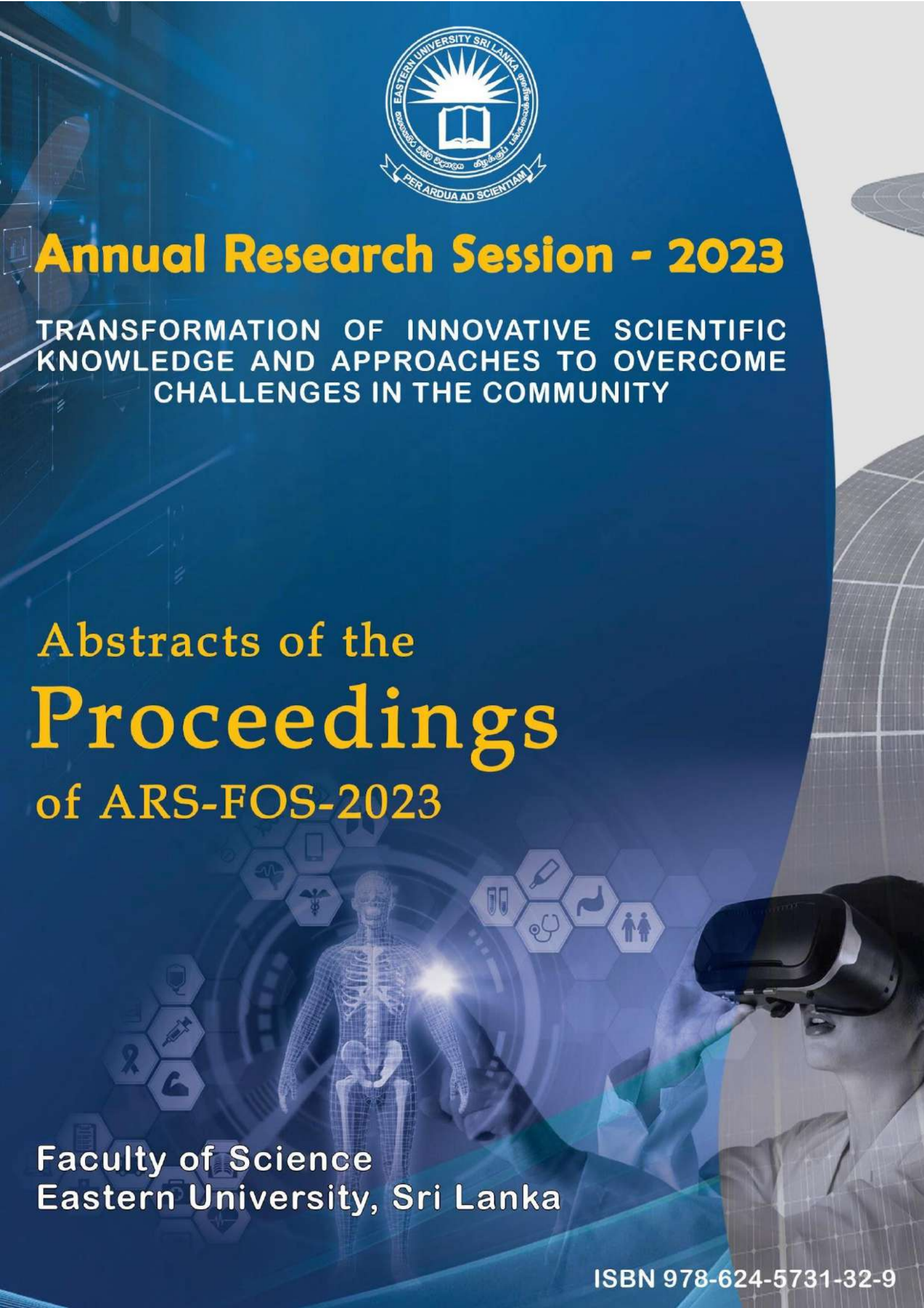
Annual Research Session - 2023

TRANSFORMATION OF INNOVATIVE SCIENTIFIC KNOWLEDGE AND APPROACHES TO OVERCOME CHALLENGES IN THE COMMUNITY

Abstracts of the Proceedings of ARS-FOS-2023



Faculty of Science
Eastern University, Sri Lanka

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Abstracts of the Proceedings

of

Annual Research Session
Faculty of Science
ARS-FOS-2023

"Transformation of Innovative Scientific Knowledge and Approaches to Overcome Challenges in the Community"

4th October 2023
Faculty of Science
Eastern University, Sri Lanka

ARS-FOS-2023 is Sponsored By

Annual Research Session, Faculty of Science 2023 (ARS-FOS-2023)

ARS-FOS-2023, 4th October 2023

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Annual Research Session, Faculty of Science 2023 (ARS-FOS-2023)

The Annual Research Session-2023 of the Faculty of Science (ARS-FOS-2023) is held on 4th October 2023, under the theme of ***"Transformation of Innovative Scientific Knowledge and Approaches to Overcome Challenges in the Community",*** focusing on research tracks that are dedicated to Biological Sciences, Physical Sciences and Mathematics, Computer Science and ICT. The ARS-FOS-2023 provides opportunities for the undergraduate and postgraduate students, and academics to disseminate their research findings particularly that address the challenges in the community using the innovative scientific knowledge and approaches. The conference is poised to provide students and academicians a professional environment to deliberate on their research experiences and receive constructive and timely feedback from participating scholars and stakeholders. Moreover, through this exercise it is expected to disseminate findings to related public and private organizations in the region, and open avenues towards community wellbeing.

Editor-in-Chief

Professor F. C. Ragel

Message from the Vice-Chancellor

Professor V. Kanagasingam
Vice-Chancellor
Eastern University, Sri Lanka

It is with great pleasure that I extend my warm greetings to all participants of the Annual Research Session (ARS-FOS-2023) hosted by the Faculty of Science, Eastern University, Sri Lanka scheduled to be held on October 4th, 2023 during in the period of 42nd University week. The theme of this Annual Research Session, "Transformation of Innovative Scientific Knowledge and Approaches to Overcome Challenges in the Community," is both timely and significant. In an era where science and technology play pivotal roles in addressing global challenges, it is heartening to see the faculty of Science embracing innovation and research to drive positive change in our communities.

I am particularly delighted to learn that Prof. S. Sivananthan, PhD., Professor Emeritus in Physics and Director of the Microphysics Laboratory at the University's Department of Physics, University of Illinois, Chicago, USA, will be the Keynote Speaker. His outstanding contributions to the field of physics and research leadership serve as an inspiration to us all. His presence at ARS-FOS-2023 promises to be a moment of enlightenment and motivation for our academic community. We eagerly anticipate his insights and wisdom as he shares his wealth of experience with us during this remarkable event.

The ARS has consistently been a platform for fostering collaboration, sharing groundbreaking discoveries, and nurturing the spirit of inquiry. It is through events like these that we cultivate a culture of innovation and encourage our scholars to explore new horizons.

As the Vice Chancellor of this institution, I am honored to be a part of this academic journey. I believe that the research presented at ARS-FOS-2023 will not only contribute to the advancement of scientific knowledge but also serve as a testament to our commitment to addressing real-world challenges through cutting-edge research.

I would like to express my sincere gratitude to the Dean, Coordinator, members of the organizing committee, other staff of the faculty, researchers, and all participants for their dedication and hard work in making ARS-FOS-2023 a reality. Your efforts are deeply appreciated.

I encourage all attendees to actively engage in the sessions, exchange ideas, and forge connections that will undoubtedly lead to new discoveries and innovative solutions.
I wish you all a fruitful and inspiring ARS-FOS-2023. May your research endeavors bear fruit, and may this event be a catalyst for transformative scientific knowledge.

Message from the Dean

Senior Professor P. Vinobaba
Dean, Faculty of Science
Eastern University, Sri Lanka

It is with great pleasure and enthusiasm that to convey my sincere felicitations for the Annual Research Session, ARS-FOS-2023 hosted by our Faculty of Science in the theme of "Transformation of Innovative Scientific Knowledge and Approaches to Overcome Challenges in the Community". This year's session is particularly special as it showcases the diverse range of research endeavors undertaken by our dedicated faculty members, passionate researchers, and inquisitive students. It is a moment to celebrate the intellectual curiosity that drives us to ask questions, seek answers, and contribute to the body of knowledge in our respective fields. On behalf of the faculty, I would like to express our sincere gratitude to the keynote speaker, S. Sivananthan, Professor Emeritus Physics, Director of the Microphysics Laboratory, University's Department of Physics, University of Illinois, Chicago, United States of America, for accepting our invitation to deliver the keynote speech despite his heavy busy schedule. We are immensely grateful to the Vice Chancellor, EUSL, Professor V. Kanagasingam for his guidance and support. I would also like to convey my warm thanks to the Chair of ARS-FOS-2023 Prof. A.G. Johnpillai. I also extend my appreciation to the organizing committee for their tireless efforts in putting together this event. Your hard work and attention to detail have ensured that this research session runs smoothly and is a resounding success. I want to express my gratitude to all the researchers, advisors, and mentors who have guided and supported our students in their research endeavors. Your guidance and mentorship are invaluable in shaping the researchers of tomorrow.

As we embark on this journey of intellectual exploration, let us remember that research is not just about finding answers; it is also about asking the right questions. It is about challenging the status quo, thinking critically, and being open to new ideas. It is about collaborating across disciplines and breaking down the barriers that limit our understanding.

In conclusion, I am confident that this Annual Research Session will be a source of inspiration and motivation for all of us. It is a reminder of the transformative power of knowledge and the boundless potential that lies within each of us to make a meaningful impact on the world through our research. I look forward to the enlightening discussions, the exchange of ideas, and the sense of camaraderie that this symposium will undoubtedly bring. Together, we are advancing not only our institution's mission but also the frontiers of human understanding.

Message from the Chairperson

Professor A. G. Johnpillai
Chairperson
ARS-FOS-2023

On behalf of the Organising Committee, it is with a great delight and enthusiasm I deliver this message on the occasion of the Annual Research Session 2023 which has been conducted by the Faculty of Science (ARS-FOS-2023), Eastern University, Sri Lanka (EUSL) under the theme of "***Transformation of Innovative Scientific Knowledge and Approaches to Overcome Challenges in the Community***".

The prime aim of the ARS-FOS-2023 is to provide a venue for the undergraduate Honours degree students and academic members of the EUSL to present their new research outcomes and share ideas with peers, outside university academician and hence enable them to create collaborations in their chosen field or cross-disciplinary of research, thereby promote a productive research culture at the EUSL.

Sixteen submissions, four full papers and twelve extended abstracts were accepted for presentation at the ARS-FOS-2023 recommended by the two reviewers selected internally and externally for each submission in consideration of their expertise in the area of research.

We are very fortunate to have with us today our Keynote Speaker for the ARS-FOS-2023 the distinguished scientist Dr. S. Sivananthan, PhD, Professor Emeritus Physics, Director of the Microphysics Laboratory at the University's Department of Physics, University of Illinois, Chicago. We are incredibly grateful for the time you spend with us. We are very thankful for your presence and it is a great source of inspiration for all of us here.

We would like to thank our Chief Guest the Vice Chancellor, Professor V. Kanagasingam. It is our pleasure to have you with us today. We gratefully acknowledge your financial support and encouragement. We express our gratefulness to the Dean, Faculty of Science, Senior Professor P. Vinobaba, for his encouragement, guidance and fellowship throughout the planning of the ARS-FOS-2023.

I thank with high appreciation the enthusiasm and painstaking hard work of Editor-in-Chief of the ARS-FOS-2023, Professor F. C. Ragel, the Secretary Mr. T. Vinothraj, Organizing Committee members, the Working Committees, and everybody for their endeavour to make this event a reality and success. My sincere thanks and admiration also go to the IT Committee for their expertise and commitments in taking care of the electronic and online based activities diligently.

The Organizing Committee and the entire Faculty are extremely grateful to our sponsors for the ARS-FOS-2023, MICHELIN LANKA PVT LTD (**Platinum Sponsor**), HJS Condiments Limited (subsidiary of Hayleys PLC) (**Gold Sponsor**) and Yokohama TWS Lanka (Private) Limited (**Silver Sponsor**) for their generous financial assistance for us. We also express our sincere thanks and gratitude to Dr. (Mrs.) B. S. W. Karunarathna and Dr. R. M. T. B. Ranathunge for being instrumental in receiving the huge financial contributions from the sponsors for the conference.

Finally, I express my appreciation to the presenters for enriching the conference with your contributions, and congratulate them for successfully publishing their research findings. I wish fervently that the ARS-FOS-2023 will be a resounding success.

Message from the Editor-in-Chief

Professor F. C. Ragel
Editor-in-Chief
ARS-FOS-2023

On behalf of the Editorial Committee, I am delighted to convey my message for the Annual Research Session-2023 (ARS-FOS-2023), conducted by Faculty of Science, Eastern University Sri Lanka, which is a scholarly forum that primarily aims on disseminating the undergraduate research findings to relevant stakeholders on issues that are significant to the local community and the environment.

The ARS-FOS-2023 with theme ***Transformation of Innovative Scientific Knowledge and Approaches to Overcome Challenges in the Community***, focuses research on tracks dedicated to 'Biological Sciences', 'Physical Sciences', and 'Mathematics, Computer Science & ICT'. As per the research policy introduced in 2020, the main focus of the Annual Research Sessions that are conducted by faculties is to create a platform to disseminate the research findings of undergraduate research projects to regional stakeholders that address solutions to societal needs and environmental issues. To accommodate this objective, research outputs were invited via two windows: (1) Research findings as full papers for evaluation that are relevant to the region/nation which emanate from examined undergraduate research reports of the faculty; (2) Research findings as extended abstracts for evaluation, that was open to all researchers. An award for each track under window-1 has been introduced for the first time in order to encourage honours degree research projects to be beneficial to region/nation in solving local issues.

Extended abstracts were subject to double-blind review and convergence towards a decision was based on at least two similar opinions. Four research findings from window-1 and twelve research outcomes from window-2 were accepted for presentation at the ARS-FOS-2023 and they appear in the form of abstracts in the proceedings. I express my sincere thanks and profound gratitude to the reviewers from Sultan Qaboos University, Oman; University of Colombo, University of Peradeniya, University of Kelaniya, University of Jaffna, South Eastern University of Sri Lanka, Sabaragamuwa University of Sri Lanka, University of Vavuniya, and Eastern University Sri Lanka; whose cooperation and timely efforts were extremely pivotal to make this event a success. I greatly appreciate with gratitude the academics from departments of Zoology and Chemistry from University of Jaffna, and Department of Zoology, University of Ruhuna, for consenting to do the evaluations for the awards in window-1.

It is appropriate to acknowledge the hard work of the Editorial Committee comprising eminent scientists from the faculty and from the University Research Council, and their contribution in selecting appropriate reviewers relevant to the research topics and in decision making. I also express my thanks to the Dean/Science, Senior Professor P. Vinobaba, and Chairman of the ARS-FOS-2023 organizing committee, Professor A. G. Johnpillai, for their support and insights.

Finally, I express my appreciation to the authors for enriching the conference, and congratulate them for successfully disseminating their research findings. I yearn that the ARS-FOS-2023 will provide a stimulating platform for resounding deliberations.

Brief Biography of the Keynote Speaker

Dr. S. Sivananthan, PhD, Professor Emeritus Physics, Director of the Microphysics Laboratory at the University's Department of Physics, University of Illinois, Chicago.

Born in Madduvil South near Chavakachcheri in Sri Lanka, Sivalingam Sivananthan attended Jaffna Hindu College. In 1980, he graduated from the University of Peradeniya with a B.Sc in Physics. He served as an assistant lecturer at the University of Peradeniya and Batticaloa University for two years. In 1985, he obtained his M.Sc in Physics and later in 1988 a Ph.D in Physics from the University of Illinois at Chicago.

He joined the University of Illinois at Chicago as a research assistant in 1983 and is currently the Director, Microphysics Laboratory at the Department of Physics and Distinguished Professor in the College of Liberal Arts and Sciences at the University of Illinois at Chicago.

He pioneered the growth of Mercury Cadmium Telluride and other II-VI materials by the molecular beam epitaxy process. This work has become vital beyond night vision technology but also has numerous applications in the solar, medical, auto and other industries. He has more than 30 years of experience in MBE semiconductor growth kinematics and characterization, and he is recognized as a leading authority in the field of II-VI based optoelectronic devices.

He remains an outstanding teacher with awards for excellence in teaching physics for over 25 years at the University of Illinois at Chicago and served on more than 57 M.S. and Ph.D thesis committees.

In 1998, Dr. Sivalingam Sivananthan founded EPIR Technologies Inc. to provide specialized photovoltaic materials for the infrared and solar industries as well as to provide research and development services to government agencies and industry. In 2009, he launched Sivananthan Laboratories Inc. (Siva Labs).

Dr. Sivalingam Sivananthan serves as the Chairman of the Board at the non-profit InSPIRE (Institute for Solar Photovoltaic Innovation, Research, and Edu-training) an Institute promoting research, development, workforce training and technology commercialization within the solar and renewable energy industry.

In 2000, Dr. Sivalingam Sivananthan was appointed a member of the editorial board of Journal of Infrared and Millimeter Waves and currently serves this position. Also, since 2000, Dr. Sivalingam Sivananthan serves as a Program Committee member, U.S. Workshop on the Physics and Chemistry of II-VI Materials.

Dr. Sivalingam Sivananthan has authored or co-authored more than 200 refereed journal articles and conference proceedings.

Since 2006, Dr. Sivalingam Sivananthan has served as an adviser to the Sri Lankan Graduate Student Association at the University of Illinois at Chicago. Since 2009, Dr. Sivalingam Sivananthan has served a Visiting Professor-Overseas at the Anna University in Chennai, India.

Dr. Sivalingam Sivananthan maintains close working ties in Sri Lanka with University of Peradeniya, Ruhuna, Jaffna and Kelaniya. Faculty and students from these universities have been supported in their several visits to the U.S. where they received extensive training and in photovoltaic solar cell technology.

In May 2013, Dr. Sivalingam Sivananthan was recognized as a "Champion of Change" at the White House for his contributions to the changes he pioneered. For his exemplary citizenship, he was awarded the "Outstanding American by Choice" award by the U.S. Citizenship and Immigration Services in 2013.

Keynote Speech

How Sri Lanka Can Win: Building a STEM Edu-Training Culture to Propel Sri Lanka to Leadership on the Global Stage

***Dr. S. Sivananthan**, PhD.*
Professor Emeritus Physics,
Director of the Microphysics Laboratory at the University's Department of Physics, University of Illinois, Chicago

Sri Lanka stands at the precipice of a period of unprecedented technological and economic growth. In today's era of rapid technological advancement and global interconnectivity, Sri Lanka is equipped with the demographical and educational base to take full advantage of her potential. Using a novel strategy pioneered by Dr. Sivalingam Sivananthan, Edu-Training, Sri Lanka can establish herself as a regional leader in a number of technological fields.

Edu-Training refers to the process of establishing a cross disciplinary approach to STEM, using the strategy to solve modern problems by equipping workers with skills and experiences from a wide range of fields to develop novel and comprehensive solutions.

Dr. Sivalingam Sivananthan is the founder of Sivananthan Labs, a business incubator located in Illinois. Sivananthan Labs has been at the forefront of propagating Edu-Training initiatives in Sri Lanka, supporting and operating a number of highly successful projects.

This presentation will cover Dr. Sivananthan's history at Sivananthan Labs, an introduction to STEM Edu-Training, the tremendous potential of Sri Lanka, and past successes using the novel approach. The presentation also covers new and emerging technologies and methods by which Sri Lanka can and will emerge as leaders in those spaces.

Table of Contents

ANNUAL RESEARCH SESSION-2023
FACULTY OF SCIENCE
EASTERN UNIVERSITY, SRI LANKA

Technical Session Schedule – ARS-FOS-2023 (04.10.2023)

SESSION 1: DISSEMINATION OF EXAMINED UNDERGRADUATE RESEARCH (11.00am)

Location: Board Room, EUSL
Meeting Link: https://tinyurl.com/ymr6ksx9
Meeting ID: 684 1595 0431
Meeting Passcode: Ars@2023
Chairperson: Prof. A. G. Johnpillai
Evaluator for Best Presenter: Prof. P. Iyngaran & Prof. T. Eswaramohan

Time	***Abstract ID***	***Abstract title and authors name***
11.00 – 11.20 am	*ARS-FOS-2023-RR01*	*Plankton composition and water quality analysis of Batticaloa lagoon at solid waste dumping site, Eravur* ***Ashraf Nisa, M.M.**, Vinobaba, P. and Harris, A.J.M.*
11.20 – 11.40am	*ARS-FOS-2023-RR02*	*Biology of Paederus beetle: its victim perception and control measures at the Eastern University premises.* ***Kalansooriya, A.S.N.** and Vinobaba, M.*
11.40 – 12.00 noon	*ARS-FOS-2023-RR03*	*Study the presence and characterization of microplastics By Oreochromis niloticus in two different locations of Batticaloa Lagoon* ***Wickramapala, K.A.S.M.** and Vinobaba, P*
12.00 – 12.20 pm	*ARS-FOS-2023-RR04*	*Preparation and characterization of chitin-clay bio nanocomposites for various applications* ***Athuraliya, A.S.S.**, Koneswaran, M. and Janarthani, L.*

SESSION 2: MATHEMATICS, COMPUTER SCIENCES AND ICT (1.30 pm)

Location: CICT, EUSL
Meeting Link: https://tinyurl.com/4wctjwcx
Meeting ID: 679 6875 2699
Meeting Passcode: Ars@2023
Chairperson: Prof. S. Thirukkanesh
Evaluator for Best Presenter: Dr.T.Mathanaranjan

Time	***Abstract ID***	***Abstract title and authors name***
1.30 -1.45 pm	*ARS-FOS-2023-A02*	*Study of Neutrosophic b-open sets in Neutrosophic topological spaces* ***Malkanthi, D.M.S**. and Elango, P.*
1.45 – 2.00 pm	*ARS-FOS-2023-A04*	*Stationary Fuzzy Pseudo metric space and its properties* ***Kajan, N.** and Kannan, K.*
2.00 – 2.15 pm	*ARS-FOS-2023-A07*	*Chromatic number based on incidence coloring for cycles* ***Dilshan, M.M.C.** and Perera, A.A.I.*
2.15 -2.30 pm	*ARS-FOS-2023-A10*	*Linearizing invertible point transformation for a nonlinear second-order ordinary differential equation arising in epidemiology* ***Weerakoon, W.M.R.D.** and Johnpillai, A.G.*
2.30 – 2.45 pm	*ARS-FOS-2023-A16*	*Yawning Detection Prediction System for Driver Drowsiness using Residual Network* ***Goshihan. B.** and Sotheeswaran, S.*
2.45 – 3.00 pm	*ARS-FOS-2023-A18*	*Constructing Holomorphic Type Functions of 3-D from Their Real Type or Imaginary Type Parts without the Cauchy-Riemann type Relations.* ***Gunasekara Y.M.N.S.** and Thayamathy P.J.N.*

SESSION 3: BIOLOGICAL SCIENCES (1.30pm)

Location: Board Room, EUSL
Meeting Link: https://tinyurl.com/ymr6ksx9
Meeting ID: 684 1595 0431
Meeting Passcode: Ars@2023
Chairperson: Dr. (Mrs) M. Vinobaba
Evaluator for Best Presenter: Prof. T. Eswaramohan

Time	*Abstract ID*	*Abstract title and authors name*
1.30 -1.45 pm	*ARS-FOS-2023-A05*	*In vitro anti-inflammatory activity of Sri Lankan red Seaweed Gracilaria edulis* ***Gunathilaka, M.D.T.L.,*** *Farween, M.R.K., Kumarasinghe, H.S., De Silva, W.A.R., Samarakoon, K.W., Ranasinghe, P.*
1.45 – 2.00 pm	*ARS-FOS-2023-A14*	*Microplastic Abundance and its Relationship with Environmental Factors at Beaches Along Northern Sri Lanka* ***Shobiya, G.****, Sivashanthini, K., Grøsvik, B.E. and Amarathunga, A.A.D.*
2.00 – 2.15 pm	*ARS-FOS-2023-A15*	*Domestic Dogs as Reservoir Hosts for Leishmania donovani: A Case from the Polonnaruwa District, Sri Lanka* *Karunarathna, D.M.N.P., Udayanga, N.W.B.A.L., Ganehiarachchi, G.A.S.M., Kumarawansha, W.K.W.S. Vinobaba, M., Kanesharatnam, N.* ***and Ranathunge, R.M.T.B.***

SESSION 4: PHYSICAL SCIENCES (2.30pm)

Location: Board Room, EUSL
Meeting Link: https://tinyurl.com/ymr6ksx9
Meeting ID: 684 1595 0431
Meeting Passcode: Ars@2023
Chairperson: Prof. M. Sithambaresan
Evaluator for Best Presenter: Prof. P. Iyngaran

Time	*Abstract ID*	*Abstract title and authors name*
2.30 – 2.45 pm	*ARS-FOS-2023-A03*	*An Anti-Sitophilus oryzae Bioactive Substance's Identification And Analysis From Plant Extracts* ***Sivaranjan, T.** and Haroon, M.H.*
2.45 -3.00 pm	*ARS-FOS-2023-A11*	*Adsorption of heavy metals (Cu2+ & Cd2+) from aqueous solutions by using "Sri Lankan wild mango" (Mangifera zeylanica) seed* ***Mudalige, N.** and Arasaretnam, S.*
3.00 -3.15 pm	*ARS-FOS-2023-A13*	*Removal Of Cd(II) From Aqueous Solutions Using Activated "Pandan" (Pandanus Amaryllifolius) Leaves* ***Madushan, L.L.W.D**. and Arasaretnam, S.*

CONCLUDING REMARKS (3.30pm)

Location: Board Room, EUSL
Meeting Link: https://tinyurl.com/ymr6ksx9
Meeting ID: 684 1595 0431
Meeting Passcode: Ars@2023
Time: 3.30pm
By: Dr. K. Premakumar

Plankton Composition and Water Quality Analysis of Batticaloa Lagoon at Solid Waste Dumping Site, Eravur

Ashraf Nisa, M.M.[1,*], Vinobaba, P.[1] and Harris, A.J.M.[1]

Abstract. Present study was aimed to assess the composition, richness of plankton species with physico-chemical water quality parameters along six sampling stations (L1-L6) at solid-waste dumping site, Eravur in Batticaloa lagoon. Study was carried out from June 2022 to September 2022 and sampling were conducted fortnightly. Plankton species along the sampling stations were analyzed and counted according to standard procedure. All the water quality parameters measured by standard procedure. Findings elucidated that total of 83 species of phytoplankton of six divisions were identified in which Bacillariophyceae is most diverse group (about 50% composition) followed by Chlorophyceae, Charophyceae, Cyanophyceae, Euglenophyceae and Dinophyceae. Total of 26 species of zooplankton of five divisions were recorded, in which Rotifers account for most diverse group (about 63% composition) followed by Arthropoda, Annelida, Mollusca and Coelenterate. The results revealed that Nitrate, Phosphate and Dissolved Oxygen level showing variation ($P < 0.05$) along the sampling points. Temperature, pH, Electrical Conductivity, Total Dissolved Solid, Turbidity and Salinity were occurred with narrow range of changes and lack the variation ($P > 0.05$). Findings from the study revealed that, the composition and abundance of plankton species were correlated with some physicochemical parameters of water. Nitrate, Phosphate, Turbidity and Electrical conductivity were showed a strong positive correlation ($r > 0.5$) with plankton composition, abundance. pH, Dissolved Oxygen, Temperature and Salinity were showed a negative correlation ($r > -0.5$) with phytoplankton composition. The presence of bio-indicators such as Euglena sp, Oscillatoria sp, Scenedesmus sp, Navicula sp, Nitzschia sp, Microcystis aeruginosa, Protoperidinium sp, Trachelomonas sp, Keratella sp, Brachionus sp and copepod in sampling locations were evident that the lagoon is subjected to nutrient pollution. The sampling point near to land (L1) resulted nutrition rich condition than the sampling points distanced from land into lagoon (L2-L6). Proper mitigation ways against pollution inputs (Solid-waste dumping) were needed to ensure lagoon utilization in sustainable manner.

Keywords: *Abundance, Bio-Indicators, Correlation, Diversity, Lagoon, Plankton, Water Quality.*

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Biology of *Paederus* beetle: its victim perception and control measures at the Eastern University premises.

Kalansooriya, A.S.N.[1,*] and Vinobaba, M.[2]

Abstract. Paederus beetles are the insects that cause Paederus dermatitis in human. This present study is undertaken to find the biology of the Paederus beetle and preventing misdiagnosis of the Paederus dermatitis as well as to fill the gaps in controlling the Paederus beetles by using natural repellents. In addition, this study focused on the survey regarding the Paederus dermatitis at the Eastern University premises. The survey was conducted during the period from February 2022 until November 2022. The questionnaire survey was carried out in order to assess the knowledge about the Paederus dermatitis among the students and people who stay at the highest vulnerable place at Eastern University, most affected area in the body of victims, and to investigate the day to day habits that increasing the chances of contacts with Paederus beetles. The repellency experiments were conducted August to October 2022, to find the repellent activity against the Paederus beetles. All stages of Paederus beetle (egg, larva, pupa and adults) were morphologically identified with some behavioral activities from the Paederus beetle culture.

At the Eastern University, higher numbers of affected participants were found in Sarsavi Medura women's hostel (49%) and the New Wing women's hostel (20%). Majority of affected participants were females (89%). Neck (22.8%) was the most affected part of the body. Most of the affected participants switched on the lights (75%) while they are sleeping and they are usually keep windows opened (91.60%) at night. Many victims used the Western Medicine for the treatment purpose. Three plant extracts; Syzygium aromaticum, Coleus amboinicus (Lour.), and Ocimum tenuiflorum were used for the repellency experiment while Ocimum tenuiflorum was not much repellent. Both Syzygium aromaticum and Coleus amboinicus (Lour.) have shown promising results as repellents. The mean RI value of Syzygium aromaticum and Coleus amboinicus (Lour.) showed Significant Difference (Kruskal-Wallis test, $p < 0.05$) with the mean Repellency Index (RI) value of Ocimum tenuiflorum. In 10% concentration of both Syzygium aromaticum and Coleus amboinicus (Lour.) the mean RI value of Syzygium aromaticum did not show Significant Difference (Kruskal-Wallis test, $p > 0.05$) with the mean repellency index value of Coleus amboinicus (Lour.). Present results suggested that the use of these phytochemicals (5%, 10% of Syzygium aromaticum and Coleus amboinicus) as repellents for the adult Paederus spp. were effective and ecofriendly.

Keywords: *Paederus beetles, Paederus dermatitis, Repellency, Plant extracts.*

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Study the presence and characterization of microplastics By *Oreochromis niloticus* in two different locations of Batticaloa Lagoon

Wickramapala, K.A.S.M.[1,*] and Vinobaba, P.[1]

Abstract. Microplastics are a huge global environmental problem. Contamination of microplastics in fish. Accumulation of microplastics can leads to health risks to humans, fishes and other aquatic animals. For the present study, common fresh water fish species that *Oreochromis niloticus* in two locations of Batticaloa lagoon was collected during August to October 2022. Microplastics were detected in both gills and gut of Nile Tilapia. Abundance, color, shape and length of microplastics were studied. Statistical analysis was done by the average abundance of microplastics in the tables and graphs. Abandance of data showing mean± standard deviation were analyzed. Tukey pair wise comparison and two sample t – test were used for compare abundance of microplastics. All the statistical analysis was done by mini tab 15. Abundance of microplastics higher in gut of fishes that collected from Batticaloa .Average abundance of microplastics abundance of gut was 2.976(±2.966).Abundance of microplastics was higher in gut.($p< 0.005$). Abundance of microplastics in gills was 1.440(±2.739). Highest abundance of microplastics was from fishes that collected from Batticaloa. Abundance of microplastics in gills were higher in fishes in Batticaloa with average abundance 2.810 (±3.351). Four types of colors (Red, blue,transparent and green) were found in both guts and gills in fishes of two locations. Most abundant color was blue color ($p < 0.005$). Two types of shapes (fibers, lines) were found in both guts and fills of fishes. Most abundant shape was fibers. Abundance of fibers in Batticaloa *Oreochromis niloticus* was 89.7% and in Eravur fishes were 77.3%. Extracted microplastics sizes between 0.1 to 5 mm in both gut and gills. Most abundant type of size range was 0.1 – 2 mm range with 79.9% in Batticaloa Nile Tilapia and 76.9% in Nile Tilapia in Eravur. This study showed that microplastics present in guts and gills of *Oreochromis niloticus* that collected from two locations of the lagoon.

Keywords: *Microplastics, Abundance, Oreochromis niloticus, lagoon.*

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Preparation and Characterisation of Chitin-Clay Bio Nanocomposites for Various Applications

Athuraliya, A.S.S. [1,*], Koneswaran, M. [1] and Janarthani Lohitharajah [2]

Abstract. The aim of this research is to utilize the most abundant natural amino polysaccharide; chitin, for the preparation of bio-nanocomposites. Chitin bio-nanocomposites with different clay loadings as a nanofiller (1, 3 and 5 wt %) were synthesized by solution blending method and the samples obtained were characterized using different analytical techniques such as TGA, FT-IR and XRD. The TGA pattern showed that the nanochitin decompose in two stages; the evaporation of water and the degradation of the polysaccharide structure of the molecule. FT-IR results revealed the chitin exists in α structure and the peaks coming from chitin and clay combined to form the chitin/clay bio-nanocomposites which observed as a wide peak at ~3260 cm^{-1}. The XRD profiles displayed that the chitin is distributed in layers and an exfoliated structure is created. These newly synthesized bio-nanocomposites, which are environmentally friendly and sustainable, can find application in many different areas in the future. It was found that the addition of clay into the chitin improved significantly the adsorption and the nanochitin with 3% nanoclay bio-nanocomposite (CT-3CL) had higher adsorbed the absorbents such as Na (I), Mg (II), Cd (II) and Cr (III) ions. The adsorption isotherm studies show that the Freundlich and Langmuir adsorption isotherms well fit to this system. Nanochitin with 1% nanoclay bio-nanocomposite (CT-1CL) had the highest percolating rate because of the lowest water sorption capacity. This may be attributed to the best dispersion of clay in the chitin matrix which enhance the percolating rate. The cation exchange capacity (CEC) was found to be 123.08 meq/100 g in a laboratory setting which indicate that this nanocomposite has a good ability to hold the cationic nutrients. Antibacterial activity of this nanocomposites was studied against the *Staphylococcus aureus* and *Escherichia coli* through a standard well diffusion method and the results shows that the anti *Staphylococcus aureus* inhibition activity of this composite was lower than its anti *Escherichia coli* activity. Superhydrophobic surfaces on cotton fabric were developed using the nanochitin. Different concentrations of nanochitin are coated/ loaded on the surface of the cotton fabric and measured the contact ankle and the results show that contact ankle is depend on the concentration of chitin loaded on the fabric surface.

Keywords: *Chitin, Bio-nanocomposite, Isotherm, Cation Exchange Capacity, Hydrophobicity.*

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Study of Neutrosophic b-open sets in Neutrosophic topological spaces

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Abstract. In this work, first, we studied some basic definitions and properties which are needed for the study of neutrosophic topological spaces. We studied different type of neutrosophic open sets and Neutrosophic closed sets in neutrosophic topological spaces with their basic properties. The main purpose of this work is to establish some new properties and relationships of neutrosophic b-open and neutrosophic b-closed sets in neutrosophic topological spaces. Firstly, we proved that the union of two neutrosophic b-open sets is a neutrosophic b-open set, and also the intersection of two neutrosophic b-closed sets is a neutrosophic b-closed set. Applications of neutrosophic topology depend on the properties of neutrosophic open sets, neutrosophic closed sets, neutrosophic interior operators and neutrosophic closure operators. In this paper, we focused our special attention to establish the relationships between the neutrosophic b-open and neutrosophic b-closed sets with other neutrosophic open and closed sets such as neutrosophic semi-open and semi closed sets, neutrosophic α-open and α-closed sets, neutrosophic pre-open and pre-closed sets. Furthermore, we proved that every neutrosophic α -open set is a neutrosophic b-open set, and every neutrosophic pre-closed set, every neutrosophic semi-closed set and every neutrosophic α –closed set is a neutrosophic b-closed set.

Keywords: *Neutrosophic sets, Neutrosophic topological space, Neutrosophic b-open sets, Neutrosophic b-closed sets.*

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Stationary Fuzzy Pseudo metric space and its properties

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Abstract. The notion of fuzzy metric space has many advantages in the analysis due to George and Veeramani since many notations and results from classical metric space and topological space theory can be extended and generalized to the setting of fuzzy metric space. In this paper, First, we discussed an interesting example of fuzzy pseudo metric space. After that, prove that, $(X, M, *)$ be a fuzzy pseudo metric space then $R_{M_d} = \{(x, y) \in X \times Y : M(x, y, t) = 1\}$ is an equivalence relation. we will further extend this idea and dealing with pseudo metric space and $R_d = \{(x, y) \in X \times X : d(x, y) = 0\}$, we established that R_d is an equivalent relation and $R_d = R_{M_d}$. Secondly, we show that $(X, M_d, *)$ be a stationary fuzzy pseudo metric space and f be a natural map X onto the quotient set $X \mid R_{M_d}$. Then the fuzzy set $\widehat{M}$ on $X \mid R_{M_d} \times X \mid R_{M_d} \times (0, \infty)$ defined by $\widehat{M}(f(x), f(y), t) = M(x, y, t)$ is a stationary fuzzy metric space on the quotient set. Thirdly, we investigated that (X, d) is a fuzzy pseudo metric space then the function $f: (X, d) \to (X, d)$ is an isometric if and only if $f: (X, M_d, *) \to (X, M_d, *)$ is a $t-$isometric. Finally, we will show that $f : (X, M, *) \to (X, M, *)$ be a continuous function on a stationary fuzzy pseudo metric space then there exists a fuzzy pseudo metric space $(X, \widehat{M}, *)$ such that $\widehat{M}(x, y, t)$ is equivalent to $M(x, y, t)$ and $f: \widehat{M}(x, y, t) \to M(x, y, t)$ is uniformly continuous.

Keywords: *Continuous triangular norm, Fuzzy metric space, Fuzzy pseudo metric space, stationary fuzzy pseudo metric space, quotient topology, $t-$isometric.*

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Chromatic number based on incidence coloring for cycles

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Abstract. We present a comprehensive study on the incidence coloring of cycles, a fascinating class of graphs representing closed loops with vertices and edges. Incidence coloring expands traditional graph coloring by assigning colors to incidences while imposing some specific properties on consecutive incidences. In this research, we investigate the incidence chromatic number $\chi i(G)$ for cycles of various sizes, revealing patterns and complexities. We explore practical applications of incidence coloring in cycles, such as communication networks and resource allocation, with a focus on conflict avoidance in adjacent incidences. Furthermore, we propose novel techniques for determining $\chi i(G)$, drawing insights from previous research on star graphs. We have shown that the chromatic incidence number of a cycle is three when its order is a multiple of three which will significantly contribute to the field of incidence coloring, advancing knowledge on graph theory applications. The study of cycles provides valuable insights into graph interconnections and lays the groundwork for future investigations into incidence chromatic numbers for other graph classes.

Keywords: *Incidence coloring, Cycles, Incidence chromatic number, Graph theory, Graph coloring.*

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Linearizing invertible point transformation for a nonlinear second-order ordinary differential equation arising in epidemiology

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Abstract. We consider a nonlinear second-order ordinary differential equation (ODE) arising in the investigation of symmetry reduction of a system in epidemiology. We study for the existence of explicit linearizing invertible point transformation that linearizes the nonlinear ODE into free particle equation. Since the nonlinear ODE admits eight-dimensional Lie algebra of point symmetries, we show how one can use the Lie-Tresse linearization theorem to obtain such a linearizing point transformation. The obtained linearizing invertible transformation enables one to study the integrability and hence the physical phenomena described by the underlying nonlinear ODE in a simpler manner.

Keywords: *Linearization conditions, Nonlinear second-order ordinary differential equation, Lie point symmetries.*

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Yawning Detection And Prediction System for Driver Drowsiness using Residual Network

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Abstract. A yawning detection and prediction system for driver drowsiness is a sophisticated application that employs computer vision and machine learning algorithms to monitor a driver's yawning behavior and predict the onset of drowsiness. This proposed system aims to enhance road safety by providing timely alerts or interventions to prevent accidents caused by drowsy driving. There are three methods for detecting drowsiness such as behavioral technique, vehicle method, and the physiologically based method. This research focused on the behavioral technique in which the study of the driver's vital signs is used to determine if the driver is awake, exhausted, or drowsy. These crucial details are first gleaned from attributes including facial expressions, eye closure, yawning, head tilt, eye blindness, and nodding. This paper is proposed a novel system for yawning detection and prediction for driver drowsiness using residual networks. The images were collected from a binary dataset in the YawDD dataset which consists of yawning and no yawning images. We used 980 images for training and 420 for testing purposes. Since the images were seen at a range of sizes, rescaling of the images was considered. The selected images from the dataset were resized to 64×64. After the rescaling process, the images were subjected to data augmentation with the parameters of shearing, zooming, and flipping horizontally. The core innovation of ResNet lies in its use of residual blocks, which allow for the training of much deeper networks without suffering from the vanishing gradient problem. The proposed model showed an accuracy of 88.5%. This showed better accuracy rather than the LSTM, CNN and SVM existing methods. For improved model performance in the future, this model can be combined with a Speech Emotion Recognition model.

Keywords: *Driver Drowsiness, ResNet, and Yawning detection.*

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Constructing Holomorphic Type Functions of 3-D from Their Real Type or Imaginary Type Parts without the Cauchy-Riemann type Relations.

Gunasekara, Y. M. N. S.[1,*] and Thayamathy, P. J. N.[1]

Abstract. Based on the extended complex number system for three-dimensional complex type number, complex type valued holomorphic functions of a complex type variable are reconstructed from its real type or the imaginary type part or vice versa. Here, we show in general, how this may be accomplished by purely algebraic means. We provide several examples to validate the algebraic method.

Keywords: *Complex number type system, Cauchy-Riemann type formula, Holomorphic type function, Algebraic methods.*

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In vitro anti-inflammatory activity of Sri Lankan red Seaweed Gracilaria edulis

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Abstract. Marine seaweeds are a rich source of bioactive metabolites that exhibit several pharmacological properties including anti-diabetic, anti-inflammatory, and anti-cancer effects. The bioactive metabolites present in marine seaweeds have the ability to inhibit the activity of human pathogens including bacteria, viruses, and fungi. Therefore, the present study aimed to determine the *in vitro* anti-inflammatory activity of crude methanol extracts and its fractions of marine red seaweed *Gracilaria edulis*. De-polysaccharide polyphenol-rich methanol extracts of *Gracilaria edulis* were sequentially partitioned with hexane, chloroform, and ethyl acetate and obtained four fractions for further analysis. The anti-inflammatory activity of crude methanol extract and fractions were determined by the inhibition of protein denaturation and proteinase inhibition activity. Results showed that the hexane fraction of *G. edulis* (IC_{50}:0.175±0.006 mg/mL) exhibited a moderate level of inhibitory activity of protein denaturation in a concentration-dependent manner compared to the standard drug Aspirin (IC_{50}:0.15±0.001 mg/mL). The order of the inhibition of the extract was found to be hexane fraction>aqueous fraction>ethyl acetate fraction> chloroform fraction> crude methanol extract. Further, hexane (IC_{50}:0.648±0.030 mg/mL) and ethyl acetate fractions (IC_{50}: 0.661±0.032) of *G. edulis* exhibited moderate inhibitory activity of proteinase inhibition comparable to the standard drug aspirin (IC50:0.69±0.02) in a dose-dependent manner. Similarly, the percentage inhibition of proteinase activity was within the range of 10-50%. The results of the present study concluded that the hexane fraction of *Gracilaria edulis* exhibited moderate anti-inflammatory activity, which may be due to the presence of nonpolar compounds. Therefore, it is warranted to analyze the GC-MS profile to detect the compounds responsible for the anti-inflammatory activity of the hexane fraction of *Gracilaria edulis.*

Keywords: *Gracilaria edulis, anti-inflammatory, crude methanol extract, fractions.*

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Microplastic Abundance and its Relationship with Environmental Factors at Beaches Along Northern Sri Lanka

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Abstract. Sri Lankan beaches are affected by considerable pollution due to microplastics (MPs), which pose potential risks to the biota and the environment. The present study investigated MP pollution in beach sand and seawater at Mathagal, Point Pedro, and Charty Beach in the northern coastal belt and the relationship between environmental factors. Sampling was conducted at monthly intervals from August 2020 to January 2022. A wooden quadrate (0.25 m^2) was used to collect the sand sample, and a plankton mesh net (153 µm) was used to collect seawater samples. Density separation using saturated sodium solution and mechanical filtration were performed to extract MPs from beach sand and seawater, respectively. The extracted MPs were characterized according to size, shape, colour and polymer type. The studied environmental or source-related factors were population density, proximity to the city, beach usage, grain size, amount of macroplastic, wind speed, precipitation and water quality parameters. There was a statistically significant difference ($p<0.05$) found between the MP abundance in beach sand (11.06 ± 6.06 items/m^2) and seawater (1.40 ± 1.12 items/m^3). The white-coloured polyethylene MPs were abundant in both beach sand and seawater, and the predominant shapes of MPs in beach sand were fragments while films were predominant in seawater. The abundance of MPs in beach sand and seawater showed a significant relationship with density of population (Pearson correlation, $p<0.05$). There was no discernible relationship between the abundance of MPs and sediment grain size or the availability of larger plastic litter on the coast. There was no significant correlation found between water quality parameters (pH, dissolved oxygen, total dissolved solids, and electric conductivity) and the abundance of MPs in seawater (Pearson correlation, $p>0.05$), except for salinity and surface water temperature. This is the first case study regarding MP pollution on the northern coastal shore, and it is evident that the beaches have been contaminated with MPs. The potential results can serve as a fundamental source for making behavioural changes to mitigate MP pollution through education and awareness, beach cleanups, limited use of single use plastics, and the implementation of laws and policies to manage and conserve the resources.

Keywords: *Abundance, Correlation, Environmental factors, Microplastics, Pollution.*

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Domestic Dogs as Reservoir Hosts for *Leishmania donovani*: A Case from the Polonnaruwa District, Sri Lanka

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Abstract. With the increasing number of cases being reported, Leishmaniasis is becoming an emerging infectious disease in Sri Lanka. Conducting studies on sandflies and their reservoir hosts is crucial for understanding the geographical distribution and population dynamics of Leishmaniasis and for epidemic management. Domestic dogs have been identified as a primary reservoir host for *Leishmania infantum* in Asia and other parts of the world. However, this aspect has been limitedly studied in the Sri Lankan context. Therefore, the current study was conducted to determine whether domestic dogs in Polonnaruwa District are acting as reservoir hosts for *L. donovani*. Five high risk Medical Officer of Health (MOH) areas were selected for sampling and blood samples were collected from a total of 62 dogs. The collected blood samples were transported to the Molecular Biology Laboratory, Department of Zoology, Eastern University, Sri Lanka. DNA was extracted using blood and tissue ® DNA extraction kit (Qiagen, Germany), in accordance with the standard procedure. Conventional Polymerase Chain Reaction (PCR) was performed to identify *Leishmania* parasites in the dog blood. The PCR products were run in 1.5% agarose gel stained with 1× ethidium bromide and visualized in a gel documentation and analysis system. Among the 62 samples, *L. donovani* DNA were detected in one dog blood sample, highlighting the potential of dogs to act as reservoir hosts for Leishmaniasis. Effective surveillance, control measures, and awareness campaigns are essential to control the reservoir population and reduce the risk of transmission to humans. Continued research and collaborative efforts between public health authorities, veterinarians, and communities are necessary to combat this zoonotic disease and ensure public health.

Keywords: *Reservoir host, Domestic dogs, Leishmaniasis, Polonnaruwa District, Leishmania donovani.*

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An Anti-*Sitophilus oryzae* Bioactive Substance's Identification And Analysis From Plant Extracts

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Abstract. The majority of the drug industry's work involves the discovery and analysis of bioactive substances. Drugs derived from plants have more potential than those derived from chemicals. Some pesticide compounds are prohibited from importation into Sri Lanka. Therefore, it is more convenient to search for natural insecticides than synthetic chemicals. The pest known as *Sitophilus oryzae* ruins rice kept in storage.There are plenty of medicinal plants which act as therapeutic agents. Using conventional herbal remedies including *Lantana camera* (leaf), *Carica papaya* (seeds), *Ricinus communis* (leaves), *Calotropis giganta* (flowers), and *Gliricidia sepium* (leaves), and methanol as solvents (1:10 w: v), it has been achieved to identify plants' insecticidal properties. The best pesticide plant, among the selected plants, according to a one-week observation on mortality, was *Gliricidia sepium* (leaves). To display the results of the total experiment, which also included information on the control test, a survival analysis test was used. With the aid of a gradient solvent system, chromatographic separations were used to fractionate *Gliricidia sepium* leaf extracts. Overall, twelve fractions were gathered, and a mortality test took place to figure out the most bioactive fractions under lab environments. The potential anti-*Sitophilus oryzae* ability was demonstrated from fraction eleven. Continuously, instrumental analysis was used to describe and pinpoint a specific bioactive component. In accordance with the results of the FTIR analysis, four significant peaks were found, and they corresponded to the presence of the O-H bond, C-H bond stretching, -CH3 bending, and C-O stretching at frequencies of 3338.14cm^{-1}, 2939.41 cm^{-1}, 1411.59 cm^{-1}, and 1011.08 cm^{-1} respectively. Additional GC-MS analysis, when combined with NIST library data, revealed the potential structure and mass fragments of anti *Sitophilus oryzae*. Briefly, the mass to charge proportions for $[C_7H_3]^{11\cdot}$, $[C_7H_{11}O_3]^{3\cdot}$, and $[C_7H_8O]^{6\cdot}$ have been observed in the CG-MS spectrum at m/z 87.0000, 143.071, and 108.508 respectively. Finally, in my research, I found that 4-c-methyl-myo-inositol was the anti-*Sitophilus oryzae* drug responsible.

Keywords: *Gliricidia sepium, Sitiophilus oryzae, insecticidal activity.*

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Adsorption of heavy metals (Cu^{2+} & Cd^{2+}) from aqueous solutions by using the shell of "Sri Lankan wild mango" *(Mangifera zeylanica)* seed

Mudalige, N. I.[1,*], Arasaretnam, S.[1] and Premkumar, S.[1]

Abstract. The discharge of heavy metals, particularly Cadmium (Cd) and Copper (Cu), into water bodies due to industrial and agricultural activities is a significant global concern. Cadmium is highly toxic and poses serious threats to aquatic ecosystems and human health. Similarly, copper contamination from industries contribute to water pollution and raises concerns about food safety. This research investigates the adsorption efficiency of mango shell activated by NaOH to remove Cu(II) and Cd(II) from water. The study examines various factors influencing the adsorption process, including solution concentration, pH and adsorbent dose. pH was identified as a critical factor affecting the process, with maximum metals uptake recorded at pH of 6. Increasing the adsorbent dose also enhanced the removal efficiency of Cu(II) and Cd(II) ions, as it provided more active surface sites for binding. The optimal conditions for the highest adsorption efficiency were found to be pH 6 and a 200 mg/L solution for 1.0 g of adsorbent, resulting in 99.3% and 97.3% removal of Cu (II) and Cd (II) ions respectively. The Langmuir isotherm model was used to describe the adsorption behavior on solid surfaces and it demonstrated a better fit than the Freundlich model. This suggests a monolayer adsorption process for both ions on the mango shell activated by NaOH. Overall, this study highlights the potential of mango shell biomass as a promising adsorbent for the removal of toxic heavy metals from water, providing valuable insights for water treatment strategies and environmental protection.

Keywords: *Adsorption efficiency, Langmuir model, Freundlich model, Adsorbent.*

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Removal Of Cd(II) From Aqueous Solutions Using Activated "Pandan" *(Pandanus Amaryllifolius)* Leaves

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Abstract. Water contamination with heavy metal pollutants, such as Cadmium (Cd), poses significant threats to both the environment and human health. So innovative and cost-effective methods are needed for removing heavy metal pollutants from wastewater. This study investigates using activated pandan leaves (Pandanus amaryllifolius) as a biosorbent for Cd(II) adsorption from aqueous solutions. The preparation of activated pandan leaves involved a comprehensive methodology, including washing, drying, grinding, sieving, and acid & alkaline treatments to optimize their adsorption potential. Adsorption of Cd(II) onto activated pandan leaves was studied under varying conditions, such as different dosages, pH levels, initial concentrations, and contact times. The results reveal that higher dosages of the biosorbent lead to increased adsorption efficiency as the number of active sites increases. At lower pH, the concentration of H+ ions is higher, leading to increased competition with Cd(II) for available binding sites. As a result, the adsorption of Cd(II) onto the biosorbent may be hindered or reduced, with optimal removal achieved at a pH of approximately 7.0 Moreover, as the initial concentration of Cd(II) increased, the percentage removal of the metal ion decreased. The study also explored the adsorption kinetics using Langmuir and Freundlich isotherm models. The Langmuir model provided the best fit, suggesting monolayer adsorption onto a surface with a finite number of identical sites. The maximum adsorption capacity for Cd(II) onto activated pandan leaves was found to be 40.136 mg/g at pH 7.0. In conclusion, the study provides valuable insights for real-world applications. Future research can focus on enhancing the biosorption process on a larger scale.

Keywords: *Activated Pandan Leaves, Kinetics, Adsorption, Isotherm, Cadmium(II).*

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