

## Ramakrishna Memorial Award

Awarded for an exceptional research contribution of an original nature in the field of Inorganic and/or Analytical Chemistry and/or related areas such as Bio-inorganic Chemistry or Bio-analytical Chemistry.

### Ramakrishna Memorial Award - 2023



**Dr. Imalka Munaweera** is a Senior Lecturer at the Department of Chemistry, Faculty of Applied Sciences, University of Sri Jayewardenepura. She obtained her PhD from the University of Texas at Dallas, United States of America. She has completed her postdoctoral studies at the University of Texas Southwestern Medical School, United States of America. She has done her bachelor's honors degree in Chemistry from the University of Peradeniya and the Master of Philosophy degree from the University of Moratuwa. Before joining the University of Sri Jayewardenepura, she has served as an Assistant Professor at the Prairie View A&M University, Texas, United States of America.

With over 15 years of research experience in the field of nanotechnology, both in the industry and academia, she has made significant contributions to the field by applying the concepts of nanotechnology in drug delivery, pharmaceutical product development, agricultural product development and water purification systems. She has authored over 30 publications in indexed journals and she is an inventor of United States granted patents, international patents and Sri Lankan granted patents. She has been recognized for her contributions in many times. She has received the Young Scientist Award for Technology at the 9<sup>th</sup> Biennial Conference on Science and Technology (BICOST IX), Young Scientists Forum (YSF), National Science and Technology Commission (NASTEC), Sri Lanka in 2023. She is a winner of the Elsevier Foundation Award for Early-Career Women Scientists in the Developing World for her research in nanotechnology in 2021.

Further, Dr. Munaweera received the National Science and Technology Award in Sri Lanka in 2010 under the category of innovative advanced technologies with commercial potential, awarded by the H.E President of Sri Lanka.

### Abstract of Ramakrishna Memorial Award - 2023

## Prospects of engineered inorganic nanostructures in multidisciplinary applications

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Considerable interest is being exhibited in the novel and enhanced properties of inorganic nanostructured materials. Inorganic particles often exhibit novel physical properties as their size approaches nanometer scale dimensions. For many advanced and diverse applications ranging from chemical fertilizer to drug delivery current research is increasingly focused on exploiting the high surface area-to-volume ratios of inorganic nanomaterials

as a framework for the assembly of complex inorganic nanomaterials. Structures including functionalized inorganic nanoparticles and multicomponent hierarchical assemblies can exhibit enhanced properties and new functionality arising from the close proximity of chemically distinct nanostructured components.

This work highlights the rich variety of structures

and properties that can be realized in materials based on inorganic nanoparticles and points to outstanding fundamental questions raised in controlling their properties for various applications.

The design of inorganic nanostructures is used as one of the economically viable technological solutions that can make agrochemical use more efficient through reduced runoff, increased nutrient uptake and bioavailability, and decreased environmental impacts. Development of urea modified hydroxyapatite nanoparticles/nanocomposites for slow and sustained release of nutrients, urea modified nano-rock phosphate for fertilizer applications and layered double hydroxide bio-nanohybrids and ilmenite graphene oxide nanohybrids to minimize the postharvest loss are included under food and agricultural applications.

Nanotechnology plays an important role in this area by covering a broad range of nanostructured materials that possess inherent antibacterial activity. Development of such materials are widely used as active materials in edible coating to minimize the post-harvest loss sterilizing agents, and advanced dermatological/medical applications.

Drug delivery systems designed for enhanced drug

efficacy and reduced adverse effects have evolved accompanied by the development of novel materials. Inorganic nanomaterials have a wide array of physical and structural properties that make them attractive candidates for various therapeutic delivery. The development of novel targeted drug and radiation delivery systems with low dosage of chemo and radiotherapeutic agents such as holmium doped iron oxide combined with platinum drug molecules, holmium doped silica nanoparticles combined with platinum drug molecules, nitric oxide loaded amine mesoporous silica nanoparticles, and electrospun nanofiber membrane combined with holmium doped nanostructures as skin patches for skin cancer applications are included under nanotherapeutics.

Further, inorganic nanoparticles have also been widely acknowledged for effective water purification due to their adsorption, catalytic and/or antibacterial capabilities, as well as having a large number of surface sites. Development of functionalized activated carbon and metal doped fictionalized activated carbon for water purification and catalytic applications are included in this section.

Institute of Chemistry Ceylon  
**INDUCTION OF THE  
86<sup>TH</sup> PRESIDENT  
&  
ANNUAL DINNER 2023**

Friday, 30<sup>th</sup> June 2023  
6.15 PM onwards  
at the Golden Rose, 261, Maharagama Road, Boralesgamuwa

Kindly reserve your dinner ticket for Rs. 3000.00 on or before 25<sup>th</sup> June 2023 by contacting the persons given below. A limited number of tickets are available for Rs. 4000.00 after 25<sup>th</sup> of June.

Reservation: 1. Ms. Mithuni Jayasinghe - 0717381475  
2. Mr. Isiwara Ratnayake - 0764333676