RESEARCH@

URC E-NEWSLETTER

2023

IN THIS ISSUE

UNIVERSITY OF PERADENIYA

Peradeniya University Research Excellence Showcase 2023

PURES 2023

University Research Council
University of Peradeniya

Peradeniya University Research Excellence Showcase 2023

29,August 2023 at JRDC

The 2nd Peradeniya University Research Excellence Showcase was held on 29 August 2023 at the Joint Research and Demonstration Centre for Water Technology. The main purpose of this event was to showcase novel and cutting-edge research and locally developed solutions for national needs. Additionally, the top-tier researchers of the university were recognized. The Prof. Lakshman Samaranayake Award recipients and the Tier 4* researchers, based on the transparent research performance scheme stipulated in UGC Circular 05/2018, were presented at the award ceremony. Prof. Lakshman Samaranayake was present to give away a certificate and cash prize to the Prof. Lakshman Samaranayake Award recipients. The Vice-Chancellor and the Deputy Vice-Chancellor awarded a plaque and a certificate to Tier 4* researchers. The official website of the University Research Council was also launched during this event.

Leading researchers of the University of Peradeniya, key members of government organizations, company CEOs, and university research administrators participated in the event. In parallel to the award ceremony, an exhibition was held to showcase the research outputs of over 50 research projects covering the areas of agriculture and biological sciences, biomedical and health sciences, engineering and physical sciences, and intelligent systems and algorithms. A large gathering was present to witness these research showcases.

Prof. Lakshman Samaranayake Research Excellence Award 2022

Name	Faculty
Prof. Samath D. Dharmarathne	Faculty of Medicine
Prof. W.A.J.M. De Costa	Faculty of Agriculture

Prof. Samath D. Dharmarathne

Prof. W.A.J.M. De Costa

Prof. Lakshman Samaranayake Research Excellence Award 2023

Name	Faculty
Prof. K.B.S.N. Jinadasa	Faculty of Engineering
Prof. S.H.P.P. Karunarathne	Faculty of Science
Prof. B.S.M.S. Siriwardena	Faculty of Dental Sciences

Prof. K.B.S.N. Jinadasa

Prof. S.H.P.P. Karunaratne

Prof. B.S.M.S. Siriwardena

Tier 4* Researchers 2022

Name	Faculty
Dr.S.A.H.A. Suraweera	Faculty of Engineering
Prof. B.C. Jayawardana	Faculty of Agriculture
Prof. K.M.S. Wimalasiri	Faculty of Agriculture
Prof. D.N.B. Gunewardena	Faculty of Arts

Prof. B.C. Jayawardana

Prof. D.N.B. Gunewardena

Prof. K.M.S. Wimalasiri

Dr. S.A.H.A. Suraweera

Tier 4* Researchers 2023

Name	Faculty
Prof. P.H.P. Prasanna	Faculty of Agriculture
Prof. B.D.R. Prasantha	Faculty of Agriculture
Prof. M.P.B. Ekanayake	Faculty of Engineering
Prof. G.M.R.I. Godaliyadda	Faculty of Engineering
Prof. D.N. Uduwawala	Faculty of Engineering
Prof. P.B.R. Dissanayake	Faculty of Engineering
Prof. K.M.A.K. Kulathunga	Faculty of Engineering
Prof. B.S.M.S. Siriwardena	Faculty of Dental Sciences

Prof. P.H.P. Prasanna
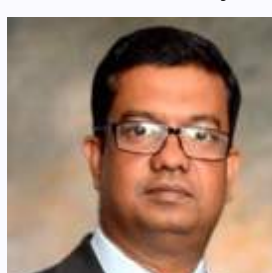
Prof. B.D.R. Prasantha

Prof. M.P.B. Ekanayake

Prof. G.M.R.I. Godaliyadda

Prof. D.N. Uduwawala

Prof. P.B.R. Dissanayake

Prof. K.M.A.K. Kulathunga

Prof. B.S.M.S. Siriwardena

From the Abstract Book………

IoT-based Medical Device for Management of Dengue Patients by Automatically Monitoring Urine Output

R. Ranaweera, J. Wijayakulasooriya, C. Rathnayake

The World Health Organization (WHO) estimates a staggering annual global incidence of 284 to 528 million dengue virus infections, resulting in a fatality rate of approximately 1%. Dengue poses a substantial public health challenge in Sri Lanka, with widespread prevalence. During the dengue outbreaks in Sri Lanka, the overwhelming influx of patients has strained hospital capacities, leading to difficulties in providing timely treatment. Monitoring patients' urine output holds paramount importance for effective medical intervention. Presently, this monitoring necessitates laborious and time-intensive manual measurements. This research undertook a pioneering investigation into the precise measurement of urinary output by utilizing a Negative Temperature Coefficient (NTC) thermistor sensor as the primary detection component. A sophisticated control circuitry was meticulously devised to discern urinary droplets impacting a disposable thermistor sensor. The circuit not only amplifies the voltage signal emitted by the sensor but also maintains the thermistor at a consistent temperature. The resultant voltage data is subjected to digitization and subsequently processed by a bespoke algorithm engineered to identify individual droplets accurately. The quantified droplet count is then converted into volume units, utilizing the known volume of a single droplet. This study not only addresses the pressing issue of labor-intensive urine collection in dengue patients but also possesses broader applicability in diverse scenarios requiring precise droplet detection.

Respirone Nano AV 99: A Revolutionary Face Mask for Enhanced Protection

R. M. G. Rajapakse , C. Herath , G.S. Thilakarathna , R. Jayakantha, C. Jayasinghe, F. Noordeen , N. Dissanayake , V. Liyanapathirana N. Samarasinghe, H. M. N. P. Gunarathna, M. A.U. Malikaramage, P.G.P.R. Abewardhana

The Respirone Nano AV 99, an inventive face mask developed by University of Peradeniya researchers in Sri Lanka, is a groundbreaking three-layered fabric design. Comprising 100% hydrophilic cotton, titanium dioxide (TiO2) nanoparticles, and zinc oxide (ZnO) nanoparticles, this mask's middle layer effectively utilizes TiO2 and ZnO nanoparticles to neutralize viruses and bacteria upon contact. The Respirone Nano AV 99's intelligent construction enhances wearer comfort and durability. The innermost cotton layer adeptly absorbs carbon dioxide and moisture, ensuring comfort during extended wear. Conversely, the mask's outermost layer employs a water-resistant material, fortifying it against external moisture. Testing has substantiated the efficacy of the Respirone Nano AV 99, showcasing its remarkable ability to neutralize up to 99.99% of viruses and bacteria. A distinctive attribute lies in its reusability, capable of up to 25 uses, bolstering sustainability. The mask is presently accessible in Sri Lanka and poised for international distribution. The advent of the Respirone Nano AV 99 signifies a transformative leap in respiratory protection. Although in developmental stages, its potential surpasses traditional face masks, presenting an eco-conscious and efficacious solution for safeguarding against respiratory ailments. The ongoing evolution of this technology is poised to redefine protective face coverings, amplifying global health security.

Keywords: *Respirone Nano AV 99, Face mask, Nanoparticles, Respiratory protection, Innovative design, Sustainability.*

Mosquitocidal Properties of Naturally Occurring Microbes of Dengue Vector Mosquitoes

W.M.S.H. Wijesundara, T.C. Weeraratne, M. Strand, W.A.P.P.de Silva

Dengue is a devastating mosquito-borne disease where *Aedes aegypti* and *Aedes albopictus* are the primary and secondary vectors. In the absence of effective treatment for dengue disease, controlling mosquito populations is crucial to managing the disease burden. Using symbiotic microbes in dengue mosquito control programs is an effective alternative to chemical insecticides. We characterized the microbial composition of *Aedes aegypti* and *Aedes albopictus* from different geographical areas in Sri Lanka to determine the effect of the naturally occurring mosquito microbiome on the fitness of the dengue vectors. Mosquito colonies of both dengue vectors were established under insectary conditions, and mosquito microbiomes from different breeding environments of dengue vectors were sampled and cultured. Morphological and molecular approaches were used to confirm the identity of isolated microbes. Gnotobiotic and larval bioassays were carried out to determine the effect of individual microbes on the survival of larvae and adults. The results suggest the effect of microbial composition on the fitness of dengue mosquitoes and the effect of isolated microbes on the growth and development of dengue mosquito larvae (0% egg hatching, 0% development of each instar level, and 0% pupation in the absence of microbes). The body morphology of adults, larval density, and conditions of microhabitats of larvae was correlated, and the results suggested that the body size variations of mosquito populations were independent of the physiochemical parameters of the breeding water but of the microbial composition. Two *Pseudomonas* strains, three *Enterobacter* strains, Two *Serratia* strains, a *Saccharomyces* strain, and *Citrobacter freundii* were identified with significant effects on the growth and development of dengue larvae. The *Pseudomonas mosselii* strain showed strong larvicidal properties with 90% larval mortality. We report the larvicidal properties of a naturally occurring *Pseudomonas mosselii* strain extracted from dengue vectors in Sri Lanka for the first time.

Keywords: Microbiome, Larvicide, Infectious diseases, Mosquito control, Breeding sites

Enhancing Students' Mental Calculation Skills through Mathematical Gaming Device Eligible for Children

T.L.A. Sasanjaya, E.A.T. Sewwandi, M.W.H. Kavindi , W.M.M.T.S. Weerakoon

In today's digital age, the widespread use of mobile phones and unrestricted access to the internet and mobile apps expose children to potential risks associated with inappropriate or harmful content. Despite efforts to implement parental controls, ensuring complete protection for children is challenging. To address this concern, the primary focus of this device lies in combining education and entertainment, ensuring that learning becomes an enjoyable experience designed to foster and refine students' mental calculation skills while maintaining a safe and controlled self-learning environment. This innovative device seeks to complement traditional teaching methods, offering an additional avenue for students to strengthen their mathematical foundation for future endeavors. This device offers games to empower students by providing an engaging platform to improve their numerical simplification and problem-solving abilities by offering instant feedback, enabling them to track their progress and monitor their performance. The significance of this device extends beyond the realm of education. Providing a secure, controlled environment safeguards children from potential exposure to harmful or inappropriate content that may be prevalent on mobile phones and the internet. This device enables Parents and educators can be convinced that their children are engaged in a productive self-learning environment. At the same time, students may confidently embark on their journey to mathematical brilliance, equipped with the skills.

Keywords: *Mental calculation skills, Innovative device, Progress tracking, Self-learning, Controlled environment, Enjoyable experience*

Efectiveness of aqueous extract of Ranwan Katu Karandu (*Barleria lupulina*) against some oral ulcer-causing bacteria

S.M. Haputhanthri, R.J. Gamage, M.F.F. Fazna, G. J. Panagoda

Over the years, medicinal plants have been used for various purposes for their antimicrobial properties. Due to the adverse effects of synthetic drugs, it has become necessary to analyze the efficacy of herbal products to develop safe, effective, and affordable antimicrobials. This study examined the effectiveness of the aqueous extract of Ranwan KatuKarandu (*Barleria lupulina*) against some oral ulcer-causing bacteria such as *Staphylococcus aureus and Pseudomonas aeruginosa*. An experimental laboratory study was conducted at the microbiology laboratory of the Faculty of Dental Sciences, University of Peradeniya, over 48 weeks. The crude extract of *B. lupulina* was prepared through freeze-drying extraction, and different concentrations of the aqueous extract were prepared by diluting it with distilled water. Through preliminary studies, 100,000 ppm concentration was selected as the suitable dilution. One standard isolate (NCTC-10662) and 23 clinical isolates of *S. aureus* and one standard isolate (HCTC-6571) and four clinical isolates of *P. aeruginosa* were tested against the plant extract using agar well diffusion assay on MHA plates using standard antibiotics as positive controls, Fusidic acid against *S. aureus* and Gentamicin against *P. aeruginosa.* Positive results were given against *S. aureus*, as 62.5% of the isolates showed clear inhibitory zones. *Pseudomonas aeruginosa* didn't provide any results. The descriptive statistics indicated that the mean diameter of the standard antibiotic (30.92 mm) was larger than that of the aqueous extract (11.72 mm). Further, the variability among the diameters observed in standard antibiotics was larger than in the aqueous extract. That indicates the specificity of the plant extract is higher compared to standard antibiotics. Therefore, Ranwan KatuKarandu extract can be used as a potential anti-staphylococcal agent, especially against *S. aureus.* The antibacterial activity of the aqueous extract of the plant is noteworthy for the treatment of oral ulcers caused by *Staphylococcus aureus.*

Keywords: *Barleria lupulina, Aqueous extract, Aral ulcers, Bacteria, Anti-microbial, Staphylococcus aureus, Pseudomonas aeruginosa.*

Classification and Analysis of Alzheimer's Disease Using Deep Learning on Neuroimaging Data

S. Subaramya, R. Nagulan, T. Kokul , U.A.J. Pinidiyaarachchi

Alzheimer's Disease (AD) is a progressive neurodegenerative disorder affecting the elderly and the leading cause of dementia without a known cure. Accurate and automated AD diagnosis through biomarkers remains a major challenge. This study proposes novel algorithms utilizing diffusion Magnetic Resonance Imaging (MRI), structural brain networks, and deep learning to detect AD and identify associated white matter changes in AD. Neurodegeneration in AD disrupts structural connections within the brain's networks. Diffusion MRI provides a noninvasive approach to creating structural brain networks. Deep Neural Networks have shown state-of-the-art outcomes in medical imaging, including AD detection, and enable interpretable analysis of classification decisions and discriminative white matter changes. It begins by generating comprehensive sets of weighted and unweighted structural brain networks for AD patients and healthy controls. An efficient Convolutional Neural Network (CNN) framework is developed to detect AD using structural brain networks accurately. Furthermore, Interpretable deep learning techniques were employed to analyze the CNN's classification choices and identify discriminative changes in white matter connectivity associated with AD. A distinct pattern was discovered, revealing significant white matter changes within the temporal/subcortical regions and between the temporal/subcortical regions and the frontal and parietal regions. An efficient CNN-based approach also investigates asymmetrical white matter changes in AD using left and right hemispherical brain networks. Interpreting the CNN's classification choices identifies discriminative asymmetrical changes, including distinct connectivity changes within the left and right hemispheres, pronounced changes primarily in the left hemisphere, and discriminative changes involving subcortical regions in both hemispheres. A Graph Neural Network (GNN) architecture is employed for AD detection, leveraging the natural graph representation of structural brain networks. GNNs capture intricate structural associations between brain regions, resulting in a reliable AD detection classifier outperforming previous approaches. These proposed techniques offer the potential for accurate and automated AD diagnosis, leading to earlier intervention, improved treatment outcomes, and enhanced understanding of the disease.

Keywords: *Alzheimer's Disease, CNN, Deep Learning, GNN, Structural Connectome*

Research Grants

Use of Digital Technology and Mobile Health (mHealth) to Improve Diagnosis, Assessments, Interventions, Management and Outcomes for Individuals with Down Syndrome Across the Lifespan

The last decade has seen an explosion of new technologies aimed at assessing and improving health. Examples include wearable devices, communication aids, robotics and e-textiles, just to name a few. During this period, there have also been enormous advances in technologies that were not created for health-related purposes, but that have potential applicability to health assessments and interventions, including mobile device applications ("apps") and social media platforms.

However, most of these technologies were originally developed for use in adults with typical cognitive and motor function. As a result, there is currently a relative paucity of valid and reliable technological tools for children and adults with intellectual and developmental disabilities (IDD) with a focus on Down syndrome (DS).

This Notice therefore invites applications specifically aimed at developing or building upon existing technological tools to improve diagnosis, assessments, interventions, management, and outcomes for infants, children, adolescents and adults with DS.

The INvestigation of Co-occurring conditions across the Lifespan to Understand Down syndromE (INCLUDE) Project was developed in response to Fiscal Year 2018, 2019, and 2020 Omnibus Appropriations Reports, which encouraged the NIH to expand its current efforts on DS and common co-occurring conditions also seen in the general population while increasing the pipeline of DS investigators. Information about projects that were funded from 2018 through 2020, as well as the INCLUDE Project Research Plan, is available on the INCLUDE Project website.

Closing date 16 November 2023
Country of applicant institution Unrestricted
Website https://grants.nih.gov/grants/guide/notice-files/NOT-OD-21-092.html

European Partnership for Responsible Minerals

EPRM seeks to improve local mining practices especially in artisanal and small-scale mining (ASM), bringing better social, environmental and economic conditions for mine workers and local mining communities. The mineral scope for this call for proposals includes tin, tantalum, tungsten, lithium, natural graphite, cobalt, copper and nickel. Gold will not be included in this call, having regard to EPRM's project-portfolio. Preferred projects will:

• Foster strong and sustainable links with formal supply chains;
• Have the potential for long-lasting impact in and around mines and mining communities and projects should be scalable;
• Demonstrate how to share costs of responsible sourcing and due diligence implementation between upstream, midstream and downstream actors;
• Improve gender equality;

- Address environmental risks and impacts of mining more broadly and/or focus on environmental due diligence.

Closing date 16 November 2023 (Forecast)
Award amount max €2,000,000
Country of applicant institution Unrestricted
Website The European Partnership for Responsible Minerals (europeanpartnership-responsibleminerals.eu)

USAID MEPPA People-to-People Partnership for Peace Fund Grants Activity

Congress enacted the Nita M. Lowey Middle East Partnership for Peace Act (MEPPA) in December 2020 to advance peaceful co-existence between Israelis and Palestinians and enable a sustainable two-state solution. Under the auspices of MEPPA, this Annual Program Statement (APS) is USAID's second solicitation issued under the parameters of USAID's People-to-People Partnership for Peace Fund Grant Activity. People-to-people peace-building programs advance reconciliation efforts by promoting greater understanding, mutual trust, and cooperation between communities. This APS seeks to engage people directly affected by the ongoing Israeli-Palestinian conflict, especially women and youth. Activities will encourage Israeli-Palestinian partnerships, including civil society initiatives and consortia, that address shared development challenges. Activities will encourage grassroots efforts that can build popular support for negotiations between the representatives of the parties to the Israeli-Palestinian conflict, with an eye toward advancing a sustainable agreement for lasting peace.

Closing date 17 November 2023
Award amount max USD 100,000 - 5,000,000
Country of applicant institution Unrestricted
Website View Opportunity | GRANTS.GOV

Army history research grants

The Australian Army invites applications for its army history research grants. These aim to encourage and support researchers to undertake substantially new research that provides new insights, understanding and information on an aspect of the Australian Army's history. Areas of research supported by the scheme include:

• operational research and battle studies;
• leadership and command;
• corps, division, brigade and unit histories;

• research on Australian army doctrine or the Australian army as an organisation;
• specific problems that have face the Australian army on one or more occasions;
• diversity within the Australian army;
• biographies of significant individuals that have contributed to the development of the Australian army as an organisation, or through doctrine or operations;
• social and cultural histories of or directly related to the Australian army;
• history of Australian army heritage.

Closing date 19 November 2023 (Forecast)
Award amount max AUD 45,000
Website Archived Grant Opportunity View - GO5265: GrantConnect (grants.gov.au)

Social science target research grants - tier 1 and 2

The World Anti-Doping Agency invites applications for its social science target research grants - tier 1 and 2. This supports research on the priority areas of the World Anti-Doping Agency. The priorities are:

• athlete pathway and athlete experience;
• clean sport behaviours;
• the role and influence of athlete support personnel;
• experience of athlete support personnel in anti-doping;
• people investment in anti-doping;
• effectiveness of anti-doping;
• WADA doping prevention model;
• anti-doping policy impact;
• sport policy;
• evolution of sport practices;
• horizon scanning;
• non-sport influences.

Tier 1 studies must provide an evidence base to inform international anti-doping policy and practice and facilitate international research exchange across academic disciplines. Tier 2 studies must contribute to programme or intervention development or improve at national level or within a single sport to support the prevention of doping.

The tier 1 category supports international studies of multi- or interdisciplinary teams in partnership with at least two anti-doping organisations with the endorsement of at least two additional ADOs. The tier 2 category supports national studies with multi- or interdisciplinary teams in partnership with at least one ADO and the endorsement of at least one additional ADO. They must have other sources of investment.

Closing date 21 November 2023 (Forecast)
Award amount max USD 20,000 - 150,000
Award amount max USD 150,000
Website Social Science Research | World Anti Doping Agency (wada-ama.org)

ERASMUS + GRANT

Up coming events!
Erasmus+ Grant writing and applying

- **Topics covered:**
  How to write winning proposals and How to   apply

- **Date:**
  05th October

- **Venue:**
  Will be notified soon

- **Resource persons:**
  Prof. Anoma Abeyrathne
            &
  Prof. S.B. Weerakoon

Research Publication Facilitation Fund
University Of Peradeniya

The new application for Research Publication Facilitation application is now available in **https://site.pdn.ac.lk/centers/urc**

According to the new process introduced for the reimbursement of Article processing charges, applicants can get prior approval for the payments before submission of the application. Upon receiving the approval for the APC from URC, usually through an email, submit the invoice for the payment of the APC, and the credit card statement to process the payment.

Note:

- Application is a fillable form, which you can fill using Adobe Acrobat Reader latest versions.
- Furnish all the details, sign the application, get the Head and the Dean to sign.
- Attach a copy of the complete manuscript and the acceptance letter.
- Only the full-length articles published in SCI/SSCI/SCI-expanded/SSCI-expanded with an impact factor of 2 or higher will be considered for Article Processing Charge (APC).

Special Note:

- The payment must be done by a permanent staff member of the University of Peradeniya.
- If two authors claim for the same article fill in two separate applications and send both applications together (Attaching one copy of the manuscript and the invoice is adequate). If one author paid for the APC, a consent letter from the second author should be submitted.
- Funding is subjected to availability of funds.

Research Publication Facilitation Fund [RPFF]
University of Peradeniya

The University Research Council [URC] is pleased to announce that it has initiated a scheme to provide financial assistance up to a maximum of USD 1000.00 per year for the researchers of University of Peradeniya to facilitate publishing their research findings in high-ranking peer reviewed journals.

Financial Assistance:
USD 500 per author up to a maximum of **USD 1000** per paper per year.

Eligibility Criteria:

The applicant should be a permanent staff member of the University of Peradeniya and one of the authors of the journal article.

The University of Peradeniya should have been identified as the sole affiliation or one of the affiliations. Journal articles which do not carry the University of Peradeniya as an affiliation are not eligible for funding.

The journal should be indexed in one of the following Web of Science indexes:
o   Science Citation Index Expanded (SCIE)
o   Social Sciences Citation Index (SSCI)
o   Arts & Humanities Citation Index (AHCI)

The impact factor of the journal should be 2 or higher

The corresponding author of the journal article should have used the institutional e-mail address (pdn.ac.lk or any variant)

None of the applicants should have used this facility within the current calendar year

The URC reserves the right to amend the eligibility criteria. The article processing charge will be reimbursed subject to the availability of funds.

Procedure:

The applicant should fill in an application form and submit the same to the Director, URC through the Head of the Department and the Dean of the Faculty along with the original copy of the receipt for the payment of page charges and a copy of the journal article. The article should have been published either online or printed with a valid DOI in the journal within the year of concern. The application can be downloaded from https://www.pdn.ac.lk/centers/urc/doc/Application%20For%20RPFF_URC_2021.pdf
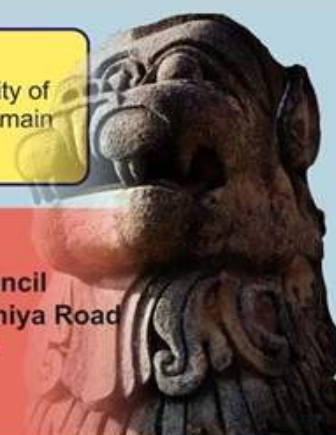
Important:
The author/s other than the corresponding author affiliated to the University of Peradeniya are encouraged to use the official e-mail address with pdn domain name provided by the University of Peradeniya.

more information

The Director
University Research Council
A6 Building, Udaperadeniya Road
University of Peradeniya
dirurc@gs.pdn.ac.lk

RESEARCH GRANT PROPOSAL WRITING

30th of October 2023

At 9.00 AM to 12.00 PM

Senate Room

More info : secretaryurc@gs.pdn.ac.lk

Organized by University Research Council University of Peradeniya in collaboration with 'nEUROcare project'

Prof. Martin Persson

Faculty of Health Sciences, Kristianstad University, Kristianstad, Sweden

Co-funded by the Erasmus+ Programme of the European Union

Reference number: 618596-EPP-1-2020-1-SE-EPPKA2-CBHE-JP
This publication [communication] reflects the views only of the authors, and the Commission cannot be held responsible for any use, which may be made of the information contained therein.

Watch workshops organized by University Research Council

Looking forward to your contributions to the October edition
Email:
secretaryurc@gs.pdn.ac.lk